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Final Environmental Impact Statement for the Mandan, Hidatsa, and Arikara Nation's Proposed Clean Fuels Refinery Project

Final Environmental Impact Statement for the Mandan, Hidatsa, and Arikara Nation's Proposed Clean Fuels Refinery Project

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Abstract

The Three Affiliated Tribes (TAT) representing the Mandan, Hidatsa, and Arikara Nation (MHA Nation) is a sovereign Indian nation with inherent powers of self-government. The MHA Nation has requested that United States Department of the Interior (DOI)-Bureau of Indian Affairs (BIA) accept 468.39 acres of land into trust status for the Tribes. This land is located within the Fort Berthold Indian Reservation boundaries. The land proposed to be taken into trust is located in the northeast corner of the Fort Berthold Indian Reservation along the south side of North Dakota Highway 23, about 2 miles west of the turnoff to Makoti, North Dakota in Sections 19 and 20 of Township 152 North, Range 87 West.

The MHA Nation proposes to construct and operate a new 13,000 barrel (bbl) of production per day clean fuels refinery and grow hay for buffalo on the Fort Berthold Indian Reservation located near Makoti, North Dakota. The MHA Nation would own the refinery. The proposed facility would refine synthetic crude oil from Canada into gasoline and diesel fuels. The MHA Nation has also applied to the U. S. Environmental Protection Agency (EPA) for a Clean Water Act (CWA), National Pollutant Discharge Elimination System (NPDES) wastewater discharge permit for the refinery. The refinery would be considered a "new source" under the NPDES permit regulations.

Preface

This document follows the format established in the National Environmental Policy Act's (NEPA) regulations (Title 40 Code of Federal Regulations (CFR) Parts 1500 to 1508). The following paragraphs outline information contained in the chapters and appendices so readers may find the areas of interest without having to read the entire document.

- **Summary:** contains a short, simple discussion to provide the reader and the decision makers with a sketch of the more important aspects of the Environmental Impact Statement (EIS). The reader can obtain additional, more detailed information from the text of the EIS.
- **Chapter 1** — Purpose and Need: identifies and describes the purpose of and need for the proposed action, decisions to be made by the agencies, their roles and responsibilities, the NEPA process, and other permits required.
- **Chapter 2** — Public Participation, Issue Identification, and Alternatives: describes the public participation process, including the scoping and issue identification processes, the Proposed Action, the significant or key issues associated with the Proposed Action, and alternatives, including the no action alternative. The agencies developed action alternatives that meet the purpose and need in response to one or more of the key issues. Alternatives considered but eliminated from detailed consideration are identified along with the rationale for excluding them from the analysis. This chapter also provides a comparative analysis of the environmental effects of the alternatives to provide a clear basis of choice among options for the decision maker and the public.
- **Chapter 3** — Affected Environment: describes the present condition of the environment that would be affected by implementation of the proposed action or any action alternative.
- **Chapter 4** — Environmental Consequences: describes the probable direct, indirect, and cumulative effects to the human environment that would result from implementing the Proposed Action or alternatives. The discussion also addresses the short-term uses versus long-term productivity, unavoidable impacts, and irreversible or irretrievable impacts. Mitigation measures for the proposed project are identified.
- **Chapter 5** — Consultation with Others: identifies the agencies, companies, and organizations consulted, as well as the cooperating agencies.
- **Chapter 6** — Preparers and Contributors: identifies the people involved in research for, writing, and internal review of the Draft EIS.
- **Chapter 7** — Distribution and Review of the Draft EIS: lists the agencies, organizations, and individuals who received a copy of the Draft EIS.
- **Chapter 8** — Glossary: describes the technical terms used in the Draft EIS.
- **Chapter 9** — References Cited: lists the references cited in the Draft EIS.
- **Index:** contains cross references and identifies the pages where key topics can be found.
- **Appendices:** contain technical and non-technical information that is important to full comprehension of the NEPA analysis, but that was too long to be included in the

primary chapters. Appendices D and E include new information developed since the Draft EIS (DEIS).

- **Technical Reports:** contain technical information associated with air emissions, hazardous waste, wetlands, water resources, etc. These reports are not in the Final EIS (FEIS); however, the reports are included on the CD-ROM enclosed with the FEIS document. The reports are also available online or upon request.

Acronyms and Abbreviations

23B	Williams-Zahl Loams (3–6% slopes)
24C	Williams-Zahl Loams (6–9% slopes)
24E	Zahl-Williams Loams
49B	Manning Sandy Loam
54E	Wabek Loam
AADT	Annual Average Daily Traffic
ABTU	Aggressive Biological Treatment Unit
AMSL	Above Mean Sea Level
API	American Petroleum Institute
APLIC	Avian Power Line Interaction Committee
AQRV	Air Quality Related Values
ATSDR	Agency for Toxic Substances and Disease Registry
BART	Best Available Retrofit Technology
bbl	Barrels
BIA	U.S. Department of Interior, Bureau of Indian Affairs
BMP	Best Management Practices
BoB	Bowbells-Tonka Loams
BPSD	barrels per stream day
C5+	Pentanes
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	Carbon Monoxide
C.P.R.	Canadian Pacific Railway
CWA	Clean Water Act
DAF	Dissolved Air Flotation
DEA	Diethanolamine
DEIS	Draft Environmental Impact Statement
DIB	Deisobutanizer
DOI	Department of the Interior
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
FAR	Federal Acquisition Regulations
FWS	U. S. Fish and Wildlife Service
gpm	gallons per minute
FEIS	Final Environmental Impact Statement
FIP	Federal Implementation Plan
FRP	Facility Response Plan
gpd	gallons per day
H_2S	Hydrogen Sulfide
HAPET	Habitat and Population Evaluation Team
HAP	Hazardous Air Pollutants
HC	Hydrocarbon
HF	Hamerly Loam
HMTA	Hazardous Materials Transportation Act
HWCP	Hazardous Waste Contingency Plan
HWMU	Hazardous Waste Management Unit
iC4	Isobutane
iC4=	Isobutylene
iC8	Iso-octane
iC8=	Iso-octene
IHS	Indian Health Services
IPCC	Intergovernmental Panel on Climate Control
IRA	Indian Reorganization Act of 1934
LP	Liquefied Petroleum
LQG	Large Quantity Generator
LTU	Land Treatment Unit
LW	Lostwood Wilderness
MCL	Maximum Contaminant Level
MDU	Montana Dakota Utilities
mg/L	milligrams per liter
MHA Nation	Mandan, Hidatsa, and Arikara Nation
MMSCFD	million standard cubic feet per day
MOU	Memorandum of Understanding
MStP &SSM	Minneapolis, St. Paul, and Sault Ste. Marie
MW	megawatt
NAAQS	National Ambient Air Quality Standards

nC4	Normal Butane
NDDH	North Dakota Department of Health
NDDOT	North Dakota Department of Transportation
NDSWC	North Dakota State Water Commission
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for HAPs
NH^3	Ammonia
NHT	Naphtha Hydrotreater
NO_2	Nitrogen Dioxide
NOI	Notice of Intent
NOx	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NSR	New Source Review
NWI	National Wetland Inventory
OBL	Obligate
ODEQ	Oregon Department of Environmental Quality
OSHA	Occupational Safety and Health Administration
PA	Parnell Silty Clay Loam
PCB	Polychlorinated Biphenyls
PGA	Peak Ground Acceleration
PLS	Pure Live Seed
$PM_{2.5}$	Particulate Matter less than 2.5 micrometers in diameter
PM_{10}	Particulate Matter less than 10 micrometers in diameter
PNA	Polynuclear Aromatics
PPR	Prairie Pothole Region
PSA	Pressure Swing Adsorption
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RfC	Chronic Reference Concentration
ROD	Record of Decision
ROW	Right-of-Way
SAR	Sodium Adsorption Ratio
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Officer
SMR	Steam Methane Reformer
SO_2	Sulfur Dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SQG	Small Quantity Generator
SRP	Sulfur Recovery Plant
SWPPP	Storm Water Pollution Prevention Plan
SWMU	Solid Waste Management Unit, RCRA definition
SWS	Sour Water Stripper
TAT	Three Affiliated Tribes
TDS	Total Dissolved Solids
TIH	Toxic-by-Inhalation
TMDL	Total Maximum Daily Load
TPO	Tribal Preservation Officer
TRNP	Theodore Roosevelt National Park
TSD	Treatment, Storage, and Disposal
UIC	Underground Injection Control
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
W1B	Williams Loam (4–6% slopes)
W1C	Williams Loam (3–6% slopes)
WRP	Water Recycle Plant
WWTP	Wastewater Treatment Plant
WWTU	Waste Water Treatment Unit, RCRA definition
ZmC	Zahl-Max Loams
$\mu g/m^3$	micrograms per cubic meter

Summary

The Three Affiliated Tribes (TAT) (Mandan, Hidatsa, and Arikara Nation [MHA Nation]) propose to construct and operate a new 13,000 barrels (bbl) per day clean fuels refinery and grow hay for buffalo on the Fort Berthold Indian Reservation (Reservation) located near Makoti, North Dakota. The MHA Nation would own the refinery. The proposed facility would refine synthetic crude oil from Canada into gasoline and diesel fuels.

On February 5, 2003, the MHA Nation voted to purchase the land for the proposed refinery and for additional forage crops. The MHA Nation purchased 468.39 acres to be used for economic development to benefit its members. The refinery would be sited on 190 acres of the property and the remaining agricultural acreage would be used to grow hay for buffalo on the Reservation. The buffalo would not be located at the site. The proposed location is in the northeast corner of the Reservation and Ward County. Following the purchase of the property, the MHA Nation requested that the United States Department of the Interior (DOI)-Bureau of Indian Affairs (BIA) accept the property into trust status. The MHA Nation has also applied to the United States Environmental Protection Agency (EPA) for a Clean Water Act (CWA) wastewater discharge permit for the refinery.

As a general matter, federal agencies, such as BIA and EPA, must comply with the National Environmental Policy Act (NEPA), including preparation of an environmental impact statement (EIS) before undertaking any major federal actions that may have a significant effect on the human environment. As Co-Lead agencies, the BIA and EPA have prepared this EIS to analyze the environmental impacts of the following federal decisions:

- Whether the BIA should accept the 468.39 acre parcel into trust for the purposes of the MHA Nation's proposal to construct and operate a clean fuels petroleum refinery and to produce buffalo forage;
- Whether EPA should issue a CWA National Pollutant Discharge Elimination System (NPDES) permit for the process water discharges associated with operation of the proposed refinery.

The MHA Nation is assisting with the preparation of the EIS as a Cooperating Sovereign Nation. The U.S. Army Corps of Engineers (USACE) is a cooperating agency in the preparation of the EIS. The USACE may also use the EIS in deciding whether to issue a Section 404 permit under the CWA for construction of the refinery. The purpose of this document is to inform the public and government agencies about the potential environmental impacts of the proposed project and alternatives. The EIS also includes mitigation measures and identifies the environmental regulations that would apply to the facility.

Summary — Alternatives Analyzed in the EIS

The EIS analyzes the combined environmental impact of the project proponent's proposed construction action (Alternative 1) and the proponent's proposed effluent discharge action (Alternative A). The remaining construction alternatives (Alternatives 2-5) and effluent discharge alternatives (Alternatives B, C & D) are discussed in comparison to the combined Alternatives 1 and A analysis for each resource area or issue analyzed in the EIS. The alternatives are summarized below:

Proponent's Proposed Actions

- Alternatives 1 and A referred to as the "Proposed Actions" include the MHA Nation's proposal that BIA accept the land into trust for the petroleum refinery and buffalo forage, and that EPA issue an NPDES permit for effluent discharges associated with operation of the refinery.

Construction Alternatives

- Alternative 2 – Accept the land into trust without construction of the proposed refinery;
- Alternative 3 – (DOI Preferred Alternative) Construction of the proposed refinery without accepting the land into trust;
- Alternative 4 – Modification of Alternative 1 proposal was developed to reduce impacts to wetlands and revise the design of the proposed refinery to reduce regulatory requirements under the Resource Conservation and Recovery Act (RCRA) (hazardous waste control law); and
- Alternative 5 – No action.

Effluent Discharge Alternatives

- Alternative A – (EPA Preferred Alternative) Discharge of effluent through an NPDES permit;
- Alternative B – Partial discharge of effluent through an NPDES permit and partial discharge of effluent through irrigation;
- Alternative C – Effluent discharge to an Underground Injection Control (UIC) Class I well; and;
- Alternative D – No action. Under this alternative, EPA would not issue any permits for the discharge of effluents from the proposed refinery.

Agencies' Preferred Alternatives

On the basis of the analysis documented in the EIS, the comments received during the public comment period on the DEIS, and other record documents, the DOI and EPA have selected preferred alternatives for the agencies' respective actions. It should be noted that the decision to build and operate the refinery rests with the MHA Nation.

DOI

The DOI[1] has identified its preferred alternative as Alternative 3. In Alternative 3, DOI would not place the land into trust status and the refinery could be constructed by the Tribes. DOI recommends that the design of the refinery, if constructed, be modified consistent with Alternative 4. The construction and operation of the proposed oil refinery does not depend on the land being held in trust by the United States.

[1] On April 3, 2008, the Assistant Secretary for Indian Affairs at the Department of Interior assumed the lead for the decision to approve or reject the Three Affiliated Tribes' application for placement of lands in trust for a clean fuels refinery. The application for placement of lands in trust was made to the BIA, Great Plain Region.

As discussed in this FEIS, it is anticipated that there would be spills and leaks of refinery products, and that over time it is expected that there would be some contamination of soil and ground water immediately underneath the refinery site. It is DOI policy to minimize the potential liability of the Department and its bureaus by acquiring real property that is not contaminated. See 602 Departmental Manual 2 (4). The Alternative that is most consistent with this policy is Alternative 3.

EPA

The MHA Nation will be deciding whether to build and operate the refinery. If the proposed refinery is constructed, EPA has identified its process water discharge preferred alternative as Alternative A, the issuance of an NPDES permit for effluent discharges associated with the refinery.

If the refinery is constructed, EPA recommends implementation of the modified refinery design as described under Alternative 4. Alternative 4 was developed to reduce impacts to wetlands and to utilize tanks instead of surface impoundments for wastewater collection and treatment. EPA also recommends that the mitigation measures developed for Alternative 4, including ground water monitoring and financial assurance, be implemented by the Tribes.

Upon completion of the wait period for this EIS, the Agencies will issue their final decisions. Each agency will prepare a Record of Decision (ROD), specifying the Agencies' respective decisions, the alternatives considered, and stating whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted or why such measures were not adopted. The RODs can be issued no sooner than 30 days following the publication of the Notice of Availability of the FEIS in the *Federal Register*.

Public Involvement and Areas of Concern

In September 2003, the MHA Nation held a series of informational meetings throughout the Reservation to describe the Tribes' Proposed Actions and answer questions. Formal scoping for the NEPA analysis of the proposed refinery began on November 7, 2003 with the publication of the Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. Comments and issues identified in the scoping process were compiled in a draft scoping report and made available to the public for review and comment on October 1, 2004. A public hearing was also held on November 9, 2004 to solicit public comment on the draft scoping report and any additional concerns regarding the environmental review of the proposed refinery.

On June 29, 2006, BIA and EPA announced the availability of the DEIS and the start of the public comment period. BIA and EPA held seven public hearings on the DEIS in Twin Buttes, White Shield, Parshall, Mandaree, New Town, and Makoti, North Dakota between July 31 and August 5, 2006. The public comment period closed on September 14, 2006. During the public comment period, BIA and EPA received 31 letters and 20 comment cards. Sixty-five people testified at the seven public hearings on the DEIS. Some of the main issues raised during the public comment period include concerns regarding: air quality, human health, environmental performance of the proposed refinery, funding for cleanup, and regulatory requirements for environmental monitoring and performance.

The Agencies response to comments is provided as Appendix E of the Final EIS (FEIS). Individual comment letters and public testimony are included in the FEIS on CD-ROM as Appendix F. Paper copies of the information are available upon request.

Environmental Issues Summary

This EIS analyzes the environmental impacts associated with the construction, operation and closure of the proposed MHA Nation refinery and production of buffalo forage. The EIS identifies the environmental impacts that are likely to occur as a result of the project. Mitigation measures have been developed, as described in the EIS, to reduce, control or eliminate many environmental impacts. The facility will also require several permits which will further limit environmental impacts.

The refinery construction alternatives, Alternatives 1, 3 and 4, would be combined with one or more of the wastewater disposal Alternatives A, B or C. Facilities that would be common to all of the refinery construction alternatives are: a tank farm to store synthetic crude and refinery products, the refining units, a loading area for trucks and railcars, a wastewater treatment plant (WWTP), fire water storage ponds, an administration building, a synthetic crude pipeline from the refinery site to an existing pipeline several miles north of the proposed site, natural gas pipeline and power line. With regard to the non-construction alternatives, Alternatives 2 and 5, the environmental impact would be the same as the existing conditions. The lands would remain in agricultural use.

The potential environmental impacts associated with the refinery are expected to vary depending upon the construction alternative selected for the refinery and the selected effluent discharge alternative. A brief discussion of the types of environmental impact is analyzed in the EIS is summarized below.

Ground water, Soils and Spills

- Ground water occurs beneath the refinery site. Ground water is in the underlying material called "till" which was deposited by glaciers in an approximately 100-foot thick layer. Ground water generally moves slowly in till layers due to low permeability. Depth to water in the till aquifer typically ranges from 5-15 feet. Ground water in the till appears to flow toward the southwest at about 0.4 to 2.4 ft/year. Ground water also occurs in the Ft. Union Formation, which underlies the till and the Fox Hills Formation which underlies the Ft. Union Formation.
- It is anticipated that there would be spills and leaks at the proposed refinery facility. Almost all refineries and other petrochemical facilities such as gas stations eventually have spills and leaks. The majority of spills and leaks would be completely contained within the facility and would not impact the environment. However, over time, it is expected that there would be some contamination of soils and ground water immediately underneath the refinery site due to leaks and spills. The contamination would remain generally within the refinery site unless a major spill occurred or a series of spills and leaks occurred over time.
- Areas within the refinery storing synthetic crude or refinery products would be required to be lined and have secondary containment (e.g., berms) to hold the entire contents of storage tanks. Areas with a high potential for spills such as the loading area for trucks and railcars would also be paved and curbed which should contain most spills.

- Due to the shallow depths to water, ground water resources in proximity to the refinery could be affected by leaks and spills. Adverse impacts to ground water withdrawn by individual well users and public supply systems are not anticipated, except for the well that was at the existing farmhouse. Since the DEIS was published, that well has been decommissioned. Other individual wells are not anticipated to be impacted because of the relatively low permeability of the till underlying the refinery site. The next closest farmstead is 1/3 of a mile from the proposed refinery site.
- Communities in the area such as Makoti and Plaza located three and five miles from the proposed refinery, respectively, use ground water as a source of drinking water. However, these communities use either the Fox Hills-Hell Creek or buried valley aquifers. Water quality in these aquifers are not expected to be impacted by the proposed facility because the buried valley aquifers do not occur in the vicinity of the refinery and the depth to the top of the Fox Hills –Hell Creek aquifer is more than 1,000 feet beneath the proposed refinery location. If the alternative for wastewater disposal through an underground injection well is selected (Alternative C), the injection zone would be required to be below any aquifer that could be used for drinking water.
- Water supply for the refinery would be from a combination of sources including the Fox Hills-Hell Creek aquifer, recycled water from the refinery and run-off collected from the site. If the refinery uses the Fox Hills-Hell Creek aquifer for the majority of its water supply, there may be localized draw down in the aquifer.

Surface Water

- The site is located in the headwaters of a small unnamed tributary of the East Fork of Shell Creek which is tributary to Lake Sakakawea. With regard to effluent discharge Alternatives A and B, stormwater and treated wastewater from the refinery would be discharged at the surface. For Alternative C, only stormwater would be discharged at the surface and process water would be discharged through an underground injection well.
- The proposed refinery construction alternatives would need surface water discharge permits (NPDES) for stormwater discharges and depending on the effluent discharge alternative selected, for wastewater discharges. EPA will be using this EIS to assess the environmental impact of EPA's future decision to issue or not issue a surface water discharge permit to the proposed refinery. Treated wastewater discharges from the facility would cause minor changes in existing water quality. The proposed NPDES permit would require that wastewater discharges be protective of aquatic life, drinking water, agriculture and wildlife uses. No NPDES permits would be needed for the non-construction alternatives and water quality would remain the same as existing conditions.
- Construction and operation of the proposed refinery would change the quantity and flow pattern of the drainage from the site. The paving/hardening of the refinery site would increase runoff and reduce infiltration. If the refinery collects most of the runoff for use as water supply, there would be less water flow from the site for the majority of storm events.

Solid and Hazardous Waste

- The proposed refinery would operate as a large quantity generator (LQG) of hazardous waste under the Resource Conservation Recovery Act (RCRA). The facility, through the RCRA generator regulations, would be required to transport the waste to approved hazardous waste facilities for the treatment and disposal of the waste. Many of the waste streams from refineries are specifically listed under the RCRA regulations as hazardous wastes.
- All refinery construction alternatives, except for the combination of Alternatives 4 and A, could also be a Treatment Storage and Disposal (TSD) Facility under RCRA. The facility would likely or potentially need to obtain a TSD permit from EPA for any of these alternatives. The TSD permit includes requirements for monitoring, financial assurance, inspections and facility closure plans.
- With regard to solid waste, the facility would be required to comply with EPA "Criteria for Classification of Solid Waste Disposal Facilities and Practices" at 40 Code of Federal Regulations (CFR) Part 257, as appropriate.

Vegetation, Wetlands

- The portion of the site that would be used for the proposed refinery would be changed from an agricultural to industrial use.
- Both jurisdictional and non-jurisdictional wetlands exist on the proposed refinery site. Jurisdictional wetlands are those wetlands which are considered to be waters of the U.S. for purposes of the CWA. Non-jurisdictional wetlands are waters that are not subject to CWA jurisdiction.
- The USACE determined one wetland, which covers 11.7 acres in the northwest corner of the site, to be subject to CWA jurisdiction. According to the initial site plan (Alternative 1), 0.5 acres of the jurisdictional wetland would be filled by the proposed refinery. An alternative site plan (Alternative 4) has been developed in part to reduce filling of jurisdictional wetlands to 0.1 acres. A CWA Section 404 permit for the discharge of dredged or fill material would be needed from the USACE prior to construction.
- The jurisdictional wetland would be impacted by the proposed refinery. Changes in the quality and quantity of water flowing into this wetland would change the hydrology and vegetation in the wetland.
- Non-jurisdictional wetlands would also be impacted during construction of the refinery.
- Any filling of wetlands would be mitigated by the creation or restoration of additional wetlands.

Wildlife, Threatened and Endangered Species

- The United States Fish and Wildlife Service (FWS) expressed concerns about potential effects to the threatened piping plover and endangered whooping cranes from landing on open water areas in the refinery wastewater treatment facilities or colliding with overhead power lines. Mitigation measures have been developed to discourage birds from using ponds within the refinery site, including adding netting to prevent birds from landing in open tanks or ponds with oily wastewater and placing cobbles on the side slopes of the constructed ponds to discourage plovers from nesting. Electrical transmission lines would be constructed to minimize collision and electrocution risks to birds

Transportation

- The refinery would increase traffic on local roads and on the rail line. With the shipment of refinery products, there would be an increased probability of petroleum products spills along the pipeline corridor, transportation corridors and the rail line.

Air Quality

- Air emissions from the refinery would be minor. Potential air emissions have been modeled; demonstrating that the proposed facility would not cause any exceedances of the National Ambient Air Quality Standards (NAAQS) or Prevention of Significant Deterioration (PSD) increments. At this time, EPA has determined that no Clean Air Act (CAA) PSD pre-construction permit would be required for the facility because the total quantity of air pollutants emitted throughout the year by the refinery are less than the regulatory threshold. The requirement for the refinery to apply for an operating permit within 12 months of commencing operation was triggered by the promulgation of News Source Performance Standards -- 40 CFR Part 60, Subpart GGGa on November 16, 2007.

Human Health

- With proper operation of the refinery, potential impacts to human health are anticipated to be negligible to the general public. Pollutants or materials which would be of concern to public health would be contained within the refinery, treated to nontoxic levels or disposed of at approved hazardous waste facilities.
- During the operation of the proposed clean fuels refinery, releases of various chemicals and hazardous materials during refinery operations are the most significant concern for impacts to human health. Transporting, handling, storing, and disposing of chemicals and hazardous materials inherently pose a risk of a release to soil, ground water, air, surface water, and sediment. Numerous regulatory programs would be implemented at the proposed facility to prevent or control potential releases such as the emergency response planning, oil spill response planning and containment measures, NPDES permits, RCRA, and Occupational Safety and Health Administration (OSHA) requirements.
- In the remote event of a catastrophic spill or fire, there could be emissions from the facility that would be of concern to public health in the immediate area of the refinery; however, there are currently no residences or businesses located in the immediate area of the refinery site that would remain occupied once refinery operations commenced.
- The air modeling analyses show that the potential impacts of hazardous air pollutants (HAP) would be below levels of concern to human health through both direct inhalation and food chain pathways outside of the proposed refinery site process area.
- Epidemiological and toxicological studies, as discussed in Chapter 4 of the EIS, did not observe any increases in health effects for people living near petroleum refineries. One

occupational health study observed increased rates for one type of cancer for workers in the petrochemical industry.

Environmental Justice, Socioeconomics

- EJ concerns that are raised in the EIS include many of the issues addressed above, such as air pollution emissions, discharge of pollutants into surface waters and ground water, and hazardous waste generation. The EIS also addresses socioeconomic effects of constructing and operating a new refinery.
- Economic benefits associated with the refinery could increase the quality of life for members of the MHA Nation. However, negative effects to the quality of life could be experienced by the communities surrounding the facility due to increases in highway traffic, noise, and light pollution during construction and operation of the facility.

Major Revisions to the EIS

This section lists the major revisions to the EIS. For more information regarding additional changes to the FEIS, please see the response to comments in Appendix E.

- Identification of the “preferred” alternatives.
- Revised information on air quality impacts and additional information regarding New Source Performance Standards (NSPS) requirements. See the revised sections on Air Quality in Chapters 3 and 4 and the revised air technical report available on the enclosed CD-ROM, on the FEIS website, or upon request. Please also see the information on air in the response to comments (Appendix E).
- Additional human health information analyzed regarding potential impacts from petroleum refineries and human health in general project area. See the revised section on Human Health in Chapter 4, Agency for Toxic Substances and Disease Registry (ATSDR) correspondence in Appendix D and the ATSDR and Qualitative and Quantitative Human Health Risk Assessment Technical Reports. Please also see the information on human health in the response to comments (Appendix E).
- Revised EJ Analysis, 2007 technical report available on the FEIS CD-ROM, EPA’s website, or upon request.

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Appendices

A Overview of Petroleum Refining (on CD-ROM only)

B Wetland Analysis (on CD-ROM only)

C Draft NPDES Permit and Fact Sheet

D Correspondence: Financial Assurance Letters, Ground Water Monitoring, ATSDR, etc.

E Response to Comments

F Comment Letters, Comment Cards & Public Hearing Transcripts (on CD-ROM only)

Technical Reports – Listed after appendices (on CD-ROM only)

Chapter 1 — Purpose and Need

On February 5, 2003; the Three Affiliated Tribes (TAT) (Mandan, Hidatsa, Arikara Nation [MHA Nation]) voted to purchase three tracts of land on the Fort Berthold Indian Reservation in North Dakota. These tracts, which are in the northeast corner of the Reservation and in Ward County (Figure 1-1) include:

- the NW ¼ of Section 20, Township 152 North, Range 87 West (Tract 1);
- the North ½ of Section 19, Township 152 North, Range 87 West (Tract 2); and
- Outlot 1 in the NE ¼ of Section 19, Township 152 North, Range 87 West (Tract 3).

Taken together as a single parcel, these tracts encompass 468.39 acres after existing easements are considered. Following the purchase, the MHA Nation requested that United States Department of the Interior (DOI)-Bureau of Indian Affairs (BIA) accept the tracts into trust status (Resolution 03–020 dated March 17, 2003). The Indian Reorganization Act of 1934 (IRA) authorizes the Secretary of the Interior to hold land for Indian Tribes and individual Indians in trust.

The MHA Nation proposes to construct, operate, and maintain a clean fuels refinery on 190 acres of the 468.39-acre parcel. The MHA Nation would own the refinery. The MHA Nation would grow hay on the remaining acreage. This would reduce the costs of purchasing hay for buffalo from other sources.

1.1 Purpose and Need for the Proposed Action

The purpose to which the federal agencies are responding is the MHA Nation's proposal that BIA accept 468.39 acres of fee land into trust for the purposes of constructing and operating a clean fuels petroleum refinery and producing buffalo forage on the Fort Berthold Indian Reservation. The need is to facilitate Tribal self-determination and economic development. The BIA, the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE) each have federal agency decisions to make based upon this EIS. BIA will decide whether to approve the Tribes' request that BIA accept the 468.39 acres of land into trust for the purposes of constructing and operating the clean fuels refinery and for producing buffalo forage. EPA will decide whether to approve the Tribes' application for a Clean Water Act (CWA) NPDES permit for process water discharges associated with operation of the proposed refinery. USACE will decide whether to issue a CWA Section 404 permit for the discharge of dredge and fill materials into waters of the United States (U.S.), associated with the construction of the proposed refinery.

1.2 NEPA Process and Decision Making

As a general matter, Federal agencies, such as BIA and EPA, must comply with the NEPA before approving any major federal actions that may have a significant effect on the human environment. BIA's decision on the MHA Nation's request that BIA accept the lands into trust for purposes of the proposed project and EPA's issuance of a new source NPDES permit constitute such major federal actions. BIA is the federal agency with the primary responsibility for administering trust lands and, as such, it must ensure the NEPA process is conducted for MHA Nation's request to accept the tracts into trust status.

As the initial lead federal agency for conducting the NEPA analysis, BIA invited others to participate in the NEPA process. After reviewing the MHA Nation's proposal, jurisdictional concerns, and potential effects, BIA invited the EPA, FWS, Indian Health Services (IHS), USACE and the MHA Nation to participate in the NEPA analysis.

EPA initially decided to participate as a cooperating agency because of its authority for permitting specific aspects of the clean fuels refinery project. As the process moved forward, BIA asked EPA to reconsider and become a joint lead. EPA directly implements its federal environmental protection programs on the Fort Berthold Indian Reservation. Under the CWA, EPA has the authority to issue an NPDES permit to the facility for the process water discharges from the operation of the refinery. The MHA Nation has submitted an NPDES permit application to EPA for the process water discharges. EPA's issuance of the NPDES surface discharge permit to this facility is a "major federal action significantly affecting the quality of the human environment." Since EPA has determined the facility is a "new source" under the CWA, EPA's issuance of the NPDES permit for a new source discharging process water invokes NEPA. In addition to the NPDES process water permit, EPA also has the authority to issue any applicable stormwater permits to the facility for stormwater construction and operation discharges into waters of the United States (U.S.).

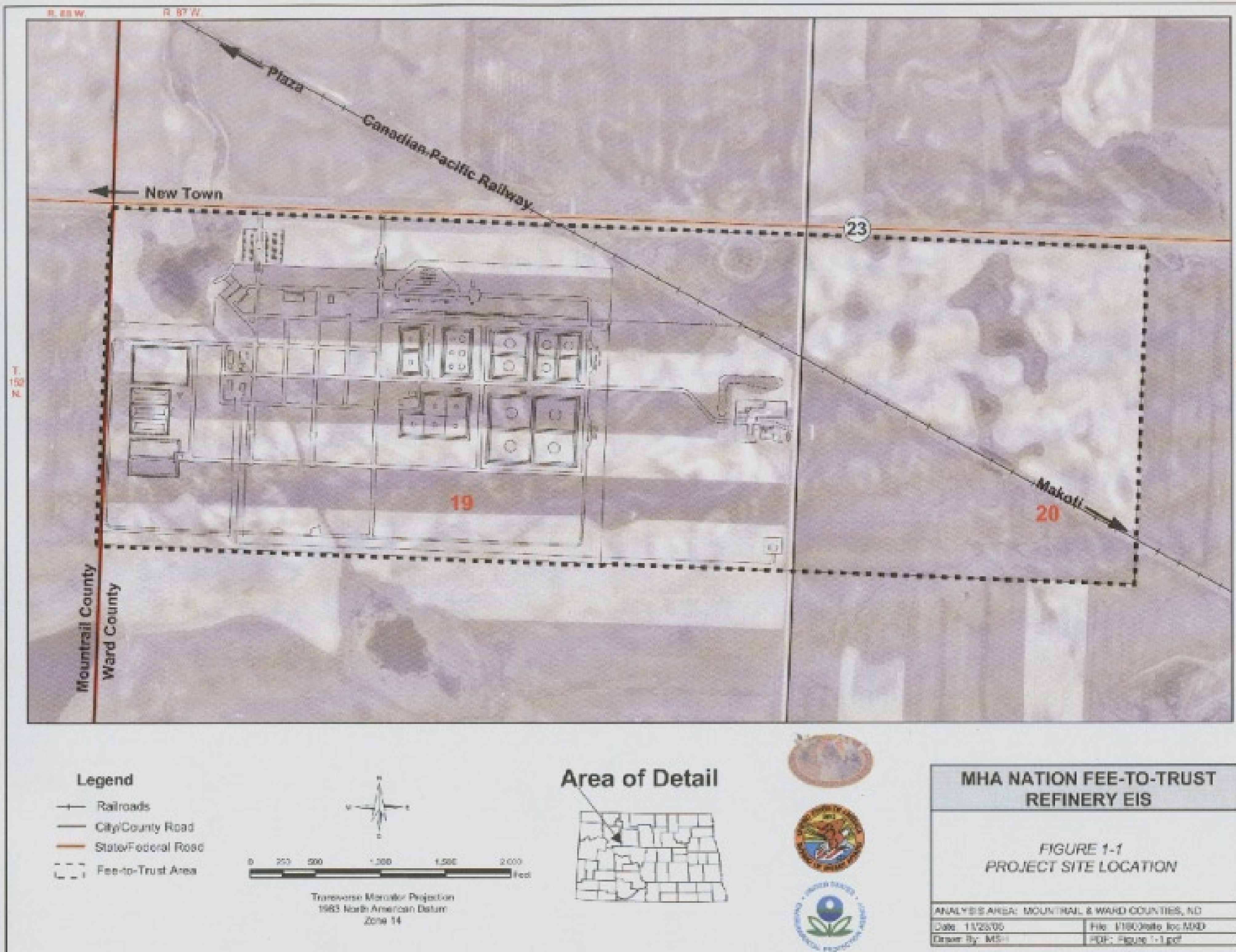
Under the Clean Air Act (CAA), EPA is responsible for permitting major sources of air pollution. However, at this time EPA has determined that the facility does not require a CAA Prevention of Significant Deterioration (PSD) permit for construction of a new major source of air pollution or a CAA Part 71 permit to regulate air emissions while the refinery is operating. Some units of the refinery would however be subject to NSPS under the CAA.

EPA has determined EPA's Underground Injection Control (UIC) program would apply to the refinery and an UIC permit would be needed if the refinery uses a septic system and leach field. Depending upon how wastewater would be discharged from the facility, the refinery may need a Class I UIC permit. The drinking (potable) water system at the facility would be considered a public water system and would be regulated by EPA under the Safe Drinking Water Act (SDWA). Depending on whether the facility uses underground storage tanks subject to the Underground Storage Tank (UST) requirements, the refinery may be regulated by EPA under the UST requirements.

Depending on how hazardous wastes will be handled and stored at the proposed facility, the refinery may need a RCRA hazardous waste permit from EPA (Treatment Storage and Disposal permit). All alternatives, except 4 and A would need this RCRA permit. The potential hazardous waste permit and the UIC permits do not invoke NEPA for EPA; however, information about the permit programs is included in the EIS.

BIA asked the MHA Nation to participate as a cooperating sovereign nation because of its local expertise and unique status. The MHA Nation has specific expertise in several areas that are important to the NEPA analysis, including cultural resources and socioeconomics. Additionally, the MHA Nation is a sovereign nation with which BIA and EPA have a federal trust relationship.

BIA asked the FWS to participate as a cooperating agency. While the FWS declined to participate as a cooperating agency, the FWS did agree to provide information and data where it could and review documents. BIA and EPA determined whether the actions they authorize, fund or carry out in connection with this project may affect federally listed threatened or endangered species or the designated critical habitat of such species. BIA and EPA determined that actions will either have no effect or may affect but will not adversely affect such species or critical habitat in consultation with the FWS as appropriate under the Endanged Species Act (ESA).


R. 88 W.
R. 87 W.
Plaza
Canadian-Pacific Railway
New Town
23
19
20
Makoti
T. 152 N.
T. 152 N.
Mountrail County
Ward County
Legend
Railroads
City/County Road
State/Federal Road
Fee-to-Trust Area
0 250 500 1,000 1,500 2,000 Feet
Transverse Mercator Projection
1983 North American Datum
Zone 14
Area of Detail
MHA NATION FEE-TO-TRUST
REFINERY EIS
FIGURE 1-1
PROJECT SITE LOCATION
ANALYSIS AREA: MOUNTRAIL & WARD COUNTIES, ND
Date: 11/25/05
File: I/1800/site loc.MXD
Drawn By: MSH
PDF: Figure 1-1.pdf

In response to the comments submitted on the October 1, 2004 draft version of the EIS scoping report, BIA asked IHS to participate in the NEPA process as a cooperating agency. IHS declined to participate as a cooperating agency. While IHS declined participating as a cooperating agency, it did agree to provide information and data where it could and review documents.

BIA asked the USACE to participate as a cooperating agency because of its authority under the CWA for permitting the discharge of dredged or fill material into all waters of the U.S., including wetlands. USACE has determined a wetlands swale and wetlands on the northwestern boundary of the project site are waters of the U.S. subject to USACE regulatory authority under CWA Section 404. The proposed project may include dredge and fill of the wetlands swale. With this determination, the MHA Nation would have to obtain a CWA Section 404 permit from USACE before any dredging and filling of the wetlands swale could occur. No dredge or fill activities are proposed for the wetlands located on the northwestern boundary of the project area.

BIA, EPA, USACE, and the MHA Nation entered into an agreement (Memorandum of Understanding [MOU]) to facilitate completion of the NEPA process and preparation of the EIS. This MOU defines each party's roles and responsibilities for preparing documents, reviewing documents, and coordinating decision making with regard to the EIS. Ultimately, both BIA and EPA intend to make decisions about the MHA Nation's proposal using the results of the NEPA analysis.

This document provides BIA and EPA with information upon which to base final decisions that consider factors relevant to the proposal. Scoping issues and concerns raised by the public and agencies drove the development of alternatives and the focus of the EIS. This EIS documents (1) the analysis of effects on human health and the environment that could result from implementation of the proposed action or alternatives to that action and (2) the development of environmental protection measures needed to reduce or eliminate environmental consequences.

Finally, this EIS is not a decision document. It discloses the process used to analyze the potential environmental consequences of implementing the proposal and alternatives to the proposed action. BIA's and EPA's decision about the proposed project will be contained in separate ROD.

1.3 Decisions to be Made Based on this NEPA Analysis

As noted above, BIA, EPA, and USACE will make separate decisions based on this NEPA analysis. BIA's decision will be documented in a ROD signed by the, Assistant Secretary of Indian Affairs, Department of Interior. The ROD will indicate any mitigation measures enforceable by BIA that need to be adopted. The BIA will consider the ROD when deciding whether to accept the 468.39 acres into trust status for the MHA Nation. In addition to the ROD, the Secretary of the Interior, or designee, must consider the existence of statutory authority, need for the additional land, purpose for the land, the impact on the State and its political subdivisions resulting from the removal of the land from the tax rolls, jurisdictional problems and potential conflicts of land use that may arise, and whether BIA is equipped to discharge the additional responsibilities resulting from acquisition of the land in trust status (25 CFR Section 151.10). The ROD and the decision on the MHA Nation's request to accept land in trust will be final for the DOI; because the Assistant Secretary – Indian Affairs will be making the determination. In the Draft EIS (DEIS), the decision was to be made by BIA with appeal rights as mandated in 25 CFR Part 2.

EPA's decision whether to issue the NPDES process water permit for the refinery will be documented in a ROD signed by EPA Region 8's Regional Administrator. EPA will issue any applicable permits for storm water (construction) and UIC and may issue a permit for RCRA hazardous waste. Permits typically delineate the maximum allowable emissions or discharges of pollution from the regulated facility, monitoring, recordkeeping, reporting, and pollution control/mitigation requirements. 40 CFR 124.19 sets forth the permit appeal process for NPDES, RCRA and UIC permits.

The USACE will use this EIS in determining whether to issue any necessary CWA Section 404 permits for the discharge of dredged or fill material into waters of the U.S., including wetlands. The USACE will issue any such permits only after compliance with the USACE regulations (33 CFR Part 320 et seq) and the CWA 404(b)(1) Guidelines (40 C.*Federal Register* 230, et seq). 33 CFR Part 331 sets forth the CWA Section 404 permit appeal process.

1.4 Authorizing Actions

A variety of permitting actions would be required to implement any of the action alternatives. Table 1–1 lists the major permits, approvals, and consultations that may be required for the acceptance of land into trust in support of the proposed refinery or which may be required at some time in the future. The list is subject to change, depending on requirements for any alternative selected by the decision makers.

Table 1-1 Major Permits, Approvals, and Consultations Potentially Required for the Clean Fuels Refinery Project

Issuing Agency/Permit Approval Name	Nature of Regulatory Action	Applicable Project Component
Federal Permits, Approvals, and Authorizing Actions		
U.S. Bureau of Indian Affairs		
Indian Reorganization Act of 1934.	Authorizes the Secretary of the Interior to hold land for Indian Tribes and individual Indians in trust.	The 468.39-acre parcel in Sections 19 and 20 of Township 52 North, Range 87 West after considering existing easements.
U.S. Environmental Protection Agency		
Clean Air Act – New Source Review (NSR) Preconstruction Air Permit.	Controls emissions from new or modified sources.	Sources of air emissions (excluding air toxic pollutants listed under Section 112) that emit 100 tons/year or more, if the source belongs to a list of 28 specific categories, or any other source type which emits 250 tons/year or more.
Clean Air Act – Title V Operating Permit.	CAA requires all major sources of air emissions to obtain a permit that applies to day-to-day operation of the facility.	Sources of air emissions that emit 100 tons/year or more of a criteria pollutant, or 10 tons/year of an HAP, or more than 25 tons/year of any combination of hazardous pollutants.
Clean Air Act –New Source Performance Standards (NSPS)	CAA requires new and modified industrial facilities to comply with performance standards for certain stationary sources of air emissions.	Stationary sources regulated under the NSPS include: flares, boilers, refinery fuel gas combustion units, storage tanks, seals, valves, drains, etc. NSPS requirements typically include testing, monitoring and recordkeeping.
Clean Water Act – National Pollutant Discharge Elimination System – Permit for Point Source Discharges – Process Water.	Authorizes point source discharges of pollutants to waters of the U.S. in accordance with effluent guidelines, water quality standards, monitoring requirements, and other conditions as set by EPA.	Facilities with proposed process water discharges associated with an industrial activity.
Clean Water Act – 401 Certifications for Section 402 NPDES process water permit and Section 404 permit.	State or Federal certification that Federal licensing or permitting activity complies with CWA requirements.	All CWA 404 (Dredge and Fill) and 402 (NPDES) permits require 401 Certification prior to issuance of the permit.
Clean Water Act – National Pollutant Discharge Elimination System – Construction General Permit.	Authorizes discharge of storm water pollutants associated with construction.	Construction activities that disturb 5 or more acres of land.
Clean Water Act – Oil Pollution Act - Facility Response Plan (FRP)	The Oil Pollution Act requires certain facilities that store and use oil to prepare FRPs and submit them to EPA in order to ensure adequate response mechanisms are in place to respond to worst case oil spills.	Storage and use of oil requires preparation of FRPs for certain facilities prior to operation to provide measures to respond to oil spills that could reach navigable waters.
Clean Water Act – Oil Pollution Act – Spill Prevention Control Countermeasure Plan (SPCC)	The Oil Pollution Act requires certain facilities that store and use oil to prepare SPCC plans and retain them at the facilities to ensure facilities put in containment and other measures to avoid oil spills that could reach navigable waters.	Storage and use of oil requires preparation of SPCC plans prior to operation to provide measures to avoid oil spills that could reach navigable waters.
Safe Drinking Water Act – Public Water Supply System Program.	National health-based standards for drinking water to protect against both naturally occurring and man-made	Public water system.

Table 1-1 Major Permits, Approvals, and Consultations Potentially Required for the Clean Fuels Refinery Project

Issuing Agency/Permit Approval Name	Nature of Regulatory Action	Applicable Project Component
	contaminants.	
Safe Drinking Water Act – UIC Permit for Septic System.	Authorizes discharges of sanitary wastes into or above shallow ground water from a system that has the capacity to serve 20 or more people per day.	Septic system and leach field.
Safe Drinking Water Act – UIC Permit for Injection (Alt. C).	Authorizes use of Class I injection well for disposal of hazardous or non-hazardous industrial waste below the lowermost underground source of drinking water, under 40 CFR Part 146 Subpart G.	Underground injection of industrial waste.
Resource Conservation and Recovery Act – Treatment, Storage, and Disposal (TSD) Permit.	Design, monitoring, and closure requirements for TSD units.	Applies if the facility stores hazardous waste more than 90 days, treats hazardous waste, or has disposal facilities for hazardous waste.
Resource Conservation and Recovery Act – Hazardous Waste Generator.	Regulations for storing, treating, and disposing of hazardous waste.	RCRA listed and characteristic hazardous waste.
Resource Conservation and Recovery Act – Solid Waste Management.	The facility must comply with federal regulations at 40 CFR 257 “Criteria for Classification of Solid Waste Disposal Facilities and Practices.”	Land disposal of non-hazardous solid waste from the facility.
Resource Conservation and Recovery Act – Subtitle I – Underground Storage Tanks (UST).	Technical standards and corrective action requirements for owners and operators of underground storage tanks	Underground storage tanks.
U.S. Fish and Wildlife Service		
ESA compliance (Section 7).	Protects federally listed threatened or endangered species and their designated critical habitats.	Any project activity that potentially affects species listed as or proposed for listing as threatened or endangered, and/or their designated critical habitats.
Migratory Bird Treaty Act.	Protects migratory birds.	All federally funded, permitted, or authorized activities.
Bald Eagle Protection Act.	Protects bald and golden eagles.	All federally funded, permitted, or authorized activities.
Advisory Council on Historic Preservation		
National Historic Preservation Act – Cultural Resource Compliance (Section 106).	Protects cultural and historic resources. Coordinated with the Tribal Preservation Office (TPO) and North Dakota State Historic Preservation Officer (SHPO).	Any federal undertakings with potential to affect cultural resources.
U.S. Department of Defense, Army Corps of Engineers		
Permit to Discharge Dredged or Fill Material (Section 404 Permit).	Authorizes discharge of dredged or fill material in waters of the U.S., including jurisdictional wetlands.	Activities involving discharge of dredged or fill materials into waters of the U.S.
U.S. Department of Transportation		
Construction and operation of natural gas pipelines.	Prescribes minimum safety requirements for pipeline facilities and the transportation of gas, including pipeline facilities.	New natural gas pipeline construction.

Chapter 2 — Public Participation, Issue Identification, and Alternatives

This chapter covers five primary topics. First, it describes the opportunities for public participation and the process used to obtain the public's input. Second, it describes the process used to develop the alternatives that were considered in this analysis. Third, it describes the alternatives that were analyzed in detail. The specific features of these alternatives are fully described. Fourth, it identifies each alternative eliminated from detailed consideration and briefly describes the rationale for the exclusion. Finally, it summarily presents, in comparative form, the components and environmental effects of the alternatives analyzed in detail and will identify the agencies' preferred alternative.

2.1 Public Participation

Public participation is a crucial component of the NEPA process overall. However, it is especially important and valuable at two particular points in the process: defining the scope of the NEPA analysis (scoping) and reviewing and commenting on the DEIS. Both of these points are discussed below.

2.1.1 Scoping

Formal scoping for the NEPA analysis of the proposal began on November 7, 2003 with the publication of the NOI to prepare an EIS in the *Federal Register*. The NOI was published to inform readers of the BIA's intent to conduct an environmental analysis of the MHA Nation's proposal (Bureau of Indian Affairs 2003). The notice also solicited comments to assist the BIA in identifying the issues and concerns that should be addressed in the analysis and documented in the EIS. The comment period ran from November 7 to December 8, 2003.

Before BIA published its NOI, the MHA Nation held a series of informational meetings at community centers around the Reservation to describe its proposal and answer questions. The six meetings, which were on successive evenings during September 2003, were not scoping meetings. The overall goal of the meetings was to provide members of the MHA Nation and others the opportunity to learn about the proposed refinery and the NEPA process. Consequently, the meetings included a presentation on the proposed refinery and a description of the NEPA process that will culminate in the EIS and RODs. The presenters also answered questions after the presentations. Finally, comment forms were distributed to facilitate the submittal of written comments and concerns.

The number of people that attended the meetings varied. A range of people (10 to 30 people) attended each of the meetings held in Makoti, White Shield, Parshall, and New Town. In contrast, the meetings in Mandaree and Twin Buttes were only sparsely attended with at most three people attending.

BIA released a Draft Scoping Report for public review on October 1, 2004 and accepted comments on the report until November 18, 2004. The report summarized the scoping efforts conducted through September 2004 and the concerns and issues previously identified. On November 9, 2004, EPA conducted a public hearing on the issues identified in the draft report. Eighty-seven people attended the hearing. The Final Scoping Report incorporates comments submitted on the Draft Scoping Report.

2.1.2 Review of the Draft EIS

The BIA and EPA jointly published the DEIS for the MHA Nation's Proposed Clean Fuels Refinery Project in June 2006. BIA and EPA announced the availability of the DEIS and the start of the public comment period on June 29, 2006 in the *Federal Register*, in press releases, and mailed announcements. BIA and EPA held seven public hearings on the DEIS in Twin Buttes, White Shield, Parshall, Mandaree, New Town, and Makoti, North Dakota between July 31 and August 5, 2006. Comments were received until September 14, 2006. Comments (questions and statements) received orally at the hearings were recorded by a court reporter. Additional written comments were received on comment cards at these hearings and in letters to BIA and/or EPA.

During the public review period, BIA and EPA received 31 letters submitted by individuals and organizations; 65 people testified at the seven public hearings and 20 comment cards were submitted during the public hearings. BIA and EPA reviewed and considered every comment submitted during the public review period. The Agencies Response to Comments is provided in Appendix E, the comment letters and cards, and oral testimony transcripts are included in the FEIS as Appendix F on the CD-ROM.

2.1.3 Review of the Final EIS

This FEIS, including the Response to Comments will be issued for a 30 day review or "wait" period. Following the FEIS wait period, BIA will decide whether to approve the Tribes' request that BIA accept the land into trust and EPA will decide whether to issue an NPDES permit for discharges from the refinery. After the 30 day FEIS wait period, each agency will prepare a ROD documenting and explaining the Agency's decision. The RODs can be issued no sooner than 30 days following the publication of the Notice of Availability of the FEIS in the *Federal Register*. (40 CFR 1505.2, 40 CFR 1506.10)

2.2 Process Used to Develop Alternatives

The process of developing alternatives to the proposed project action involved five steps. First, the agencies conducted scoping to identify the key issues of concern, which would define the scope of the impact assessment. The scoping involved concerns that were both internal to the agencies and that were raised by the public. It also considered environmental and project-design elements.

The second step consisted of formulating alternatives to the acceptance of land into trust in support of the proposed refinery. Each alternative had to meet the purpose and need for the project. Typically, at this stage, issues are identified by the agencies to help define the changes that are needed to avoid, eliminate, reduce, minimize, or mitigate effects that would result from implementing the proposed project action.

The third step consisted of developing alternatives for the discharge of effluent from the refinery. Each alternative had to meet the purpose of and need for the project and each alternative had to be likely to continuously achieve compliance with environmental laws such as the CWA, SDWA and RCRA. The primary driving issue for these alternatives is protecting water quality.

The fourth step involved screening the potential alternatives for reasonableness. The NEPA process requires that alternatives evaluated in detail be reasonable. The regulations for implementing NEPA discuss the need for reasonable alternatives in the NEPA process (40 CFR 1500.2(e) and 1502.14). In addition, the Council on Environmental Quality's (CEQ) 40 Most Asked Questions about NEPA (Question 2a) state, in part, that "reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense" (Council on Environmental Quality 1981).

Based on this direction, the agencies focused the screening of alternatives on technical, environmental, and economic feasibility. Technical considerations included the feasibility of constructing and operating the facilities. Environmental considerations included the potential for significant effects and the feasibility of successfully mitigating them. Economic considerations included potential costs and benefits of implementing the alternative.

Finally, unreasonable alternatives were eliminated from detailed consideration. If an alternative did not pass the technical, environmental, and economic screening for feasibility, it was not considered for further analysis.

2.2.1 Alternatives Considered in the NEPA Analysis

The process described above resulted in the development of alternatives that specifically responded to one or more of the key issues. Although a variety of alternatives was developed, not all were analyzed in detail. Some were deemed unreasonable during the feasibility screening. Others were eliminated after initial analysis indicated they were not reasonable or that conditions had changed. Consequently, the alternatives are described in two overall sections. The alternatives analyzed in detail are described first. A section on Alternatives Considered but Eliminated from Detailed Analysis follows the alternatives analyzed in detail.

2.2.2 Alternatives Analyzed in Detail

Five alternatives for BIA's decision on acceptance of the land into trust status and four effluent discharge alternatives were analyzed in detail. The project alternatives for BIA include the proposed project action (Alternative 1), three modified action alternatives (Alternatives 2, 3, and 4), and the no action alternative (Alternative 5). Under Alternative 2, BIA would accept the 468.39-acre parcel into trust, but it would not approve MHA Nation's proposal to construct, operate, and maintain a clean fuels refinery on the parcel. Under Alternative 3, BIA would not accept the 468.39 acres into trust status. However, the MHA Nation would construct the clean fuels refinery as described (under Alternative 1) with applicable permitting from EPA. Under Alternative 4 (the modified proposed project), the Refinery facilities would be configured to move most of the project facilities out of the wetland and to replace the effluent wastewater treatment ponds with a tank system. Lastly, Alternative 5 is the No Action Alternative.

The four effluent discharge alternatives for EPA include: (Alternative A) the proposed project action involving effluent discharge through an NPDES permit, (Alternative B) partial effluent discharge through an NPDES permit and some storage and irrigation, (Alternative C) effluent discharge to an UIC Class I well, and (Alternative D) no action. All of the EPA effluent discharge alternatives apply to the BIA project alternatives that include constructing and operating the refinery. All of these alternatives are described in detail in the following sections.

Several terms are used throughout this EIS to identify the 468.39-acre parcel, parts of the parcel, or areas surrounding the parcel that are the focus of the action alternatives. "Project site" refers to the entire 468.39-acre parcel. "Refinery site" refers to the 190-acre portion of the project site where the refinery would be constructed. The "analysis area" encompasses the project site and the corridors connecting the oil, natural gas, and water pipelines and power lines to the refinery site. Figure 2-1 shows the area surrounding the refinery site, utility corridors, and proposed utility lines.

2.3 Alternative 1 — Original Proposed Project Action

The project proposed by the MHA Nation is to accept the 468.39-acre project site into trust; construct and operate a clean fuels refinery on 190 acres of the project site; and produce forage for MHA Nation's buffalo on the remaining acreage. The following sections describe the process and analysis MHA Nation used to develop the proposed project action and the details of this alternative. EPA will consider all of the effluent discharge alternatives for this proposed project action.

2.3.1 Development of the Proposed Project Action

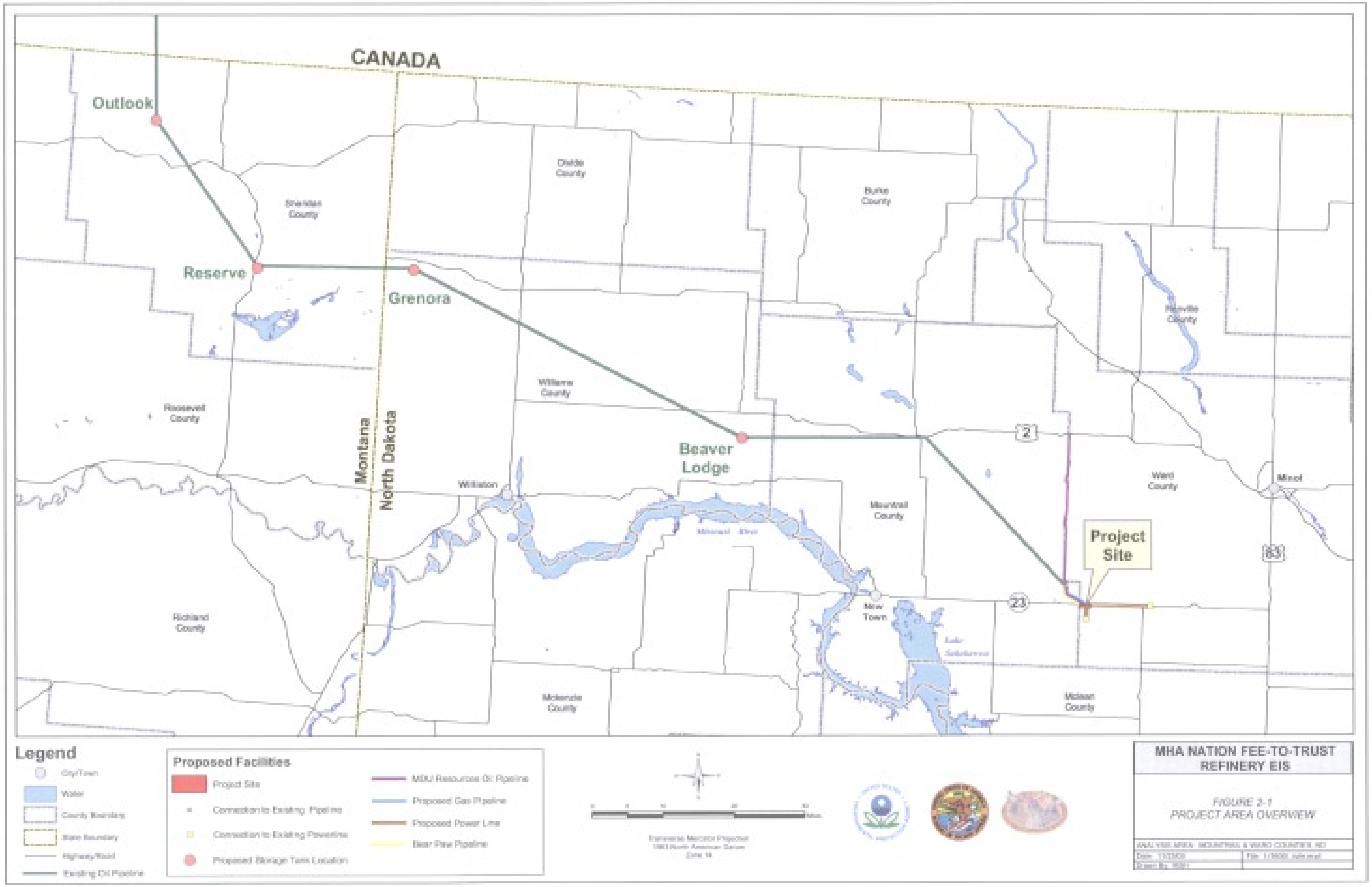
The MHA Nation's development of the proposed project action began with a search of the Reservation for sites that would be potentially suitable for constructing, operating, and maintaining a clean fuels refinery. The search was conducted using an initial set of screening criteria (Triad Project Corporation 2003a). These criteria included:

- The site must be relatively flat,
- The site must encompass a minimum of 160 acres (at least 320 acres was preferred),
- The site must be close to a railroad (The existing rail line runs from Makoti, through Parshall to New Town.),
- The site must have proximate access to an all-weather state highway, and
- The spur from the railroad into the site must be minimal and not cross any roads.

Using these initial screening criteria, eight potentially suitable sites were identified in the vicinity of the existing railroad corridor and highway 23.

The eight potentially suitable sites were then evaluated and ranked using the following criteria:

- Ownership of the property (Is the site: within the reservation, tribally owned, held in trust, or can the site be accepted into trust?) with tribal land and land within the reservation getting the highest points,
- Suitable topography (can the site be easily graded/configured to enhance operation of the refinery) with a relatively flat site getting the highest points,
- Potential for effects to surface water, watershed, and wetlands with no impacts getting the highest points,
- Potential for effects to communities (an adequate population base must be nearby to supply the work force; however, the refinery should not be located too close to communities) with no impacts getting the highest points,
- Proximity to the existing pipeline was considered with more points attributed for close proximity to the line,
- Proximity to an existing highway was considered with more points attributed for close proximity to the highway,
- Proximity to an existing railroad was considered with more points attributed for close proximity to the railroad and switch yard,
- Proximity to oil industry facilities was considered with more points attributed for close proximity to existing facilities,
- Value of the site as farmland or wetlands was considered with points attributed for soil type and existence of wetlands, and
- Visibility of the refinery from recreational areas, namely Lake Sakakawea, was considered with points attributed for visibility.


CANADA
Outlook
Reserve
Grenora
Beaver
Lodge
Montana
North Dakota
Sheridan
County
Divide
County
Burke
County
Renville
County
Williams
County
Roosevelt
County
Williston
Mountrail
County
Ward
County
Minot
Project
Site
New
Town
Richland
County
Mckenzie
County
Mclean
County
2
23
83
Legend
City/Town
Water
County Boundary
State Boundary
Highway/Road
Existing Oil Pipeline
Proposed Facilities
Project Site
Connection to Existing Pipeline
Connection to Existing Powerline
Proposed Storage Tank Location
MDU Resources Oil Pipeline
Proposed Gas Pipeline
Proposed Power Line
Bear Paw Pipeline
Transverse Mercator Projection
Zone 14
MHA NATION FEE-TO-TRUST
REFINERY EIS
FIGURE 2-1
PROJECT AREA OVERVIEW

The final evaluation of the three sites with the highest scores involved a cost and safety analysis that included the following criteria:

- Seller willing to sell at a reasonable price within the budget,
- Cost of infrastructure in relation to each site (cost of constructing rail services, roads, surface drainage, utilities and overall facility),
- Safety factors relative to highway and railway traffic and any ongoing liability, which can be reduced or eliminated by site selection, and
- Ability to have the land acquired into trust status.

Using these criteria, the MHA Nation determined the project site parcel was the most suitable site and entered into negotiations with the landowners to purchase the properties. After buying the parcels and beginning work on a refinery design, the MHA Nation submitted a request to the BIA to accept the parcels into trust.

2.3.2 Refinery

Under this alternative, the MHA Nation would construct, operate, and maintain a clean fuels refinery on the refinery site. Feedstock for the refinery would include 10,000 bbl per stream day (BPSD) of synthetic crude oil, 3,000 BPSD of field butane, 6 million standard cubic feet per day (MMSCFD) of natural gas, and 300 bbl of bio-diesel or 8,500 bushels per day of soybeans. From the feedstock, the refinery would produce about 5,750 BPSD of diesel fuel, 6,770 BPSD of gasoline, and 300 BPSD of propane. With the planned maintenance program, the refinery would have an economic life well past 20 years. At the end of its economic life, MHA Nation would decommission and reclaim the facility.

2.3.2.1 Processes Comprising the Refinery

The refinery would consist of 14 plants. Each plant would handle a specific operation or portion of the overall refining process. Table 2-1 briefly summarizes the 14 plants. The following sections describe the functions of each of the 14 plants.

The numbering of the plants is for reference only and the numbers assigned to the various units and plants are meaningful only to the design engineers. Although gaps exist in the numbering of the 14 plants, all proposed plants are included in the description of the refinery and in the impact analysis. Engineering design convention is to leave gaps in numbers between major units to facilitate adjustments during the refinery's design and operation. The general layout of the refinery is depicted in Figure 2-2.

Unit A — Crude Processing

The Crude Processing Unit of the refinery would consist of the crude plant and a saturated gas plant. The crude plant would distill crude oil into various fractions that would be the feedstock for other plants. The saturated gas plant would receive gas that contains saturated hydrocarbons (HC) from the crude plant and other plants and strip those saturated hydrocarbons from the gas.

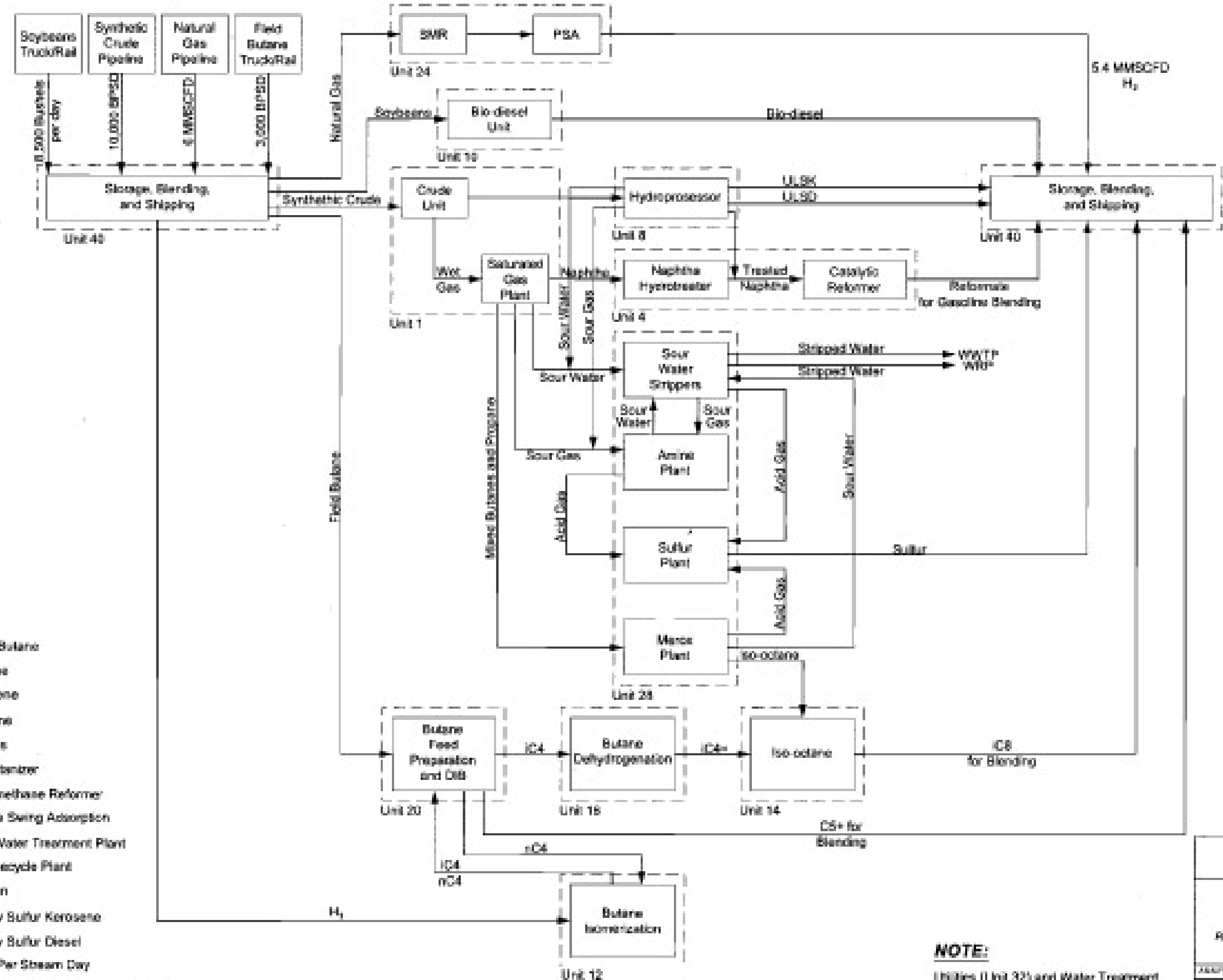
Plant 01— No. 01 Crude

The crude plant would be the first step in the refining process (Figure 2-2). In the crude plant, crude oil would go through a series of steps where it is heated, vaporized, fractionated, condensed, and cooled. Initially, the crude oil would be pumped through a series of heat exchangers that would increase its temperature. During this heating, some vaporization of the feed stream would occur, with fractions such as naphtha, light diesel, and heavy diesel being vaporized and sent directly to the atmospheric crude column (fractionating column). The crude stream from the exchangers that was not vaporized in the exchangers would be sent to the atmospheric crude heater and heated to specific temperatures and then sent to the fractionating column. This column would separate the crude oil into different fractions based on their boiling range fractions or "cuts." Additional stripping would occur in stripper columns downstream of the fractionator. The fractions from the fractionator and strippers may be recycled for additional treatment or sent directly to finished product blending or to other downstream plants, such as the saturated gas plant, for further processing.

Table 2-1 Summary of Plants that would Compose the Refinery

Unit	Description
Crude Processing	Takes the crude oil and separates it into component parts by a heating process called distillation.
Naphtha Hydrotreater	Removes sulfur from naphtha feedstock and reforms the desulfurized naphtha with hydrogen to produce a high-octane gasoline blending component.
Reformer	Reformate stream is collected and sent to storage as a gasoline blending component.
Hydroprocessor	Cracks hydrocarbons into smaller, lighter ones under high temperatures, high pressures, and a hydrogen atmosphere. Produces light and heavy ultra-low sulfur diesel fuels.
Treating	Removes sulfur compounds from various water and gas streams and converts the removed material into elemental sulfur.
Butane Isomerization	Processes normal butane (nC4) into isobutene. The isobutane is isolated in the Deisobutanizer (DIB) overhead and fed to the Olefin Unit.
Olefin	Converts isobutane to isobutylene as part of the process to produce iso-octane.
Iso-octane	The process dimerizes isobutylene (from the Olefin Unit) into iso-octene. Then the iso-octene is saturated with hydrogen in a separate reactor to produce iso-octane, a very clean high octane gasoline blending component.
Hydrogen	Produces the hydrogen needed for other refinery units.
Utilities	Composed of the fuel gas, flare, instrument and utility air, fire water, boiler feed water, and nitrogen systems.
Water Treatment	Process raw water from wells to treated water and treats wastewater.
Storage, Blending, and Shipping	Includes tanks for storing products, pumps for blending products, and facilities for loading railcars and trucks.
Bio-diesel	Processes oil from soybeans into bio-diesel (methyl esters).
General Refinery	Consists of off-sites, office/warehouse, and general offices.

Source: Triad Project Corporation 2003, Woolley 2004, Woolley 2006



LEGEND

nC4	Normal Butane
iC4	Isobutane
iC4=	Isobutylene
iC8	Iso-octane
c5+	Pentanes
DIB	Deisobutanizer
SMR	Steam-methane Reformer
PSA	Pressure Swing Adsorption
WWTP	Waste Water Treatment Plant
WRP	Water Recycle Plant
H_2	Hydrogen
ULSK	Ultra-low Sulfur Kerosene
ULSD	Ultra-low Sulfur Diesel
BPSD	Barrels Per Stream Day
MSCFD	Million Standard Cubic Feet Per Day

NOTE:

Utilities (Unit 32) and Water Treatment (Unit 36) are not shown.

MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 3-2
SCHEMATIC SHOWING THE OVERALL RELATIONSHIP OF THE REFINING UNITS

Plant 02— Saturated Gas Plant

The saturated gas plant would receive wet gas from the crude plant and other process plants (for example, the reformer and hydroprocessor) that contains saturated hydrocarbons (for example, methane, ethane, propane, and butanes). Further treatment in the saturated gas plant would be necessary to remove these "light end" hydrocarbons that could not be separated in the atmospheric crude distillation or other units. A crude debutanizer column would be used to separate the butanes and propane from the naphtha, and a crude depropanizer column would be used to separate out propane. These separated light ends would be used for further product production or refining activities (for example, butane and propane to the amine plant and stabilized naphtha to the naphtha hydrotreater [NHT]).

Unit B — Naphtha Hydrotreater

The NHT would be used to treat sulfur-containing naphtha that would be used subsequently as a feedstock to the catalytic reforming unit. Hydrotreating would be needed to remove components, such as sulfur, nitrogen, and metals, to protect the reformer catalyst and to meet air quality regulations for the use of low sulfur distillates and jet fuels.

Plant 05 — Naphtha Hydrotreater

The NHT would receive stabilized naphtha as feedstock from the saturated gas plant. The naphtha feedstock would be mixed with hydrogen and heated. The naphtha combined with hydrogen would then be sent to a vessel containing a catalyst. Several reactions would occur in the presence of the catalyst, including:

- Sulfur and nitrogen compounds would be converted to hydrogen sulfide (H_2S) and ammonia (NH_3);
- Metals that are present in the feed would be deposited on the catalyst;
- Some compounds such as naphthenes and aromatics, would become saturated with hydrogen and some cracking would occur, resulting in lighter components, such as methane, propane, and butanes.

The resulting treated naphtha stream (low-octane naphthas) from the NHT would be charged to the catalytic reformer for additional treatment. The catalytic reformer would convert low-octane naphthas into high-octane gasoline blending components called reformates.

Unit D — Reformer

The catalytic reformer is comprised of a reactor section and a product-recovery section; the basic units are a feed/effluent heat exchanger, 3 furnaces, 3 reactors, a regenerator, overhead recontacting section, net gas compressor, recycle gas, and a stabilizer column.

Plant 08 — Reformer

Desulfurized naphtha feed from the NHT would be mixed with hydrogen, heated, and discharged to the reformer unit. The mixture would then be passed through a series of fixed bed catalytic reactors, where higher-octane compounds, such as aromatics, are formed. The effluent from the final reactor would be cooled and pumped to a separator that would allow butanes and lighter components to be removed and recycled to the saturation gas plant. Liquid product from the bottom of the separator would be pumped to a fractionating column called a stabilizer (debutanizer). The resulting bottom reformate stream would then be collected and sent to storage as a gasoline blending component.

Unit F — Hydroprocessor

The Hydroprocessor Unit consists of the Hydroprocessor and Fractionation plants.

Plant 11 — Hydroprocessor

The hydroprocessor would use several technologies in an integrated process to upgrade distillate-range compounds to high-quality kerosene and diesel that would meet air quality requirements for sulfur, aromatics, and cetane number in vehicles. The hydroprocessing plant would perform three basic steps: hydrodesulfurization, hydrocracking, and fractionation.

The primary purpose of hydrodesulfurization would be to remove sulfur compounds and other impurities, such as nitrogen, oxygen, halides, and trace metals, that could negatively affect the catalysts used in other downstream refining processes. Hydrodesulfurization is a process that catalytically treats various hydrocarbon streams by reacting them with hydrogen in the presence of a catalyst.

Plant 12 — Fractionation

In hydrocracking, which is a combination of catalytic cracking and hydrogenation, heavier feedstock (gas, oil, and diesel) would be converted into lighter components in high-temperature, high-pressure reactors in the presence of hydrogen and a catalyst. The product stream from the reactors would then be sent to a fractionating column for further refinement. The primary fuels produced by this process would be ultra-low sulfur kerosene and diesel. In addition, some of the heavier naphtha streams would be sent as feedstock to the catalytic reformer for upgrading (increase octane), because these streams (heavy hydrocrackate) would have many aromatic precursors.

Unit H — Treating

Unit H would consist of six sections. They are the sour water stripper (SWS), amine plant, merox plant, contaminated water stripper, butane treater, and sulfur plant. Each unit is discussed below.

Plant 16 — Amine Plant

The purpose of the amine unit would be to remove hydrogen sulfide and carbon dioxide from various hydrocarbon gas streams referred to as sour gas streams. This is accomplished by absorption in an aqueous solution of diethanolamine (DEA).

In the amine plant, sour gas streams would undergo a multi-step process. Sour gas streams from refining processes (for example, hydroprocessor and saturation gas plant) would first enter a filter/coalescer vessel, where the separated liquid fraction would be pumped to the SWS. The overhead gases would then pass through an absorber (amine contactor) where hydrogen sulfide would be removed. Sweetened fuel gas would be returned to the refinery fuel system.

The liquid bottoms would continue through further treatment in the amine plant. The liquid fraction containing hydrogen sulfide (rich DEA) would be stripped to separate the hydrogen sulfide as an acid gas stream. This stream would be sent to the sulfur plant for treatment. The stripped liquid solution (lean DEA) would be recycled in the process.

Plant 17 — Sulfur Plant

Air quality regulations require minimizing the amount of sulfur dioxide emissions to the atmosphere by end products. The main source of these emissions is from the burning of hydrocarbon streams containing hydrogen sulfide. Petroleum refining operations can remove hydrogen sulfide from end product fuel systems and convert the removed material to elemental sulfur.

The MHA Nation Refinery would use the most widely used sulfur recovery system — the “Claus” Process. This process consists of two basic phases: combustion and reaction. During the combustion phase, about one-third of the hydrogen sulfide in the feed gas to the unit would be burned in a furnace. This would form sulfur dioxide, water, and sulfur. In the reaction phase, the sulfur dioxide would be reacted in reactors with the remaining two-thirds unburned hydrogen sulfide over a catalyst to form sulfur.

Claus units typically convert 90 to 93 percent of the hydrogen sulfide to sulfur. The remaining hydrogen sulfide is referred to as the tail gas. This tail gas would be diverted to an incinerator for additional treatment. Exhaust from the incinerator would be discharged to the atmosphere via a tall sulfur stack.

The primary feed streams of the MHA Nation Refinery to the sulfur plant would be acid gases from the amine plant and the SWS. The resulting molten sulfur product would be sent to a sulfur pit. From the pit, the sulfur would be pumped to the loading facilities for shipment by truck. The sulfur would be sold and shipped to the buyers’ locations.

Plant 18 — Sour Water Stripper

Sour water refers to various waters containing sulfides; however, these waters typically also include ammonia and small quantities of phenol and other hydrocarbons. Sour water would be produced as a by-product of operations in several units, including the crude distillation unit, hydroprocessor unit, amine plant, merox plant, and sulfur plant. In addition, sour water may be generated when steam is condensed in the presence of gases containing hydrogen sulfide.

The SWS would be designed to remove hydrogen sulfide, ammonia, some phenolics, and other contaminants from the sour water stream. The feed streams to the SWS would first enter a sour water degasser vessel, where sour gas would be removed and pumped to the sulfur plant. The sour water would be directed to the SWS column where sour gas would be diverted to the sulfur plant for processing. Stripped water would be diverted to a sour water storage tank. The water would then be recycled or pumped to the wastewater treatment unit (WWTU) for treatment.

Plant 19 — Contaminated Water Stripper

The purpose is to strip benzene and other Volatile Organic Compounds (VOC) from the contaminated waste water that has been in contact with the process and recycle them back to the process. The stripped waste water contains less than 0.005 parts per million by volume (ppmv) of benzene, and is sent to the WWTU.

Plant 20 — Merox Plant

Non-hydrotreated fuels (sour stocks that contain sulfur compounds) would be sent to the merox plant to remove sulfur compounds. This “sweetening” process would remove sulfur compounds (primarily hydrogen sulfide) and mercaptans (thiols) to improve odor, color, and oxidation stability and to comply with applicable air quality regulations for the fuels’ use. The process would use both extraction and conversion steps using caustic and a dissolved catalyst for the reactions.

The feed streams (mixed butanes and propane from the saturation gas plant) would first enter a separate extractor vessel and would be contacted with recycled, regenerated caustic solution. The treated butane stream would be pumped through to a knockout drum and a sand filter and then on to the iso-octane unit. The propane stream would flow to a knockout drum, sand filter, and propane dryers and then would be sent to propane storage. Sour water generated in the process would be pumped to the SWS. Acid gas would be sent to the sulfur plant.

The caustic solution from the extractors that contain dissolved mercaptans would be sent to oxidizers. Here, the mercaptans would be oxidized to disulfides and the caustic would be restored. The stream would then be sent to the disulfide separator where the excess air/disulfides mixture would be separated and sent to the flare. The caustic solution would be recycled to the extractor.

Plant 21 — Butane Treater

Field butanes are imported as feedstock for the production of iso-octane for gasoline. The field butanes are about 70% nC4 and 30% iso-octanes, and must be treated for sulfur removal with hydrogen and catalyst. The treated butane mixture is then sent to the DIB for separation by fractionation.

Unit J — Butane Isomerization

The Butane Isomerization Unit consists of the DIB, Butane Isomerization, and Caustic Treater.

Plant 25 — Deisobutanizer

This unit is the initial step in the process of producing iso-octane.

Field butanes would be pumped from the storage vessels in the tank farm to the feed preparation described in Plant 21. The field butanes would then be desulfurized.

Once desulfurized, the field butanes would be charged to the DIB (fractionation column). The DIB would separate isobutane (iC4), nC4, and pentanes (C5+). The isobutane would be charged to the olefin unit (Unit K) for processing. The nC4 would be charged to the butane isomerization unit (Plant 26) to convert it to isobutane.

Plant 26 — Butane Isomerization

In the butane isomerization plant, nC4 would be processed to produce isobutane, the key feedstock for the iso-octane (iC8) unit. The mixed butanes from the Isomerization unit (about 52% conversion to isobutane) would be returned to the DIB column to separate the isobutane and nC4. The nC4 coming from the DIB column side draw would be directed to the Isomerization unit. In the presence of the catalyst, nC4 would be converted to isobutene. The isobutane manufactured in the Isomerization unit along with the isobutane in the field butanes fresh feed is all recovered in the DIB and sent overhead as feed to the Olefin unit (Unit K).

Plant 27 — Caustic Treater

The nC4 product must be treated with caustic solution to remove any sulfur compounds.

Unit K — Olefin

The butane dehydrogenation plant would employ catalytic dehydrogenation technology to convert isobutane (iC4) to isobutylene (iC4=).

Plant 29 – Olefin

The process would be composed of three sections: a reactor section, a product recovery section, and a catalyst regeneration section. In the reactor section, isobutane feed from the DIB overhead would flow through a series of reactors. The platinum catalyst in these reactors would promote a dehydrogenation reaction. The reactant effluent from this reaction process would then be sent to the product recovery section, where the effluent would be cooled, compressed, dried, and sent to a cryogenic system to separate hydrogen from hydrocarbon. The separator liquid product, isobutylene, would be sent to the iso-octane unit as a feedstock. Unconverted gases are sent to the pressure swing adsorption (PSA) unit for production of pure hydrogen. The PSA unit is discussed in the section on Unit P – Hydrogen.

Unit M — Iso-octane

This plant would produce iso-octane, which is a very clean (no sulfur or aromatics), high-octane gasoline (100 octane (R+M/20)). The iso-octane would be used as a blending component for gasoline. Processing of isobutene in the iso-octane plant would involve two primary phases: dimerization and hydrogenation.

Plant 31 – Dimerization

In the dimerization phase, molecules of isobutylene (iC4=) from the olefin unit (Unit K) would be combined into molecules of iso-octene (iC8=). Dimerization would involve feeding the isobutylene through a series of exchangers, reactors, column reboilers, and column condensers. The resulting iso-octene would be charged to the hydrogenation plant.

Plant 32 – Alcohol Extraction

In the dimerization reactors water is present and combines with isobutylene to form tertiary butyl alcohol (TBA) that is beneficial to the reaction. However, the amount of TBA in the system is controlled by this unit, recycling the required amount to the reactors, and yielding the excess.

Plant 33 – Hydrogenation

In the hydrogenation phase, the iso-octene would be saturated with hydrogen under low pressure to produce iso-octane. The primary components of the hydrogenation unit would be the saturation reactor and product stripper. The hydrogen used in the process would come from the hydrogen plant (Unit P). From the product stripper, the iso-octane would be sent to storage for use as a blending component for gasoline.

Unit P — Hydrogen

A significant amount of hydrogen would be required for operating specific refining processes, such as the hydroprocessor. Although some hydrogen would be produced within refinery operations such as catalytic reforming, the supply would not be sufficient to meet the needs of the refinery's operations. Therefore, the MHA Nation Refinery would use a steam methane reforming (SMR) plant and a PSA plant to produce the additional amount of hydrogen required for operations.

Plant 36 – Steam Methane Reformer

The SMR unit would accomplish the following basic steps:

- **Sulfur Removal** — the feed streams (fuel gas, natural gas, and boiler feedwater) to the SMR would first be pretreated in a hydrogenation reactor vessel to convert any sulfur compounds to hydrogen sulfide. The feed from the hydrogenation vessel would then flow through vessels containing zinc oxide to remove any hydrogen sulfide.
- **Reforming** — following removal of sulfur compounds, the gas stream would be mixed with steam in a reformer furnace and undergo a catalytic reaction that produces carbon monoxide (CO) and hydrogen.

- **Shift Conversion** — the CO from the reformer would then be reacted in the presence of a catalyst and additional steam to produce hydrogen and carbon dioxide. About 92 percent of the CO would be converted into hydrogen.

Plant 37 – Pressure Swing Adsorption

To produce a more pure hydrogen stream, the hydrogen stream from the SMR would be sent to the PSA. The PSA would adsorb impurities from the hydrogen-rich stream by using a fixed bed of adsorbents operating at high pressure. This can result in purity in excess of 99.9 percent. The high purity hydrogen will supply the refinery's need for desulfurization. The PSA tail gas is available at low pressure, so will be used in the nearby SMR furnace as fuel.

Unit R — Utilities

The utilities unit would consist of almost a dozen systems. These systems include the fuel gas system, the flare system, the instrument/utility air system, the fire water system, the boiler feed water system, the emergency power and the nitrogen system.

Plant 40 — Boiler Feedwater System

Refinery operations require steam, which would be supplied by the boiler feedwater system. The boiler feedwater system would include three steam generator boilers to provide the required steam. Feeds to the unit would consist of recycled treated water from the water treatment unit (unit 36), condensate from steam condensate recovery, and recycled low-pressure steam. The steam generators would be fueled with fuel gas from the fuel gas system.

Periodically, the boiler system would be blown down for cleaning. This water would be sent to the water recycle plant (WRP) for treatment. The water would be segregated from contaminated water sent to the WWTP.

Plant 41 — Boilers

There are package steam boilers capable of providing steam for plant start up. During operation the boilers will continue to provide steam to supplement steam provided by recovery of waste heat, such as the Hydrogen Plant waste heat recovery.

Plant 42 — Plant Air

Plant air is required for utility usage throughout the plant for pneumatic tools and other maintenance activities.

Plant 43 — Instrument Air System

Compressed air would be required for various operations at the refinery. Consequently, the refinery would produce the instrument and utility air required for its operations. Two instrument air compressors would discharge air to two moisture separators, a prefilter, an air dryer and an air receiver. From the air receiver, air would be distributed to units throughout the refinery.

Plant 44 — Nitrogen System

Nitrogen would be purchased and delivered to the refinery by truck. The nitrogen would be offloaded into liquid nitrogen storage tanks. From the tanks, a nitrogen header would distribute the nitrogen throughout the refinery.

Plant 45 — Emergency Power (UPS)

In case of a loss of electrical power to the refinery, the uninterrupted power supply will supply critical power from a battery source.

Plant 46 — Fire Water System

A fire water system would be constructed, operated, and maintained as part of the refinery. This system would be capable of delivering 1,100 gallons of water per minute in an emergency (2 pumps, each moving 550 gallons per minute [gpm]). Two vertical pumps in the fire water pump house would provide fire water through a fire water header to hydrants and fixed fire water systems located at strategic locations throughout the refinery. Water would be supplied to the pump house from two dedicated fire water reservoirs. The reservoirs would hold 600,000 cubic feet (4.5 million gallons) of uncontaminated water. The fire water pump house would be located adjacent to the fire water reservoirs and would pump water directly from the reservoirs. Assuming 75 percent availability and both pumps running, the system could deliver 1,100 gpm of fire water to a fire continuously for 50 hours.

The fire water reservoirs would be constructed and filled before the refinery is mechanically completed. The fire water reservoirs would be constructed early so uncontaminated stormwater runoff could be used to initially fill them. Well water may be used as an additional water source; in the event uncontaminated stormwater runoff does not fill the fire water reservoirs. During operation, the reservoirs would be maintained at capacity by pumping water from the evaporation pond. If needed during an emergency, water in the evaporation pond or from the water supply wells could be pumped to the fire water reservoirs to supplement the standing supply.

Plant 47 — Power Supply

The power supply is designed to provide two independent sources of power from the utility supplier in the area, Verendrye Electric. The power will be reduced to the plant voltages from the line supply voltage. The lower voltage power will be directed to substations in the refinery through switchgear and MCC's to the individual process units. In addition, there will be an emergency generator (diesel driven) capable of providing power for critical services (such as reflux pumps etc.) in the event of a power failure.

Plant 48 — Control Room/Lab

The control room is the central control system for the refinery and houses the Distributed Control System (DCS) for board mounted control throughout the units. The laboratory is adjacent and contains all the testing apparatus for quality control of all the process streams in the refinery.

Plant 49 — Fuel Gas System

Fuel gas refers to any gas generated within the refinery that is combusted. The main source of fuel gas for use in the refinery would be the amine unit. Here, treated (sweetened) fuel gas would be produced during the treatment of sour gas streams sent to the amine unit from various refinery operations. The treated fuel gas would be sent to a main fuel gas separator, where it would be metered and distributed to the various refinery operations.

Plant 50 — Flare System

The flare system has two main components: the flare knockout drum and the 180-foot tall flare stack. Waste gas streams from several units would be diverted to the flare knockout drum. Liquids that accumulate in the drum would be pumped to the waste water treatment system for treatment. The gases would be sent directly to the flare, which would operate at 165°F.

The flare would have sufficient controls and a flare detection system to ensure that it is working and that it is working efficiently. The flare would have three pilots, each with an igniter, flame sensor, and a fire eye. Each of the three fire eyes would be connected to an alarm, which would go off if no flame is detected. The image from a camera that would be focused on the flare and the three pilots would be shown continuously on a screen in the main control room. Finally, an infrared sensor would monitor the flare for surges of hydrocarbons. If such a surge is detected, the sensor would increase the production of steam from the steam injection ring to minimize the formation of soot and smoke. The response of the infrared sensor is substantially quicker than that of a human controller.

Unit T — Water Treatment

The water treatment unit would handle all water, except the fire water. This includes raw water, treated water, and waste water.

The source of water for the refinery would be four water wells. Water would be pumped from the wells to a 5,000-bbl raw water holding tank. As it is needed, water would be withdrawn from the holding tank to a raw water sump by means of raw water sump pumps. The water would then be pumped to two treatment buildings that would provide primary and secondary softening. From the softening treatment, the water would be pumped to the treated water storage tank that feeds the boiler feedwater system.

The four water wells also would provide potable water for uses in offices and buildings. Potable water would be treated before distribution. The potable water system would be separate from other water systems at the refinery. Under the SDWA, the refinery water system would be considered a non-transient, non-community public water supply. Because the water supply wells are to be developed in the Fox Hills-Hell Creek bedrock aquifer, which is separated from shallow aquifers by typically 1,000 feet, the ground water supply would be classified as "not under the direct influence of surface water." The Sentinal Butte and Tongue River formations are between the Coleharbor (near surface) and the Fox Hills-Hell Creek aquifer.

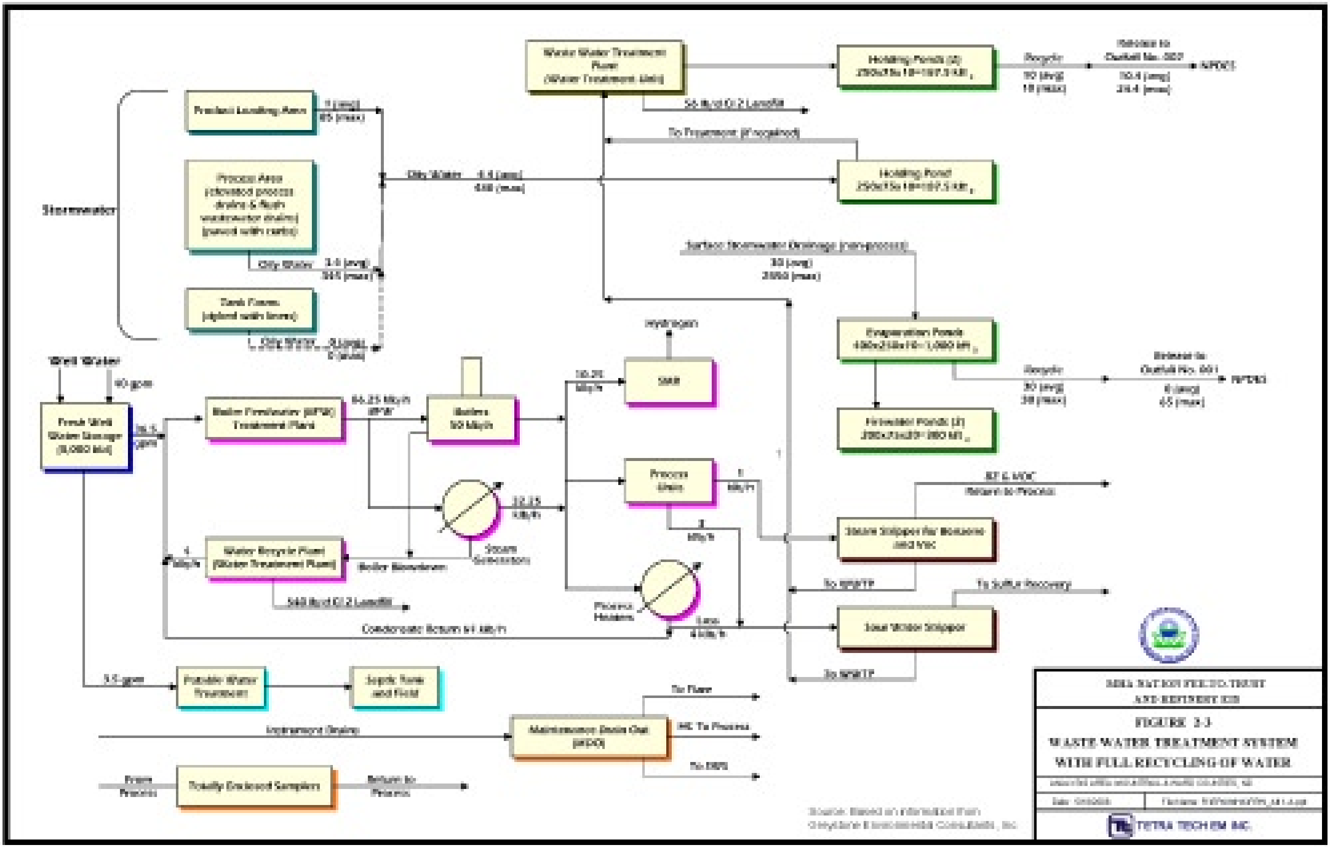
Figure 2-3 and Figure 2-4 show a well water supply of 40 gpm plus surface precipitation and a net effluent of 53.9 gpm [e.g. 50.4 gpm surface water discharge and 3.5 gpm septic system (sanitary) discharge]. Once the inventory of plant water has been established, the facility will be self sufficient for water without drawing upon well water supply during periods of normal precipitation. Thus, Figure 2-4 shows operations with no recycling of water and Figure 2-3 shows operations with full recycling of water.

Plant 55 — Waste Water

The refinery would generate three types of waste water: (1) sanitary waste water, (2) uncontaminated (non-oily) water, and (3) process wastewater or potentially contaminated (oily) water. Each of these streams of waste water would be handled separately. They also would receive different levels of treatment.

Sanitary waste water from the offices and other buildings would be collected and disposed of via a sanitary sewer system. All water collected by this system would be discharged via a septic system and leach field. Figure 2-3 and Figure 2-4 show the 3.5 gpm of fresh water that would be used for sanitary purposes and discharged via the septic system and leach field.

The second type of waste water is uncontaminated (non-oily) waste water which originates from two sources, the boiler system and stormwater. Waste water from the boiler system (boiler blowdown) will be routed to the WRP for treatment and recycling back to refinery processes (Figure 2-3 and Figure 2-4). This waste water will be segregated from the


Stormwater
Well Water
40 gpm
Hydrogen
SMR
Process Units
Boilers
Steam Generation
Boiler Blowdown
Process Heaters
Steam Stripper for Benzene and VOC
Sour Water Stripper
To WWTP
To Sulfur Recovery
Recycle
NPDES
Potable Water Treatment
Septic Tank and Field
Totally Enclosed Samplers
From Process
Return to Process
To Flare
FIGURE 2-3
WASTE WATER TREATMENT SYSTEM
WITH FULL RECYCLING OF WATER
TETRA TECH EM INC.

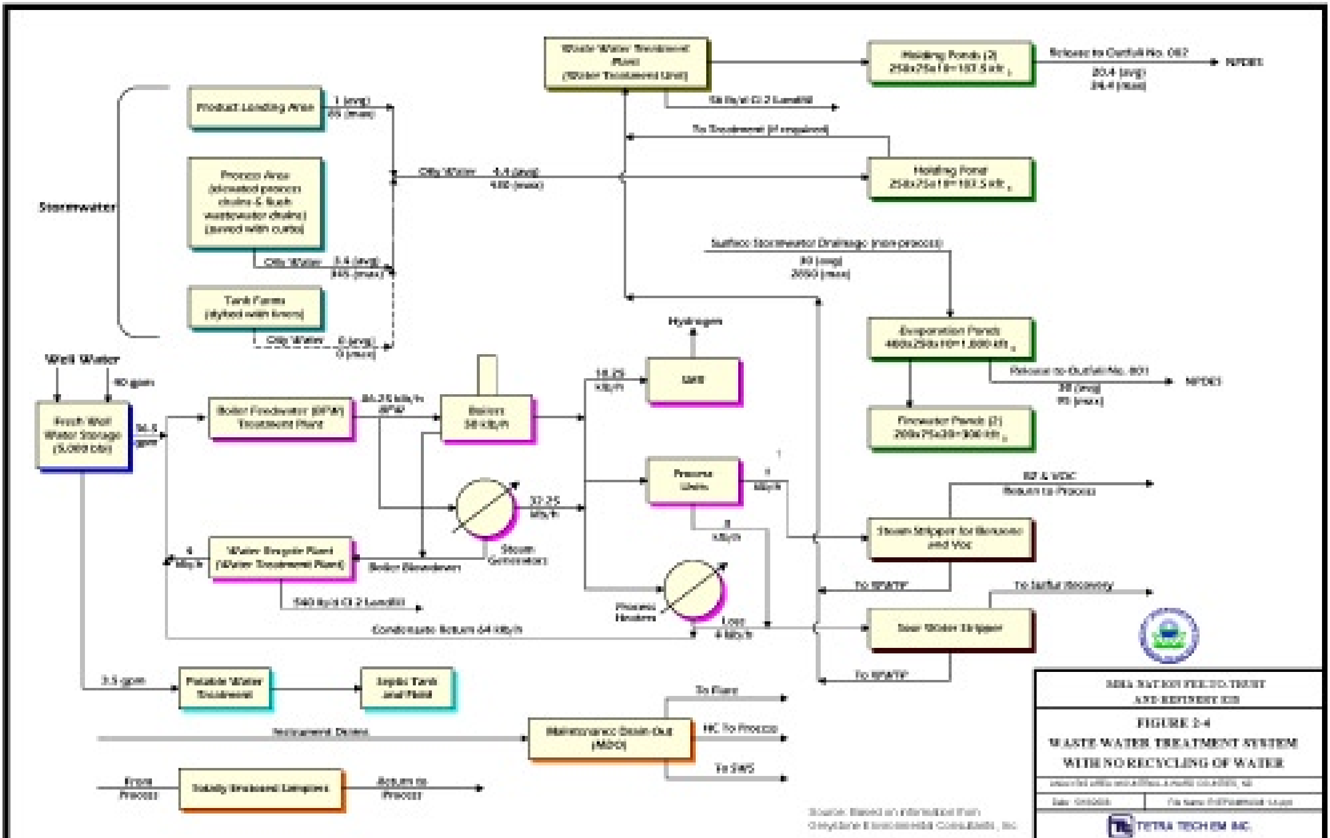
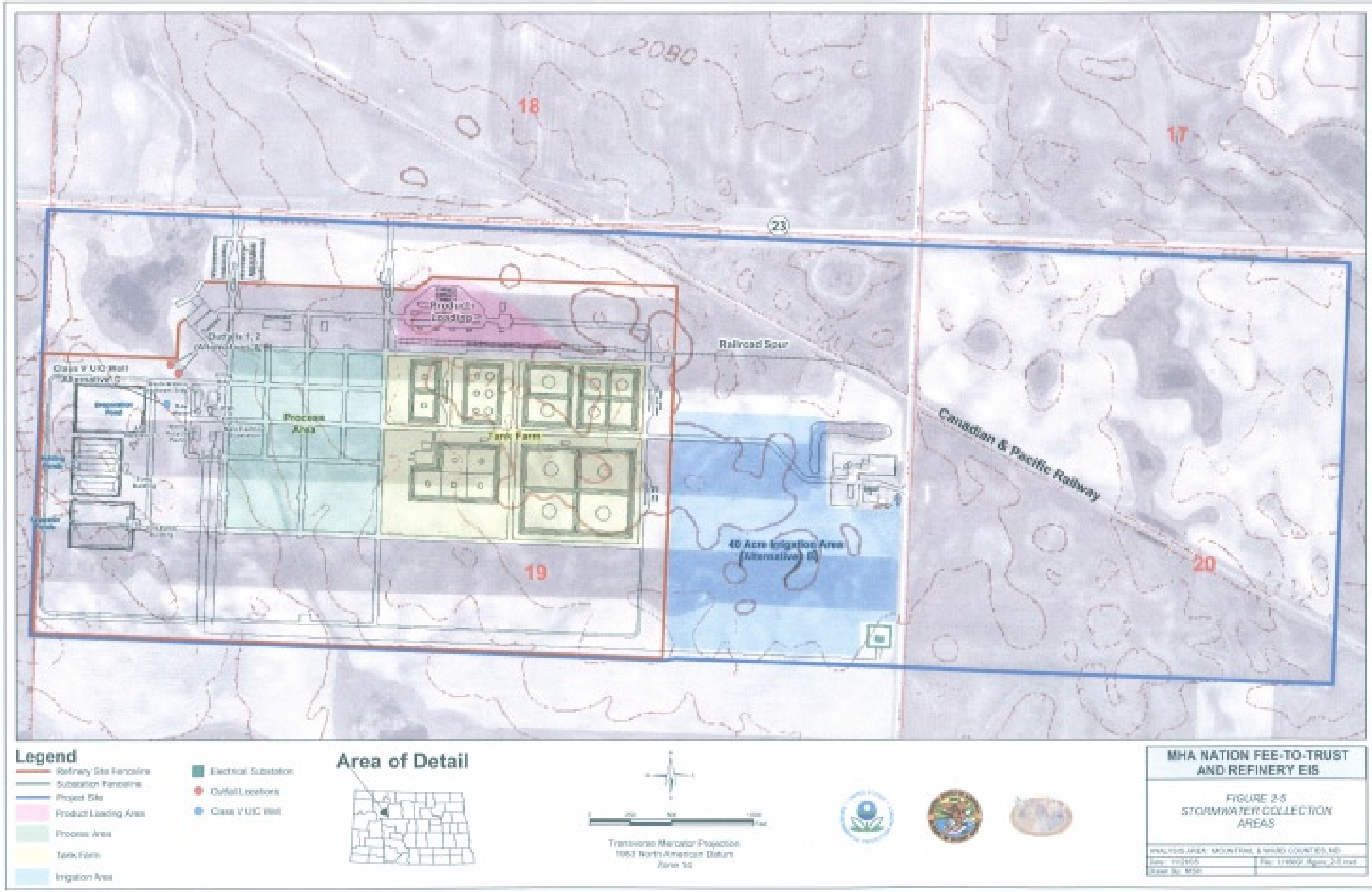


FIGURE 2-4
WASTE WATER TREATMENT SYSTEM WITH NO RECYCLING OF WATER


2080
18
17
23
Product Loading
Outfalls 1, 2
Railroad Spur
Class V UIC Well
Alternative C
Process
Area
Tank Farm
Canadian & Pacific Railway
40 Acre Irrigation Area
(Alternative B)
19
20
Legend
Refinery Site Fenceline
Substation Fenceline
Project Site
Product Loading Area
Process Area
Tank Farm
Irrigation Area
Electrical Substation
Outfall Locations
Class V UIC Well
Area of Detail
Transverse Mercator Projection
1983 North American Datum
Zone 14
MHA NATION FEE-TO-TRUST
AND REFINERY EIS
FIGURE 2-5
STORMWATER COLLECTION
AREAS
ANALYSIS AREA: MOUNTRAIL & WARD COUNTIES, ND

contaminated (oily) waste water to minimize production of hazardous sludge. Uncontaminated (non-oily) stormwater will be collected from non-process areas of the refinery and routed to a 7.48 million gallon evaporation pond. Waste water from the evaporation pond would be used as makeup water for the fire water system (two reservoirs of 2.25 million gallons each) as needed, recycled back to the refinery processes or when necessary discharged through a NPDES permitted outfall. Depending on the type of liner in the evaporation pond, additional water may be needed to keep the water in the pond. A clay liner would need some water/moisture to remain in the pond at all times to maintain the integrity of the liner.

The third type of waste water would consist of contaminated (oily) waste water. Wastewater collected from process operations (primarily the SWS) would be routed directly to the WWTU for treatment and then directed to two effluent holding ponds (700,000 gallons each/1.4 million gallons total). Potentially contaminated (oily) stormwater will be collected from process areas (i.e. loading area, tank farm (Figure 2-5) and routed directly to a 1.4 million gallon holding pond. Depending on quality, the waste water from the holding pond would be directed to the two effluent holding ponds described above or sent to the WWTU for treatment and then into the effluent holding ponds. The effluent from the holding ponds would be recycled back to refinery processes as needed, or discharged through a permitted NPDES outfall in this alternative. It may be used for irrigation or disposed of in an injection well as discussed in the effluent alternatives section. All waste water treatment processes would be proven technology and would be designed to meet quality requirements for recycling back to refinery processes, NPDES discharge permit requirements, irrigation/land application requirements, or UIC requirements.

Water directed to the WWTU would first pass through an American Petroleum Institute (API) separator. The separator would remove non-emulsified oil and oil-bearing sludge from the water by allowing it to float to the surface of the water where it would be skimmed off. The oil skimmed off the water would be recycled to the crude unit (Figure 2-6). From the API separator, the water would be discharged to a dissolved air flotation (DAF) system.

The DAF system would use air to remove oils, greases, and suspended solids from the stream of waste water. In the DAF system, a portion of the clean effluent is removed, super saturated with air, and mixed with the waste-water influent before being injected into the DAF separation chamber. Inside the separation chamber, the dissolved air comes out of solution producing millions of microscopic bubbles. These bubbles attach to solids and oils and float them to the surface where they would be skimmed and removed from the tank. Sludge and solids from the DAF would be sent to the sludge thickener, centrifuge or plate press, before being transported offsite (Figure 2-6).

Waste water effluent from the DAF system would then be directed to the bio-treatment plant. In this plant, organic chemicals in the waste water would be biodegraded using bacteria. The bacteria would continuously metabolize the organics in the water, which converts them to CO_2 and water. Using blowers and a high-efficiency diffuser manifold system, oxygen would be supplied to the microbial layer to provide proper conditions for microbial growth.

Waste water effluent from the bio-treatment plant would be held in the two holding ponds (700,000 gal each) and tested. If testing suggests additional treatment is needed, the water would be routed through the WWTU. If the water meets the refinery's criteria for discharge, it would be released to NPDES discharge Outfall 002.

Unit W — Storage, Blending, and Shipping

The refinery would maintain storage tanks and support facilities of sufficient size and capability to handle the production, handling, blending, and distribution of the products produced by the refinery. The primary components of this unit include storage tanks and vessels, rail and truck loadout facilities, and a vapor recovery system. The storage tanks would be in the tank farm and the rail and truck loadout facilities would be in the product loading area on the north side of the refinery site (Figure 2-7). The following sections describe each component.

Plant 60 — Storage Tanks and Storage Vessels

The eastern half of the refinery site would be occupied by the tank farm (Figure 2-7). The farm would include tanks for feedstock, intermediate products, and final products. Table 2-2 shows the projected inventory of storage tanks. Storage tanks would include both floating roof and fixed roof tanks. Storage tanks with floating roofs are used for storing volatile petroleum products with higher flash points to minimize vapor loss. The roof rests on the liquid, which greatly reduces the vapor space between the top of the tank and the top of the liquid. Minimizing the vapor space also reduces the potential for fires. Fixed roof tanks are used for storing less volatile products because they tend to have higher vapor loss.

The tanks and tank farm would be constructed to minimize the potential for accidental releases of the products stored in the tanks. The lower third of each tank would be double-walled. Additionally, each tank would be diked and the space inside the dike would be lined with a geotextile liner. Each dike would be sized to hold the entire contents of the tank plus stormwater from a 100-year, 24-hour storm event. The 100-year, 24-hour storm event for the portion of North Dakota that encompasses the project site is about 5 inches (Hershfield 1961).

Six vessels would be constructed to store butane and propane (Table 2-2). Storage vessels are pressure vessels or tanks that are generally used for storing organic liquids and gases with high vapor pressures (in contrast to floating and fixed roof tanks that store products at atmospheric pressure). Propane delivered from the merox plant would be stored until sent to the loading facilities for distribution. Field butanes would be delivered to the butane storage tanks via transport trucks. These field butanes would then be pumped to the iso-octane unit as an addition to the feedstock. Butane generated in the iso-octane unit would be pumped to a butane storage tank and then to the butane blending pump for blending with gasoline.

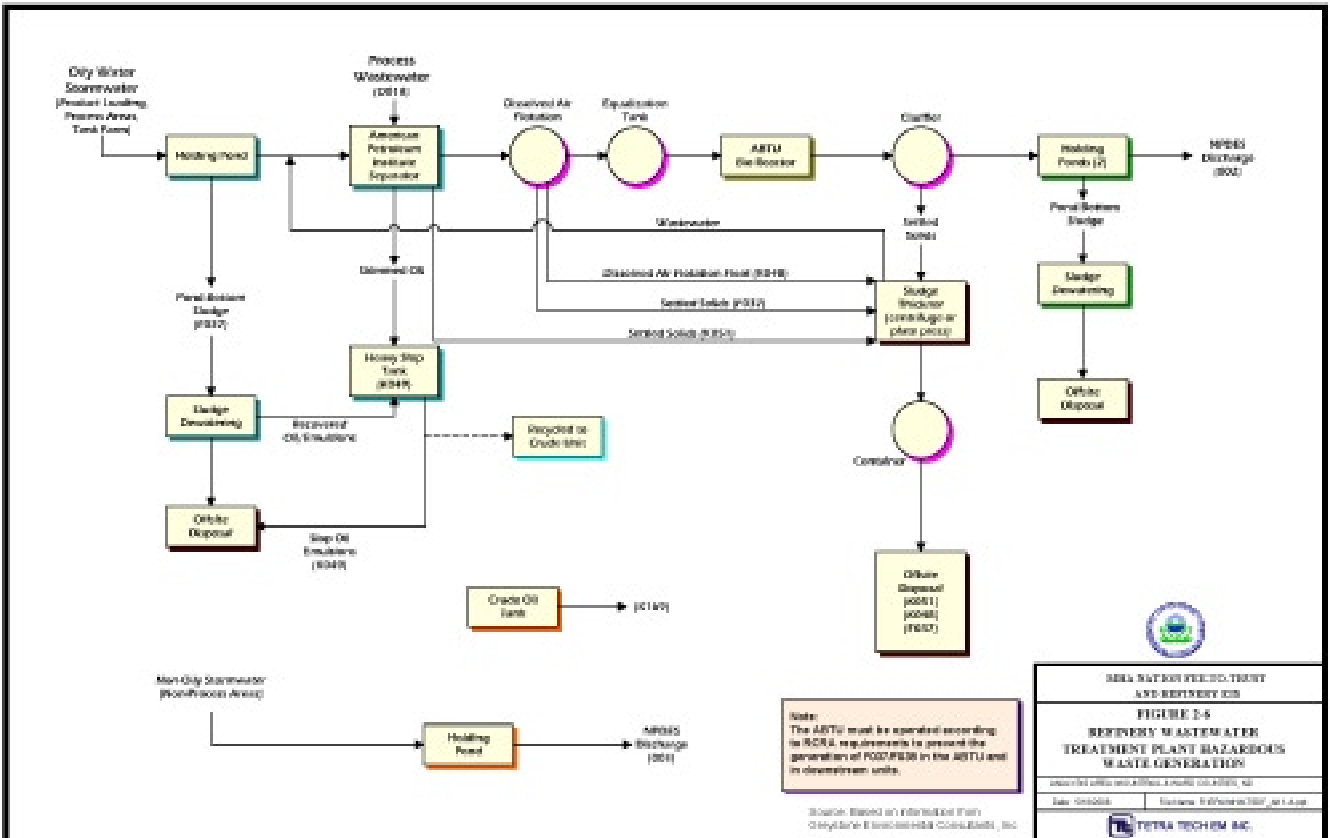


FIGURE 2-6
REFINERY WASTEWATER TREATMENT PLANT HAZARDOUS WASTE GENERATION

FIGURE 2-7
SITE LAYOUT

Table 2-2 Summary of Tanks to be Constructed on the Refinery Site

Content of Tank	Volume (bbls)	Size of Tank: Diameter (feet)	Size of Tank: Height (feet)	Type of Tank
Crude Oil	40,000	85	48	Floating roof
Crude Oil	40,000	85	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Mid Distillate	50,000	86	48	Floating roof
Raw Light HC	5,000	30	40	Floating roof
Light Slop HC	5,000	30	40	Floating roof
Hydrocrackate	5,000	30	40	Floating roof
Naphtha	5,000	30	40	Floating roof
Ethanol	5,000	30	40	Floating roof
Alkylate	10,000	45	40	Floating roof
Reformate	10,000	45	40	Floating roof
Bio-diesel	10,000	45	40	Floating roof
Atm Red Crude	8,000	42	40	Fixed Roof
Raw Heavy HC	5,000	30	40	Fixed Roof
Raw Heavy Diesel	8,000	42	40	Fixed Roof
Raw Light Diesel	8,000	42	40	Fixed Roof
Heavy Slop HC	5,000	30	40	Fixed Roof
Regular Gasoline	25,000	67	40	Floating roof
Regular Gasoline	25,000	67	40	Floating roof
Premium Gasoline	25,000	67	40	Floating roof
Off Road Gasoline	3,000	30	32	Floating roof
Propane	2,000	11	126	Pressure vessel
Propane	2,000	11	126	Pressure vessel
Propane	2,000	11	126	Pressure vessel
Propane	2,000	11	126	Pressure vessel
n Butane	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Field Butanes	2,000	14	85	Pressure vessel
Total	**461,000**			

Source: Woolley 2003, Woolley 2006

Plant 61 — Blending

The preparation of finished products involves a blended recipe of various components to produce the final specification product. These requirements change seasonally so tankage must be designated as component tankage, blending tankage, and finally sales tankage. The blend tank is filled with various components and is blended with tank mixers or circulating pumps. Laboratory testing is conducted to ensure product quality and then the blend tank is released to sales. All deliveries are obtained from approved sales tankage only.

Plant 62 — Shipping and Receiving

Product delivery would be provided by railroad and truck delivery.

Rail Loading

Rail loading would be provided for light diesel, heavy diesel, regular gasoline, and premium gasoline. These loading facilities would use the vapor recovery system to control emissions during loading. The loading area also would be paved with concrete surrounded by curbs. All process drains would be sealed and elevated above grade. Hydrocarbons collected in these drains would be returned for reprocessing. Stormwater drains would be mounted in the concrete flush with grade. Water collected in these drains would be delivered to the WWTU for treatment.

Truck Loading

Truck loading facilities, with vapor recovery systems, would be available for loading and shipment of light diesel, heavy diesel, regular gasoline, premium gasoline, and propane. Field butanes would be delivered to the butane storage vessels via transport trucks unloaded at the truck loading facility.

As with the rail loading facilities, the truck loading area would be paved with concrete surrounded by curbs and dual drain systems installed. All process drains would be sealed and elevated above grade. Hydrocarbons collected in these drains would be returned for reprocessing. Stormwater drains would be mounted in the concrete flush with grade. Potentially contaminated (oily) stormwater will first be sent to a holding pond and could be routed to the WWTU effluent holding ponds or to the WWTU (API Separator).

Vapor Recovery System

The refinery would incorporate a vapor recovery system to minimize the loss of VOCs from the tank farm, rail and truck loading docks, and the WWTU. This system would consist of floating roof, spherical, and bullet storage tanks in the tank farm and a separate pipe loop that would collect vapors at each tank, loading spot, and the WWTU. Vapors captured by the system would be compressed, air cooled, and returned to the process for recovery. This vapor recovery system would minimize fugitive emissions of VOCs from the refinery.

Unit X — Bio-diesel

Initially, the MHA Nation would purchase bio-diesel for blending at the refinery. Bio-diesel is readily available at favorable economics. Consequently, MHA Nation proposes to open the refinery with only a bio-diesel blending plant.

Plant 66 — Bio-diesel

The economic situation favoring buying bio-diesel over producing the bio-diesel is unlikely to last. Consequently, the MHA Nation expects the need to produce bio-diesel at the refinery in the future. As a result, the MHA Nation has included this unit in the proposed project action because it ultimately would be constructed even though it may not be built initially.

The bio-diesel plant would convert oil from soybeans into a mono alkyl ester of long chain fatty acids or bio-diesel. Although this bio-diesel would have an excellent cetane index and no sulfur content, the pour point would be relatively high for cold weather use. Consequently, the output of this plant would be blended with the refinery diesel pool to produce a useable bio-diesel product. The bio-diesel plant would be sized to produce up to 300 BPSD of bio-diesel from 8,500 bushels per day of locally grown soybeans, canola, or camelina.

In the plant, bio-diesel would be produced using the base catalyzed transesterification process. In this process, the soybeans would be crushed mechanically to release their oil. This oil would then be reacted with a short-chain alcohol, such as methanol, in the presence of a catalyst. The catalyst would be sodium or potassium hydroxide, which would be premixed with the methanol. The reaction would produce bio-diesel and glycerin. Generally, 100 pounds of oil reacted with 10 pounds of methanol and 1 pound of catalyst would produce 100 pounds of bio-diesel and 10 pounds of glycerin. The residual solids could potentially have market value as animal feed, if the material met federal and state standards for limiting toxic or deleterious residues in animal feed. Both the soybeans and mash would be contained in covered storage units.

Unit Z — General Refinery

Plant 80 — Off-Sites

Each of the process units is defined by a battery limit boundary within which all the related equipment is contained. These facilities are considered to be Inside Battery Limits (ISBL). Everything else in the refinery is considered to be Outside Battery Limits (OSBL). These are referred to as Off Sites, and include such things as interconnecting pipe racks, roads, connections to infrastructure coming to the refinery (power, crude oil pipelines, natural gas pipeline, and water supply.

Plant 81 — Office/Warehouse

The office and warehouse are connected together to provide a central location for administrative staff at the refinery. The warehouse will contain very valuable spare parts critical to the operation. The warehouse will also have a machine shop with tools to provide maintenance spare parts right on site. The medical facility will also be attached to the Warehouse including a garage for the Fire Truck, ambulance and foam wagon. The central location leads to better supervision of these critical services.

Plant 82 — General Unit

The general area is designated to assign control over office equipment, mobile equipment, safety equipment, and other equipment used refinery wide, but not assigned to a specific unit.

2.3.2.2 Pollution Prevention Measures

The MHA Nation Refinery’s design incorporates many measures to minimize pollution. Many of these design elements, such as the use of synthetic oil, air instead of water for cooling, double-walled tanks, and a vapor recovery system, are identified in previous sections. Wastewater pollution prevention measures include segregating potentially contaminated (oily) and uncontaminated (non-oily) stormwater, reuse of treated wastewater in refinery processes, and reuse of uncontaminated (non-oily) wastewater in fire water system. Additional pollution prevention measures include monitoring plans, spill contingency plans, designating a waste minimization and pollution prevention coordinator, regularly assessing hydrocarbon losses, segregating oily from non-oily wastes, minimizing the use of drums for chemical additives, conducting regular and pertinent personnel training, and using centralized computerized monitoring systems.

2.3.2.3 Construction Phase

The description of the construction phase for the refinery has been divided into several elements. They are the refinery itself, the pipeline that would connect the refinery to Enbridge’s oil pipeline, connections to utilities (natural gas and electricity), the railroad spur, and workforce requirements. Details of these elements are presented in the following sections.

Refinery

The MHA Nation expects to begin constructing the MHA Nation Refinery after it has acquired the appropriate permits. Construction would take 18 to 24 months.

Construction would begin with the stripping of topsoil, grading of the refinery site, and excavating foundations and spaces for underground works (Figure 2-8).

The topsoil would be stockpiled in a berm along the northern boundary of the refinery site. This berm would provide some screening of the refinery from highway 23. The topsoil would be used during reclamation of the site after the refinery is decommissioned and removed.

As excavations for foundations and spaces for underground works are completed, construction of these facilities would begin. Pipe racks and piping that would connect the various modules would then be constructed (Figure 2-9). As the piping for connecting the various processes, including the storage tanks, process units, and loading units, is completed, the units would be constructed (Figure 2-10).

The process units would be modular in nature and shipped to the refinery site via truck or rail when ready (Figure 2-11). These modules would then be dropped into place using cranes and plumbed into the existing pipeline connections. The MHA Nation expects most of the modules would be fabricated at shops in North Dakota.

Figure 2-8 Example of Initial Excavation of a Refinery

Figure 2-9 Aerial View of Typical Foundation and Underground Structure Construction

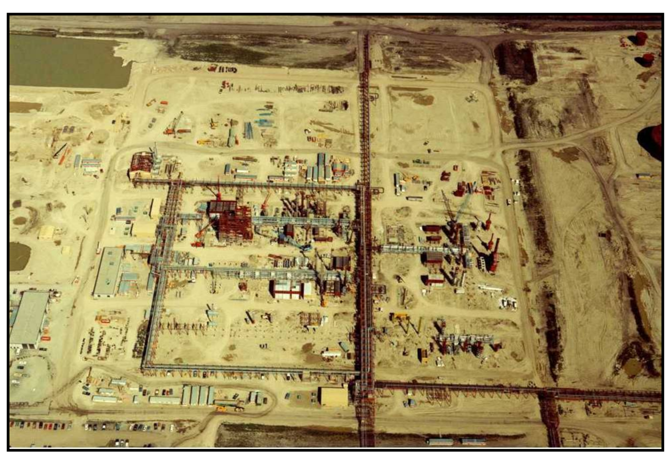
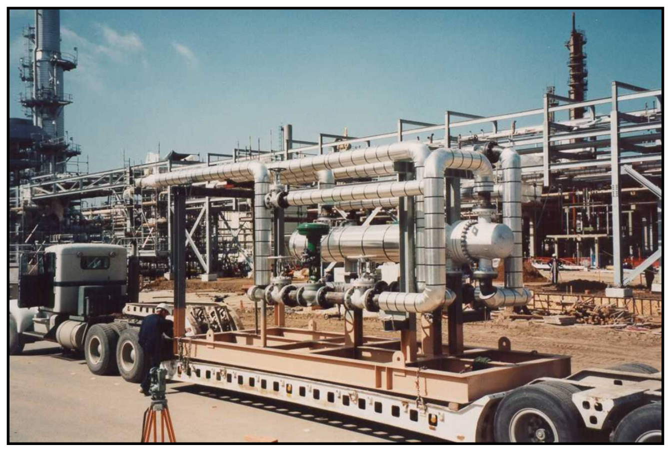


Figure 2-10 Typical Construction of Aboveground Structures

Figure 2-11 Example of a Modular Unit Arriving at a Refinery Ready for Installation



Oil Pipeline

Enbridge Pipelines of North Dakota (Enbridge) would supply the synthetic crude oil feedstock to the refinery. Enbridge would tie into a synthetic crude oil pipeline in Outlook, Montana and pump the oil through its existing system to its Wabek/Plaza field pipeline, which terminates about 4 miles north of the refinery (Figure 2-1). Enbridge would construct a new pipeline to connect the terminus of its Wabek/Plaza field pipeline to the crude oil storage tanks in the refinery's tank farm (Figure 2-12). Additionally, Enbridge would have to construct four new 30,000-bbl storage tanks between Outlook, Montana and the refinery (Figure 2-1). Thus, Enbridge would provide the synthetic crude oil to the refinery using the combination of existing pipelines and storage tanks, new pipeline, new storage tanks at existing stations, and new pumping facilities.

Along its existing pipeline, Enbridge would construct four new 30,000-bbl tanks to store the synthetic crude. Enbridge would need these tanks to facilitate its operations and ability to keep oil flowing to the refinery. Two of the tanks would be constructed in Montana and two would be constructed in North Dakota. Enbridge would construct all four tanks on properties where it already has pumping stations, storage tanks, and other facilities (Table 2-3). The tanks would be constructed on portions of the properties that were cleared of vegetation, graded, graveled, and fenced during development of the original facilities in anticipation of future expansion. Thus, no expansion of these stations or construction on undisturbed ground would be needed to accommodate the new storage tanks. The four tanks would be constructed similarly to those at the refinery (floating roof, double walled at bottom, and diked).

Enbridge would construct a new pipeline to connect the refinery to its Wabek/Plaza field pipeline (Figure 2-12). This pipeline would extend 4 miles to the terminus of the Wabek/Plaza field pipeline in the SW¼ of Section 2, Township 152 North, Range 88 West to the refinery. About one mile of the pipeline would be constructed along a local road and three miles would be constructed along a railroad belonging to the Canadian Pacific Railway (C.P.R.).

The pipeline would be a standard type of pipeline for crude oil. Enbridge would construct the pipeline of steel pipe. It would have an outside diameter of 6⅝ inches. The pipeline would be buried with a minimum cover of 36 inches.

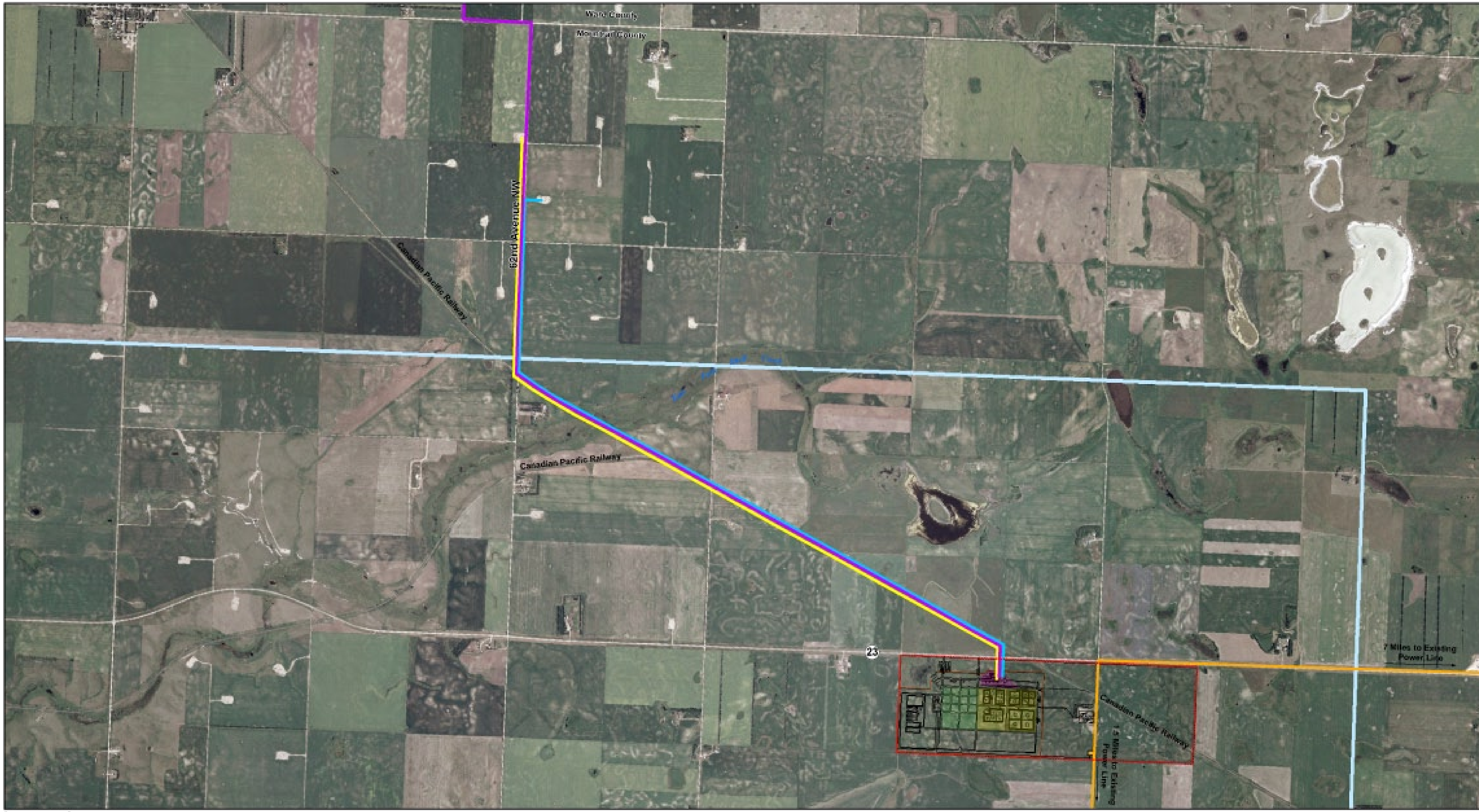
Table 2-3 Locations of Proposed 30,000-bbl Storage Tanks along Enbridge's Pipeline

Station Name	County	Legal Description
Montana		
Outlook	Sheridan	Township 36 North, Range 53 East, Section 21, SW¼
Reserve	Sheridan	Township 33 North, Range 56 East, Section 30, NW¼ of NW¼
North Dakota		
Grenora	Williams	Township 159 North, Range 103 West, Section 14, NE¼ of NE¼
Beaver Lodge	Williams	Township 156 North, Range 95 West, Section 32, SE¼ of SW¼

Construction of the pipeline would follow standard methods. The pipeline would be constructed in a single spread consisting of equipment and crews handling the various phases of construction along the route. Construction would take three to four weeks. The construction spread would involve 10 to 12 workers. Enbridge would stage the construction from the terminus of its Wabek/Plaza field pipeline, which would involve only property it already leases. Construction practices would follow the stormwater pollution prevention plan (SWPPP) according to the stormwater construction permit.

Before construction begins, the centerline and the exterior boundaries of the Right-of-Way (ROW) would be staked. The pipeline would be constructed within the ROW of the road and C.P.R.'s rail line. The permanent ROW would be 10 feet wide, which is the maximum the C.P.R. would allow.

Following construction, Enbridge would test the pipeline and reclaim the area disturbed during construction. The pipeline would be tested hydrostatically. After soil over the pipeline is graded to approximate original contour, it would be seeded with seed mixes approved by the landowner. Construction and reclamation conducted through wetlands would be conducted according to nationwide permits Enbridge commonly uses for constructing pipelines.



Legend

- Proposed Oil Pipeline
- MDU Resources Pipeline
- Power Transmission Line
- Bear Paw Pipeline
- Fenceline
- Fee-to-Trust
- Fort Berthold Indian Reservation
- Product Loading Area
- Process Area
- Tank Farm

Area of Detail

0 1,000 2,000 4,000 6,000 Feet

Transverse Mercator Projection
1983 North American Datum
Zone 14

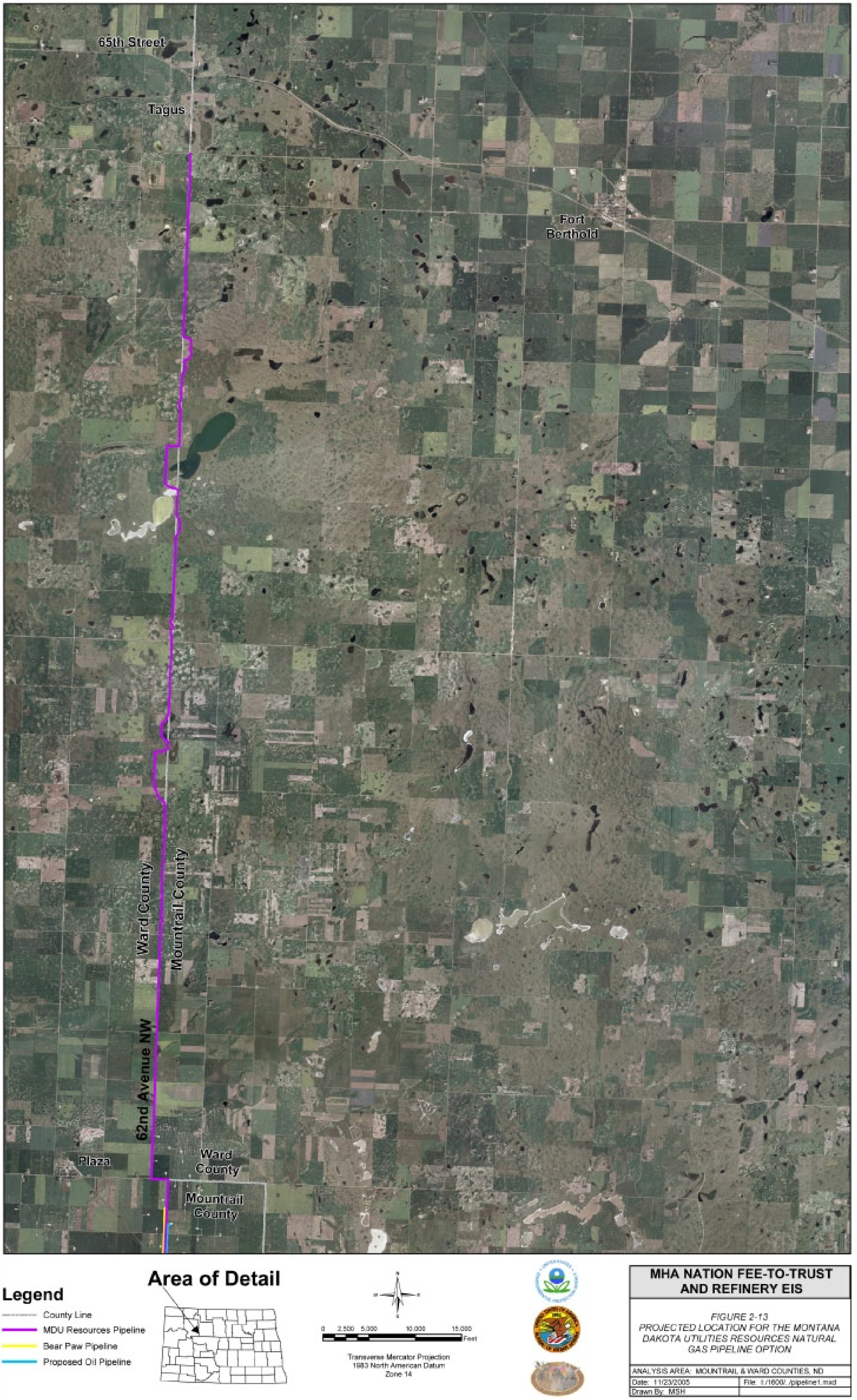
MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 2-12
PROPOSED PIPELINES, POWER LINES, AND PROJECT SITE

ANALYSIS AREA: MOUNTRAIL & WARD COUNTIES, ND

Date: 11/23/2005 | File: I:/1600/../figure_2-9.mxd

Drawn By: MSH



MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 2-13
PROJECTED LOCATION FOR THE MONTANA DAKOTA UTILITIES RESOURCES NATURAL GAS PIPELINE OPTION

ANALYSIS AREA: MOUNTRAIL & WARD COUNTIES, ND
Date: 11/23/2005 File: I:/1600/../pipeline1.mxd
Drawn By: MSH

Natural Gas Pipeline

The refinery would require natural gas for operations. Natural gas would be both a source of hydrogen and fuel. The hydrogen would be used to remove sulfur from the oil. The proposed project action includes SMR as the process for generating the hydrogen needed in the process. Demand for natural gas would be 6 MMSCFD.

The MHA Nation is considering two options for providing natural gas to the refinery. First, Montana Dakota Utilities (MDU) Resources Group, Inc. would supply natural gas using a new pipeline that would connect its existing Williston Basin Interstate Pipeline to the refinery (Figure 2-12 and **Figure 2-13**). This pipeline would extend 29 miles from the existing pipeline in the NE¼ of Section 24, Township 155 North, Range 88 West to the refinery. As with the oil pipeline, a portion of the pipeline would be constructed along the railroad belonging to C.P.R.. The oil and gas pipelines would be constructed on opposite sides of the railroad because of space requirements.

Under the second option, Bear Paw Natural Gas Company (Bear Paw) would supply natural gas using a new pipeline that would connect its existing Plaza pipeline to the refinery (**Figure 2-13**). This pipeline would extend 4 miles from the existing pipeline in the NE¼ of Section 3, Township 152 North, Range 88 West to the refinery. As with the oil pipeline, about one mile of the pipeline would be constructed along a local road and three miles would be constructed along the railroad belonging to the C.P.R.. The oil and gas pipelines would be on opposite sides of the railroad because of space requirements.

Under either option, the pipeline would be a standard type of pipeline for natural gas. MDU Resources or Bear Paw would construct the pipeline of steel pipe. It would have an outside diameter of 8 inches. The pipeline would be buried with a minimum cover of 36 inches.

Construction of either pipeline would follow standard methods. The pipeline would be constructed in a single spread consisting of equipment and crews handling the various phases of construction along the route. Construction would take three to four weeks. As with the oil pipeline, the construction spread would involve 10 to 12 workers. MDU Resources or Bear Paw would stage the construction from existing facilities near the pipeline’s route. Thus, they would not need to acquire any additional property to stage construction of the pipeline. Construction practices would follow the SWPPP according to the stormwater construction permit.

Before construction begins, the centerline and the exterior boundaries of the ROW would be staked. The pipeline would be constructed within the ROW of the road and C.P.R.’s rail line on the side opposite the oil pipeline. The permanent ROW would be 10 feet wide, which is the maximum the C.P.R. would allow.

Following construction, MDU Resources or Bear Paw would test the pipeline and reclaim the area disturbed during construction. The pipeline would be tested hydrostatically. After soil over the pipeline is graded to approximate original contour, it would be seeded with seed mixes approved by the landowner. Construction and reclamation conducted through wetlands would be conducted according to nationwide permits both companies commonly use for constructing pipelines.

Power Lines

The refinery needs a constant supply of 6 to 7 megawatts (MW) of electricity. Blackouts can cause substantial problems. Consequently, electricity would be supplied to the refinery from two separate circuits.

Verendrye Electric would provide electricity to the refinery by constructing new power lines from two separate locations and 41.6 kV circuits (Figure 2-12). The first connection would occur in the southeast corner of Section 15, Township 152 North, Range 86 West. Verendrye's main north-south loop line crosses highway 23 at this location. From here, Verendrye would construct a new power line along the edge of the highway 23 ROW to the northeast corner of Section 19 at the Project Site. The line would then proceed south along the edge of the gravel road ROW to the southeastern corner of the north ½ of Section 19. At this corner, Verendrye would construct the primary substation for the refinery (Figure 2-7). The total length of the power line would be almost 9.5 miles and the substation would occupy 0.4 acres of the project site.

The second connection would be in the southeast corner of Section 30, Township 152 North, Range 87 West. Verendrye's main east-west loop line runs along the southern edge of Section 30. The new power line would follow the gravel road ROW 1½ miles north from this connection to the location of the new substation in the southeastern corner of the north ½ of Section 19. From the substation, a single power line would be constructed into the refinery (Figure 2-7).

Construction of the power lines would follow standard methods for constructing power lines. The structures would be the same as currently exist for both loop lines (Figure 2-14). Consequently, the power lines would be constructed to prevent the electrocution of raptors. Verendrye would construct the power lines by drilling holes for the poles, installing the poles, and hanging the conductors from each road's ROW. Thus, Verendrye would require only a minimal easement along each road.

Figure 2-14 Existing Verendrye Power Line at Highway 23 Crossing

The power lines would be constructed using a single spread consisting of equipment and crews handling the various phases of construction along the route. Construction would take 5 weeks. The construction spread would involve 8 workers.

Water Wells

As noted earlier, water for the refinery would be provided by four wells drilled from the refinery site. These wells would probably be completed into the Fox Hills-Hell Creek bedrock aquifers. Depths of the wells could range from 150 to 1,000 feet.

Railroad Spur

A railroad spur would be constructed into the refinery from the existing railroad that crosses the project site (Figure 2-5). The C.P.R., which owns the railroad, would construct a spur into the refinery's loading area (Figure 2-7). This spur would facilitate the delivery of feedstock and shipment of product via rail.

Construction of the railroad spur would follow standard methods. Existing vegetation would be cleared from the new rail bed. Ground that would be under the rail bed would be grubbed and the topsoil would be removed and stockpiled for reclamation after the spur is decommissioned. Gravel and other materials required for the rail bed would be acquired from local sources. After the subgrade is prepared, sub-ballast material would be placed and compacted to a depth of 6 to 12 inches. Ties and rail would be laid on the subgrade and welded in place. Ballast would then be brought in, dumped on the subgrade and around the ties, and compacted into place to a minimum depth of 8 to 12 inches below the tie. Areas adjacent to the rail bed and outside the product loading area that were disturbed during construction would be regraded, covered with topsoil, and seeded and mulched.

The portion of rail spur in the product loading area would not be regraded and covered with topsoil. Instead, this area would be covered with concrete. This concrete would contain any leaks that occur during loading or unloading of rail cars at the refinery.

Workforce Requirements

A substantial number of workers would be required to construct the refinery. A peak of 800 to 1,000 labors and skilled workers are expected to be employed in the refinery's construction during 18- to 24-month long construction period.

A substantial portion of the construction workers are expected to be members of the MHA Nation. The Fort Berthold Community College had training courses for individuals that are interested in working at the refinery. As a facility owned and operated by the MHA Nation, MHA Nation members would have preference in hiring. Consequently, many of the workers would live on the Fort Berthold Reservation and would commute to the refinery site daily to work. The rest of the workforce is expected to live in or around Minot. Consequently, they would commute to the refinery site from Minot daily.

2.3.2.4 Operation and Maintenance Phase

This section describes the operations of the various facilities and notable maintenance procedures.

Refinery

Products

During the operation and maintenance phase, the refinery would operate for 347 stream days annually. During the other 18 days, production at the refinery would be shut down for maintenance. With 347 days of production annually, the refinery would produce almost 2.0 million bbl of diesel fuel, 2.3 million bbl of gasoline, and 0.1 million bbl of propane on average every year. These products would be shipped from the refinery via truck and rail car as discussed in the section on traffic below.

Water Demand and Treatment

As noted earlier, water for the refinery's processes and daily use would come from four wells drilled on site. The refinery's overall operational demand for water would be 40 gpm. Because the refinery would be operating with air cooling equipment instead of water cooling equipment, the demand for water would be far less than occurs at other refineries in operation in the U.S. and North America. The closest refinery (in size and type) was the Turbo Refinery in Canada, which also used air cooling. This refinery, which had a desalter, used up to 250 gpm of water. No desalter is needed for the MHA Nation's refinery because the crude is already treated at the source in Canada.

The refinery's water treatment facilities would handle water used in the various processes and stormwater that falls within the loading area, tank farm, and process area. Handling and treatment of the waste water would depend on the source of the waste water (Figure 2-3 and Figure 2-4). Contaminated water from processes would be routed to the WWTU for treatment before being released to holding ponds and discharged through NPDES permitted Outfall 002.

At least 10 of the 40 gpm demand would be recycled through the WRP. However, half or more of the 40 gpm could be recycled, depending on the amount of actual contamination that occurs (Figure 2-4). The portion of the waste water too contaminated for recycling would be routed to the WWTU for treatment. Contaminated water could be held in the three holding ponds, before treatment (1 holding pond) and after treatment (2 holding ponds). The wastewater will be tested prior to release to NPDES permitted Outfall 002.

Solid and Hazardous Waste and Solid Byproduct Production

The refinery would produce solid waste and would be classified as a generator of hazardous waste under 40 CFR Part 262 and would be a TSD Facility under 40 CFR Part 264. Projections suggest the refinery would produce about 660 pounds of solid waste per day. The solid waste streams generated by the WWTU and WRP would be segregated to minimize the amount of hazardous waste requiring disposal. By segregating the streams, about 600 of the 660 pounds of solid waste produced daily would be non-hazardous. Consequently, the refinery would produce about 60 pounds of hazardous waste daily.

Wastes designated as "hazardous" would be temporarily stored on site prior to handling and shipment offsite to permitted commercial facilities for treatment, disposal, or both. Any waste generated in the units would be contained and controlled before placement in storage/shipment containers. No hazardous wastes would be stored for more than 90 days from the time of generation, unless an extension is requested by the refinery and granted by the EPA, as allowed for in 40 CFR 262.34 (b). Reasons for such an extension would be unforeseen, temporary, and uncontrollable circumstances. The temporary storage of hazardous wastes would take place in full compliance for management of tanks, containers, drip pads, or containment buildings (40 CFR 262.34 (a)).

The MHA Nation's refinery would generate solid wastes at a much lower level than the average existing refinery. The API surveyed 117 refineries and concluded solid wastes, on average, represent about 0.08 percent by weight of the crude oil feed. For the MHA Nation's refinery, this amount would be 2,100 pounds per day. However, the amount of wastes that would actually be produced (660 pounds per day) would be substantially lower than results of the survey suggest because the feedstock would be cleaner and the refineries involved in the survey have processes that would not be constructed at the MHA Nation's refinery (vacuum units, water cooling towers, desalters, and cokers) that produce substantial amounts of wastes.

The refinery's configuration also includes a bio-diesel process unit to convert locally grown soybeans to bio-diesel. The plant has been designed to produce about 300 BPSD of bio-diesel from 8,500 bushels per day of locally grown soybeans. The residual solids from the bio-diesel process (byproduct) have market value as animal feed. The soybean feed would be transported into the refinery and the solid residue exported by truck and rail. On-site storage for soybeans and soybean mash would consist of two concrete silos, one for the soybeans and one for the mash. Each silo would be 20 feet in diameter and 100 feet tall.

Traffic

The refinery would generate new traffic to and from the project site. This traffic would consist of cars, trucks, and rail cars. Most of the trucks would be semi-tractor trailer types and the rail cars would be tank cars. There would be between 65 and 70 full time employees commuting to and from work daily. However, these employees would not be arriving and departing simultaneously because they would be distributed across three shifts. There would also be ancillary employees commuting to and from the work as needed. Most of the feedstock and shipments that are not transported via pipeline would arrive or depart the refinery via truck (Table 2-4). Only butane would arrive via rail tank car. Once the biodiesel plant is constructed and functioning, soybeans and soybean mash will also be delivered by railcar.

Maintenance

The refinery would have a specific and detailed maintenance plan in place when it begins operations. This plan would define the various duties (for example, inspections, periodic work, and shutdowns), schedules (daily, weekly, monthly, annually, and periodically), and responsibilities for all processes and facilities at the refinery.

Oil Pipeline

During operation of the refinery, Enbridge's oil pipeline would supply 10,000 BPSD of synthetic crude oil. Assuming the refinery operates for 347 stream days per year, Enbridge would supply 3.47 million bbl of synthetic crude oil to the refinery annually.

Once the pipeline is on line, it would become part of Enbridge's overall system of pipelines. Consequently, it would fall under Enbridge's program of routine inspections and maintenance. Enbridge's maintenance program follows all U.S. Department of Transportation regulations for pipelines.

The pipeline would be monitored 24 hours per day. Pressure within the pipeline and readings from meters would be monitored electronically. The pressure and readings from meters would be transmitted to Enbridge's 24-hour control center. Changes in pressure or inconsistent readings from the meters would indicate if a leak has developed.

Utilities

During operation of the refinery, the natural gas pipeline would supply 6 MMSCFD of natural gas. Assuming the refinery operates for 347 stream days per year, MDU Resources or Bear Paw would supply 2,000 MMSCFD of natural gas to the refinery annually.

Once the pipeline is on line, it would become part of MDU Resources' or Bear Paw's overall system of pipelines. Consequently, it would fall under the appropriate company's program of routine inspections (monitoring) and maintenance. MDU Resources' and Bear Paw's maintenance programs follow all regulations for natural gas pipelines.

Table 2-4 Summary of Weekly Truck and Rail Traffic at the Refinery

Traffic	Number of Vehicles by Type: Semi-truck	Rail Car[1]
Incoming		
Butane	22	20 movement in
Ethanol	14	
Bio-diesel[2]	8	
Soybeans[3]	15	14
Outgoing		
Gasoline	161	
Diesel	154	
Propane	6	
Sulfur	1	
Soybean mash[3]		14
Non-hazardous sludge	1	
Hazardous sludge	<1 [4]	
Total (without full bio-diesel unit)	**367**	**20**
Total (with full bio-diesel unit)	**374**	**48**

Notes:
1. All rail cars would be included in a single outbound train and a single inbound train each week.
2. Bio-diesel would be purchased and used for blending when the refinery opens. Purchasing of bio-diesel would continue as long as it is economically favorable to do so.
3. Soybeans and soybean mash would be supplied to and from the refinery only after buying bio-diesel directly becomes economically unfavorable and the bio-diesel unit has been constructed.
4. One truck per month.

The two power lines and substation would become part of Verendrye's overall system of power lines. Consequently, the lines and substation would fall under Verendrye's program of routine inspections (monitoring) and maintenance. Verendrye's maintenance program follows all regulations for electrical distribution lines.

Workforce Requirements

The refinery would require new workers during the operation and maintenance phase of the project. There would not be any anticipated new employees for the pipelines, other utilities, or railroad. The refinery is expected to employ about 86 workers directly. This would include 65-70 employees needed to run the refinery on a continuous basis. Additional personnel and contractors would be needed for: security, maintenance, grounds keeping, and administrative personnel. The types of positions that would comprise these jobs are summarized on Table 2-5. Most of these positions would require some level of technical education, such as was offered at the Fort Berthold Community College. Consequently, most of the positions are expected to be filled by the local community, which also would not increase the demand for housing. In addition, the refinery would regularly use the services of a variety of contractors throughout the year (Table 2-5).

Table 2-5 Summary of Workforce for the MHA Nations' Proposed Clean Fuels Refinery

Position	Shift	No. of Crews	No. of Employees/Crew	Total No. of Employees
Permanent Personnel				
Refinery Manager	Days	1	1	1
Operations Manager	Days	1	1	1
Engineering[1]	Days	1	5	5
Accounting Manager	Days	1	1	1
Accounting Staff	Days	1	3	3
Clerical	Days	1	6	6
Maintenance Planners	Days	1	4	4
Nurse	Shift	4	1	4
Dayshift Supervisor	Days	1	1	1
Shift Supervisor	Shift	4	1	4
Lead Operator	Shift	4	2	8
Plant Operators	Shift	4	10	40
Laboratory	Days	1	3	3
Safety	Days	1	1	1
Training	Shift	4	1	4
Total				**86**
Contract Personnel				
Security	Shift	4	2	8
Regular Maintenance[2]	Days	1	20	20
Contractors[3]	Days	1	25	25
Turnaround Maintenance[4]	Annual	1	350	350
Total				**403**

Notes:
1. Includes staff engineers and one process control engineer.
2. Daily tradesmen.
3. Estimate of outside contract services.
4. Annual tradesmen working for 1 month annually.

2.3.2.5 Decommissioning and Reclamation Phase

This section describes the final phase of the project where the refinery and associated facilities would be decommissioned and removed and the project site would be returned to approximate pre-project conditions. Decommissioning consists of decontamination, dismantling, shipment and final disposition of refinery components, and site rehabilitation. Disposition of refinery plant components can take place either by re-use or depositing them into properly permitted off-site disposal sites. Decommissioning must comply with all relevant regulations, including those promulgated pursuant to RCRA. All refinery construction alternatives except for Alternatives 4 and A, would be required to prepare a RCRA closure plan for all Hazardous Waste Management Units (HWMU) (including surface impoundments, tanks, and areas used for greater than 90-day container storage). All alternatives, including 4 and A, would also need to meet the clean closure requirements under RCRA for areas where hazardous waste is generated or accumulated. A RCRA closure plan, however, would not encompass site rehabilitation, which would be governed by other agreements between the federal agencies and the Tribes. For all alternatives except 4 and A, RCRA corrective action requirements would also apply for all releases of hazardous waste or hazardous waste constituents from all solid waste management units (SWMU).

Refinery

Upon decommissioning, all surface facilities at the refinery site would be removed. Units, equipment, and materials that could be used at other facilities would be sold and shipped to those facilities. Other units, equipment, and materials would be disassembled and sold as scrap.

After the surface facilities have been removed, the site would be sampled for contamination and remediated as necessary. Appropriate sampling and laboratory testing would be used to determine if any contamination exists and if so, to determine the areal extent of that contamination. Any contaminated areas would be remediated using methods appropriate to the materials of concern identified by the sampling and testing.

If no contamination is identified or after any contamination is remediated, the refinery site would be reclaimed. Reclamation would consist of ripping the soils, recontouring the site to approximate original contours, redistributing the topsoil that was stockpiled in the berm, and seeding. The seed mixture or mixtures used in reseeding would be determined by the MHA Nation based on post-reclamation land uses proposed for the site at the time of reclamation. The wetland would be recreated as part of recontouring and revegetation.

Utilities

All utilities would be decommissioned and reclaimed, unless the MHA Nation identifies a need for a particular utility at the time of reclamation. Assuming no post-reclamation need for the utilities is identified, reclamation would proceed as described.

The procedures for decommissioning and reclaiming the pipelines are straightforward. The underground pipelines would be purged, cleaned, disconnected, capped, and abandoned in place to avoid any unnecessary surface disturbance. The oil pipeline would be purged with nitrogen. Aboveground facilities associated with the pipelines would be removed and the surface disturbances associated with those facilities would be ripped, recontoured, and seeded with a seed mixture approved by the landowner.

The aboveground electrical facilities would be disconnected and removed. The conductors and power poles would be removed from along highway 23 and 366th Street. Also, the electrical substation along the east side of Section 19 would be removed and the site reclaimed. Reclamation would involve ripping the soil, recontouring the site to approximate original contours, redistributing the topsoil that was stockpiled during construction, and seeding with a landowner-approved seed mixture.

2.3.2.6 Safety and Emergency Response

This section outlines the methods the entities involved in the MHA Nation's proposed Clean Fuels Refinery Project would employ to ensure the safe operation of the refinery and pipelines during construction, operation, and maintenance.

Fires and Explosions

The potential for leaks or ruptures in pipelines and in units at the refinery would exist. In the case of buried pipelines, most ruptures are the result of heavy equipment that accidentally strikes the pipeline. These ruptures could result in an explosion and fire if a spark or open flame ignites the escaping gas or oil. The materials used in the pipelines would be designed and selected according to applicable standards to minimize the potential for leak or rupture. Frequent markers along the pipelines would reduce the risk of accidental ruptures from excavating equipment. Additionally, the companies would monitor flows in the pipelines by either remote sensors or daily inspections of the flow meters, which would reduce the probability of ruptures through prompt detection of leaks.

Because most processes are closed, the primary potential for fire at the refinery is from leaks or releases of liquids, gases, or vapors reaching an ignition source such as a heater. Consequently, the operation of equipment and the various processes are closely monitored and controlled. An extensive, computerized plant information network would be installed to monitor all operations and provide early warnings of any developing problems. Also, operations at the refinery would conform to regulations of the OSHA. OSHA regulations require safe work practices and appropriate personal protective equipment (as needed for exposures to chemicals and other hazards such as noise and heat) during tests, inspections, maintenance and turnaround activities, and when handling regenerated or spent catalyst.

Public Safety

The MHA Nation would take measures to protect the public from hazards at the refinery. The entire facility would be fenced and gated to prevent unauthorized entry. Also, warning signs would be posted around the facility. The refinery would conform to all OSHA health and safety regulations. All operations and permitted releases to surface water and air would be monitored.

Employee Safety

The MHA Nation would develop an Emergency Action Plan that would cover all potential emergencies, including fires, injuries to employees, chemical releases, and general public safety. The plan would include telephone numbers for all medical and emergency services and the contacts in event of emergencies. The plan would be posted at all offices and facilities. All employees and subcontractors would be trained on the Emergency Action Plan when they are hired and refresher courses would be conducted annually.

The refinery also would develop and maintain an emergency response team. This team and its equipment would be stationed at the refinery. The equipment would include fire engines and other fire-fighting equipment and an ambulance. The members of the team would be trained emergency response technicians.

Security

The refinery would be operated as a secure facility with restricted access. The facility (all but the office building) would be enclosed by an 8-foot high chain link fence topped with barbed wire. The main gate would be manned by security personnel 24 hours per day, 7 days per week. The east gate, which primarily would provide access during construction and access to vehicles too high to clear pipe racks, would be locked and only opened by security personnel when granting access to specific vehicles. The main gate also would be monitored by a closed-circuit television camera. Security personnel would patrol the perimeter fence.

Emergency Response Plan

An SPCC Plan, FRP, Hazardous Waste Contingency Plan (HWCP), Superfund Amendments Reauthorization Act (SARA) Emergency Plan and, as applicable, a CAA Risk Management Plan and Hazardous Materials Transportation Act (HMTA) Response Plan, would be an integral part of the refinery's Emergency Response Plan in responding to releases of oil and hazardous substances. The plan would provide for an organized response to incidents and emergencies to protect the environment, employees, and public. Emergency Response Team members, as well as other designated refinery staff members, would be properly trained in the plan requirements and spill/release response and cleanup techniques and procedures. Periodic mock spill drills would take place as part of the on-going spill response training process.

The objectives of the emergency response plan for spills or releases would be:

- to describe the responsibilities and required actions of each individual working for the refinery in the event of an environmental incident or emergency;
- to describe actions to be taken to minimize the effects of an environmental incident or emergency on personnel, equipment and the environment; and
- to describe the internal and external communications necessary in the event of an unplanned spill or release.

On-Site Incidents

Minor spills and releases would typically be contained and managed by refinery personnel assigned to a specific work area, as long as they were not exposed to significant risks, e.g., hydraulic fluid leak from machinery. Such actions typically would not require the assistance of emergency response personnel. For major spills or releases, such as a significant release of crude oil or product material such as diesel, the refinery's Emergency Response Plan would be activated, with the Emergency Response Team responding. These team members would be trained in spill response measures. As required, the Emergency Response Team would obtain the assistance of refinery operations and maintenance staff in obtaining information on the type and quantity of spilled material, shutting down or moving equipment as needed, acquisition of equipment and supplies, and providing access to areas where entry is needed to respond to the spill or release. If an emergency release exceeded the capability of the response team, or posed as an unacceptable safety risk, assistance would be requested from professional spill response specialists and contractors and the appropriate state and/or federal environmental agencies, such as, EPA and the NDDH.

Off-Site Incidents

Typically all minor or major off-site spills or releases would be responded to by the local Emergency Response Teams within its geographic jurisdiction. Assistance from the Refinery

Emergency Response Team may be required for providing information on the spilled material, acquisition of equipment and supplies, and assisting with containment at the source of the spill or release. Only trained personnel would be allowed to participate in any cleanup activities with the potential for exposure.

If any spill or release is significant enough that it exceeded the capability of the Emergency Response Teams to adequately respond, assistance would be requested from professional spill response specialists and contractors and the appropriate state and federal environmental agencies.

2.3.3 Hazardous and Non-hazardous Wastes

Non-hazardous and hazardous waste residuals would be generated from many of the refinery processes, petroleum-handling operations, as well as the waste water treatment and WRP operations. Most of the solid wastes that would be generated would be non-hazardous residuals or those excluded from regulation as a waste. Most hazardous wastes would be generated upon cleaning of the WWTU. Wastes would be recycled or regenerated within the refinery as much as practical, with the remainder recycled, reclaimed, regenerated, or disposed of offsite at approved third-party facilities. Most of the wastes that would be generated would be in the form of oily, non-oily, and biological sludges (especially from the waste water and water recycle facilities); spent process catalysts; product filter/adsorbent media; slop oil emulsions/solids; tank bottom sludge; spent liquids, such as caustic and acid solutions: and pond sediments. Table 2-6 summarizes the major types of wastes that the refinery would generate.

The volume of wastes generated would vary with activities occurring at the refinery. Two major groups of activities that would occur are normal operations and periods of major maintenance activities called turn-arounds. During normal operations, maintenance activities are limited and generation of wastes is typically limited to specific operational activities. Quantities of solid wastes can be generated in the form of sludges; spent materials such as catalysts, absorbents, and chemical solutions; and cleaning solutions.

During turn-arounds, which would occur approximately every three to five years for individual process units, the refinery is shutdown for a short time. Although individual units would require turn-arounds every three to five years, turn-arounds would occur annually because individual units or groups of interdependent units would be shut down in rotation. Thus, only a partial shutdown would occur each year, which would minimize the effect of lost production. Activities would consist of cleaning out the major processing equipment and storage tanks of undesirable residues that have accumulated over time; replacing catalysts, absorbents, and other types of process media that become depleted over time; conducting required repairs; and performing any other actions necessary for the improved operation of the units and refinery.

The quantity of waste generation can be significantly higher for a short period during turn-arounds, as compared to the same period during normal operations. The operating philosophy of the refinery would be to avoid planned total plant outages (about once every 5 years). The shutting down of individual units or groups of interdependent units in rotation as discussed above also would minimize the volume of wastes mentioned above. In addition, waste minimization would be emphasized (especially for hazardous wastes). An example of this in the WWTU would be the possible use of a centrifuge and naphtha to wash and dewater oily sludges. This could greatly reduce the amount of hazardous waste sludges generated.

Table 2-6 Major Types of Waste Generation Projected for the MHA Nation's Proposed Refinery

Site Of Generation	Types Of Waste
Operations And Maintenance	➢ Wastewater ➢ Spent Catalyst ➢ Spent Caustic ➢ Spent Amine ➢ Spent Acid ➢ Spent Filter/Absorbent Media ➢ Off-Spec Product ➢ Waste Oil/Oily Sludges ➢ Wash Out Solids (Flushing Of Equipment) ➢ Process Equipment Cleanup Sludge [Other Than Heat Exchangers] ➢ Heat Exchanger Bundle Sludge [KO50] ➢ Storage Tank Sludge [Crude (K169), Product, Other] ➢ Other Oily Sludges ➢ Oil Contaminated Debris ➢ Spent/Used Cleaning Solutions ➢ Waste Gases (sent to flare)
Water Recycle Plant	➢ Water Plant Filter Cake (e.g., Treatment Of Boiler Blowdown) ➢ Wastewater ➢ Unused And Used Chemicals
Waste Water Treatment Unit Wastes	➢ API Separator Sludge [KO51] ➢ DAF Float [KO48] ➢ Slop Oil Emulsions [KO49] ➢ Primary Treatment Sludges (Other Than API Separator Or DAF) [FO37] o Sludge from Process Sewer Sumps o Sludge from Process Stormwater Sumps o Primary Holding (1) Pond Bottom Sludge o Equalization Tank Solids ➢ Secondary Treatment Sludges [FO38] o BioReactor Solids o Clarifier Solids o Secondary Holding Ponds (2) Bottom Sludge o Evaporation Pond Bottom Sludge ➢ Waste Chemicals (e.g. Flocculants) ➢ Firewater Ponds (2) Bottom Sludge ➢ Sludge from Non-Process Stormwater Sumps

Table 2-6 Major Types of Waste Generation Projected for the MHA Nation's Proposed Refinery

Miscellaneous	➢ Oily Rags/Debris ➢ Empty Containers With/Without Residual ➢ Laboratory Wastes ➢ Maintenance Oily/Non-oily Wastes ➢ Industrial Waste (Non-oily Trash) ➢ Surplus And Unused Chemicals ➢ Spent Solvents ➢ Contaminated Soils ➢ Scrap Metal/Equipment ➢ Floor Dry/Absorbent ➢ Sand Blast Grit ➢ Used Hydraulic Fluids ➢ Mercury (i.e., Instruments) ➢ Paint And Paint Wastes ➢ Spent Filter Cartridges

2.3.3.1 Waste Inventory

Non-hazardous Waste Streams

Most of the non-hazardous waste produced at the refinery would originate from the WRP. The WRP would be used to purify and recycle water to minimize water usage, as discussed earlier and shown on Figure 2-4. These streams routed to the WRP would bypass the API separator to minimize commingling with the hazardous API separator sludges and float streams, thereby reducing the amount of hazardous waste to be managed. The WRP would produce 600 lb/day of waste cake that would be disposed of in an off-site approved non-hazardous Class 2 landfill.

Additional types of miscellaneous non-hazardous wastes may include storage tank bottoms (other than crude oil), non-contaminated empty containers, contaminated soils, scrap metal, industrial trash and debris (non-oily), various maintenance shop wastes, and spent filter/absorbent media. These types of wastes would not have levels of contamination that would result in the materials being considered hazardous under RCRA.

Hazardous Waste Streams

The major anticipated hazardous waste streams to be generated by the refinery during normal operations include:

- Wastewater Treatment Sludge
- Primary Sewer Sludge
- Slop Oil Emulsion Solids
- Spent Caustic Solution

The major wastes to be generated by the refinery during major maintenance activities (i.e., turn-arounds) that may be hazardous include:

- Tank Bottom Wastes
- Process Equipment Sludge
- Spent Catalyst

Each of these groups of wastes is discussed below.

Waste Water Treatment Sludge

The primary solid wastes that would be produced by the operation of the WWTU are summarized in a separate solid and hazardous wastes management report. Sludges from the API Separator and bio-treatment clarifier would be fed to the sludge thickener and sludge dryer, resulting in an estimated 56 lb/day of hazardous dried sludge that would be disposed of in a third-party licensed off-site disposal site. Figure 2-6 shows the processes that generate waste.

Primary Sewer Sludge

The source of primary sewer sludge and oil emulsions would be the waste water collection and treatment system. Oily sludges settle out of the waste water streams in sumps within the refinery. The sludges in the sumps would be periodically cleaned out and are classified as a listed hazardous waste (F037 petroleum refinery primary oil/water/solids separation sludge). These sludges would be cleaned as necessary, but typically not more than every 3-year refinery turn-around period. The solids would be recovered and sent to a third party licensed off-site disposal site.

Slop Oil Emulsion Solids

Recovered oil would be sent to a heavy slop tank, including skim oil from the API separator, oil from oily sludge dewatering, and bottom tank draws from the raw heavy oil tank and reduced crude storage tank. The recovered oil would be recycled to the crude unit for reprocessing. Any slop oil emulsion solids that cannot be recycled would be disposed of in a third-party licensed off-site hazardous waste disposal site. The slop oil emulsion solids are classified as a listed hazardous waste – KO49. The recovered oil is excluded from RCRA regulations.

Spent Caustic Solution

Caustic would be used throughout the refinery for a number of purposes, including entrained catalyst removal, sulfur compound conversion, and low pH wastewater neutralization. Examples of process units where caustic is used include the distillation section of the crude unit and the isomerization unit. The spent caustic solutions are sent to a spent caustic neutralization tank. Once neutralized, the solution would be discharged to a third-party licensed off-site disposal site.

Tank Bottom Wastes

Tank bottom wastes that accumulate in storage tanks typically consist of solids found in the stored material (for example, crude and various intermediate process streams); rust or scale from tanks, pipes, and other equipment; and heavy hydrocarbons (California Environmental Protection Agency 2004). Periodic cleaning of the tanks would occur to remove these solids that settle in the tank over several years of operation. The purpose of the cleaning includes recovery of lost tank capacity, tank integrity inspection, change in service, and repair. The frequency of tank cleanouts would depend upon the type of material stored. The storage tanks that typically require more frequent cleanout are crude oil and heavy and middle distillates. It is currently estimated that cleaning of the tanks may be required every 6 to 9 years. However, a storage tank can be cleaned out more frequently if it needs repair or refurbishment.

The synthetic crude tank sludge is designated as a "listed" RCRA hazardous waste (K169 – crude oil storage tank sediment). Therefore, any tank bottoms removed from the synthetic crude storage tanks would be handled as a hazardous waste. The amount of tank bottoms generated is minimized by the use of pretreated synthetic crude and fixed tank mixers that help keep solids from settling.

Whether the tank bottom sludge from the remaining storage tanks is classified as a hazardous waste would be determined by RCRA characteristic testing. Typically lighter product tank bottoms (for example, gasoline) are classified as a hazardous waste due to the levels of benzene. At the refinery, light products may contain benzene levels high enough to cause the bottom sludge to be designated as a hazardous waste. However, the middle distillates may not contain benzene and specific metals at levels that would cause the bottom wastes to be considered as a hazardous waste.

Cleaning of the tanks would entail centrifuging or dewatering of the sludge to minimize the amount of solid residue. Recovered oil would be returned for processing and waste water would be sent to the oily water sewer for treatment in the WWTU. Solids would be shipped to a third-party licensed off-site disposal site.

The production of heavy oil is expected to be less than 1 percent from the hydrocracking process. The feedstock would have an end boiling point of less than 1,000ºF and the heaviest component would be fed to the hydrocracker. This small bottoms stream would be sent to a user permitted to burn or blend the material.

Process Equipment Sludge

Periodic cleanout of the residues within various pieces of process equipment is necessary to maintain the preferred processing efficiencies. Such wastes are typically generated during maintenance periods, especially during plant turn-arounds. Solid residues that are not listed hazardous waste that cannot be recycled would be tested to determine whether they are a RCRA characteristic hazardous waste.

One of the major cleanout activities associated with equipment maintenance is associated with the heat exchangers. Heat exchangers would be routinely cleaned to maintain their efficiency. Accumulated residues deposited from the process streams that are either heated or cooled would be removed. This would be accomplished with the use of hydro-blasting and steam. Cleaning would occur on a concrete cleaning pad that contains a drain sump that would overflow to the oily process sewer for treatment in the WWTU. The pad would be designed to collect as much of the solid residues as possible. These residues would be placed in approved hazardous waste drums for temporary storage and eventual transport to a third-party licensed off-site hazardous waste disposal site.

The removed scale and hydrocarbon solids waste generated from this cleaning activity is classified as hazardous waste KO50 – heat exchanger bundle cleaning sludge. The cleaning of the heat exchanger is expected to occur every three years during a turn-around. However, excessive fouling, such as in the crude unit, could require more frequent cleaning for some of the heat exchangers. The refinery does have the advantage of using synthetic crude as the primary feedstock, which should reduce the amount of fouling, as compared to the refineries using typical crude as a feedstock.

Spent Catalyst

Various catalysts are used throughout the refinery process for a variety of purposes, including promotion of hydrocarbon conversion reactions (hydrocracking and isomerization), reduction of sulfur and nitrogen content of certain hydrocarbon streams (hydrotreating), conversion of sulfur, and conversion of natural gas to hydrogen for use in the hydrotreating and hydrocracking reactions. Catalysts that are used in these processes lose effectiveness over time and must be regenerated or replaced. The frequency of replacement with new or regenerated catalyst depends on the type of catalyst. Most catalysts would be replaced every 3 to 5 years. Replacement typically coincides with major maintenance periods, such as turn-arounds.

Major spent catalysts to be generated at the refinery include metal-impregnated refining catalyst generated from processes that treat, crack, and reform hydrocarbon streams. The metals within the catalyst that create the necessary reactions can result in the spent catalysts being considered hazardous. Two types of spent catalysts are "listed" hazardous waste (K171-spent hydrotreating catalyst and K172-spent hydrorefining catalyst). The rest of the catalysts are tested to determine whether they are a RCRA characteristic hazardous waste. Spent catalysts are subject to RCRA regulation if they are listed or characteristic hazardous waste, but may be recycled or reclaimed as allowed by RCRA regulations.

2.3.3.2 RCRA — Treatment, Storage, and Disposal of Hazardous Waste

Under Alternative 1, the refinery as designed would be a TSD Facility. Therefore, the refinery would need to obtain a RCRA TSD permit from EPA. A TSD permit would significantly increase the regulatory requirements for the proposed refinery project (40 CFR Part 264 including RCRA corrective action requirements). This would include applicable construction requirements (including double liners) for all hazardous waste surface impoundments (40 CFR 264.221(c)).

2.3.4 Buffalo Forage Production

The MHA Nation raises buffalo as an economic enterprise. Currently, forage for the herd of 650 animals is insufficient and MHA Nation must buy bales of forage from other sources to feed the herd during the winter.

The primary land use within Section 19 and 20 of the project area is intensive dry land farming (e.g., cereal row crops – barley and wheat), which may include cattle grazing in the late fall. The MHA Nation proposes to use the remaining acreage of the project site to raise forage for the buffalo herd to reduce dependency on outside sources. Therefore, the acreage would be converted from a dry land farming crop to a dry land forage crop. The acreage would be seeded initially with oats and crested wheatgrass and the crop would be swathed and baled. Subsequently, the property would be seeded to alfalfa and a mixture of grasses and the crop would be swathed and baled. Buffalo would not be grazing within the property; the forage would be hauled to lands where the Tribal herd is being managed.

2.4 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, BIA would accept the 468.39-acre project site into trust status, but would not approve MHA Nation's proposal to construct, operate, and maintain a clean fuels refinery. Consequently, the entire 468.39-acre project site would continue to be used for agricultural purposes similar to those that have been occurring on the property for decades. Additionally, the MHA Nation could decide to use the entire project site to produce feed for their buffalo.

Alternatively, the MHA Nation could have the land included in the Farm Pasture Leasing Program as administered by BIA under 25 CFR Part 162.

Under the Farm Pasture Leasing Program, BIA assists Indian tribes and landowners in leasing their land for agricultural purposes, through either negotiations or advertisement. BIA typically reviews a negotiated lease for approval, and defers to the landowners' determination that the lease is in their best interest, to the maximum extent possible. If a lease is granted on the landowners' behalf, BIA will attempt to obtain a fair annual rental and ensure that the use of the land is consistent with the landowners' wishes.

2.5 Alternative 3 — No Transfer to Trust, Refinery Constructed (DOI Preferred alternative)

Under this alternative, BIA would not accept the 468.39 acres into trust status; however, the MHA Nation would construct, operate, and maintain a clean fuels refinery on this property (e.g., without the trust status). Under this alternative, the MHA Nation would not need BIA's approval for the clean fuels refinery, but the Project would need to obtain required permits from the EPA and others. All of the effluent discharge alternatives will be considered for this alternative.

2.6 Alternative 4 — Modified Proposed Action

Under this alternative, BIA would accept the 468.39 acres into trust for the construction and operation, and maintenance of a clean fuels refinery; however, the design would be modified from the MHA Nation's original proposal. The refinery would be reconfigured to minimize impacts to the jurisdictional wetland; use of tanks instead of ponds for potentially contaminated (oily) stormwater and contaminated process waste water; and use of a sanitary collection tank or sanitary waste treatment plant instead of a leach field. The refinery would continue to be regulated as a RCRA LQG. The refinery would be redesigned so that tanks and tank systems are used for holding and processing of potentially contaminated (oily) stormwater and contaminated process waste water. When the refinery discharges are regulated by an NPDES permit, and the RCRA WWTU exemption applies, the refinery would not be regulated as a RCRA TSD Facility. The proposed septic tank for employee wastewater would also be replaced with either a small treatment plant or wastewater would be trucked to a municipal WWTP.

The revised design reduces impacts to the jurisdictional wetland by changing the locations of the utility building, main electrical substation and sulfur plant as shown in Figure 2-15. The ditches containing the uncontaminated stormwater from the western part of the site would be directed to one or two collection points adjacent to the east side of the swale. This water would cross the swale via an underground pipe consistent with minimal impact. The final design would impact less than 0.1 acre of the jurisdictional wetland due to two roadway crossings. This redesign eliminates the "future expansion" area shown in Figure 2-7.

The modification of the facility design would change the NPDES discharge permit outfalls: New Outfalls 002a and 003 would be added.

- Outfall 001 uncontaminated stormwater
- Outfall 002 discharges from the process (refinery) wastewater treatment unit
- Outfall 002a potentially contaminated (oily) stormwater, treated as needed
- Outfall 003 employee WWTP

The potentially contaminated (oily) stormwater holding pond and final effluent holding ponds would be replaced with a tank system to meet specific regulatory requirements under RCRA (Figure 2-16). An additional NPDES outfall (002a) would be provided for the discharge of the potentially contaminated (oily) stormwater from the tank system. The holding ponds for potentially contaminated (oily) stormwater could generate a RCRA listed waste, F037-petroleum refinery primary oil/water/solids separation sludge and potentially F038- petroleum refinery secondary (emulsified) oil/water/solids separation sludge. The potentially contaminated (oily) stormwater would be directly conveyed to a group of surge tanks located between the process units and the evaporation pond. These are underground shallow tanks to accommodate gravity filling following the site gradient. The tanks would be made of double wall steel or equivalent in compliance with 40 CFR 265 Subpart J. The total capacity of the tanks is 15,000 bbl, but multiple tanks would be used to minimize individual tank size and the risk of potential leakage. If there is leakage, then only one tank would be taken out of service for repair, leaving all the others in service. The tank system would be sized to contain the maximum stormwater flow predicted for a 100-year storm event which is 5 inches in 24 hours. Annual precipitation averages 18 inches/year with an average of 0.05 inches in 24 hours. The holding tanks would provide the surge capacity to hold the stormwater for testing before its release to the release tanks, or to the process wastewater treatment unit, if required. The release tanks would be located near the surge tanks, but the piping would be segregated for release control. After testing, the water in the release tanks would either be routed to the wastewater treatment unit, recycled or released to Outfall 002a.

Process (refinery) wastewater would be treated in the wastewater treatment unit as described in Alternative 1; however, rather than being stored in holding ponds, it would be sent to a series of final effluent release tanks prior to discharge from Outfall 002. This wastewater could be tested prior to release and if it does not meet discharge limits it could be routed back to the wastewater treatment unit for further treatment.

The uncontaminated stormwater would be surface drainage outside the paved and curbed process areas. This water would be conveyed in surface ditches to the evaporation pond for holding and testing prior to release to Outfall 001, used for recycling, or to maintain capacity in the firewater ponds. The average flow here is based on 18 inches/year of precipitation, but the evaporation pond would be large enough to hold the 5 inches/24 hour storm, the 100 year maximum. The normal operation would be to recycle this water (after testing) to the plant, and release any excess (up to the 55 gpm maximum) to Outfall 001. The average recycle rate is 30 gpm along with 10 gpm from the water wells for the total refinery average water needs. If the evaporation pond is lined with natural clay, some water would have to remain in the pond to maintain liner integrity. Other surface stormwater outside either those areas that are paved and curbed or within process areas would continue to follow natural contours.

Sanitary wastewater (e.g., employee restrooms and showers) would be collected in a dedicated holding tank for removal from the MHA site to a licensed third-party permitted municipal WWTP (estimated at 1 truck per day holding 3,750 gallons, average 4,500 gallons per week or 1.2 trucks per week). Alternatively, a modular sanitary WWTP would be installed. Treated wastewater would be discharge through Outfall 003 and solid waste removed to an offsite approved landfill site. Lastly, the laboratory waste would be collected in a dedicated holding tank for testing, and removed by truck to a properly permitted off-site disposal site.

Water stored on site would be maximized in the fall to service the plant recycle needs during winter. Shortfalls of water will be made up by the water wells. Water inventories would be at a minimum just prior to the spring thaw.

2.6.1.1 RCRA — Generator Classification

Under Alternative 4, the refinery would be classified as a RCRA generator of hazardous waste. As such, it must meet the requirements of 40 CFR Part 262. The regulations that the refinery would comply with based on its generator classification are identified in Table 2-7.

Table 2-7 Hazardous Waste Generation Classification and Applicable Regulations

Generator	Quantity	Regulation
Large Quantity (LQG)	> 1,000 kg/month (approximately 2,200 lbs) > 1 kg/month acute (approximately 2.2 lbs) > 100 kg residue or contaminated soil from cleanup of acute hazardous waste spill)	All Part 262 Requirements
Small Quantity (LQG)	Between 100-1,000 kg/month (approximately 220-2,200 lbs)	Part 262, Subparts A,B,C (262.34(d) is specific to SQGs);and Subparts E,F,G,H if applicable; and portions of Subpart D as specified in 262.44.
Conditionally Exempt Small Quantity Generator (CESQGs)	<100 kg/month <1 kg/month of Acute Hazardous Waste <100 kg/month of Acute Spill Residue or Soil	Part 261.5

Source: U. S. Environmental Protection Agency 2003a

2.6.1.2 Solid Waste

Under Alternative 4, solid waste and hazardous waste would be managed as generally described under the proposed Alternative 1. Because of the replacement of the potentially contaminated (oily) stormwater holding pond and effluent holding ponds with a tank system, no pond sludges would be generated. The sludge thickening process would be designed to minimize hazardous wastes generated for offsite disposal by use of a centrifuge with solvent wash or similar process. Figure 2-17 shows how wastes generated from the redesigned wastewater treatment unit would be handled.

2.6.1.3 RCRA Treatment Storage and Disposal (TSD) Facility Considerations

Under Alternative 4, the refinery would be designed and operated so that hazardous waste is not treated, stored or disposed of at the site. However, the facility could potentially become a RCRA TSD if an NPDES permit is not obtained (and the “wastewater treatment unit” exemption at 40 CFR 264.1(g)(6) does not apply), and/or if the wastewater treatment unit is not designed and operated on a continuous basis according to the requirements for Aggressive Biological Treatment Units (ABTU) (40 CFR 261.31(b)(2)) resulting in “hazardous waste” wastewater being land applied (Alternatives 4 and B), or disposed of in an UIC well (Alternatives 4 and C). The facility could also become a TSD in other ways. For example, if hazardous wastes are stored for greater than 90-days at the refinery, or if certain waste streams are combined or exceed the toxicity characteristic, the facility could become a TSD. If the facility becomes a TSD, it would be required to obtain a RCRA TSD permit from EPA. For more information on RCRA applicability, see the interim final EPA document “Discussion of Regulatory Applicability of RCRA /NPDES/UIC to Three Affiliated Tribes Refinery Alternatives” (March 2008, technical report). A TSD permit would significantly increase the regulatory requirements for the proposed refinery project (40 CFR Part 264 including RCRA corrective action requirements). This would include applicable construction requirements (including double liners) for all hazardous waste surface impoundments (264.221(c).

2.6.1.4 Decommissioning and Reclamation Phase- Alternative 4

The decommissioning and reclamation phase for this alternative differs from Alternative 1 in that a RCRA closure plan for all HWMUs (including surface impoundments and tanks) would not be required. The clean closure requirements under RCRA for areas where hazardous waste is generated or accumulated would need to be met as in Alternative 1. The site (non-RCRA) closure plan developed through other agreements between the Federal agencies and the Tribes would encompass general cleanup and site rehabilitation. RCRA corrective action requirements would not apply for all releases of hazardous waste or hazardous waste constituents from all SWMUs for this Alternative unless conditions present an imminent and substantial endangerment to health or the environment as applicable under Section 7003 of RCRA

MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 2-15
MODIFIED REFINERY LAYOUT
PLOT PLAN

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Drawn By: MSH	

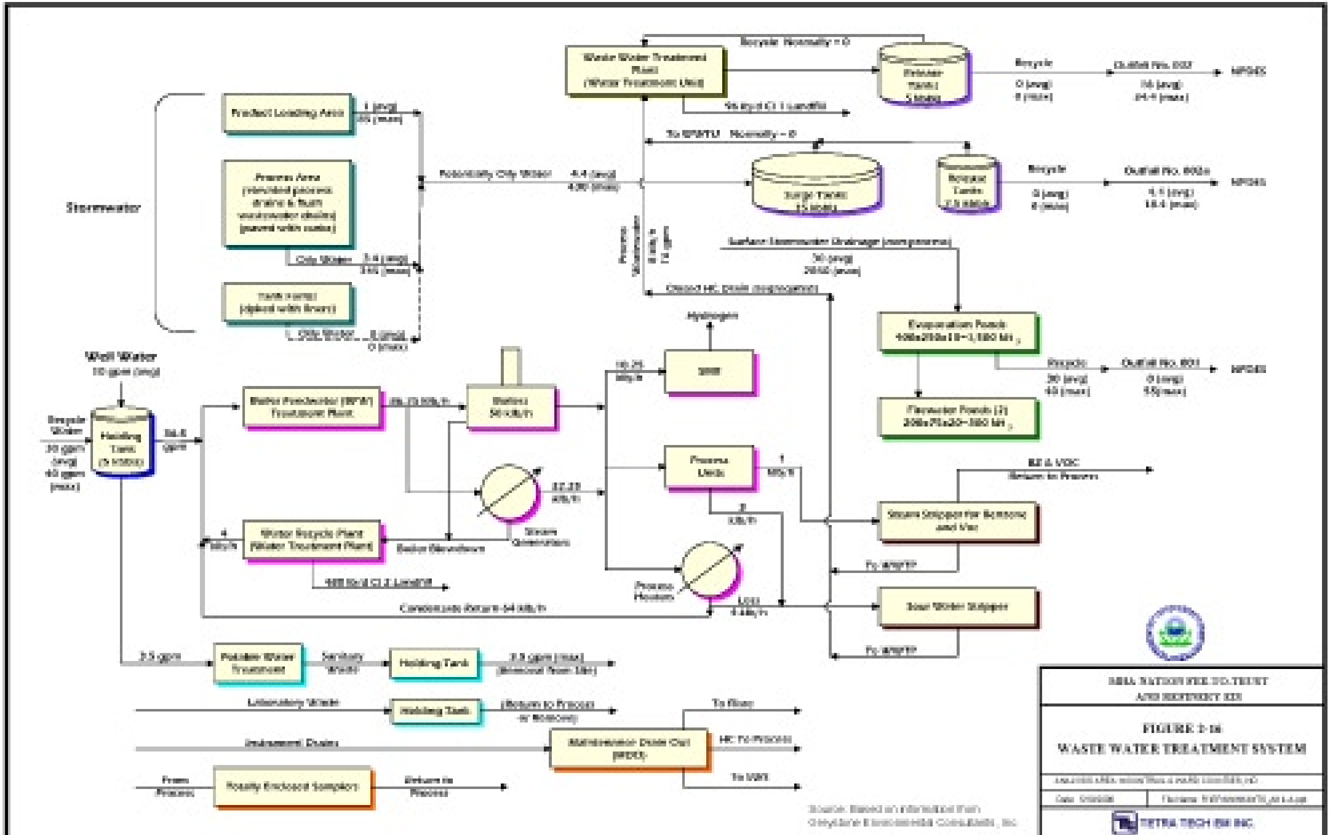
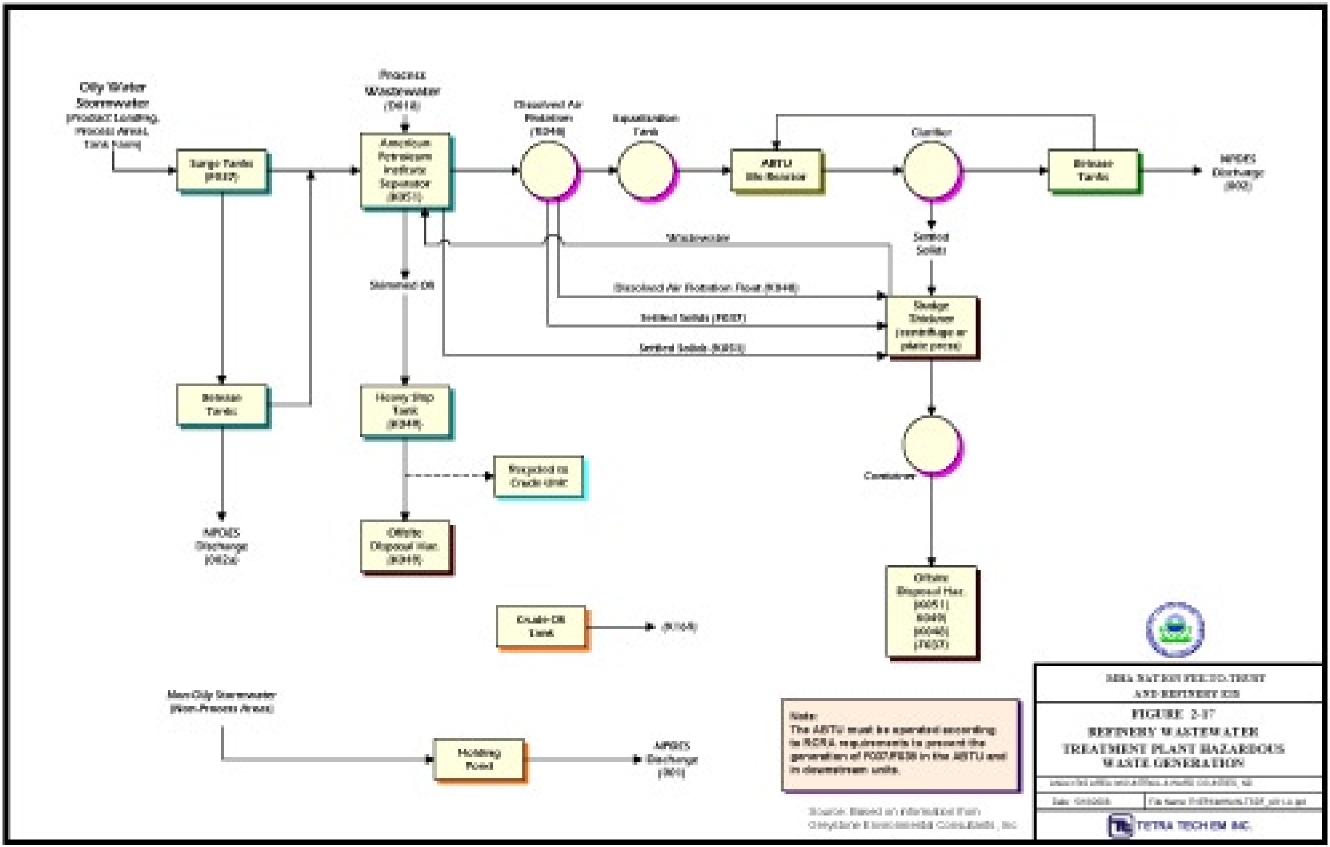


FIGURE 3-16
WASTE WATER TREATMENT SYSTEM



Oily Water Stormwater
Process Wastewater
Surge Tanks
American Petroleum Institute Separator
Dissolved Air Flotation
Equalization Tank
AETU Bio Reactor
Clarifier
Release Tanks
NPDES Discharge
Wastewater
Settled Solids
Skimmed Oil
Dissolved Air Flotation Float
Sludge Thickener (centrifuge or plate press)
Release Tanks
Heavy Slop Tank
Recycled to Crude Unit
Offsite Disposal Haz.
Container
Offsite Disposal Haz.
Crude Oil Tank
Non-Oily Stormwater (Non-Process Areas)
Holding Pond
NPDES Discharge
Note:
The AETU must be operated according to RCRA requirements to prevent the generation of F037/F038 in the AETU and in downstream units.
FIGURE 2-17
REFINERY WASTEWATER TREATMENT PLANT HAZARDOUS WASTE GENERATION
TETRA TECH EM INC.

2.7 Alternative 5 — No Action

Alternative 5 is the no action alternative. Under this alternative, BIA would not accept the 468.39 acres into trust status for the refinery. The MHA Nation would continue to own the property outside of trust status. For this alternative, BIA assumed the refinery would not be constructed and the entire 468.39-acre project site would continue to be used for agricultural purposes similar to those that have been occurring on the property for decades. This alternative also serves as the baseline for comparison of the other action alternatives.

2.8 Effluent Discharge Alternatives

As noted earlier, four effluent discharge alternatives were developed for the three refinery construction alternatives: Alternatives 1, 3 and 4. There may be modifications to the design to accommodate requirements of the discharge alternative, such as adding additional storage capacity to holding ponds or tanks.

2.8.1 Alternative A - Proposed Effluent Discharge Action (EPA Preferred Discharge Alternative)

Under this alternative, the MHA Nation would obtain an NPDES permit from EPA for the discharge of effluent from the refinery. There is a difference in the number of outfalls and the discharge from those outfalls for each of the construction Alternatives.

Under Alternative 1, there would be two NPDES permitted outfalls. One would be for uncontaminated (non-oily) waste water which originates from two sources, the boiler system and stormwater. Waste water from the boiler system (boiler blowdown) would be routed to the WRP for treatment and recycling back to refinery processes (Figure 2-3 and Figure 2-4). This waste water would be segregated from the contaminated (oily) waste water to minimize production of hazardous sludge. Uncontaminated (non-oily) stormwater would be collected from non-process areas of the refinery and routed to a 7.48 million gallon evaporation pond. Waste water from the evaporation pond would be used as makeup water for the fire water system (two reservoirs of 2.25 million gallons each) as needed, recycled back to the refinery processes or when necessary discharged through an NPDES permitted outfall.

The other NPDES permitted outfall would be for potentially contaminated (oily) waste water. Wastewater collected from process operations (primarily the SWS) would be routed directly to the WWTU for treatment and then directed to two effluent holding ponds (700,000 gallons each/1.4 million gallons total). Potentially contaminated (oily) stormwater would be collected from process areas (i.e. loading area, tank farm (Figure 2-5) and routed directly to a 1.4 million gallon holding pond. Depending on quality, the waste water from the holding pond would be directed to the two effluent holding ponds described above or sent to the WWTU for treatment and then into the effluent holding ponds. The effluent from the holding ponds would be recycled back to refinery processes as needed, or discharged through a permitted NPDES outfall in this alternative. All waste water treatment processes would be proven technology and would be designed to meet quality requirements for recycling back to refinery processes and NPDES discharge permit requirements

Under Alternative 4, there could be four NPDES discharge permitted outfalls: Outfall 001 for uncontaminated stormwater, Outfall 002 for wastewater treatment unit, Outfall 002a for potentially contaminated (oily) stormwater, treated as needed, and Outfall 003 for employee WWTP.

The potentially contaminated (oily) stormwater holding pond and final effluent holding ponds would be replaced with a tank system to meet specific regulatory requirements under RCRA (Figure 2-16). An additional NPDES outfall (002a) would be provided for the discharge of the potentially contaminated (oily) stormwater from the tank system. The potentially contaminated (oily) stormwater would be directly conveyed to a group of surge tanks located between the process units and the evaporation pond. These are underground shallow tanks to accommodate gravity filling following the site gradient. The tanks would be made of double wall steel or equivalent in compliance with 40 CFR 265 Subpart J. The holding tanks would provide the surge capacity to hold the stormwater for testing before its release to the release tanks, or to the process wastewater treatment unit, if required. The release tanks would be located near the surge tanks, but the piping would be segregated for release control. After testing, the water in the release tanks would either be recycled to process the wastewater treatment unit or be released to Outfall 002a.

Process (refinery) wastewater would be treated in the wastewater treatment unit as described in Alternative 1; however, rather than being stored in holding ponds, it would be sent to a series of final effluent release tanks prior to discharge from Outfall 002. This wastewater could be tested prior to release and if it does not meet discharge limits it could be recycled back to the wastewater treatment unit for further treatment.

The uncontaminated stormwater would be surface drainage outside the paved and curbed process areas. This water would be conveyed in surface ditches to the evaporation pond for holding and testing prior to release to Outfall 001, used for recycling, or to maintain capacity in the firewater ponds. The normal operation is to recycle this water (after testing) to the plant, and release any excess (up to the 55 gpm maximum) to Outfall 001. The average recycle rate is 30 gpm along with 10 gpm from the water wells for the total refinery average water needs. If the evaporation pond is lined with natural clay, some water would have to remain in the pond to maintain liner integrity. Other surface stormwater outside either those areas that are paved and curbed or within process areas would continue to follow natural contours.

A modular sanitary WWTP could be installed. Treated wastewater would be discharge through Outfall 003 and solids waste removed to an offsite approved landfill site. Lastly, the laboratory waste would be collected in a dedicated holding tank for testing, and removed by truck to a properly permitted off-site disposal site.

2.8.2 Alternative B —Partial Discharge through an NPDES Permit and Some Storage and Irrigation

Under this alternative, wastewater would be treated in the WWTU and then stored in the ponds on the west side of the facility or in release tanks. The MHA Nation would discharge water as described for the proposed project action during times when irrigation is not possible. During the growing season when saturated soil conditions do not exist, the refinery could use treated wastewater to irrigate trees and forage on the project site. Thus, this alternative is a modification of Alternative A. With this alternative, the MHA Nation could either irrigate when possible or discharge treated wastewater. As in Alternative A, wastewater would be discharged as needed from an outlet into the wetland in the northwest corner of the project site (Figure 2-7).

The refinery wastewater would be (by definition) a solid waste under RCRA. As such, all wastewater proposed to be used for irrigation should be treated to meet appropriate standards to protect human health and the environment. In addition, unless the wastewater is treated sufficiently, it will continue to be considered a solid waste containing hazardous waste constituents, and RCRA corrective action requirements could apply for the irrigated land parcel.

2.8.3 Alternative C — Effluent Discharge to an Underground Injection Control (UIC) Class I Well

Under this alternative, the MHA Nation would discharge all effluent from the WWTU to a Class I, Non-hazardous UIC well that would be drilled on the project site. This well would dispose of non-hazardous fluids into isolated formations beneath the lowermost underground source of drinking water (USDW). Thus, the well would place effluent in porous formations of rocks or a deep aquifer that is not identified as existing or future USDWs. Because injection wells have the potential to inject contaminants that may cause underground sources of drinking water to become contaminated, the UIC Program prevents contamination by setting minimum requirements. These requirements typically include contamination prevention by keeping injected fluids within the well and the intended injection zone, direct or indirect injection into an USDW, or otherwise adversely affect public health. The siting of the UIC well and the construction, operation, maintenance, monitoring, testing, and closure of the well will consider these minimum requirements.

2.8.4 Alternative D — No Action

Under this alternative, EPA would not issue any permits for the discharge of effluents from the proposed refinery. This includes permits for NPDES regulated discharges, discharges to a Class I non-hazardous UIC well, and discharges of the septic system to a leach field. Thus, no discharges of water of any kind from a refinery would be permitted under this alternative.

2.9 Summary of RCRA Applicability

The design and operation of the facility would play an important role in determining which environmental permits would be needed. This is discussed briefly below and in more detail in the “Discussion of Regulatory Applicability” document (EPA 2008).

This analysis regarding the applicability of RCRA permitting for the various wastewater treatment scenarios is based upon the desire of the MHA Nation to have the analysis reflect any and all circumstances where a RCRA permit might be required based on the limited information available during preliminary design. This includes circumstances where listed and/or characteristic hazardous waste may be present in the wastewater treatment system due to incidents such as process upsets or equipment shutdowns, particularly where land-based units are proposed for wastewater treatment operations, or where land-based practices (e.g. irrigation and UIC injection well) are proposed for ultimate wastewater disposition. Likewise, the analysis takes into account the possibility that certain HWMUs might not ultimately qualify for specific permitting exemptions, based upon possible changes made in final facility design, policy or legal issues, or any other project specific circumstances.

A RCRA TSD Facility permit would likely or potentially be required for all construction alternatives except Alternative 4 and A. Alternatives 1 and 3 with any discharge alternative would need a RCRA TSD permit, because the refinery units generating hazardous waste are surface impoundments instead of tanks. A RCRA TSD permit would also likely or potentially be needed for any of the refinery construction alternatives combined with Effluent Discharge Alternatives B and C, because all or part of the wastewater would not be discharged in accordance with an NPDES permit. Based on the preliminary design for the facility, the only alternatives combination which would most clearly not need a TSD permit would be Alternatives 4 and A. The final determination of RCRA applicability would be based on the final design and the TSD permit application for the facility. The main factors affecting RCRA applicability are listed below:

Alternatives 1, 3

- Alternative 1, 3 and A: Surface impoundments would not meet the RCRA definition of tanks or tank systems;
- Alternative 1, 3 and B: Surface impoundments would not meet the RCRA definition of tanks or tank systems, and irrigation (land application) would not likely be covered under the WWTU because some of the wastewater would not be discharged under an NPDES permit under CWA; and
- Alternative 1, 3 and C: Surface impoundments would not meet the definition of tanks or tank systems, and UIC disposal would not likely be covered as the WWTU exemption applies if discharges are subject to an NPDES permit under CWA.

Alternative 4

- Alternative 4 and A: A RCRA TSD Facility permit would not be required due to the use of tanks and tank systems in the WWTU in conjunction with an NPDES discharge permit as this meets the requirements for the WWTU exemption (other exemptions or considerations may apply);
- Alternative 4 and B: Wastewater would be treated prior to discharge through an NPDES permit or disposal through irrigation (land application). Because a portion of the wastewater would not be disposed through a CWA permit, the tanks in the wastewater treatment system would be unlikely to be covered by the WWTU exemption from the requirement to obtain a RCRA TSD permit. At petroleum refineries, wastewater treatment tanks may occasionally manage hazardous waste, requiring a TSD permit unless the facility qualifies for a WWTU exemption. Therefore, a RCRA TSD permit could potentially be required.
- Alternative 4 and C: UIC well disposal: For this alternative, process wastewater would not be disposed of through an NPDES (CWA) permit. Therefore, the tanks in the wastewater treatment system would be unlikely to be covered by the WWTU exemption and a RCRA permit may be required.

2.10 Alternatives Considered but Eliminated from Detailed Analysis

Several alternatives were considered for this analysis, but were eliminated from detailed study for various reasons. These alternatives are listed below. The reasons they were excluded from further consideration also are described.

Alternative Considered	Use of local light sweet crude oil as a feedstock
Reasons Considered	This alternative was specifically developed to respond to the MHA Nation's desire to refine oil that it may extract from under the Fort Berthold Reservation. It also would have accepted other local supplies of crude oil.
Reasons Dropped	This alternative was dropped from detailed analysis because of technical considerations. Initially, when the refinery was proposed, the local supply of light sweet crude oil was declining and was expected to continue to decline. The refinery needed a dependable source of oil for at least 20 years. Based on that information this alternative was dropped. Recently there has been new exploration and production from the deeper Bakken Formation. However, the Tribes are still planning to refine synthetic crude oil. Additionally, the locally available crude oil has several disadvantages that the refinery would have to overcome. Processing would require desalting of the oil. This process uses a substantial amount of water (equivalent to about 5 percent of the crude feed), and local supplies of water for the refinery are limited. Also, the refinery would need an injection well to dispose of the brine that the desalting process would generate. Finally, the local crude would produce fewer aromatics and less diesel. It also would have more selenium, other metals, and bottoms requiring disposal.

Alternative Considered	Alternative to completely avoid wetlands with pumping.
Reasons Considered	This alternative was considered to minimize dredging and filling jurisdictional waters of the U.S. including wetlands.
Reasons Dropped	The shift of the facility to the east and slightly south as designed would encroach upon the safety zones for the edge of property, railroad, and existing homestead. It would require additional excavation to achieve acceptable surface water drainage and capture. The drainage would not be all in one direction as presently designed so a pumping system would need to be installed to move captured water to the treatment facility. The cost for the facility construction would increase by approximately $2,000,000 as there would be additional infrastructure required; more excavation to achieve acceptable surface water drainage, and a surface water capture system and pumping to the water treatment unit. There would also be increased operational costs for the facility from the pumps. When considering the need for acceptable surface water drainage, the use of pumps or alterations of existing gradient would increase the potential for adverse environmental consequences because of pump failure, breaching of drainage capture, or ponding of

potentially contaminated water in unprotected areas. This alternative would also limit future expansion of the facility.

Alternative Considered Discharge of Effluent from the WWTP to a Wetland Treatment Unit Constructed on the Project Site.

Reasons Considered This alternative was considered to provide additional treatment of nutrients and hydraulic buffering of the effluent before it was discharged into the existing wetland on the project site.

Reasons Dropped This alternative was dropped from detailed evaluation because of uncertainties regarding whether there would be a significant benefit to the existing wetland. Although constructed wetland can attenuate flow, it is unclear if attenuation would benefit the existing wetland. From a water quality standpoint, the wastewater treatment unit would already meet the permit limits at the end of the pipe before water is discharged into the existing wetland. Thus, having a constructed unit would not change the water quality permit limits that need to be met. Pond/wetland treatment systems provide little to no treatment in the winter because of low temperatures. Treatment performance of the constructed wetland decreases over time without substrate replacement or removing vegetation every couple of years. There would also be additional construction costs and siting difficulties in locating another treatment unit on the site with gravity flow from the existing treatment units.

Alternative Considered Alternative to minimize impact to wetlands by moving ponds east of the wetland.

Reasons Considered This alternative was considered to minimize dredging and filling jurisdictional waters of the U.S. including wetlands.

Reasons Dropped Reducing the fill of the wetland by 100 feet by moving the water treatment unit and ponds to the east of the swale would encroach upon the safety setbacks for the tank farm (240 foot separation) and property line (200 foot separation). This alteration would cost approximately $930,000 more to construct than the proposed alternative as two high capacity trash pumps with pump houses and associated piping would be needed ($588,700), as well as 80,000 cubic yards of additional excavation ($340,000).

There could be an increase in potential adverse environmental consequences from captured surface water pump failure, breach of drainage capture systems, or ponding of potentially contaminated water in unprotected areas. There would also be increased operational costs for the facility from the pumps.

Alternative Considered	Discharge of the WWTP Effluent to the East Fork of Shell Creek stream channel north of highway 23.
Reasons Considered	This alternative was considered to move the point of discharge out of the existing on-site wetland to reduce hydraulic impacts and changes in function to the 11 acre wetland in the northwest corner of the site.
Reasons Dropped	This alternative was dropped from detailed evaluation because the Tribes would prefer not to discharge directly off-site onto land which the Tribes do not own. There would be additional costs including construction of a 1-2 mile effluent pipeline ($200,000/mile), pipeline easement and operations/maintenance.

Alternative Considered	Pipe the WWTP Effluent to a Discharge Point in Lake Sakakawea west of Parshall (about 19 miles) or in the Lower Portion of East Shell Creek (about 15 miles).
Reasons Considered	This alternative was considered to reduce hydraulic impacts and changes in function to the wetland in the northwest corner of the site.
Reasons Dropped	This alternative was dropped from detailed evaluation because of the substantial additional costs for constructing and maintaining the pipeline (15 to 20 miles). Also, the MHA Nation would have to acquire extensive rights-of-way within which to construct the pipeline. Preliminary estimates for the pipelines suggest the costs of construction would be slightly more than $1 million per mile. The estimate includes construction of 15 to 20 miles of pipeline, lift station(s) and easement purchases). Maintenance costs the MHA Nation would incur would be in addition to this cost.

Alternative Considered	No Effluent Discharge, Storage and Irrigation
Reasons Considered	This alternative was considered to reduce hydraulic impacts and changes in function to the wetland in the northwest corner of the site and the need for a NPDES permit.
Reasons Dropped	This alternative was dropped from detailed evaluation because of the technical limitations in meeting a no flow situation to be in compliance with CWA regulations.

2.11 Summary of Environmental Consequences

The matrix presented on Table 2-8 summarily compares the effects to the affected environment that would occur by implementing each of the four alternatives considered in detail for the MHA Nation's proposed fee-to-trust and clean fuels refinery and buffalo forage project.

2.12 Summary of Mitigation Measures:

See Chapter 4 Selected Plans and Mitigation Measures.

2.13 Agency-preferred Alternative

On the basis of the analysis documented in the EIS, the comments received during the public comment period on the DEIS, and other record documents, the DOI and EPA have selected preferred alternatives for the agencies' respective actions. It should be noted that the decision to build and operate the refinery rests with the MHA Nation.

DOI

The DOI has identified its preferred alternative as Alternative 3. In Alternative 3, DOI would not place the land into trust status and the refinery could be constructed by the Tribes. DOI recommends that the design of the refinery, if constructed, be modified consistent with Alternative 4. The construction and operation of the proposed oil refinery does not depend on the land being held in trust by the United States.

As discussed in this FEIS, it is anticipated that there would be spills and leaks of refinery products, and that over time it is expected that there would be some contamination of soil and ground water immediately underneath the refinery site. It is DOI policy to minimize the potential liability of the Department and its bureaus by acquiring real property that is not contaminated. See 602 Departmental Manual 2 (4). Alternative 3 is consistent with this policy.

EPA

The MHA Nation government will be deciding whether to build and operate the refinery. If the proposed refinery is constructed, EPA has identified its process water discharge preferred alternative as Alternative A, the issuance of an NPDES permit for effluent discharges associated with the refinery.

If the refinery is constructed, EPA recommends implementation of the modified refinery design as described under Alternative 4. Alternative 4 was developed to reduce impacts to wetlands and to utilize tanks instead of surface impoundments for wastewater collection and treatment. EPA also recommends that the mitigation measures developed for Alternative 4, including ground water monitoring and financial assurance, be implemented by the Tribes.

Upon completion of the wait period for this EIS, the Agencies will issue their final decisions. Each agency will prepare a ROD, describing the Agencies' respective decisions, the alternatives considered, and stating whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted or why such measures were not adopted. The RODs can be issued no sooner than 30 days following the publication of the Notice of Availability of the FEIS in the *Federal Register*.

Table 2-8 Summary of Environmental Impacts by Alternative and Resource

Construction & Effluent Alternatives	Construction Alternatives				Effluent Alternatives		
Alternatives 1 & A	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternatives 5**	**Alternative B**	**Alternative C**	**Alternative D**
BIA would accept 469-acre project site into trust. MHA Nation would construct and operate a refinery on 190 acres of the project site; and produce forage on the other 279 acres forage for MHA Nation's buffalo. Wastewater from the refinery would be treated and discharged into surface waters. EPA would issue an NPDES permit.	BIA would accept the 469-acre project site into trust status, no refinery would be constructed.	BIA would not accept the 469 acres into trust status; However, the refinery would be constructed and operated on the property without the trust status. EPA would issue permits.	Alternative 1 redesigned to avoid wetland impacts and reduce regulation under RCRA. BIA would accept the land into trust and EPA would issue permits.	No Action -- No refinery constructed. BIA would not accept the 469 acres into trust status. No EPA permits issued.	Wastewater from the refinery would be treated and either discharged into surface waters or used for irrigation on the site. EPA would issue an NPDES permit for surface water discharges.	Wastewater from the refinery would be treated and injected into a well for disposal drilled on the project site. EPA would issue a Class I, Non-hazardous UIC Permit.	No Action. EPA would not issue any permits for the discharge of effluent from the proposed refinery.
Geology							
Impacts to the geologic environment would be limited to near surface resources. No impacts would be anticipated to the subsurface geologic environment. Potential impacts related to geologic resources would be localized and limited to the time of construction	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	No effects to geologic resources	This well would dispose of treated wastewater into isolated formations beneath the lowermost existing or potential future underground source of drinking water.	Existing conditions continue.
Groundwater							
Water supply for the refinery could cause localized drawdown of Fox Hills-Hell Creek aquifer. Shallow ground water quality immediately underneath the refinery would be impacted over time by spills and leaks from the proposed refinery. Impacts to ground water would be minimized by designing the refinery to prevent and contain leaks and spills.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Impacts to ground water would be similar to Alternatives 1 & A for the portion of wastewater discharged to surface water. The remaining treated wastewater would be land applied and a portion of the land applied treated wastewater would eventually infiltrate into ground water underneath the land application site.	The injection well for the treated wastewater would be constructed to protect any potential or existing sources of drinking water. The injection zone would be below and isolated from any aquifers that could be used for drinking water.	Existing conditions continue.
Surface Water							
Treated wastewater discharges from the facility would cause minor changes in existing water quality. The proposed NPDES permit would require that wastewater discharges be protective of aquatic life, drinking water, agriculture and wildlife uses. Construction and operation of the proposed refinery would change the quantity and flow pattern of the drainage from the site. The paving/hardening of the refinery site would increase runoff and reduce infiltration.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Impacts would be similar to Alternatives 1 & A. Less treated wastewater would be discharged into surface waters, reducing flows.	All refinery wastewater would be disposed through injection into a deep underground formation, no impacts to surface water quality would be anticipated under except for some storm water discharges. Water flow rates from the site would be less than for Alternatives 1&A.	Existing conditions continue.
Spills							
It is anticipated that there would be spills and leaks at the proposed refinery facility. The majority of spills and leaks would be contained within the facility and would not impact the environment. However, over time, it is expected that there would be some contamination of soils and groundwater immediately underneath the refinery site due to leaks and spills. The contamination would remain generally within the refinery site unless a major spill occurred or a series of spills and leaks occurred over time. Several spill and emergency response plans would be required for the refinery to provide preventative measures and to plan responses for spills and other emergencies.	Impacts similar to existing conditions, site would remain in agricultural use. No construction of the refinery and thus no additional impacts from spills in the project area.	Impacts same as Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Impacts similar to Alternatives 1&A.	Impacts from spills in the project area would be similar to those described under Alternatives 1 and A due to construction of the refinery.	Existing conditions continue.

Table 2-8 Summary of Environmental Impacts by Alternative and Resource (continued)

Construction & Effluent Alternatives	Construction Alternatives				Effluent Alternatives		
Alternatives 1 & A	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternatives 5**	**Alternative B**	**Alternative C**	**Alternative D**
Solid and Hazardous Waste							
The facility would be a RCRA TSD facility. The RCRA TSD permit would regulate design, operation, monitoring, closure, post-closure, financial assurance and corrective action for all solid waste management units. The facility would also be a RCRA generator.	There would be no solid and hazardous waste impacts associated with a refinery.	Impacts same as Alternatives 1&A	The refinery would be classified as a RCRA generator of hazardous waste not a TSD facility. Impacts would be similar to Alternatives 1&AA, however there would less regulatory oversight and no required financial assurance	Existing conditions continue.	The solid and hazardous waste impacts would be similar to Alternatives 1&A; however, the refinery site would be expanded to include the area used for land application.	The solid hazardous waste impacts would be similar to Alternatives 1&A. The injection well could provide an on-site disposal option for saline wastes such as brine from water treatment.	Existing conditions continue.
Soils							
Soils immediately underneath the refinery would be impacted over time by spills and leaks from the proposed refinery. Impacts to soils would be minimized by designing the refinery to prevent and contain leaks and spills. Upon closure of the facility, it is anticipated that some soil removal or remediation would be needed prior to closure.	Impacts similar to existing conditions, site would remain in agricultural use. No effects to soil resources from the refinery's construction and operation.	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Soils in area have not been previously irrigated. An irrigation management plan would be developed to identify application rates and wastewater treatment levels	Implementation of this alternative not affect soil impacts	Existing conditions continue.
Vegetation							
An estimated 190 acres of cultivated agricultural fields would be affected by surface disturbance associated with the refinery footprint over the long-term operation of the refinery.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Crops have not been irrigated before in this area. There would be some modification of farming practices and types of crops.	Implementation of this alternative would not affect vegetation impacts.	Existing conditions continue.
Wetlands							
There would be a loss of 0.5 acres of jurisdictional wetland and a loss of 0.3 acres of isolated wetland. Wetlands would also be affected by increased peak flows from the site.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A	There would be a loss of 0.1 acres of jurisdictional wetland and a loss of 0.3 acres of isolated wetland. Wetlands would also be affected by increased peak flows from the site.	Existing conditions continue.	Flow rates would be less than Alternative A, reducing hydraulic impacts to downstream wetlands.	Implementation of this alternative would not affect vegetation impacts.	Existing conditions continue.
Wildlife							
Displacement impacts and some changes due to increased flows in tributary predicted, increased vehicle collision potential	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	similar to existing	Impacts would be similar to Alternatives 1&A. Since most of the site is already used in agricultural crop rotation, land application of treated wastewater would effect wildlife.	Implementation of this alternative would not affect wildlife impacts.	Existing conditions continue.
Threatened and Endangered Species							
Construction and operation of the refinery "may affect, but is not likely to adversely affect" the whooping crane and piping plover with conservation measures to minimize the use of refinery retention ponds. Large cobble rock should be used to line exposed slopes of all wastewater/storage ponds to discourage plovers. Any ponds having the potential to hold contaminated (oily) water should be netted. Power transmission lines would be constructed to protect raptors and whooping cranes.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Similar to Alternatives 1&A	Similar to Alternatives 1&A	Existing conditions continue.

Table 2-8 Summary of Environmental Impacts by Alternative and Resource (continued)

Construction & Effluent Alternatives	Construction Alternatives				Effluent Alternatives		
Alternatives 1 & A	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternatives 5**	**Alternative B**	**Alternative C**	**Alternative D**
Cultural Resources Impacts to cultural resources will be minor. A new rail siding would be constructed along the historic Soo Line railroad that runs through the refinery site.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A.	Impacts same as Alternatives 1&A.	Existing conditions continue.	Similar to Alternatives 1&A	Similar to Alternatives 1&A	Existing conditions continue.
Land Use Short term impacts for utility corridor construction. MHA Nation would be able to supplement their existing land base within the Fort Berthold Reservation Boundaries and no longer pay taxes to a non-Indian government.	MHA Nation would be able to supplement their existing land base within the Fort Berthold Reservation boundaries and no longer pay taxes to a non-Indian government.	Impacts similar to Alternatives 1&A except the land would not be exempt from property taxes paid to Ward County.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	The outfall and irrigation associated with this alternative would fall within the disturbance footprint of the refinery and would cause a change in land use.	The UIC well associated with this alternative would fall within the disturbance footprint of the refinery and would not cause a change in land use.	Existing conditions continue.
Transportation The refinery would increase traffic on local roads and on the rail line by approximately 30 percent. There would be an increase in the probability of transportation accidents and petroleum spills along the highways, pipeline corridors and the rail line.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Similar to Alternatives 1&A	Similar to Alternatives 1&A	Existing conditions continue.
Aesthetics The refinery would be visible in the existing landscape and would be in the foreground to background distance zones as viewed by people on county roads, Highway 23, rural residences, and Makoti. Night lighting would increase the distance from which the proposed facilities would be visible.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Similar to Alternatives 1&A	Similar to Alternatives 1&A	Existing conditions continue.
Air Quality Modeling showed that criteria pollutant air emissions would not exceed the national ambient air standards or PSD increments. Estimated ambient impacts from hazardous air pollutants were below the federal risk based concentrations.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	No additional effect on air quality.	No additional effect on air quality.	Existing conditions continue.

Table 2-8 Summary of Environmental Impacts by Alternative and Resource (continued)

Construction & Effluent Alternatives	Construction Alternatives				Effluent Alternatives		
Alternatives 1 & A	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternatives 5**	**Alternative B**	**Alternative C**	**Alternative D**
Socioeconomics Economic benefit for MHA Nation, additional employment in area	Impacts similar to existing conditions, site would remain in agricultural use.	Employment would be the same as Alternatives 1&A. However, the economic benefit for the MHA nation would be less if the land is not accepted in the trust.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	This alternative would not affect socioeconomics. However, that would change if inadequately treated wastewater was land applied.	This alternative would not affect socioeconomics.	Existing conditions continue.
Environmental Justice Considering both the positive and negative effects of the project, the communities of concern would not be classified as disproportionately affected when compared to other communities on the Reservation or in the surrounding area.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts similar to Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Impacts similar to Alternatives 1&A.	Because the aquifer used for disposal would be completely isolated, implementation of this alternative would not result in adverse effects to the EJ communities in the affected area that would be disproportionate relative to the surrounding area.	Existing conditions continue.
Health and Safety With proper operation of the refinery, potential impacts to the health of local and area communities are anticipated to be negligible. There would be an increased risk of a release of chemicals and hazardous materials to soil, ground water, surface water and air due to refinery operations. In the event of a catastrophic spill or fire, facility emissions would be of concern to workers and the immediate vicinity of the refinery.	Impacts similar to existing conditions, site would remain in agricultural use.	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Impacts similar to Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.
Irreversible or irretrievable commitment of resources Removal of ground water, Loss of vegetative cover until the refinery is decommissioned and reclaimed. Loss of wildlife habitats for the life of the refinery. Loss of crop or forage productivity until the refinery is decommissioned and reclaimed. The addition of an industrial facility to the rural landscape.	None	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Impacts similar to Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.
Unavoidable Adverse Effects Impacts to groundwater and soil immediately underneath the refinery site from spills and leaks. Loss of 0.5 acres of wetlands. Changes in hydrology to the wetlands and unnamed tributary. Mitigation would be developed for these impacts such as a wetlands mitigation plan and groundwater monitoring.	None	Impacts same as Alternatives 1&A	Impacts similar to Alternatives 1&A.	Existing conditions continue.	Impacts similar to Alternatives 1&A.	Impacts similar to Alternatives 1&A.	Existing conditions continue.

Chapter 3 — Affected Environment

This chapter describes the affected environment for the project alternatives. The affected environment is the portion of the existing environment that could be affected by the project. The information in Chapter 3 describes existing conditions, before any of the alternatives are implemented. Chapter 4 describes the changes that are expected to occur from implementing the alternatives. The information presented here focuses on issues identified through the scoping process and interdisciplinary analyses.

The affected environment varies for each issue. Both the nature of the issue and components of the proposed project and alternatives dictate this variation. The following sections concentrate on providing the specific environmental information necessary to assess the potential effects of the proposed action and alternatives.

3.1 General Physical Environment

The Fort Berthold Indian Reservation encompasses about 1,583 square miles in portions of six counties in west-central North Dakota. The counties are Dunn, McKenzie, McLean, Mercer, Mountrail, and Ward. Surface elevations range from about 1,835 feet above mean sea level (AMSL) along Lake Sakakawea to more than 2,600 feet AMSL in Dunn County.

The project area occurs at the confluence of two North Dakota ecoregions — the Missouri Coteau Slope and the Northwestern Glaciated Plains (Bryce et al. 1998). Physiographically, this area consists of nearly level till plains and rolling morainic hills and is also known as the glaciated Prairie Pothole Region (PPR). The PPR is a unique area of approximately 300,000 square miles in the United States and Canada that stretches northwest from northern Iowa through southwest Minnesota, eastern South Dakota, eastern and northern North Dakota, southwest Manitoba, and south Saskatchewan to southeast and east central Alberta and bordering areas of northern Montana (Kantrud et al. 1989).

The landscape of the PPR is largely the result of the scouring action of Pleistocene glaciation that created and maintained numerous shallow depressions (which are classified into various wetland classes). The numerous seasonal, semi-permanent and permanent wetlands (also known as potholes or sloughs) capture snowmelt and rainwater or are within reach of shallow subsurface waters (Samson et al. 1998). Historically, the PPR contained approximately 25 million wetlands, or an average of about 83 per square mile (Kantrud et al. 1989). Today, the PPR is a major producer of cereal grains and is the most important area in North America for the production of waterfowl.

Characteristic vegetation communities in the region include seasonal, semi-permanent and permanent wetlands, mixed-grass prairie including numerous range sites, wooded draws, intermittent seasonal drainages, and agricultural/seasonal crop fields.

3.2 Geologic Setting

Sedimentary units on the Fort Berthold Indian Reservation (Figure 3-1) include all rocks above the Cretaceous-age Pierre Shale, a marine shale that is as much as 2,300 feet thick (Cates and Macek-Rowland 1998). Correspondingly, in western North Dakota, the top of the Pierre Shale may be considered the base of the fresh-water-bearing units. Rocks overlaying the Pierre Shale include, in ascending order, the Cretaceous-age Fox Hills Sandstone and Hell Creek Formation, the Tertiary-age Fort Union Formation and Golden Valley Formation, and the Quaternary-age deposits of glacial drift and alluvium (Cates and Macek-Rowland 1998). The Fox Hills Sandstone and the Hell Creek Formation were deposited in a deltaic environment. The Fort Union Formation includes the Ludlow, Tongue River, and Sentinel Butte Members, which are continental units that were deposited in a generally westward-transgressing sea on an alluvial plain, and the Cannonball Member, which is a marine equivalent and interfingers with the Ludlow Member (Cates and Macek-Rowland 1998). The Golden Valley Formation was deposited as fluvial point-bar sediments and flood-plain deposits (Cates and Macek-Rowland 1998).

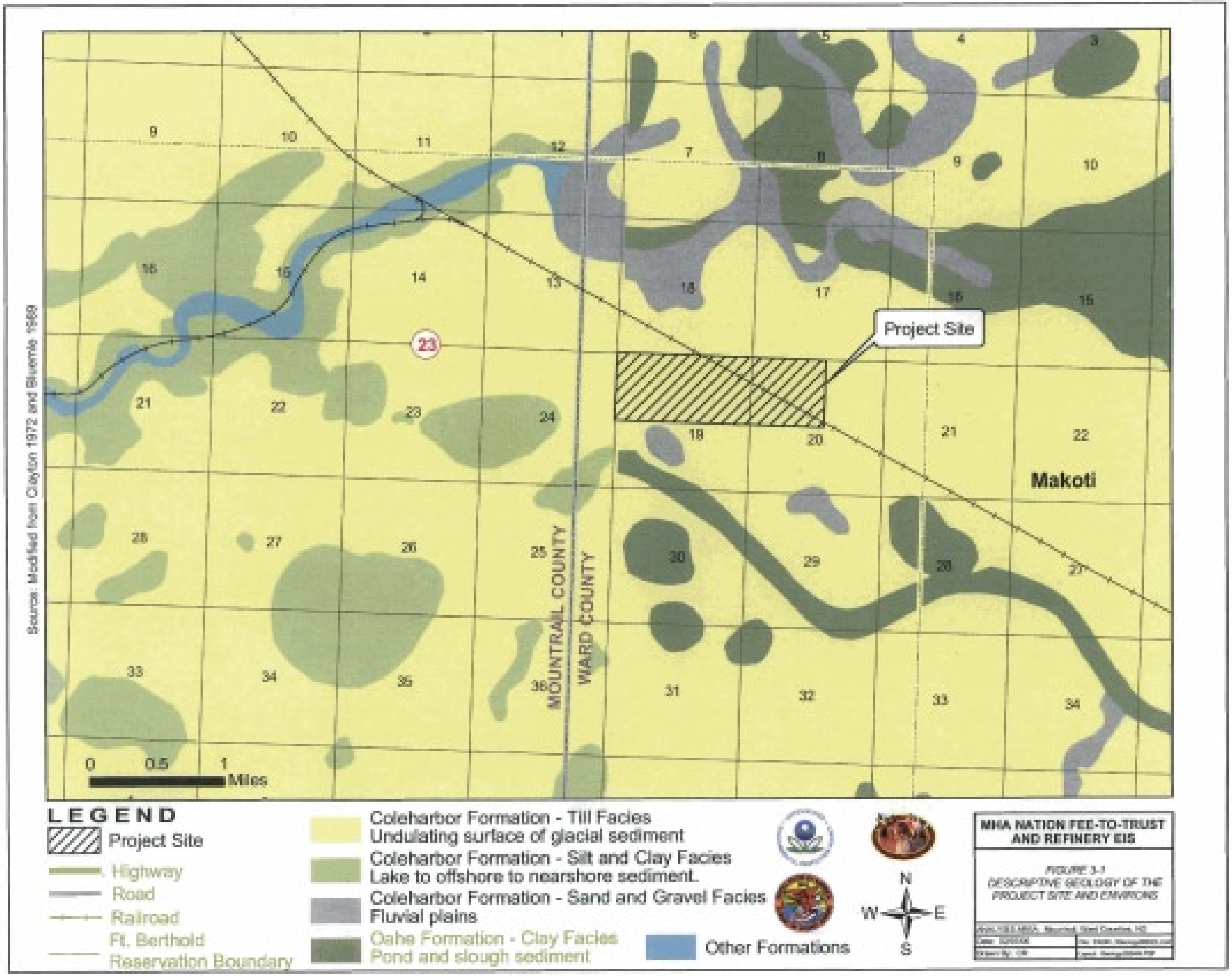
The Williston Basin, a structural feature centered west of the Reservation, affects the thickness of the bedrock units of Cretaceous age and older. The Tertiary-age units on the Reservation are relatively horizontal or have westward dips of less than 10 feet per mile, although some small structures have dips that exceed 150 feet per mile (Cates and Macek-Rowland 1998). Major structural features on the Reservation include the Nesson Anticline and the Antelope Anticline. Correlation of the linear features with subsurface data indicates that several faults occur on the Reservation.

During the Pleistocene, glaciers advanced across central Canada and extended southward over most of the Fort Berthold Indian Reservation. Rivers that flowed from the Rocky Mountains northeastward to Hudson Bay were diverted by the glaciers and forced to flow southward into the Mississippi River Basin. Glacially derived material covers about 50 percent of the Reservation, mostly north and east of Lake Sakakawea. Large rivers fed by melting glaciers generally deposited Pleistocene-age sands and gravels on the Reservation. The East Fork of Shell Creek, Shell Creek, White Shield, New Town, and Sanish buried valleys occur beneath a veneer of glacial till. Pleistocene-age glacial sediments and Holocene-age fluvial sediments that were deposited on the underlying, eroded Tongue River and Sentinel Butte Member sediments fill the buried valleys. Most of the sand and gravel deposits within the buried valleys are horizontally layered lenses that generally have limited lateral extent.

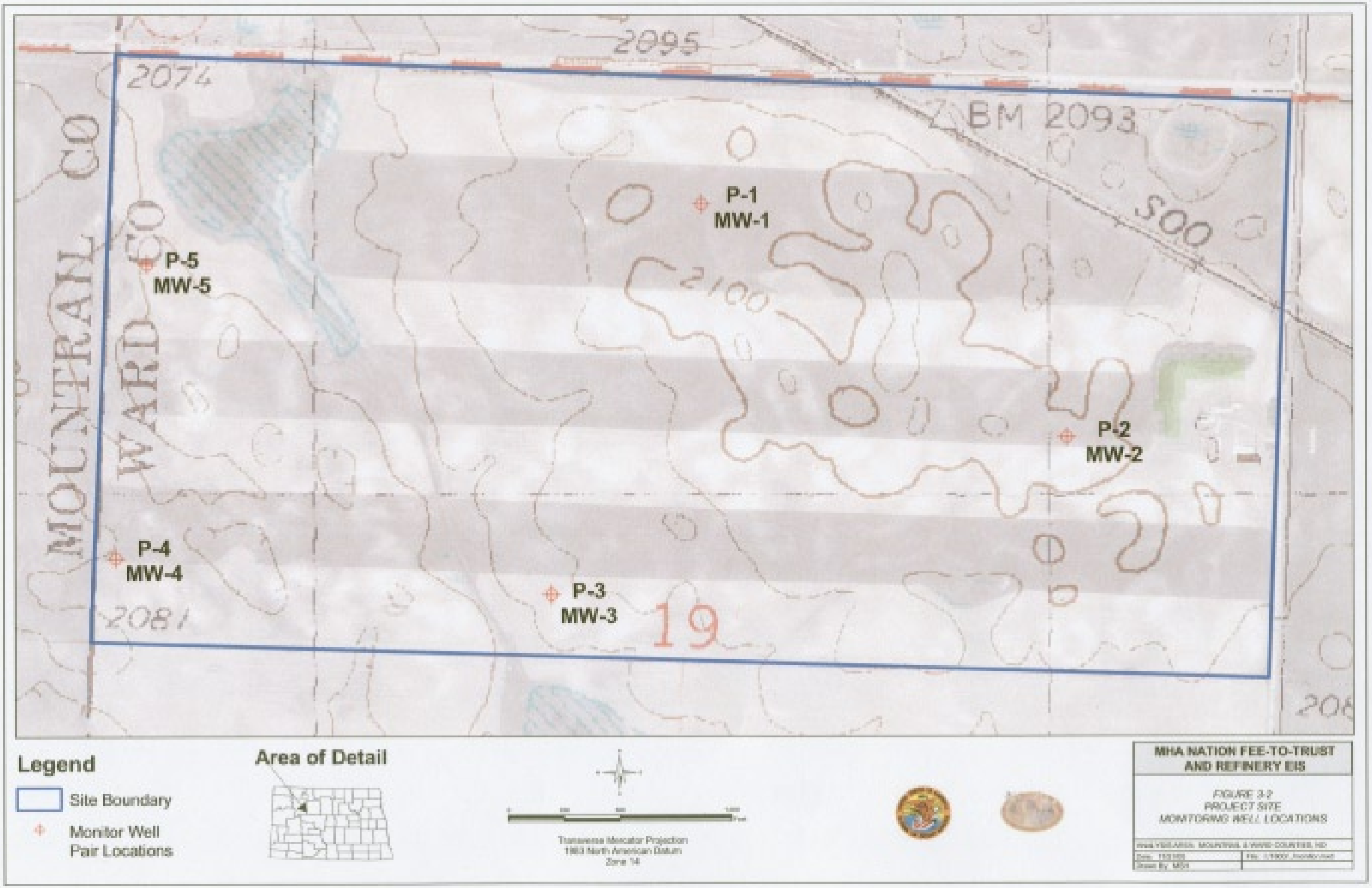
3.2.1 Geology at Project Site

In February 2005, GeoTrans completed five shallow (35-40 feet in depth) and five deep monitoring wells (110 to 125 feet deep) within the proposed refinery site (Figure 3-2). Based on the geologic logs from the five deep wells, the till deposits across the proposed refinery site range from 105 to more than 125 feet in thickness. Till is a glacial deposit which is characterized as non-layered and unsorted (i.e., mixture of particle sizes from clays to boulders). Based on the five deep wells, the thickest till occurs along the eastern boundary of the site. The geologic logs from the five deep wells indicate that the till is comprised primarily of clay from the surface to depths of 70 to 110 feet. In all five deep wells the logs describe silty sand to poorly graded sand layer that occurs beneath the clay. The sandy zones are about five to ten feet thick.

The Fort Union Formation under lays the glacial till layer at a depth of 105 to more than 125 feet below the ground surface. The Fort Union Formation is largely composed of layers of clay, silt, clayey sand, and silty sand. In four of the five deep wells, the first lignite deposit in the Fort Union Formation was encountered between 105 to 110 feet below the surface.



Source: Modified from Clayton 1972 and Bluemle 1989
Project Site
Makoti
MOUNTRAIL COUNTY
WARD COUNTY
23
0 0.5 1
Miles
LEGEND
Project Site
Highway
Road
Railroad
Ft. Berthold Reservation Boundary
Coleharbor Formation - Till Facies
Undulating surface of glacial sediment
Coleharbor Formation - Silt and Clay Facies
Lake to offshore to nearshore sediment.
Coleharbor Formation - Sand and Gravel Facies
Fluvial plains
Oahe Formation - Clay Facies
Pond and slough sediment
Other Formations
N
W
E
S
MHA NATION FEE-TO-TRUST AND REFINERY EIS
FIGURE 3-1
DESCRIPTIVE GEOLOGY OF THE PROJECT SITE AND ENVIRONS



2095
2074
BM 2093
500
2100
2081
19
MOUNTRAIL CO
WARD CO
P-1
MW-1
P-2
MW-2
P-3
MW-3
P-4
MW-4
P-5
MW-5
Legend
Site Boundary
Monitor Well Pair Locations
Area of Detail
Transverse Mercator Projection
1983 North American Datum
Zone 14
MHA NATION FEE-TO-TRUST AND REFINERY EIS
FIGURE 3-2
PROJECT SITE
MONITORING WELL LOCATIONS

3.2.2 Stratigraphy

The project site lies within the Williston Basin, one of the largest structural troughs in North America. The term "Williston Basin" is arbitrarily applied to the Phanerozoic succession in Manitoba, Saskatchewan, the Dakotas, and eastern Montana. However, in a structural context it denotes the ellipsoidal depression centered in North Dakota, more or less below the -1,500 meter (m) contour on the Precambrian basement (Kent and Christopher 1996).

Glaciers deposited most of the rock and sediment exposed at the surface during the Pleistocene. Marine and non-marine sedimentary rocks underlie the glacial deposits. Crystalline rocks of Precambrian age underlie the sedimentary rocks. The rocks deposited in the Williston Basin during the Paleozoic Era and during Triassic and Jurassic time, generally consist of evaporates and carbonates interbedded with some clastic rocks (Cates and Macek-Rowland 1998). Deposition of clastic rocks predominated from the latter part of the Paleozoic. Throughout the Paleozoic, the Williston Basin was at times a cratonic basin or a shelf area that bordered a miogeosyncline farther west. At other times, the area was flooded by seas that followed a trough extending eastward from the miogeosyncline across the area of the central Montana uplift and the central Williston Basin. At times, the entire Williston Basin area was above sea level and subjected to subaerial erosion for relatively short intervals of time. Figure 3-3 presents a generalized stratigraphic column of near-surface rocks of the Fort Berthold Reservation.

3.2.3 Hydrogeology

The Reservation east and north of the Missouri River is underlain by significant glacial deposits comprised primarily of till with lesser amounts of sand and gravel deposits (buried valley deposits). These deposits are collectively referred to as the Coleharbor Group. In places the glacial deposits exceed 400 feet in thickness, but are generally less than 150 feet thick.

Five significant buried valley deposits have been mapped by Cates and Macek-Rowland (1998). These include: (1) East Fork Shell Creek, (2) Shell Creek, (3) White Shield, (4) Sanish, and (5) New Town. The buried valley deposits are composed of Pleistocene-age sands and gravels deposited by large, glacial-fed rivers. The deposits occur in eroded valleys eroded into the underlying Tongue River and Sentinel Butte members of the Fort Union Formation. The five major buried valley deposits within the Reservation are linear, range in width from less than a mile to 10 miles, and underlie from 8.5 to 48 square miles (Table 3–1).

Table 3-1 Major Buried Valley Aquifers — Fort Berthold Indian Reservation

Buried Valley Aquifer	Areal Extent (miles^2)	Width (miles)	Depth (feet)	Thickness (feet)	Estimated Volume of Ground Water Storage (acre-feet)
East Fork Shell Creek (Parshall)	12	1	Down to 100	Approx. 20	48,000
Shell Creek	10	0.75 to 2	Down to 100	Up to 100 (generally less)	38,000
White Shield	48	2 to 10	Down to 350	18 to 226 (average = 100)	920,000
New Town	18	1.7 to 4.7	Up to 300	10 to 100	170,000
Sanish	8.5	1	Up to 300	25 to 270	240,000

Source: Wireman 2005

System	Series	Geologic Unit		Lithology	Maximum Thickness (feet)	Aquifers Contained within Geologic Unit
Quaternary	Holocene	Oahe Formation		Silt, sand, and gravel.	60	
	Pleistocene	Coleharbor Group		Till, silt, sand, and gravel.	450	Buried-valley
Tertiary	Eocene	Golden Valley Formation		Sandstone, silt, clay, claystone, lignite, and carbonaceous shale.	120	Golden Valley
	Paleocene	Fort Union Formation	Sentinel Butte Member	Clay, claystone, shale, sandstone, siltstone, and lignite.	425	Sentinel Butte
			Tongue River Member	Marine sandstone, clay, shale, and siltstone.	640	Tongue River
			Cannonball Member	Marine sandstone, clay, shale, and lignite.	550	
			Ludlow Member	Continental siltstone, sandstone, shale, clay, and lignite.		
Cretaceous		Hell Creek Formation		Siltstone, sandstone, shale, claystone, and lignite.	350	Fox Hills - Hell Creek
		Fox Hills Sandstone		Sandstone, shale, and siltstone.	375	
		Pierre Shale		Shale.	2,300	

Figure 3-3 Generalized Geologic Column on Near-surface Rocks of the Fort Berthold Indian Reservation

The Fort Union Formation underlies the glacial deposit. Within the Reservation, the Fort Union Formation is represented primarily by the Tongue River and Sentinel Butte members. Both of these members are composed primarily of inter-bedded claystones, siltstones, shale, and lignite. The Tongue River Member underlies the entire Reservation and crops out southwest of New Town. The Sentinel Butte Member overlies the Tongue River Member and is the subcrop except in the valleys of Shell Creek and Deepwater Creek. The Fort Union Formation generally exceeds 1,000 feet in thickness, and the top of the formation is typically identified by the first significant lignite deposit encountered. The lignite deposits, where thick enough, function as aquifers and can yield water to domestic wells.

The Fox Hills Formation underlies the Fort Union Formation beneath the entire Reservation. The Fox Hills Formation is composed primarily of sandstone with lesser amounts of shale and siltstone. The Formation ranges from 100 to 350 feet thick. Within the Reservation, depths to the top of the Fox Hills range from about 1,100 to 2,000 feet.

3.2.4 Geologic Hazards

Potential geologic hazards include landslides, subsidence, and seismic activity related to known or suspected active faults. No known active faults with evidence of Quaternary movement are present in the project area (U.S. Geological Survey 2004f). No earthquakes of significant intensity have occurred in North Dakota during historical times (U.S. Geological Survey 2003).

Seismic hazard is commonly expressed in Peak Ground Acceleration (PGA) of percent gravity with 10 percent probability of exceedance in 50 years. The project area falls at 0 percent gravity, which indicates virtually zero potential for damages to structures from an earthquake activity (U.S. Geological Survey 2002).

Landslide potential in the project area is moderate (Federal Emergency Management Agency 2004). In general, landslide potential is greatest in areas where steep slopes occur, particularly where rock layers dip parallel to the slope, or where erosional undercutting may occur. Slope gradients in the project area are gentle; however, the few steeper areas may be susceptible to slumping, sliding, and creeping.

3.3 Ground Water Resources

EPA does not have the statutory authority to regulate ground water quality. To date, the MHA Nation has not promulgated Tribal standards for ground water, and does not have a ground water classification system or a ground water discharge permit system. Since the DEIS was published, the MHA Nation has started developing ground water quality standards.

The project site is within the glaciated Missouri Plateau section of the Great Plains physiographic province. The Missouri Plateau is subdivided into two districts: the Coteau du Missouri and the Coteau Slope, of which, the project site is located within the Coteau Slope district. The Coteau Slope is an area of older ground moraine that is characterized by gently rolling topography dissected by stream valleys.

Several surficial-outwash and buried-valley fill aquifers store large quantities of ground water within the Coteau du Missouri and Coteau slope region (Harkness and Wald 2003). Ground water in the region is contained in aquifers in the glacial drift of Quaternary age, the Fort Union Formation (Sentinel Butte and Tongue River), Hell Creek Formation, and the Dakota Group of Cretaceous Age. These glacial deposits range from 0 to 800 feet in thickness and average about

165 feet thick (Clayton 1972). The following sections describe these bedrock and buried valley aquifers.

Within the Reservation, ground water occurs in the till deposits, the buried valley deposits, the Fort Union Formation and the Fox Hills Formation. All of these geologic units will yield enough ground water to a well to be considered an aquifer. The Fort Union aquifers (Tongue River and Sentinel Butte Members) and the till typically yield only enough water for domestic uses. The buried-valley deposits and the Fox Hills Formation are capable of yielding enough water for public water supply, irrigation, and industrial use. However, the chemistry of the ground water in all of these aquifers constrains the use to some extent.

As indicated on Table 3–1, the estimated volume of ground water stored in the five major buried–valley aquifers within the Reservation is approximately 1,414,000 acre-feet. Well yields from these aquifers are quite variable and depend on saturated thickness. These aquifers are capable of yielding more than 300 gpm where there is sufficient saturated thickness. However, yields of less than 100 gpm are far more common. The East Fork Shell Creek aquifer has been used by the Town of Parshall to obtain municipal supplies.

The MHA Nation's Environmental Protection Office estimates that more than 700 wells have been installed on the Reservation. Of these, about 300 are less than 100 feet deep and currently in use.

Depth to water in the till that underlies the project site ranges from 10 to15 feet (GeoTrans, Inc. 2005). The ground water in the till appears to flow towards the southwest. GeoTrans (2005) determined that the horizontal gradient for the May 2005 water levels is about 0.01 feet/foot. Based on this gradient and hydraulic conductivity values derived from slug tests, GeoTrans (2005) also estimated horizontal ground water flow velocity in the till to be between 0.4 to 2.4 feet/year.

At least four of the five deep wells encountered the top of the Sentinel Butte Member of the Fort Union Formation. The geologic log for deep well P-5 does not indicate that the Sentinel Butte member was encountered. GeoTrans used water levels in these wells to construct a potentiometric surface map for ground water in the Fort Union Formation beneath the project site. Based on this map, GeoTrans (2005) determined the direction of ground water flow in the upper part of the Fort Union is towards the southeast. The calculated horizontal gradient on the potentiometric surface is 0.0009 feet/foot (GeoTrans, Inc. 2005). Based on this gradient and the hydraulic conductivity value obtained from a pump test using deep well P–3, GeoTrans calculated a horizontal ground water flow velocity of 100 feet/year. This well is screened from 95 to 105 feet and is probably screened in the till. The log for well P-3 indicates that a poorly graded sand occurs from 95 to 103 feet and the first lignite is encountered is at 110 feet. The depth of the first lignite encountered is typically used to mark the top of the Sentinel Butte member of the Ft. Union formation. In the other four deep wells, horizontal ground water flow ranged from 0.03 to 0.5 feet/year. Wells P-1, P-2 and P-4 are screened below the first lignite and no lignite was encountered in well P-5. Ground-water flow velocities estimated from slug tests conducted on the shallow till wells MW-1, MW-2, MW-3 and MW-4 ranged from 0.37 to 2.36 ft/year. Geotrans (2006) concludes that, outside of the sand lens, the surrounding lower permeability of the silts and clays will determine the overall ground water flow velocity in the upper Fort Union formation of around 0.2 feet per year (GeoTrans, Inc. 2006).

It is important to note that the potentiometric surface map included in Cates and Macek-Rowland (1998) indicates a northeast-to-southwest flow direction for the Tongue River east of the Missouri

River. The Tongue River formation is the next deepest layer of the Fort Union formation or group. As discussed above the upper layer of the Fort Union formation (Sentinel Butte formation) flows towards the southeast, a 90° difference in flow direction.

3.3.1 Hydraulic Conductivity

Slug tests and baildown tests from wells on the project site showed that the hydraulic conductivity values in the water table wells ranged from 5x10-5 cm/sec to 3x10-6 cm/sec (GeoTrans, Inc. 2005). The values represent clay till in which all the water table wells are screened. The hydraulic conductivity values ranged from 2x10-2 cm/sec to 1x10-5 cm/sec. The higher hydraulic conductivity was from a well that was screened in a sand layer. Conversely, the other wells were screened in much finer grained material within the Fort Union Formation, resulting in lower hydraulic conductivities.

The average linear ground water flow velocity was calculated for each of the wells using the horizontal gradient and the average hydraulic conductivity for each well. The calculated ground water velocity ranges from 0.4 to 2.4 feet per year for the clay till. The calculated ground water velocity in the Fort Union Formation ranges from 0.2 to 100 feet per year, with the upper end of that range due to the sand lens. However, because of the limited lateral extent of the sand lens, the surrounding low permeability of the silts and clays will determine the overall ground water flow velocity in this formation. Based on water level elevations in the ten monitoring wells on the project site, a strong downward vertical gradient exists between the till and the Fort Union Formation. Thus to the extent that vertical ground water flow occurs through the till, the direction of the flow will be downward.

3.3.2 Bedrock Aquifers

Bedrock aquifers include Fox Hills-Hell Creek, Tongue River, and Sentinel Butte. These three aquifers are estimated to store 93 million acre-feet under the Reservation boundary (Cates and Macek-Rowland 1998).

The hydraulic characteristics of the ground water aquifers have been investigated by pumping tests and slug tests in monitoring wells previously installed throughout the Reservation. Data from these pumping and slug tests provide estimates of hydraulic conductivity, transmissivity, and storativity.

Hydraulic conductivity and transmissivity are measures of the permeability of an aquifer. Storativity is the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head.

Fox Hills-Hell Creek

The Fox Hills-Hell Creek aquifer underlies the entire Reservation and ranges from 100 to 350 feet in thickness under the Reservation. The Fox Hills Sandstone consists mainly of brown shale and massive, fossiliferous, and white marine sandstone (Armstrong 1971, Cates and Macek-Rowland 1998). Conversely, the Hell Creek Formation primarily consists of light-gray sands and clay of both fluvial and marine sediment origin (Armstrong 1971, Cates and Macek-Rowland 1998). Sandstone beds in the upper Fox Hills Sandstone and the lower Hell Creek Formation are apparently connected hydrologically (Armstrong 1971). Therefore, the water-producing interval within the two formations is considered a single aquifer.

This aquifer is composed mainly of very fine- to medium-grained sandstone interbedded with siltstone and shale (Armstrong 1971). The elevation of the base of the aquifer ranges from about

295 to 877 feet AMSL (Cates and Macek-Rowland 1998). Transmissivity of the aquifer ranges from about 180 to 260 feet squared per day (Cates and Macek-Rowland 1998). Based on an areal extent of 1,583 square miles, an average cumulative thickness of 200 feet, and an assumed porosity of 25 percent, the volume of water stored in the Fox Hills-Hell Creek aquifer is about 51 million acre-feet (Cates and Macek-Rowland 1998). The potentiometric surface of the Fox Hills-Hell Creek aquifer suggests general flow is from northwest to southeast (Cates and Macek-Rowland 1998).

Production from wells completed in the Fox Hills-Hell Creek varies with location. Wells within Mountrail County could yield production as low as 3 gpm (Armstrong 1971). In contrast, yields of 200 to 400 gpm have been reported in Dunn County (Klausing 1979 as cited in Cates and Macek-Rowland 1998).

Direct recharge of the aquifer occurs outside of the Reservation where the aquifer crops out in the extreme southwestern corner of North Dakota and in eastern Montana (Cates and Macek-Rowland 1998). Within the Reservation, recharge results from downward movement of ground water from overlying aquifers. Discharge occurs by lateral movement of water to adjacent areas, upward leakage to overlying aquifers, flowing wells, and well pumpage (Cates and Macek-Rowland 1998).

The Fox Hills and Hell Creek aquifers are being considered as water sources for the proposed project. According to Schmid (2004), very few deep wells have been drilled in this region of the Reservation. This is due in part to two primary reasons: the topographical relief of lands on the north side of Lake Sakakawea is not suited for irrigated agricultural crops and the small, rural populations that occur in this area of the Reservation make use of the abundant, shallow surficial glacial aquifers as local water supply sources. Therefore, the demand for irrigation water and local water supply is relatively low in this portion of the Reservation.

A search was conducted on the North Dakota State Water Commission (NDSWC) website database to determine if any wells have been completed in the Fox Hills-Hell Creek aquifer near the project area. The search revealed that only one well (152–093–26BCC see Table 3–2) was completed in the Fox Hills or Hell Creek aquifers within Mountrail County and no wells were identified in Ward County. According to Wanek (2004), NDSWC has not updated its database for wells in either Mountrail or Ward County. Therefore, an additional search of the Wald and Cates (1995) report and the U.S. Geological Survey (USGS) website database (U.S. Geological Survey 2004e) was conducted. The results of both searches suggest that 40 wells have been drilled into the Fox Hills-Hell Creek aquifer within Reservation lands (Table 3–2). Figure 3-4 shows their approximate location and proximity to the project site. A review of Figure 3-4 shows that well 153–088–33 is the closest proximity deep-water well (7.7 miles).

Tongue River

The Tongue River aquifer underlies the entire Reservation and crops out southwest of the New Town. The aquifer is composed mainly of claystones and siltstones and has widely distributed pockets of sandstone or lignite layers. Although claystone and siltstone are the dominant sediments in the Tongue River Member, lignite beds (which are a major source of ground water on the Reservation) are common and may be as thick as 15 feet (Cates and Macek-Rowland 1998). Hydraulic conductivity in the Tongue River aquifer underlying Dunn County ranges from 0.01 to 0.95 foot per day (Cates and Macek-Rowland 1998). Based on an areal extent of 1,583 square miles, an average cumulative thickness of 80 feet, and an assumed porosity of 30 percent, the volume of water stored in the Tongue River aquifer is about 24 million acre-feet of water (Cates and Macek-Rowland 1998).

Yields from water wells in the aquifer vary and depend on the zones in which the wells are completed. Yields range from 10 to 200 gpm (Klausing 1979 and Croft 1985 as cited in Cates and Macek-Rowland 1998). The potentiometric surface of the Tongue River aquifer suggests general flow is toward the Missouri River or Lake Sakakawea (Cates and Macek-Rowland 1998).

Table 3-2 Record of Wells and Test Holes Completed within Fox Hills and Hell Creek Aquifer on Reservation Lands

ID #	USGS ID	Depth drilled (feet)	Depth of well (feet)	Year of Construction.	Aquifer code[1]	Elevation of Land Surface
153-094-32CDBD	480132102475301	1,590	1,524	09-29-89	211FXHL	2,266
153-094-23CCC1	480311102442501	1,860	1,767	08-21-80	211HCFH	2,186
153-088-35	--	1,560	1,523	05-28-1997	211HCFH	--
151-096-36AAA[2]	475141102535701	1,300	--	12-08-81	211FXHL	2,490
151-095-30ACA[3]	475220102530001	1,500	1,460	06-15-83	211FXHL	2,316
151-095-30ABD[2]	475226102530001	1,470	1,400	--	211FXHL	2,320
151-095-04DBD2	475529102502702	1,620	1,432	06-30-81	211FXHL	2,309
151-091-11BBC	475504102175601	1,340	1,340	04-15-85	211FXHL	1,880
151-090-29BBC	475227102140801	1,620	1,620	10-19-82	211FXHL	2,150
150-095-08BDBD	474942102520901	1,580	1,560	07-15-83	211FXHL	2,319
150-095-05BBA2[2]	475049102522102	1,460	--	--	211FXHL	2,380
149-095-09CDD	474400102504501	1,740	1,564	7-17-84	211FXHL	2,226
149-094-14BA	474349102403601	1,750	1,745	07-21-70	211HCFH	2,160
149-089-14CBB	474326102022501	1,370	1,370	05-02-85	211FXHL	1,920
148-095-22CCA	473711102463101	1,455	1,430	--	211FXHL	1,925
148-089-33CCA[2]	473526102015201	1,390	1,390	10-22-86	211FXHL	1,940
148-087-33BBB	473607101464201	1,320	1,320	08-21-86	211FXHL	2,005
148-087-15DCD[3]	473800101443701	1,160	1,160	09-09-82	211FXHL	1,910
147-095-26BBB1	473152102452301	--	1,850	1969	211FXHL	2,280
147-095-24AAC	473237102430801	--	1,580	1969	211FXHL	2,000
147-095-14AAA	473334102441501	1,430	1,430	1968	211FXHL	1,980
147-095-13CCC3	473246102440403	2,130	1,980	05-22-79	211FXHL	2,420
147-095-13CCC2	473250102440602	1,950	1,930	1971	211FXHL	2,420
147-095-13CCC1[2]	473250102440601	160	--	--	211FXHL	2,420
147-095-12CAD	473354102433701	1,420	1,410	1969	211FXHL	1,880
147-094-36BAD[2]	473053102360001	1,460	1,450	05-27-89	211FXHL	2,000
147-094-35CBB[3]	473034102452301	1,560	1,560	06-08-89	211FXHL	2,150
147-094-35CAA[2]	473032102371501	1,610	1,610	10-09-74	211FXHL	2,270
147-094-34BAD	473054102383001	1,510	1,502	1968	211FXHL	1,980
147-094-33DB[2]	473031102393201	--	1,660	1969	211FXHL	2,210
147-094-26BCB	473139102374201	1,510	1,500	1969	211FXHL	1,940
147-093-35CBC3[3]	473027102300303	1,420	1,320	10-14-89	211FXHL	1,860
147-093-34DBB	473028102304601	1,300	1,300	06-20-89	211FXHL	1,860
147-093-33DAC	473024102314001	1,400	1,390	05-19-89	211FXHL	2,220
147-091-35BDA[3]	473045102141701	1,550	1,550	09-00-70	211FXHL	2,190
146-094-08DAD2	472840102402702	1,730	1,730	10-23-74	211FXHL	1,965
146-094-05DCC	472917102390001	--	1,500	1972	211FXHL	1,960
146-094-05CBD	472932102412401	1,410	1,410	1968	211FXHL	1,910
146-094-04BBC[2]	472958102401801	--	1,600	1969	211FXHL	1,980
146-093-03CDD	472919102305301	1,525	1,525	07-15-72	211FXHL	2,160
146-092-15BBB	472820102234101	1,760	1,610	11-22-88	211FXHL	1,930

Notes:
1. Aquifer codes: 211FXHL Fox Hills; 211HCFH Hell Creek Formation
2. No data available
3. Only water quality or water level data available, but not both datasets.

Sources: Wald and Cates 1995, U.S. Geological Survey 2004e, North Dakota State Water Commission 2004

Based on the hydraulic heads of both the overlying Sentinel Butte aquifer and the underlying Fox Hills-Hell Creek aquifer, recharge occurs from leakage and recharge (Cates and Macek-Rowland 1998). Discharge from the Tongue River aquifer is by lateral movement of water to adjacent areas, base flow into streams, and well discharge (Cates and Macek-Rowland 1998).

Sentinel Butte

The Sentinel Butte aquifer underlies most of the Reservation. The aquifer is composed mainly of interbedded claystones, siltstones, shale, fractured lignite, and poorly consolidated sandstone (Cates and Macek-Rowland 1998). The sandstone beds (which occur at depths ranging from 10 to 400 feet) are composed mainly of fine sand interbedded in a matrix of clay and silt and range in thickness from a few feet to about 120 feet. The lignite beds are limited in lateral extent and yield only local water supplies (Cates and Macek-Rowland 1998). Transmissivity within a well completed in sandstone in the Sentinel Butte aquifer near Plaza is about 400 square feet per day (Armstrong 1971). Based on an areal extent of 914 square miles, an average cumulative thickness of 100 feet, and an assumed porosity of 30 percent, the volume of water stored in the aquifer is about 18 million acre-feet of water (Cates and Macek-Rowland 1998).

Yields from water wells in the aquifer vary and depend on the zones in which the wells are completed. Yields from wells completed in sandstones range from 1 to 100 gpm. In contrast, yields from wells completed in lignite beds are generally about 1 gpm (Armstrong 1971).

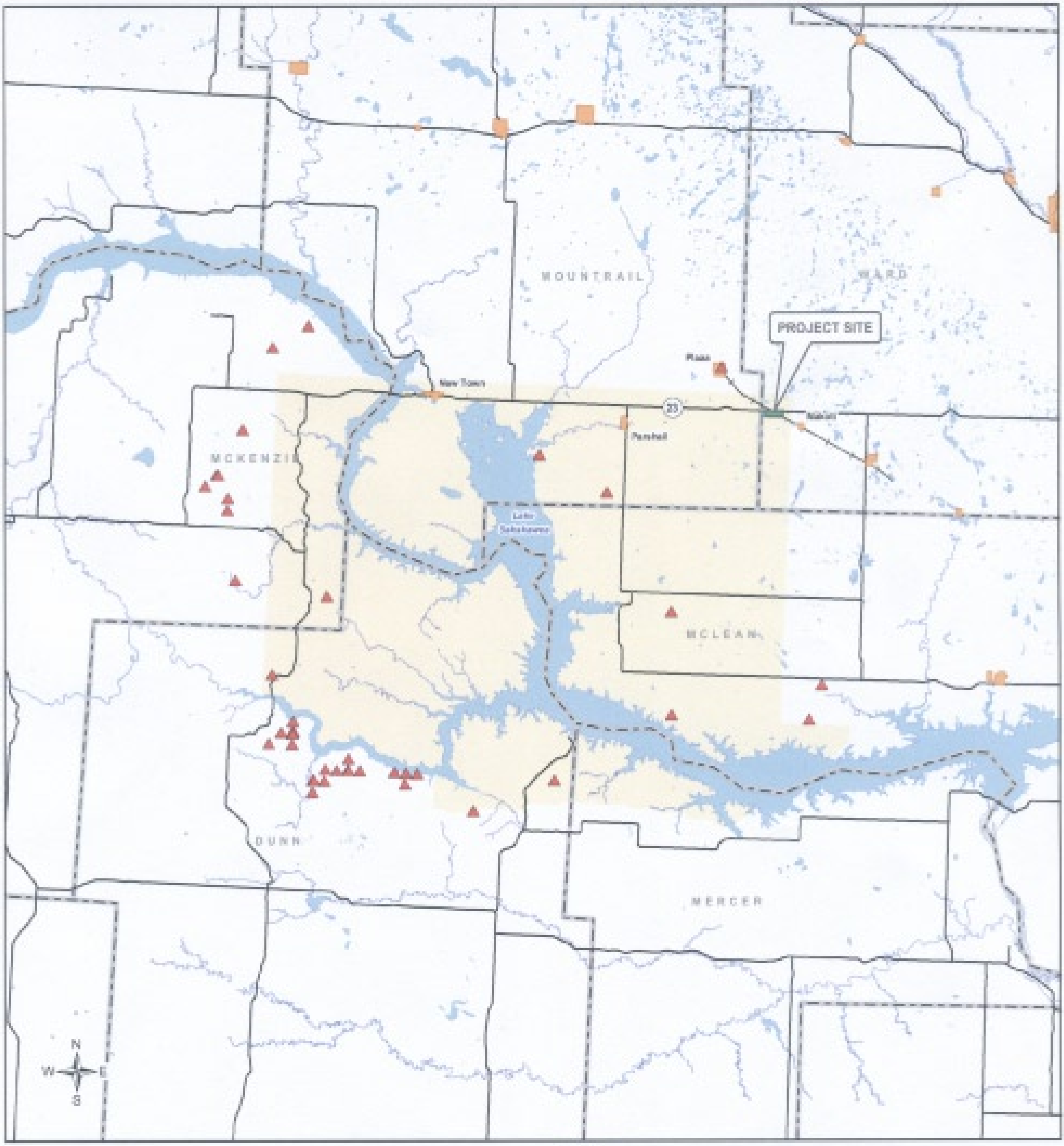
Recharge occurs primarily by infiltration of precipitation. Conversely, discharge is by lateral movement of water to adjacent areas, downward seepage into the Tongue River aquifer, seepage into streams and springs, and wells (Cates and Macek-Rowland 1998).

3.3.3 Buried-Valley Aquifers

The East Fork Shell Creek, Shell Creek, White Shield, New Town, and Sanish aquifers occur within buried valleys and store about 1,414,000 acre-feet of water within the Reservation (Cates and Macek-Rowland 1998). Five buried-valley aquifers occur in the general vicinity of the project site. They are the East Fork Shell Creek, Shell Creek, Ryder Ridge, Hiddenwood Lake, and Vang aquifers (Figure 3-5).

Yields from the above-mentioned aquifers are highly variable and water from these sources is typically very hard. The East Fork of Shell Creek aquifer was previously used by Parshall as their local water supply and yields from this aquifer may be as high 150 gpm, but typically will be less than 50 gpm (Bartlett and West Engineers, Inc. 2002). The area also has two deep aquifers, the Dakota aquifer and the Fox Hills-Hell Creek aquifer. Both are very deep aquifers, as the Dakota aquifer ranges from 3,505 feet to 5,210 feet and Fox Hills at 2,100 feet below the land surface (Bartlett and West Engineers, Inc. 2002). Yield from the Dakota is as high as 320 gpm and yield from the Fox Hills/Hell Creek is as much as 60 gpm (Bartlett and West Engineers, Inc. 2002).

A file search of well logs records near the project area was conducted in the NDSWC's offices. Based on a search of approximately 60 to 70 well logs, seven wells were identified that may have relevant baseline data useful for comparison analyses (Table 3–3).



LEGEND

Railroad

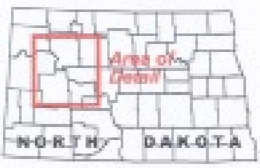
State Highway

County Boundary

Well Locations

MHA Nation

Project Site



0 2.5 5 10 15

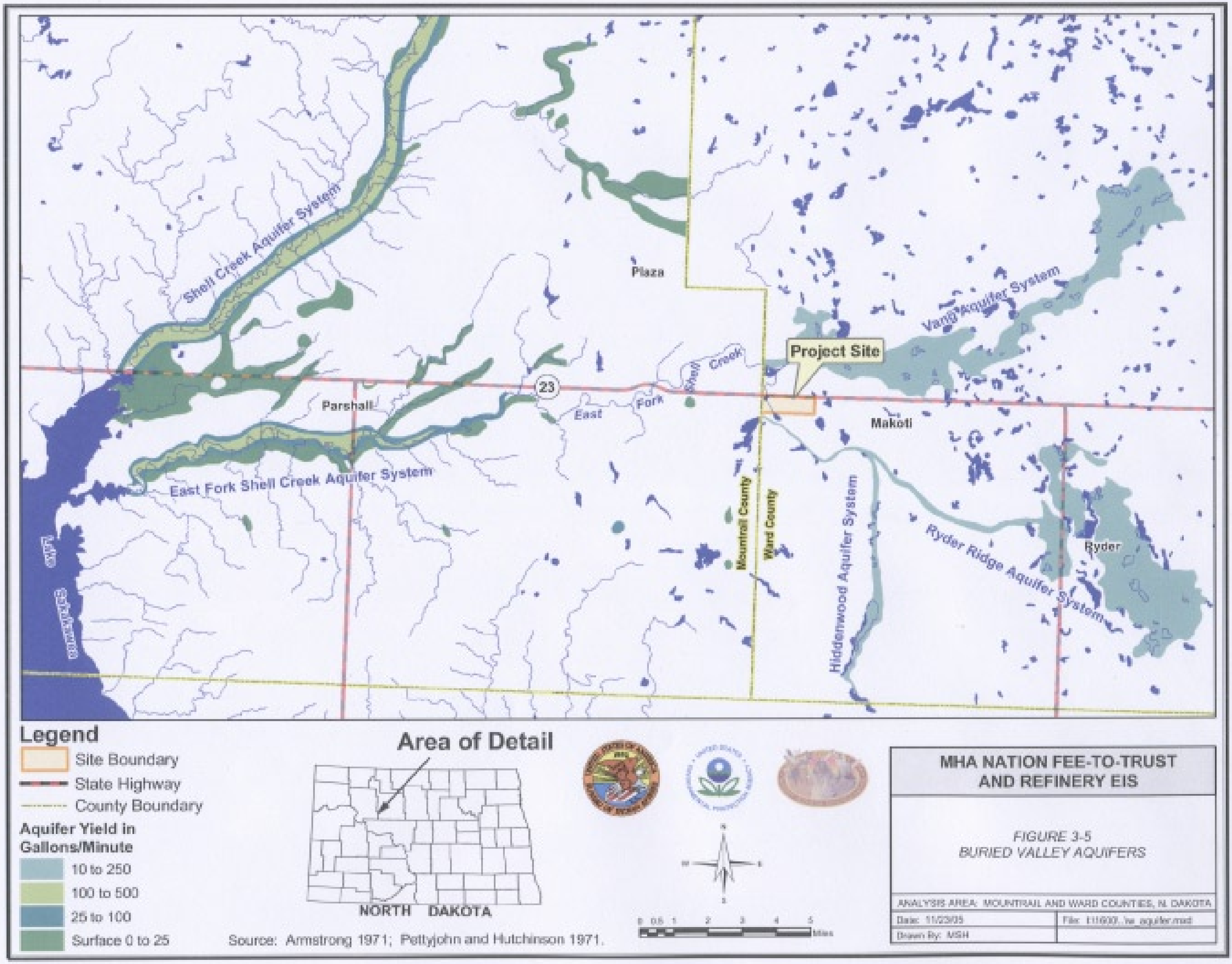
Miles

Well Data Source: Wald and Cates, 1995.

MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 3-4
WELLS WITHIN THE FOX HILLS-HELL CREEK AQUIFERS

ANALYSIS AREA: MOUNTRAIL AND WARD COUNTIES, N. DAKOTA	
Date: 11/23/05	File: I:\1600L.3\Wells.mxd
Drawn By: CR	Wells.pdf



Shell Creek Aquifer System
Plaza
Vang Aquifer System
Project Site
Shell Creek
23
East Fork
Parshall
Makoti
East Fork Shell Creek Aquifer System
Mountrail County
Ward County
Hiddenwood Aquifer System
Ryder Ridge Aquifer System
Ryder
Lake Sakakawea
Legend
Site Boundary
State Highway
County Boundary
Aquifer Yield in Gallons/Minute
10 to 250
100 to 500
25 to 100
Surface 0 to 25
Area of Detail
NORTH DAKOTA
Source: Armstrong 1971; Pettyjohn and Hutchinson 1971.
0 0.5 1 2 3 4 5
Miles
MHA NATION FEE-TO-TRUST AND REFINERY EIS
FIGURE 3-5
BURIED VALLEY AQUIFERS
ANALYSIS AREA: MOUNTRAIL AND WARD COUNTIES, N. DAKOTA
Drawn By: MSH

Table 3-3 Summary of Wells Data Relevant to the Project Site

Well ID	Date Drilled	Well Depth (feet)	Static Water Level (feet)	Pumped Gallons per Minute	Pumped Water Level (feet)
152-87-10	01-1990	240	35	33	55
152-87-26	05-1988	296	30	5	65
152-87-27	10-1981	158	27	30	70
152-87-31	08-2001	189	--	6	80
152-88-04	04-1981	88	25	37	55
153-88-23	06-1982	160	31	80	100
153-88-35	05-1997	1,543	155	32	1,200

Source: Schmid 2004

Well numbers 152–87–10, 152–87–26, 152–87–27, 152–87–31, 152–88–04, and 152–88–23 have been completed in various sand lenses in the underlying glacial aquifers (Schmid 2004). These sand lenses vary in depth, recharge, and volume of water. Therefore, the exploration of these sand layers should be analyzed as sources of reliable water supply at the project site. Schmid (2004) estimated that three to four wells completed within these sand lenses should be able to produce 40+ gpm. Because the boundaries of the underlying aquifers and subsequent sand lenses are not extensively mapped, a modeling drawdown analysis was not conducted. However, a review of static water levels and associated draw down levels for the wells in Table 3–3 show that these shallow wells are capable of producing water quantities that may be required throughout the year.

Shell Creek

The Shell Creek aquifer lies within a broad, deep buried valley northwest of Parshall (Figure 3-5). The Shell Creek aquifer is composed of sand and gravel lenses that are surrounded by less permeable till. Flow in the aquifer is down gradient towards the Missouri River, which generally corresponds to the topography of the drainage basin. The aquifer has an areal extent of about 10 square miles and ranges from ¾ to 2 miles in width (Armstrong 1971, Cates and Macek-Rowland 1998). Available data suggest that the aquifer's thickness is as much as 100 feet (Armstrong 1971). Assuming an areal extent of 10 square miles, an average cumulative thickness of 20 feet, and a porosity of 30 percent, the volume of water stored in the aquifer is about 38,000 acre-feet (Cates and Macek-Rowland 1998).

Although very few wells have been drilled in the aquifer, transmissivity at well 155–89–25ACB1 was evaluated using the Theis method. This testing suggests a transmissivity of about 90,000 gallons per day (gpd) per foot at the test well and about 138,000 gpd at a nearby observation well (Armstrong 1971). The storage coefficient was calculated at 0.0004. Based on these results, Armstrong (1971) concluded that pumping rates as high as 300 gpm probably could be maintained over an irrigation season.

Recharge to the aquifer is from direct precipitation, underflow through adjoining outwashes, and inflow from the adjacent Fort Union sediments (Armstrong 1971). Flow of ground water generally follows the topography of the drainage basin.

East Fork Shell Creek

The East Fork Shell Creek aquifer consists of glaciofluvial sediments deposited in buried valleys. The East Fork Shell Creek aquifer underlies East Fork of Shell Creek and has an areal extent of about 12 square miles and width of about one mile (Armstrong 1971). The aquifer is composed of sand and gravel lenses that vary in thickness, have unknown lateral extent, and are surrounded by less permeable till (Cates and Macek-Rowland 1998). The sand and gravel lenses occur at various depths down to 100 feet. The aquifer is underlain directly by the Tongue River Member, which was eroded into a rugged topography before or during glaciation.

According to Armstrong (1971), the specific capacity of well 152–090–25DBC2 in the East Fork Shell Creek aquifer is 11 gpm per drawdown, indicating a transmissivity of about 2,950 square feet per day. Additionally, Schmid (1962) determined a similar transmissivity of 3,350 square feet per day and a storage coefficient of 0.0043 at well 152–090–25DBC1. Based on an areal extent of 12 square miles, an average cumulative thickness of 20 feet, and an assumed porosity of 30 percent, the volume of water stored in the East Fork Shell Creek aquifer is about 46,000 acre-feet (Cates and Macek-Rowland 1998).

Recharge is primarily from direct precipitation, seepage from stream flow in times of maximum runoff in the East Fork of Shell Creek, and from inflow from the Sentinel Butte Formation (Armstrong 1971). Flow of ground water generally follows the topography of the drainage basin.

Ryder Ridge

The Ryder Ridge aquifer extends from just west of Ryder, northwestward across T152N, R87W, and into Mountrail County approximately 9 miles (Figure 3-5). West of Makoti, the aquifer apparently overlies the Hiddenwood Lake aquifer. The Ryder Ridge aquifer has a core of water-bearing sand and gravel that reaches a total thickness of 55 feet, and material ranges in size from fine sand to fine gravel (Pettyjohn and Hutchinson 1971).

The USGS monitored ground water levels in the aquifer at test well 151–086–05CBB (USGS 475540101431201) for a 1-year period of record (1966). The ground water level in the aquifer was observed at 27 feet below ground surface (U.S. Geological Survey 2004b). No wells were known to produce water from the Ryder Ridge aquifer (Pettyjohn and Hutchinson 1971).

Hiddenwood Lake

The Hiddenwood Lake aquifer is a valley-fill deposit that was cut into the bedrock at least 130 feet below the upland surface (Pettyjohn 1968). It extends from McLean County northward through Hiddenwood Lake to Makoti in southwestern Ward County (Figure 3-5). The aquifer material consists of fine to coarse sand and fine to medium gravel, which ranges between 9 to 45 feet in thickness, including a few thin layers of clay (Pettyjohn and Hutchinson 1971). This is overlain by at least 66 feet of glacial drift, predominantly lake deposits, in its southern end, and generally by more than 100 feet of glacial till in its northern end (Pettyjohn 1968).

The USGS monitored ground water levels in the aquifer at test well 152–087–28DAA (USGS 475729101483401) for a 30-year period of record (1965 to 1995). As shown on Figure 3-6, ground water levels in the aquifer have ranged from a low of 29 feet below ground surface to a high of 22 feet below ground surface (U.S. Geological Survey 2004a).

Vang

The Vang aquifer extends southwestward from the west-central part of T153N, R85W through T153N, R86W and T152N, R87W, and into Mountrail County approximately 14 miles (Figure 3-5). The City of Makoti obtains its local water supply from two wells completed in this aquifer. The aquifer is a collapsed-outwash deposit that partly fills a glacial drainage way that averages about 1,000 feet in width to slightly more than 2 miles in length (Pettyjohn and Hutchinson 1971). The aquifer material ranges in size from fine sand to coarse gravel and ranges in thickness from 0 to 28 feet. The estimated average permeability of the entire deposit is approximately 1,500 gpd (Pettyjohn and Hutchinson 1971). In addition, the aquifer provides water to a few domestic and stock wells, and in several small areas, wells could produce an estimate of 150 gpm (Pettyjohn and Hutchinson 1971).

The USGS monitored ground water levels in the aquifer at test well 152–087–16AAA for a 28-year period of record (1966 to 1994). As observed in Figure 3-7, ground water levels in the aquifer have ranged from a low of 10.5 feet below ground surface to a high of 5.5 feet below ground surface (U.S. Geological Survey 2004c).

3.3.4 Ground Water Quality

The USGS conducted a study of water resources of the Reservation during May 1990 through November 1992 (Wald and Cates 1995). Water quality data were collected from 293 water samples from wells and springs, and additional trace element data were collected from 225 wells. In addition, Cates and Macek-Rowland (1998) prepared a water resources report of the Fort Berthold Indian Reservation. The 1998 report detailed distribution, quantity, and quality of water on the Reservation. Finally, GeoTrans and EPA completed water quality sampling events in 2005.

3.3.4.1 Bedrock Aquifers

Fox Hills Formation

Because the Fox Hills Formation is quite deep in this part of North Dakota, ground water that occurs in the aquifer has had a long residence time. This results in relatively high concentrations of Total Dissolved Solid (TDS). TDS concentrations typically exceed 1,500 milligrams per liter (mg/L). With respect to the common cations in ground water, dissolved sodium concentrations commonly exceed 500 mg/L, and dissolved boron concentrations commonly exceed 1,000 µg/L. With respect to common anions, bicarbonate and alkalinity concentrations typically exceed 1,200 mg/L (as $CaCO_3$), chloride concentrations commonly exceed 100 mg/L, and locally sulfate concentrations exceed 500 mg/L. Ground water in the Fox Hills is a sodium-bicarbonate type of water.

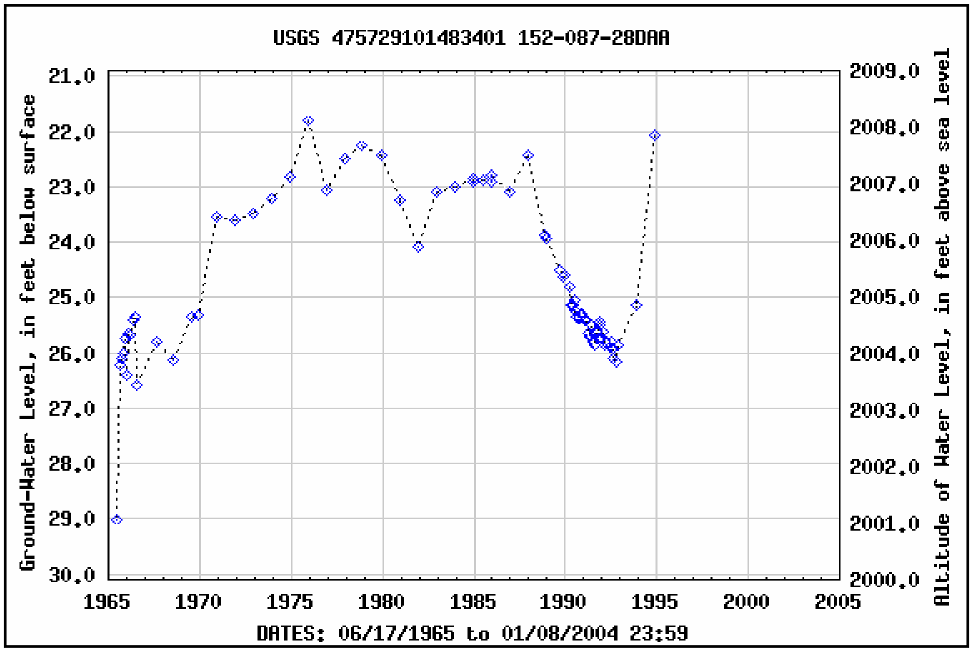


Figure 3-6 Ground Water Levels — Hiddenwood Lake Aquifer

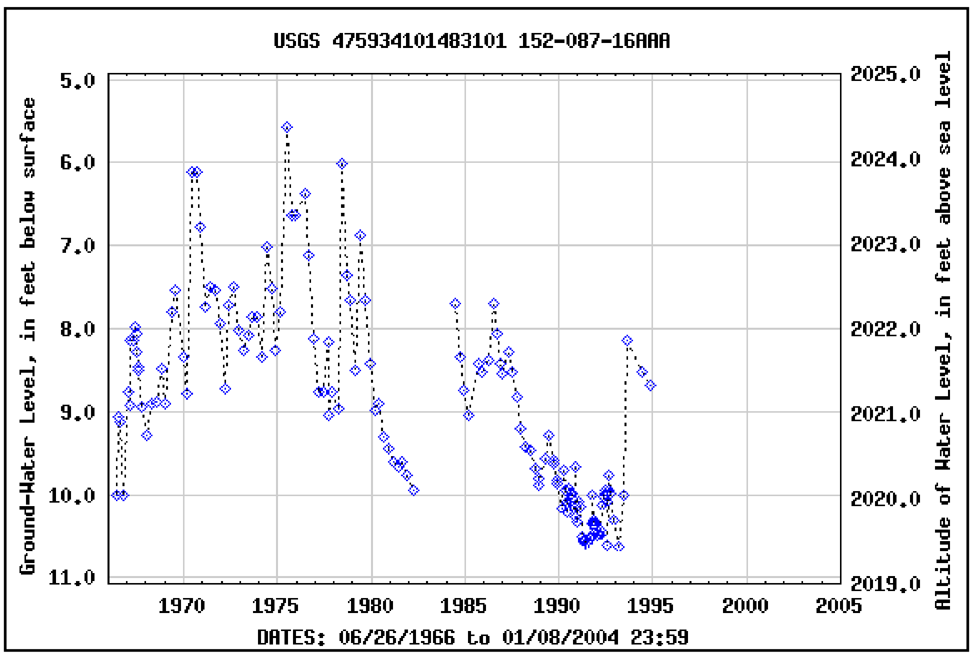


Figure 3-7 Ground Water Levels — Vang Aquifer

The available water chemistry data for the Fox Hills formation in west-central North Dakota do not indicate any common exceedances of primary maximum contaminant levels (MCLs). Because of the high sodium concentrations, ground water in the Fox Hills Formation typically has a very high sodium adsorption ratio (SAR) with values typically exceeding 80. The combination of high salinity (measured as TDS) and high SAR indicates that ground water from the Fox Hills Formation is unsuitable for irrigation.

Because of the significant depth to the top of the aquifer, not many wells are constructed in this aquifer within the Reservation. However, the City of Plaza recently finished a deep well within the aquifer to use as a public water source. According to Rogers (2004), Plaza historically relied on shallow wells for its local water supply. In the early 1990s, one of the wells was abandoned and the remaining two active wells produced water with copper and lead levels above NDDH standards (Rogers 2004). Because of reliable water quality concerns, Plaza constructed a deep water well in 1997 to alleviate this problem. Well 153–088–35 (Well #4 for example) was completed to a depth of 1,560 feet in the Fox Hills-Hell Creek aquifer. The well produces approximately 40 gpm and is the primary water supply for Plaza's 170 residents (Rogers 2004). Plaza does rely on the two shallow wells during peak use periods when make-up water is needed. Annual water usage by the town averages about 7 million gallons annually.

According to the Well Driller's Report, Well 153–088–35 was completed in a vacant lot within the city limit boundary (Greystone 2004). The well is a 6-inch-diameter casing extending from 2+ feet to 1,398 feet, and 3-inch-diameter casing from 1,366 to 1,523 feet. At the time of well completion, the static water level was 155 feet below the surface. Data from a well pump test show that pumping water at 32 gpm for 3 hours reduced the water level to 1,200 feet below land surface (Greystone 2004).

The NDDH, Division of Water Quality completed a wellhead protection area delineation for the Plaza well field in 2000 (Greystone 2004). In general, the wellhead protection area encompasses 212 acres. The local land use is a mixture of local residences and commercial business within the city limits. Agricultural crops surround the city on all sides. Plaza is also included within an active oil field.

The NDSWC's website database was queried for data on the quality of water in well 153–088–35; however, no data were available for this well. Plaza does conduct annual water tests to comply with the SDWA.

Fort Union Formation

The chemistry of the ground water in the two members of the Fort Union Formation is similar. Ground water in both members varies from a sodium-bicarbonate to a mixed calcium/magnesium/sodium-sulfate type. This reflects the dissolution of cations from the rocks that comprise the Fort Union. TDS concentrations presented in Cates and Macek-Rowland (1998) range from 133 to 4,230 mg/L (135 wells) and commonly exceed the secondary MCL of 500 mg/L. Ground water from many wells in the Fort Union exceeds the secondary MCL for iron, manganese, and sulfate. The SAR for ground water in the Tongue River member is high. In combination with high salinity values, this indicates that the ground water in the Tongue River is unsuitable for irrigation. The SAR for ground water in the Sentinel Butte member is low. In combination with high salinity values, this indicates that ground water from the Sentinel Butte member is suitable for irrigating soils with high permeability.

It is likely that at least a few hundred domestic wells within the Reservation are withdrawing water from the Fort Union Formation. Well yields that are sufficient for domestic/stock use are common.

Tongue River

Cates and Macek-Rowland (1998) summarized water quality data collected from 52 wells within the Tongue River aquifer between 1952 and 1992. Background water quality in the aquifer is slightly basic with pH values ranging from 6.7 to 9.1, with a median of 8.2. Water in the aquifer varies from a sodium-bicarbonate type to a mixed calcium/magnesium/sodium-sulfate type. Concentrations of dissolved solids ranged from 817 to 4,660 mg/L and had a mean of 2,110 mg/L. In addition, these sampled values for dissolved solids range from slightly saline to moderately saline. Sampled fluoride levels ranged from 0.2 to 8.4 mg/L, and nitrate levels ranged 0.11 to 5.9 mg/L (Greystone 2004).

Sentinel Butte

Cates and Macek-Rowland (1998) summarized water quality data collected from 83 wells within the Sentinel Butte aquifer between 1950 and 1992. Based on available data, background water quality in the aquifer is slightly basic with pH values ranging from 6.7 to 8.9, with a median of 7.7. Water in the aquifer varies from a sodium bicarbonate type to a mixed calcium/magnesium/sodium-sulfate type. Dissolved solids concentrations ranged from 133 to 4,230 mg/L, and a mean of 1,300 mg/L. The mean sampled values for dissolved solids occur in the slightly saline range (Greystone 2004).

3.3.4.2 Buried-Valley Aquifers

Though the buried-valley aquifers are the most productive (and most accessible) aquifers within the Reservation, their use is limited because, except for the White Shield aquifer, they are located along the northern border of the Reservation and close to Lake Sakakawea. Most people in this part of the Reservation receive water from a public water supply that obtains source water from Lake Sakakawea.

The sediments that comprise the buried-valley deposits are from the underlying formations. As a result, the chemistry of the ground water in these deposits is similar to that in the underlying Fort Union Formation. Cates and Macek-Rowland (1998) present chemistry data for 34 wells constructed in the five major buried-valley aquifers within the Reservation. Ground water in the East Fork Shell Creek aquifer, the Shell Creek aquifer, and the White Shield aquifer is a sodium-bicarbonate/sulfate type. Ground water in the New Town and Sanish aquifers is a mixed calcium/sodium/magnesium-bicarbonate/sulfate type. Concentrations of TDSs range from 459 to 4,440 mg/L. Concentrations of iron, manganese, and sulfate often exceed the secondary MCL. The use of ground water from the buried-valley aquifers for irrigation is constrained by the high salinity. However, only ground water from the East Fork Shell Creek aquifer has a high SAR. Ground waters from the White Shield, New Town, and Sanish buried-valley aquifers have low SAR values. Ground water from all but the East Fork of Shell Creek aquifer can be used to irrigate soils with moderate to high permeability.

Shell Creek

Cates and Macek-Rowland (1998) summarized water quality data collected from four wells within the Shell Creek buried-valley aquifer between 1977 and 1990. Generally, water in the Shell Creek aquifer is a sodium bicarbonate sulfate type. Mean dissolved solids concentrations were 1,470 mg/L in water from the Shell Creek aquifer. Background water quality in the aquifer is slightly basic with pH values ranging from 7.3 to 8.4, with a median of 8.2. Dissolved solids concentrations ranged from 757 to 2,030 mg/L, and a mean of 1,470 mg/L (Greystone 2004). The mean sampled values for dissolved solids occur in the slightly saline range.

East Fork Shell Creek

Cates and Macek-Rowland (1998) summarized water quality data collected from five wells within the East Fork Shell Creek buried-valley aquifer between 1962 and 1990. Generally, water in the aquifer is a sodium sulfate bicarbonate type. Dissolved-solids concentrations ranged from 2,470 to 4,440 mg/L, with a mean of 3,220 mg/L. Dissolved iron concentrations ranged from less than 10 to 1,700 mg/L, with a mean of 880 mg/L and a median of 910 mg/L (Greystone 2004).

Ryder Ridge

The USGS monitored and performed water quality analyses for test well 151–086–05CBB (USGS 475540101431201) during the 1966 calendar year. Water sampled from this site indicated that it was a moderately hard sodium sulfate type. The water had a pH of 7.5 and a specific conductance of 1,640 μ S/cm. In addition, the sulfate (672 mg/L) and salinity (288 mg/L) levels were relatively high (Greystone 2004). Based on the single data set of sampled parameters, water within this aquifer would be classified as poor to moderate quality.

Hiddenwood Lake

The USGS monitored and performed water quality analyses for test well 152–087–28DAA (USGS 475729101483401) in 1965, 1971, 1988, and 1992. Generally, water in the aquifer is a sodium sulfate bicarbonate type with high quantities of sulfate, iron, and dissolved solids. Dissolved-solids concentrations ranged from 4,740 to 4,960 mg/L. Dissolved iron concentrations ranged from 400 to 2,500 mg/L (Greystone 2004). Based on the sampled parameters, water within this aquifer is of very poor quality for any industrial use or as drinking water.

Vang

The USGS monitored and performed water quality analyses within the Vang aquifer from both test well 152–087–16AAA (USGS 475934101483101) during the 1966 calendar year and test well 152–087–18DDD (USGS 475847101510401) during the 1988 and 1992 calendar years. Generally, water in the aquifer is a hard calcium bicarbonate type. Dissolved-solids concentrations ranged from 2,470 to 4,440 mg/L. Dissolved iron concentrations ranged from 2,700 to 14,000 mg/L. Iron concentrations of this magnitude would most likely cause staining in clothes and plumbing fixtures (Greystone 2004).

3.3.4.3 Project Site — Ground Water Chemistry

The ten ground water monitoring wells installed in February 2005 have each been sampled. In February 2005, all ten wells were sampled and the samples analyzed for basic cations/anions, RCRA dissolved metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver), seven polychlorinated biphenyls (PCBs), 19 common pesticides, and 78 VOCs and polynuclear aromatics (PNAs). All ten wells were sampled again in May 2005, and the samples were analyzed only for the suite of VOCs and PNAs.

Chemistry data from the GeoTrans (2005) quarterly sampling events indicate the following:

- Ground water in the till deposits beneath the proposed refinery site is mainly a calcium-bicarbonate/calcium-sulfate type of water. Ground water in the underlying Fort Union Formation is mainly a sodium-bicarbonate/sodium bicarbonate type of water;

- All PCBs were at non-detectable levels in all samples;
- RCRA metal concentrations were below MCLs in all samples;
- Very low concentrations of some VOCs were detected in some samples; however, the duplicate samples were non-detectable;
- All samples were non-detectable for the 19 pesticides; and
- TDS concentrations were high for all wells. Concentrations from samples collected from the five till wells (MW–1 to MW–5) ranged from 450 to 4,200 mg/L with a mean value of 2,280 mg/L. Concentrations for the Fort Union wells ranged from 2,500 to 4,500 mg/L with a mean value of 3,860 µg/L. Sodium concentrations for the ten wells ranged from 14 to 860 µg/L with a mean value of 355 mg/L. SAR values were not calculated from these data, but with the high sodium and TDS concentrations it is highly likely that SAR values are high and that most of the water beneath the proposed refinery site is not suitable for irrigation without treatment.

To supplement the chemistry database, EPA Region 8 sampled five of the ten wells for stable water isotopes in August 2005. Two samples were also collected from the pothole wetland on the western boundary of the refinery site and one sample from the perennial reach of the East Fork of Shell Creek about 15 miles northwest of the refinery site. Preliminary results are shown in Delta 18 O values in shallow ground waters are typically close to values for the weighted average of annual precipitation (Clark and Fritz 1997 as cited in Wireman 2005). Furthermore, the delta 18 O values for precipitation are more depleted (more negative) with increasing latitude. The delta 18 O values shown for ground water samples in Table 3–4 (MW–4, MW–3, MW–1, MW–2, P–5) are typical for precipitation in west-central North Dakota. These data suggest that the till is recharged by direct infiltration of precipitation.

A general summary of ground water in the till deposits and underlying Fort Union Formation beneath the proposed refinery site reveals that it is suitable for drinking water and stock watering but is not suitable for irrigation. Generally, the deep wells in the Fort Union Formation had higher TDS, total alkalinity, and sodium as compared to the shallow wells in the Coleharbor Formation.

Table 3-4 Preliminary data for stable water isotopes obtained from analysis of samples collected in August 2005

Location	Delta ^{18}O	Deuterium
South inlet to wetland	-4.85	-41.5
North outlet from wetland	-5.16	-42.8
MW–4	-16.56	- 129.4
MW–3	-13.63	Cond. too high
MW–1	-15.05	-117.7
MW–2	-13.70	Cond. too high
P–5	-16.34	Cond. too high
East Fork Shell Creek	-10.66	Cond. too high

Source: Wireman 2005

3.4 Surface Water Resources

The project site is located near the edges of the Coteau Slope and Coteau du Missouri. The Missouri Coteau is primarily east of the project site and is characterized as a rolling, hilly area that has numerous prairie potholes and lakes and generally lacks streams. The average 20-mile width of this area, which extends from east-central South Dakota northwestward into western Saskatchewan, is the continental divide between drainage into Hudson Bay and the Gulf of Mexico. Conversely, the Coteau Slope gradients westward from the Missouri Coteau and is characterized by several streams that are tributary to the Missouri River.

Drainage on the Coteau Slope is generally well developed, although there are a few local poorly drained areas and sub-basins. The four principal tributaries that drain the Coteau Slope in Mountrail and Ward Counties include the White Earth River, Little Knife River, Shell Creek, and East Fork of Shell Creek. These tributaries are generally incised and drain sub-basins and local topographical depressions that are interspersed within the glaciated topography. Surface flow in the region is generally southwesterly toward the Missouri River basin. Perennial, intermittent, and ephemeral streams generally originate in plains and open high hills at elevations ranging from 1,835 to 2,600 feet. Riverine wetlands associated with drainage basins in Mountrail and Ward Counties cover approximately 612 acres and 2,424 acres, respectively (Reynolds et al. 1996).

Surface water resources of the Reservation consist of many ephemeral streams and the Missouri River. Major streams near the project site include Shell Creek and the East Fork of Shell Creek (Figure 3-8). These streams are generally ephemeral, have extended periods without flow, and are tributary to the Missouri River (Lake Sakakawea). A large number of unnamed, ephemeral streams originating from deeply eroded, small drainage basins also flow into the Missouri River.

Lake Sakakawea is the largest surface-water body in the region and most prominent feature within the Reservation. Lake Sakakawea was formed in 1953 by impoundment (Garrison Dam) of the Missouri River downstream of the Reservation. The lake averages between 2 and 3 miles in width and is 6 miles wide at its widest point. Its maximum depth is 180 feet at the face of the dam. At normal operating pool (1,850 feet AMSL), the lake covers 368,000 acres, has 1,300 miles of shoreline, and stores nearly 23 million acre-feet of water. Areas of complex glacial moraines bound the lake on the north and east, whereas outcrops of bedrock with scattered patches of glacial-remnant material typify the south and west. Rugged, deeply eroded badlands, formed when rivers eroded the glacial deposits and bedrock, occur in area south and west of the lake. The drainage area of the lake is about 181,400 square miles.

3.4.1 Applicable Regulatory Requirements — Clean Water Act

3.4.1.1 Section 402 NPDES Permitting Requirements

Section 402 of the CWA establishes the NPDES regulatory program. Pursuant to Section 402, point sources discharging pollutants into “waters of the U.S.” must obtain NPDES permits from the appropriate governmental body. EPA issues NPDES permits on the Fort Berthold Reservation because the MHA Nation has not applied for, and EPA has not approved the Tribes for “Treatment as a State” for purposes of Section 402. NPDES permits set limits on the amount of various pollutants that a source can discharge in a given time. The proposed project will require an NPDES permit for discharges of process water and storm water associated with facility operation. In addition, the proposed project will require an NPDES permit for discharges of stormwater associated with construction of the facility. The draft NPDES discharge permit for facility operations is attached in Appendix C.

3.4.1.2 Section 404 Permitting Requirement for Discharges to Waters of the U.S.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the USACE, and in consultation with EPA, to issue permits where required for discharge of dredged or fill material into the "waters of the United States," including certain wetlands, provided that the applicant demonstrates that the project design is the least environmentally damaging practicable alternative. The USACE will issue any such permits only after compliance with the USACE regulations (33 CFR 320 et seq.) and the CWA 404(b)(1) Guidelines (40 CFR 230, et seq.). 33 CFR 331 sets forth the CWA Section 404 permit appeal process. The USACE has determined the construction of the proposed project will require a permit for the discharge of dredged or fill material pursuant to CWA Section 404 and its implementing regulations for discharges into certain wetlands.

3.4.1.3 Section 401 Certification Requirement

Section 401 of the CWA requires certification by the appropriate governmental body that any activity covered by a Federal license or permit, including, but not limited to the construction or operation of facilities which may result in any discharge into the navigable waters, will comply with the applicable provisions of CWA Sections 301, 302, 303, 306 and 307. This includes any CWA Section 402 permits issued by EPA, or Section 404 permits issued by USACE.

EPA issues the Section 401 certification for discharges in Indian country where a Tribe has not received "Treatment as a State" status for Section 401 certification. EPA may grant, condition, or deny Section 401 certification for such federally permitted or licensed activities. The decision is based on determination from data submitted by an applicant (and any other available information) of whether the proposed activity will comply with the requirements of the applicable sections of the Act. EPA may thus deny certification because the applicant has not demonstrated that the project will comply with those requirements. Or EPA may place whatever limitations or conditions on the certification it determines are necessary to ensure compliance with those provisions.

For any permits issued for the proposed project, including Section 402 and Section 404 permits, Section 401 certification must be obtained from EPA.

3.4.2 Water Quality Regulatory Requirements

Water quality standards are the foundation of the water-quality-based control program mandated by the CWA. Water quality standards define the goals for a water body by designating its uses, setting criteria to protect those uses, and establishing provisions to protect water quality from pollutants. A water quality standard consists of four basic elements:

(1) ***designated uses*** of the water body (e.g., recreation, water supply, aquatic life, agriculture),

(2) ***water quality criteria*** to protect designated uses (numeric pollutant concentrations and narrative requirements),

(3) ***antidegradation policy*** to maintain and protect existing uses and high quality waters, and

FIGURE 3-8
SURFACE WATER RESOURCES ON THE PROJECT SITE AND ENVIRONS

(4) ***general policies*** addressing implementation issues (e.g., low flows, variances, mixing zones).

The MHA Nation adopted Tribal water quality standards in 2000 to protect public health and welfare, and enhance the quality of water on the Reservation. Specifically, the MHA Nation adopted the Water Quality Standards for the Three Affiliated Tribes — Fort Berthold Indian Reservation for all surface waters within the exterior boundaries of the Reservation. It is also the intent of the MHA Nation that the adopted standards will be sufficient to protect any federally listed threatened or endangered species occurring on the Reservation. The Tribes' water quality standards specify Designated Uses to be achieved and protected for all Reservation surface waters. Those uses (including, but not limited to, aquatic life, recreation, agriculture, and public water supply) are assigned to individual waters within Reservation boundaries. Additionally, narrative Tribal water quality standards are applied to all Reservation surface water resources. Tribal standards for the protection of wetlands, and antidegradation policies are included in the adopted water quality standards and are intended to apply to all Reservation surface waters. Hence, the Tribal water quality standards are designed to protect the Tribes uses of their waters; specifically protect water quality for endangered species and wetlands; and contain antidegradation policies ensuring maintenance of existing water quality.

The proposed project discharge would drain to the East Fork of Shell Creek, flowing initially through the Fort Berthold Indian Reservation, then through the State of North Dakota, and subsequently back through the Reservation. A surface discharge would eventually reach the Missouri River via Lake Sakakawea. Under the CWA, the permitted discharge must include effluent limitations as stringent as necessary to meet the State of North Dakota surface water quality standards where the water crosses the boundary onto non-Indian country lands. EPA's CWA § 304(a) criteria recommendations form the basis for North Dakota's numeric criteria. Although EPA has not approved water quality standards for the Fort Berthold Indian Reservation waters, EPA considered the Tribal and State standards in determining appropriate effluent limitations for the NPDES permit. The specific water quality standards and criteria are shown in the Statement of Basis for the NPDES discharge permit attached in Appendix C.

3.4.2.1 Designated Uses — East Fork of Shell Creek

The East Fork of Shell Creek flows through both the Fort Berthold Indian Reservation and the State of North Dakota, and therefore designated uses under each must be considered. It is important to note that the designated uses may be specified as a goal for the water body segment whether the use is currently being attained or not. Designated uses for the portions of the East Fork of Shell Creek that are within the boundaries of the Fort Berthold Indian Reservation include: I – public water supply, primary IIA – contact recreation, IIB – secondary contact recreation, IIIA – coldwater aquatic life, IV – industrial water supply, V – agriculture, and VI – navigation.

For those areas of the East Fork of Shell Creek that are outside the Reservation, it is classified as a Class III surface water in North Dakota pursuant to 33–16–02.1–09 of the Standards of Quality for Waters of the State (North Dakota Century Code Chapters 61–28 and 23–33; specifically, sections 61–28–04 and 23–33–05, respectively). In general, Class III streams are characterized as having low average flows and, generally, prolonged periods of no flow. The streams are of limited seasonal value for recreation, fish, and aquatic biota. Finally, the quality of the water in this surface water class is typically suitable for agricultural uses such as livestock watering, industrial use, and in some circumstances irrigation.

It is important to note that the MHA Nation water quality standards have not been federally approved by EPA for CWA purposes. Also, although EPA has approved North Dakota water quality standards for waters within the State of North Dakota, EPA has not approved the State's standards for waters that are within Indian country, as defined in 18 U.S.C. Section 1151. In addition, EPA has not approved a non-federal NPDES permit program for the Reservation under CWA Section 402. Therefore, EPA administers the CWA on the Fort Berthold Indian Reservation.

3.4.2.2 Impaired Water Bodies

Section 303(d) of the CWA requires states and authorized tribes to periodically prepare a list of all surface waters for which beneficial uses of the water (for example, drinking, recreation, aquatic habitat, and industrial uses) are impaired by pollutants. Waters placed on the 303(d) list are prioritized for the preparation of Total Maximum Daily Loads (TMDL), which identify the maximum amount of a pollutant that can be released into a water body so as not to impair uses of the water, and allocate that amount among various sources. While EPA has not approved water quality standards for the waters on the Reservation, EPA considers the Tribe's and State's standards in determining appropriate designated uses for the East Fork of Shell Creek. Any impairment evaluation conducted by the State of North Dakota is applicable only to those waters where the State water quality standards apply (i.e. not on any waters within the Fort Berthold Indian Reservation).

A review of the CWA Section 303(d) TMDL Waters in the Missouri River Basin (North Dakota Department of Health 2003) reveals that both the East Fork of Shell Creek downstream to Lake Sakakawea (ND–10110101–072–S_00) and Unnamed Tributaries to the East Fork of Shell Creek (ND–10110101–073–S_00) were delisted in 2002. Rationale for delisting was based on lack of sufficient credible data and/or information to make a use support determination (North Dakota Department of Health 2003). In addition, the previous claims of impairment for recreational activity were based on data that was older than 5 years (North Dakota Department of Health 2003).

Clean Water Act — Oil Pollution Act Regulatory Requirements

The CWA, as amended by the Oil Pollution Act, and its implementing regulations, require certain facilities that store and use oil to prepare and submit plans to ensure the facilities put in place containment and other countermeasures that should prevent oil spills that could reach navigable waters (SPCC Plans) and plans to respond to a worst case discharge of oil and to a substantial threat of such a discharge (FRP). EPA regulations define who must prepare and submit SPCC plans and FRP plans and what must be included in the plan. See 40 CFR 112. The proposed project falls within the regulatory criteria of 40 CFR 112, therefore the facility must prepare both SPCC and FRP plans prior to operation.

3.4.3 Applicable Regulatory Requirements — Safe Drinking Water Act

EPA implements the SDWA in Indian country if no other entity has been authorized to do so. All public water systems on the Fort Berthold Indian Reservation must comply with the National Primary Drinking Water Regulations (NPDWR) promulgated pursuant to the SDWA. The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public water systems. The law was amended in 1986, and again in 1996 with further requirements to protect drinking water and its sources. The SDWA authorizes the EPA to set national health-based drinking water standards to protect against both naturally occurring and man-made contaminants. The NPDWR, based on these health-related criteria, protect public health by limiting the levels of contaminants allowed in drinking water.

Public Water Systems are those systems that have at least fifteen service connections or regularly serve an average of at least twenty-five individuals daily at least 60 days out of the year. 42 U.S.C. Section 300f(4). If the proposed facility meets the definition of a Public Water Supply System, EPA will regulate the facility pursuant to the SDWA. Regulated public water systems are classified into the following categories: community, non-transient non-community and transient non-community water systems.

A non-community water system means a public water system that is not a community water system. A non-community water system is either a “transient non-community water system” or a “non-transient non-community water system.” A non-transient non-community water system means a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months of the year. A transient non-community water system means a non-community water system that does not regularly serve at least 25 of the same persons over six months of the year. Monitoring and reporting requirements differ based on the classification of a regulated water system, and whether the water system uses ground water or surface water.

3.4.4 Characteristics of Surface Drainage Systems

Primary drainages in proximity to the project site include Shell Creek, East Fork of Shell Creek, and Deepwater Creek drainages, which occur within the northern and eastern parts of the Reservation. These three streams are characterized by incised channels within glacial sediments, small stream slopes, and relatively low basin elevations. All three streams are tributary to the Missouri River/Lake Sakakawea.

The project site is in the East Fork of Shell Creek basin (Figure 3-9). The East Fork of Shell Creek is the nearest principal tributary to the project site and drains a watershed of 467 square miles, of which 125 square miles are within the Reservation (Cates and Macek-Rowland 1998). The East Fork of Shell Creek is characterized as a larger basin with flat stream slopes that typically has high flows characterized by rapidly rising flows and gradually receding flows (Macek-Rowland and Lent 1996). The upper portion of the creek is predominantly a Rosgen E channel type, and the upper stream gradient is about 2 percent, with wetted widths averaging around 6 feet (Confluence Consulting, Inc. 2001).

A Rosgen E channel is typically a meandering stream characterized by narrow channel width, low width-to-depth ratio, high entrenchment ratio, broad floodplain, high sinuosity, low slope gradient and cohesive stream banks retained in place by dense stands of woody shrubs and/or grass like vegetation.

The East Fork of Shell Creek is primarily regulated by periods of snowmelt, direct precipitation, surface runoff, and ground water discharge from seeps and springs. Surface runoff in the undrained or poorly drained basins within the watershed generally draws off into depressions or small individual basins commonly referred to as sloughs or prairie potholes. Many of these depressions represent small individual basins; however, some fill up, reach capacity, and overflow into well-developed basins interspersed throughout the region. Tributary streams that originate in the plains and open high hills generally are ephemeral, flowing primarily during spring runoff generally following winters with above average snowfall. USGS discharge data indicate that this stream is ephemeral and has many days of no flow during the 1991 through 2002 period of record (Harkness et al. 2003).

An unnamed tributary, which is characterized as a small, intermittent stream, flows north through the lowest topographical area within the western margin of Section 19 until its confluence with a large semi-permanent wetland. It is important to denote that a significant lineal length of the streambed within Section 19 has been channelized. The channel originates within a large semi-permanent wetland located in the southern ½ of the section. The tributary continues north (under highway 23) for ¾ mile until its confluence with the East Fork of Shell Creek. Flow in the tributary is charged primarily by spring snowmelt runoff. Depending upon the saturation of the area and elevation of standing water in upstream areas, the tributary's drainage area is approximately 11,470 acres or 17 square miles. Shallow-subsurface flow (water movement immediately beneath the land surface) would likely be towards the nearest surface depression, channel or swale. The ground water table at the site is estimated at 30 to 50 feet below the surface. As demonstrated by water level data from the Geotrans wells ground water in the till flows generally to the southwest at the project site.

3.4.5 Stream Flow

Stream flow characteristics depend on the specific features unique to each drainage basin and sub-basin. These features typically include geology, topography, vegetative cover, size, climate, and land use. Major contributions to stream flows in the project site include direct precipitation and surface runoff, springs and seeps, and ground water discharge. Conversely, evaporation, evapotranspiration, and infiltration cause decreases in stream flow.

Statistics on stream flow have been compiled from USGS stream gauging stations at Parshall to provide a perspective of perennial stream flow within the project site. Specifically, the USGS monitors stream gage station 06332523[2] (established June 1991) on the East Fork of Shell Creek near Parshall, North Dakota prior to discharging into the Missouri River/Lake Sakakawea (Figure 3-8). There are no upstream dams within the watershed; therefore, subsequent discharges do not influence surface flows within the watershed.

The average annual runoff within the East Fork of Shell Creek watershed for the 11-year period of record (1991 to 2002) was 4,660 acre-feet (Harkness et al. 2003). Surface annual mean flows range from a low of 2.19 cubic feet per second (cfs) in 1992 to a high of 15.1 cfs in 1999. The annual mean for the period of record is 6.4 cfs (Harkness et al. 2003). Figure 3-10 clearly shows the variation in flows that occur in the East Fork of Shell Creek. Peak stream flows also varied substantially over the period of record. The maximum recorded peak flow of 1,170 cfs was record on March 27, 1999 (Harkness et al. 2003). The lowest peak flow was 31 cfs, which occurred on May 12, 2000 (U.S. Geological Survey 2004d).

Monthly mean flow rates reported by USGS for the available periods of record are presented on Figure 3-11. The data clearly show that peak flows in the East Fork of Shell Creek basin are usually the result of spring runoff or intense spring or summer thunderstorms that occur over the basin. Most of the runoff occurs during March and April. Base or low flows occur during the winter months.

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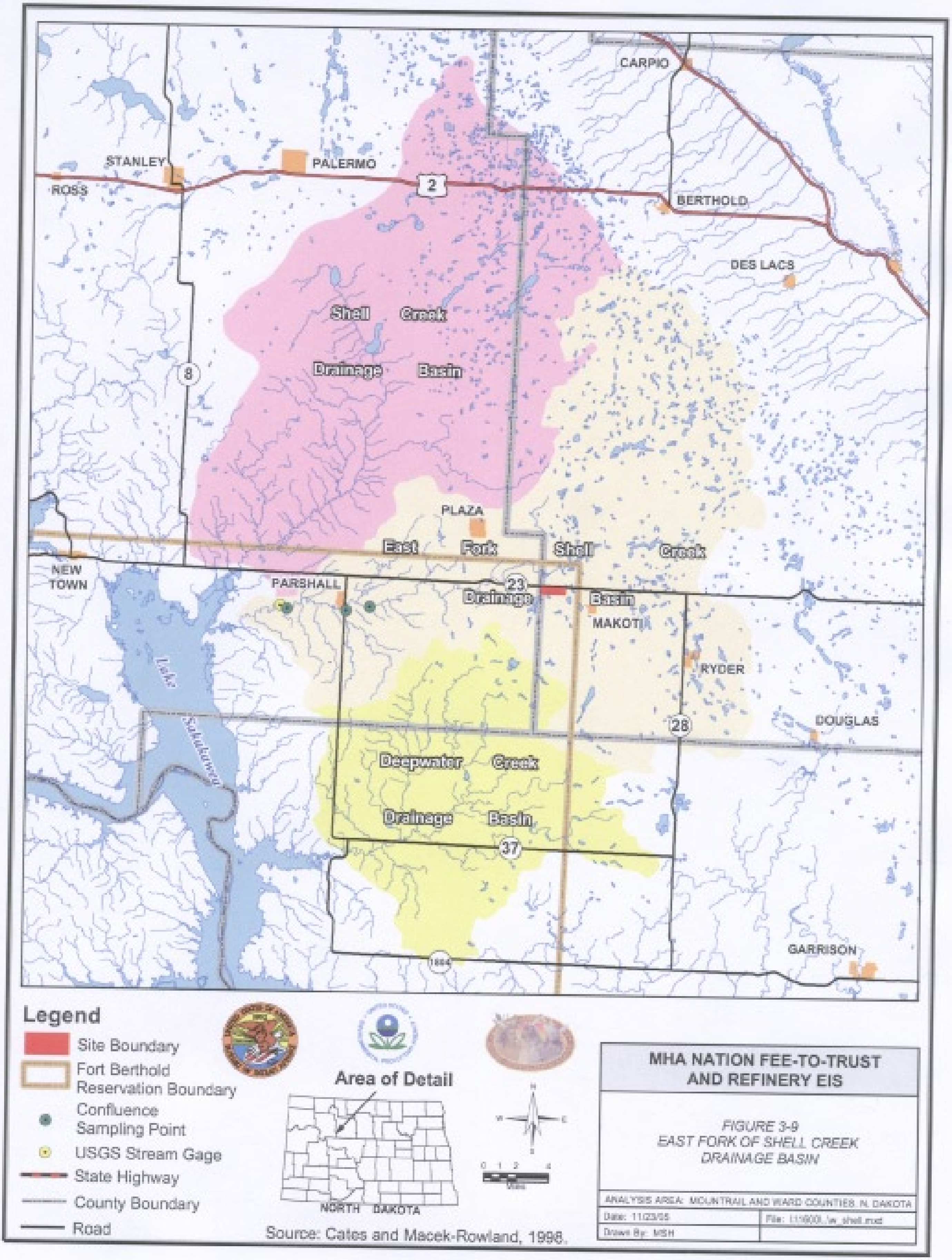
[2] The East Fork of Shell Creek was converted to continuous record gaging station in June 1991. The new gaging site 06332524 was subsequently moved upstream to reflect a new site.


CARPIO
STANLEY
PALERMO
ROSS
2
BERTHOLD
DES LACS
Shell Creek
Drainage Basin
8
PLAZA
East Fork Shell Creek
Drainage Basin
NEW TOWN
PARSHALL
23
MAKOTI
RYDER
28
DOUGLAS
Lake Sakakawea
Deepwater Creek
Drainage Basin
37
1804
GARRISON
Legend
Site Boundary
Fort Berthold Reservation Boundary
Confluence Sampling Point
USGS Stream Gage
State Highway
County Boundary
Road
Area of Detail
NORTH DAKOTA
Miles
Source: Cates and Macek-Rowland, 1996.
MHA NATION FEE-TO-TRUST AND REFINERY EIS
FIGURE 3-9
EAST FORK OF SHELL CREEK
DRAINAGE BASIN
ANALYSIS AREA: MOUNTRAIL AND WARD COUNTIES, N. DAKOTA
Date: 11/23/05
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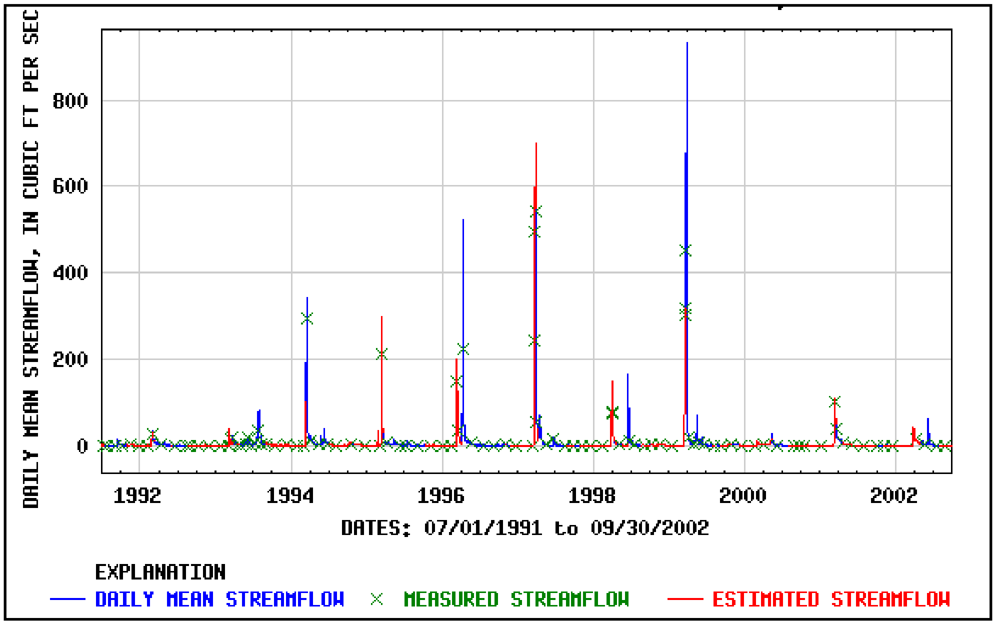
Drawn By: MSH

3.4.6 Surface Water Quality

The chemical composition of surface water changes continuously, as water quality in surface streams is commonly a function of stream flow. Alternatively, water quality in most surface drainages varies inversely with stream flow. Most changes in water quality are related to the amount of water and source of water flowing in a stream at a given time. The timing of precipitation events, adjacent land uses, geology, and elevation directly influence surface water quality.

Figure 3-10 Hydrograph for Measured Daily Mean Stream Flow, Measured Stream Flow, and Estimated Stream Flow for the East Fork of Shell Creek



Stream flows resulting from snowmelt and spring precipitation events generally result in higher water quality. This is primarily because of the limited amount and time of contact with exposed soils and rocks; therefore, these waters generally have only small amounts of dissolved minerals. Conversely, stream flows occurring during the growing season typically have lower water quality. This may be due in part to the collection of solids and inert organic material from surface erosion and the collection of phosphorous and nitrogen from pesticide treated agricultural fields. Generally, most surface waters within the area are primarily sodium sulfate type waters (e.g., alkaline with moderate to high levels of hardness).

Ambient Water Quality — East Fork of Shell Creek

The USGS has periodically monitored water quality data within the East Fork of Shell Creek at stream gage station 06332523. In addition, Cates and Macek-Rowland (1998) sampled select locations within the watershed over a period of record from 1990 to 1991 and 1991 to 2002. Finally, Confluence Consulting (2001) conducted water quality sampling at three stream reaches within the East Fork of Shell Creek. Summaries for these selected water quality data are presented in Greystone 2004.

Based on available data, background surface water quality in the East Fork of Shell Creek is slightly basic with pH values ranging from 7.8 to 9.9. In addition, the stream exhibits moderate to high concentrations of TDSs (206 to 3,040 mg/L). Dissolved oxygen levels are varied over the

11-year period of record, but it is important to note that most measurements are well above the water quality standard for dissolved oxygen of 5 mg/L. The water within the stream is characterized as a sodium sulfate bicarbonate type and the overall water quality of the stream system is inferior for most domestic uses.

A review of the values collected from water samples within the East Fork of Shell Creek show that most are usually found in the slightly saline range with some samples occurring in the moderately saline range.

Arsenic and lead concentrations were analyzed from several samples in the East Fork of Shell Creek. Concentrations of lead are generally low (0 to 1.94 µg/L) whereas arsenic concentrations (0 to 9 µ g/L) have exceeded both the aquatic and human health maximum limit concentrations.

Field pH values collected over the 11-year sampling period of record have ranged from a low of 7.8 to a high of 9.9 (standard units). The median values fall within the maximum numeric criteria (7.0 to 9.0), and generally reflect moderate to good water quality.

Sulfate values collected and analyzed over the 11-year sampling period of record ranged from a low of 36 mg/L to a high of 1,540 mg/L.

Sample values for chloride analyzed over the 11-year sampling period of record have ranged from a low of 1.5 mg/L to a high of 52 mg/L. Therefore, no exceedances of chloride levels were collected within this period of record.

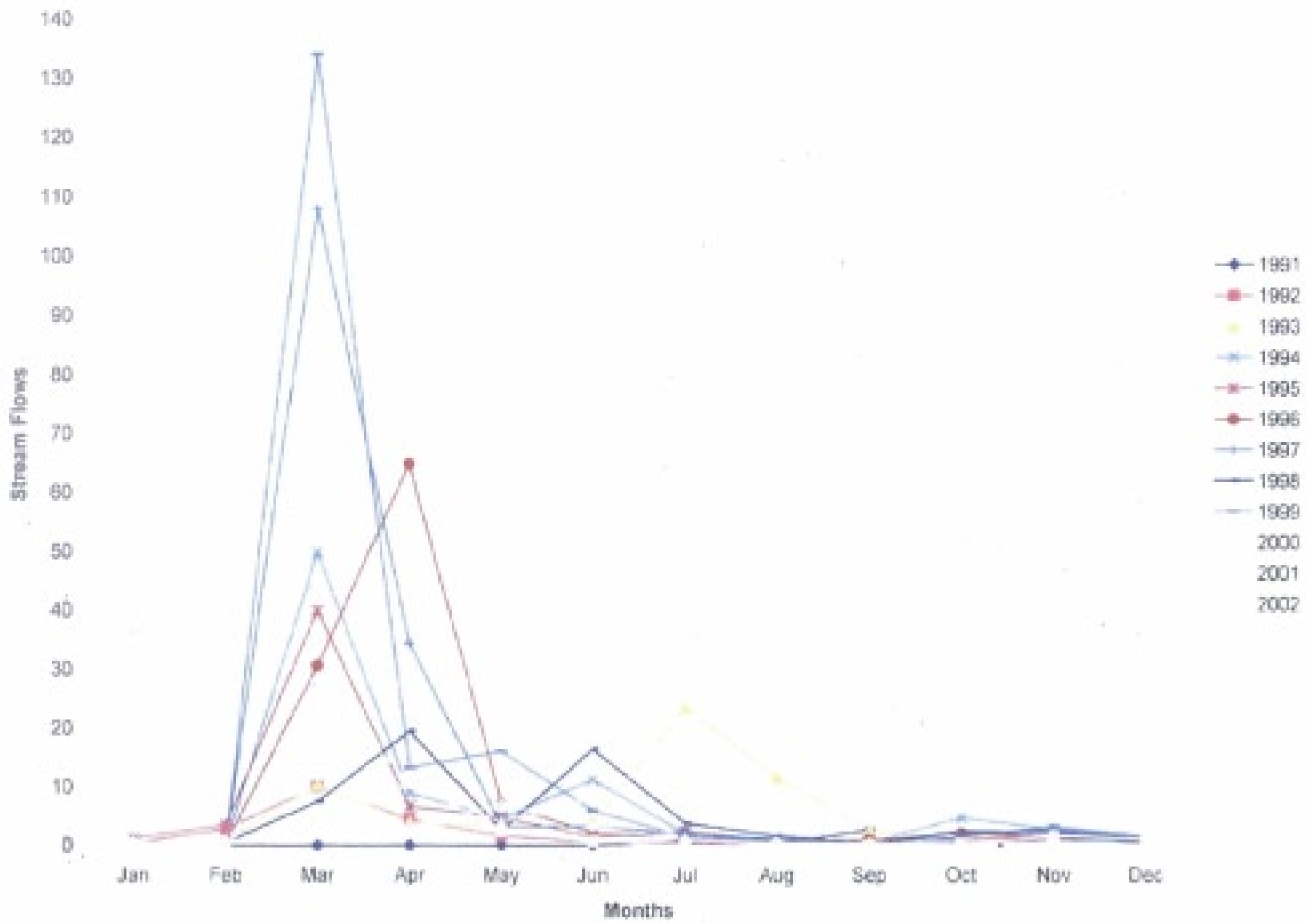
3.4.6.1 Physical, Chemical, and Biological Integrity of East Fork of Shell Creek

Confluence Consulting (2001) assessed the physical, chemical, and biological integrity of streams at 16 sites on six streams (including the East Fork of Shell Creek — see Figure 3-9) within the Reservation using the environmental monitoring and assessment program protocols developed by the EPA. The assessment involved three biological assemblages (fish, macroinvertebrates, and periphyton), analysis of select physicochemical parameters, and qualitative and quantitative assessments of stream morphology and riparian conditions. The analysis provided a means to estimate the extent of human influences on streams within the Reservation.

The following description of East Fork of Shell Creek aquatic resources was taken directly from the *Biological, Physical, and Chemical Integrity of Select Streams on the Fort Berthold Reservation, North Dakota* (Confluence Consulting, Inc. 2001).

3.4.6.2 Lower East Fork Shell Creek (2A)

Indicators of biological, chemical, and physical integrity suggest moderate impairment of beneficial uses at this site. Several physicochemical water quality parameters, including nutrients and specific conductance, were higher than ecoregion reference values. Nutrient loading could be from natural sources or agricultural activities in the basin. Furthermore, this site is below municipal lagoons for the town of Parshall, which may also contribute nutrients. Specific conductance at this level precludes use of this water for irrigation purposes.



MHA NATION FEE-TO-TRUST AND REFINERY EIS	
FIGURE 3-11 *HYDROGRAPH FOR MEASURED DAILY MEAN STREAM FLOW, MEASURED STREAM FLOW, AND ESTIMATED STREAM FLOW FOR THE EAST FORK OF SHELL CREEK*	
Date: 11/23/2005	File: 1600 TABLE.dwg
Drawn By: JLJ	Layout 001

Biological assemblages also provide indications of moderate impairment. Dominance by pollution-tolerant diatoms is further indication of nutrient enrichment. A ranking of 14 out of 16 stream reaches sampled for macroinvertebrates suggests significant impairment of invertebrate communities. Low richness values, low diversity, and high numbers of tolerant individuals contributed to this ranking. Likewise, the fish metrics indicated low diversity and a preponderance of pollution-tolerant species. The site also ranked 14^{th} in terms of fish assemblage.

Habitat conditions were influenced largely by beaver activities and a road crossing. Beavers impounded the flow for much of the reach, and a large scour pool occurred under the bridge. The monotonous habitat was possibly related to the low diversity of fish.

In summary, biological communities and water quality samples at lower East Fork Shell Creek suggest moderate impairment of aquatic life, warm water fishery, and agricultural uses. Nutrient loading is implicated as a cause of impairment. More investigation is needed to assess the role of agricultural chemicals in shaping biological communities at this site.

3.4.6.3 Middle East Fork of Shell Creek

Conditions at Middle East Fork Shell Creek indicate minor to moderate impairment of physical, chemical, and biological integrity. Physicochemical parameters demonstrated elevated concentrations of nutrients and dissolved solids at this site. These relatively high values may be caused by either natural sources or human activities.

Measures of biological integrity varied with the assemblage. Diatom associations scored within the range of good biological integrity, with minor impairment caused by slightly elevated pollution and siltation indexes. The site ranked seventh out of 16 stream reaches in terms of macroinvertebrates. Macroinvertebrate communities demonstrated good richness and relatively high diversity, although the proportion of non-insect taxa was relatively high because of large numbers of snails and ostracods. The near lentic conditions in the lower half of this reach were probably responsible for the abundances of these taxa.

Several factors in this site’s fish assemblage suggest moderate impairment. First, taxa richness was low, with only two species represented (fathead minnow and brook stickleback). In addition, the fish here displayed the highest level of observed abnormalities. Eye problems were the most prevalent, although tumors were also observed. These could be the result of several factors. Nutrient loading could increase primary productivity and decomposition so that supersaturation of gases exerts pressure on eyes. Another potential cause of abnormalities is the presence of toxic chemicals. This site had the greatest degree of human influence of all sites, including excessive amounts of trash and a railroad crossing, both of which are potential sources of toxic chemicals. Nevertheless, diatoms did not demonstrate indications of toxicity through abnormal cells.

Land use at this site varied at a fence line near the midpoint. The downstream half was grazed by horses and had an unusually wide and shallow channel. Poor sediment transport capacity in this section resulted in a substrate dominated by deep mud and dense filamentous algae. The upper half was not grazed as intensively and retained riffle pool morphology and more diverse substrate composition.

In summary, this site warrants a determination of moderate impairment and partial support of warm-water fishery, aquatic life, agriculture, and aesthetics beneficial uses. Additional investigation is recommended to evaluate causes of fish abnormalities.

3.4.6.4 Upper East Fork of Shell Creek

This site presents a scenario of least impaired habitat conditions but fair to poor biological integrity based on periphyton, macroinvertebrate, and fish samples. There were numerous indications of high-quality habitat. For example, this site scored the highest of all sites on the rapid habitat assessment questionnaire. This site was characterized by a narrow, deep channel with some of the most diverse substrate composition of all sites evaluated. The channel was classified as a Rosgen E channel type. Cover features for fish included undercut banks and overhanging vegetation. The riparian area was dominated by herbaceous species, and grazing pressure was light. Impairment of biota in the presence of good habitat suggests that water quality is the primary factor limiting beneficial uses. As discussed below, agricultural chemicals are a possible source of impairment at this site.

In contrast to the other assemblages, algal associations demonstrated a few indications of excellent biological diversity. This was most apparent in the high diversity of diatoms and low proportion of the dominant species. Still, the pollution index was the highest of all sites sampled, suggesting nutrient loading from either natural sources or human activities.

Ranking of macroinvertebrate assemblages indicate this site is among the most impaired, with a ranking of 13^{th} out of the 16 stream reaches sampled. The dominance by non-insect taxa despite diversity of substrate particles and substantial flow suggests toxic conditions. Pesticides in this heavily farmed basin are a potential source of impairment. Pesticides are usually specific to arthropods (including insects), and do not affect other invertebrates such as snails, worms, and amphipods.

Fish populations at this site rated relatively low in light of the high-scoring habitat conditions. Fish at this site consisted of low numbers of two species, fathead minnow and brook stickleback, resulting in a rank of ninth out of 16. While brook stickleback are considered moderately tolerant to pollution, they can withstand relatively high levels of dissolved solids. Their tolerance of agricultural chemicals is unknown.

Generally, the site demonstrates moderate to severe impairment of fish and macroinvertebrate communities, despite least impaired habitat conditions. Nutrient loading, herbicides, and pesticides may be a factor in limiting these assemblages. Further investigation into sources of impairment is recommended.

In summary, East Fork Shell Creek demonstrated indications of slight to severe impairment. Several lines of evidence at the three sampling sites indicated nutrient loading from either human activities or natural sources. In addition, low proportions of insects suggest that pesticides may be affecting aquatic life at two sites. Further evidence of toxic chemicals included high proportions of tumors and other abnormalities on fish and low diversity of fish species.

3.4.7 Water Supply

Water supplies for domestic and municipal uses are obtained from both surface water and ground water sources. Lake Sakakawea is the source of Public Water Supply for Newton and Parshall. The Towns of Makoti and Plaza obtain public water supplies from buried valley aquifers and the Fox Hill Formation. Many residents of the MHA Nation obtain domestic water supplies from wells constructed in the surficial deposits, primarily till. More than 700 domestic wells occur within the Reservation. The water contained in the till typically has relatively high TDS and may exceed secondary MCLs; however, the water quality does not preclude its use for drinking water.

The till cannot yield sufficient quantities of water for a public water supply but does yield sufficient quantities for domestic water supply.

3.4.7.1 Immediate Surroundings of the Project Site

Six residences occur within 1 mile of the project site. All of these are isolated rural residences that are part of the agricultural operations surrounding the project site. Local residents in the area typically use the wells for their livestock only. Residents purchase and haul water, using a cistern system for household water use. In addition, most residents separately haul in water for drinking and cooking.

Horace Pipe (2006), an employee of the MHA Nation, gathered information about the sources of water for two of these residences. The following is a summary of the contacts.

- The farm residence just north of Highway 23 has a well that is 103 feet. This well is only used to water their horses. They haul water for drinking and all household activities (washing, cooking, and plumbing). The water has a lot of TDS and is brownish-red colored.
- The farm residence to the south of the refinery site has a well that was completed August 8, 2001 at a depth of 189 feet. This residence also hauls water and the well water is used for cattle and horses.

3.4.7.2 Makoti

Makoti does not operate a water treatment plant. Residents within the town obtain water from two ground water wells completed in the Vang aquifer at depths of 22 and 41 feet below the surface (Wavra 2004, North Dakota Department of Health 2000). The two wells (152–086–18baa and 152–086–18abb) are located in Section 18, T152N, R86W, about 3 miles northeast of Makoti. According to the Safe Drinking Water Information System (U. S. Environmental Protection Agency 2004), approximately 145 residents are served water by these two wells. The two wells produce an annual average of 9.2 million gallons or about 28 acre-feet (North Dakota Department of Health 2000). Residential homes outside of the town boundary use either cisterns or domestic wells.

3.4.7.3 Plaza

Residents within the town of Plaza obtain water from three ground water wells: well #1, well #2, and well #4. Well #1 and well #2 are completed at depths of 88 and 91 feet below the ground surface. In 1997, well #4 was constructed within Section 35, T153N, R88W at a depth of 1,560 feet below the ground surface. Well#4 is finished in the Fox Hills-Hell Creek aquifer and yields about 45 gpm (Rogers 2004). Well#4 fills most of the local water needs; however, well #1 and well #2 are used when make-up water is needed during high usage periods. Plaza also has an inactive well (Wavra 2004).

Plaza operates a water treatment plant that utilizes greensand filtration process and potassium permanganate treatment to facilitate removal of iron and manganese. In addition, water is chlorinated prior to distribution. The City of Plaza treats about 7 million gallons per year (North Dakota Department of Health 2002). According to the Safe Drinking Water Information System (U. S. Environmental Protection Agency 2004), about 170 residents are served by these three wells. Homes outside of the town boundary use either cisterns or domestic wells.

3.4.7.4 Parshall

The town of Parshall is the community closest to the project site that is served by a public water system. Rural residents in the area use either domestic wells or cisterns. The Parshall water supply uses an intake at Parshall Bay on Lake Sakakawea. The water treatment plant has the capacity to produce approximately 575,000 gallons of water per day, although current average daily use is approximately 360,000 gallons or 63 percent of operational capacity (Bartlett and West Engineers, Inc. 2002).

3.5 Soils

Soils within the project area have developed on till plains and moraines in a climatic regime characterized by cold winters, warm summers, and low to moderate precipitation. The soils have developed in four kinds of parent material: glacial till, glacial lacustrine deposits, glacial outwash, and postglacial alluvium. Slopes range from nearly level to very steep with deeper soils found in the less steeply sloping areas. Approximately ⅔ of the land use is cropland with the remaining ⅓ used as rangeland within the two counties. Remnant native grassland is predominantly mixed-grass prairie that is used for grazing and wildlife habitat.

The following section lists the dominant soil series for all the associations in the project area, and the general characteristics of the soils are listed below for each series. A brief description of the general physical characteristics for wind erosion hazard, poor revegetation potential, and prime farmland and hydric soils also follows. This information was derived from both the *Soil Survey of Ward County, North Dakota* (Howey et al. 1974) and *Soil Survey of Mountrail County, North Dakota* (VanderBusch 1991).

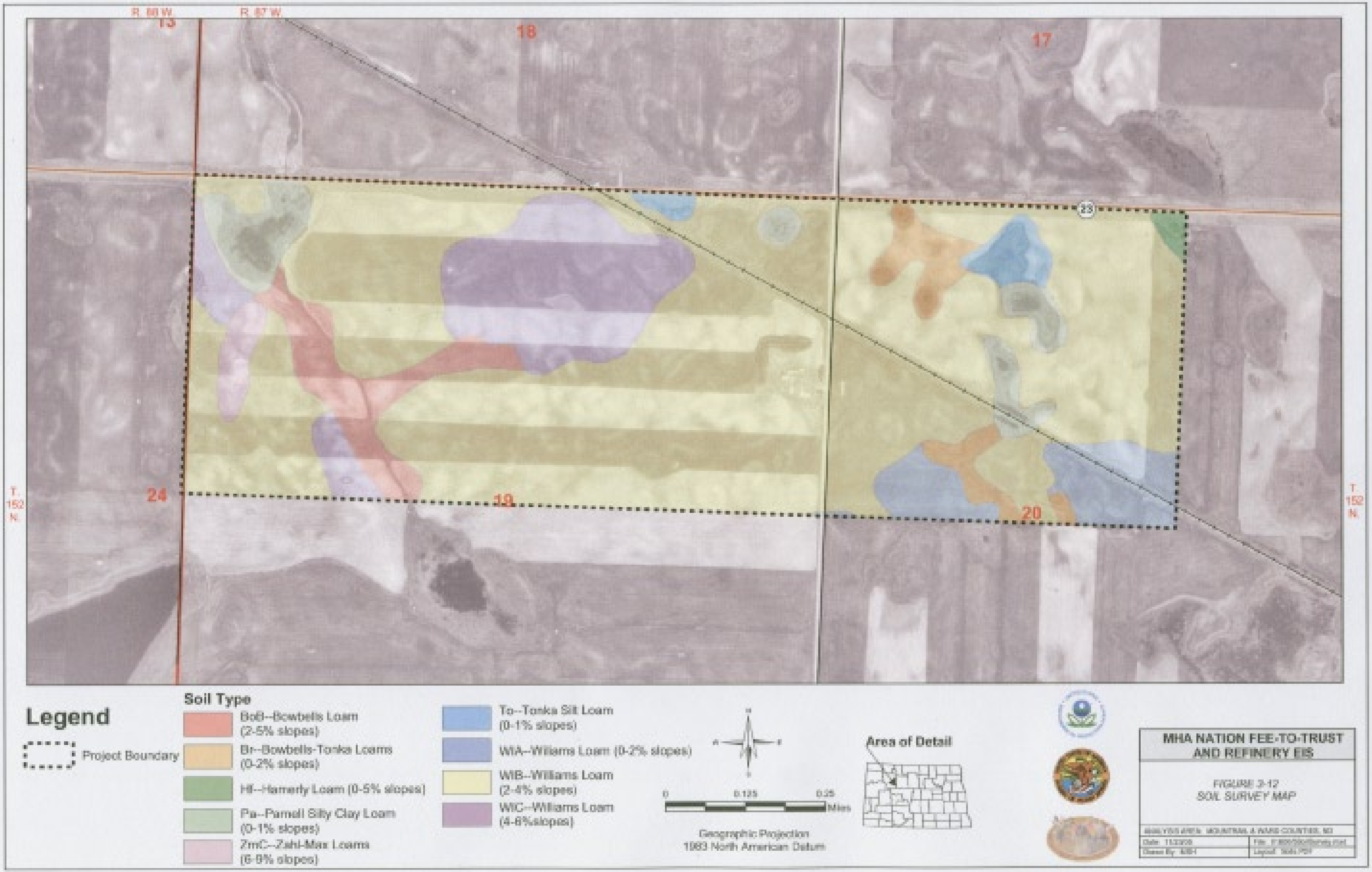
3.5.1 Soil Mapping Units

The following section contains detailed descriptions of the soil mapping associations and series/units identified in the project area using the *Soil Survey of Ward County, North Dakota* (Howey et al. 1974) and *Soil Survey of Mountrail County, North Dakota* (VanderBusch 1991). The Williams-Hamerly-Bowbells and Williams-Zahl associations are dominant throughout the project area, and subsequently include Williams, Parnell, Bowbells, Zahl, Hamerly, Manning, and Wabek soil series/units. Figure 3-12 shows the areal distribution of soil mapping units within the project site.

3.5.1.1 Williams – Hamerly – Bowbells Association

This association consists of level and nearly level soils on flats, rises, and in swales on till plains. A characteristic landscape would consist of rolling hills intermixed with depressions and knolls with slopes ranging between 0 and 3 percent. Williams series soils are typically located on the flats and rises, Hamerly on flats adjacent to the depressions, and Bowbells occurring in the swales and flats. Minor soil series occurring within this association typically consist of Tonka and Parnell, which are poorly and very poorly drained and most often occur in both shallow and deep depressions, respectively.

This association is well-suited for cultivated crops primarily small grains, but some areas are used for range and pasture. The Tonka and Parnell soils are primarily associated with palustrine wetlands, which are best suited for wetland habitats.


R. 88 W.
R. 87 W.
13
18
17
23
T.
152
N.
24
19
20
Legend
Project Boundary
Soil Type
BoB--Bowbells Loam
(2-5% slopes)
Br--Bowbells-Tonka Loams
(0-2% slopes)
Hl--Hamerly Loam (0-5% slopes)
Pa--Parnell Silty Clay Loam
(0-1% slopes)
ZmC--Zahl-Max Loams
(6-9% slopes)
To--Tonka Silt Loam
(0-1% slopes)
WIA--Williams Loam (0-2% slopes)
WIB--Williams Loam
(2-4% slopes)
WIC--Williams Loam
(4-6%slopes)
0
0.125
0.25
Miles
Geographic Projection
1983 North American Datum
Area of Detail
MHA NATION FEE-TO-TRUST
AND REFINERY EIS
FIGURE 3-12
SOIL SURVEY MAP

3.5.1.2 Hamerly Series

The Hamerly series consists of deep, level and undulating, moderately well drained soils that formed in glacial till, and the corresponding range site is primarily categorized as silty. These soils are adjacent to intermittently ponded closed depressions. Permeability is moderately slow, and these soils typically have a seasonally perched water table that delays tillage. Shrink-swell potential is low to moderate.

Hamerly loam, 0 –5 percent slopes (Hf) – This soil is found in the areas around rims and low swales of potholes. The areas of deposits are small and irregularly shaped and typically include other series. Permeability is moderately slow (0.2 to 0.63 inches/hour), and surface runoff is slow to medium. The land capability for crop cultivation is moderately limited due to potential erosion from wind.

Tonka silt loam (3) – This deep, level, poorly drained soil is in shallow depressions on till plains, moraines, and lake plains. Permeability is slow (0.06 to 2.0 inches/hour), runoff is generally ponded, and the seasonal high water table is generally 0.5 foot above to 1 foot below the surface. The land capability for crop cultivation is moderately limited due to potential impacts from water.

Vallers loam, saline (4) – This soil is deep, level, poorly drained, moderately saline, highly calcareous and typically associated with drainage ways on till plains. Permeability is moderately slow (0.6 to 6.0 inches/hour), runoff is slow, and the seasonal high water table is usually within a depth of 1 foot. The land capability for crop cultivation is severely limited due to potential erosion from wind.

Hamerly – Tonka complex, 0 – 3 percent slopes (17) – These deep soils are located on till plains. The level and nearly level, somewhat poorly drained soil is typically found on flat areas surrounding depressions. Permeability is moderately slow (0.6 to 2.0 inches/hour), and runoff is slow. The land capability for crop cultivation is moderately limited due to potential erosion from wind.

3.5.1.3 Bowbell Series

The Bowbell series consists of deep, level and gently sloping, moderately well drained soils that formed in glacial till and local alluvium derived from till, and the corresponding range site is primarily categorized as silty. These soils are typically found on upland till plains and permeability is moderate to a depth of about 36 inches (and moderately slow below that depth). These soils receive additional moisture from snow accumulation and runoff from adjacent slopes. Shrink-swell potential is moderate.

Bowbells-Tonka loams, 0 – 2 percent slopes (BoB) – This complex consists of nearly level soils in shallow swales on till plains. Bowbells loam makes up about 75 to 90 percent of the complex with the remainder encompassing Tonka silt loam. Bowbells is better drained and is on the higher parts of the swales and concave depressions, while the Tonka soil is in the low depressions that are flooded by water from adjacent areas. Permeability is moderate to a depth of 18 inches: 0.63 to 2.0 inches/hour, and surface runoff is slow. The land capability for crop cultivation is moderately limited due to a slight potential erosion from wind.

3.5.1.4 Williams – Zahl Association

This association consists of undulating and gently rolling soils on side slopes, shoulder slopes, summits, low ridges, and knolls on till plains. A characteristic landscape within this association would typically be dotted with depressions, swales, and flats with slopes ranging between 3 and 9 percent. The Williams series occur on the side slopes and summits, contrasted by the Zahl series on the shoulder slopes, low ridges, and knolls. Minor soil series within this association typically consist of Bowbells series within the swales, Farnuf on the flats, Parnell and Tonka within the depressions, and Vebar on the side slopes.

Williams Series

Williams loam, gently undulating, 2 to 4 percent slopes (W1B) – This soil is in areas characterized by low knolls, ridges, and smooth slopes. Permeability is moderate (0.2 to 0.63 inches/hour), and runoff is slow to moderate. The land capability for crop cultivation is moderately limited due to a slight potential erosion from wind.

Williams loam, undulating, 4 to 6 percent slopes (W1C) – This soil is on irregular knolls, ridges, and side slopes around potholes, swales and valley sides. Slopes are generally short, permeability is moderate (0.2 to 0.63 inches/hour), and runoff is medium. The land capability for crop cultivation is moderately limited due to a slight potential erosion from wind.

Williams – Zahl loams, 3 – 6 percent slopes (23B) – This soil is deep, undulating, well drained and primarily located on till plains. The Williams soil is typically on the side slopes and summits, while the Zahl soil generally occurs on the knolls, ridges, and shoulder slopes. Permeability is moderately slow (0.2 to 2.0 inches/hour), and runoff is medium. The land capability for crop cultivation is moderately to very severely limited due to a slight potential erosion from wind.

Williams – Zahl loams, 6 to 9 percent slopes (24C) – These deep soils are generally associated with gently rolling, and well drained areas of the till plains. The Williams soils are typically found on the side slopes and summits, while the Zahl soils are most commonly associated with the shoulder slopes and knolls. Permeability is moderately slow (0.2 to 2.0 inches/hour), and runoff is rapid. The land capability for crop cultivation is severely to very severely limited due to a slight potential erosion from wind.

Zahl – Williams loams, 9 to 25 percent slopes (24E) – These deep, rolling and hilly, and well-drained soils are primarily located on moraines. The Zahl soils are most commonly found on the shoulder slopes and summits, while the Williams soils are typically associated with the slopes and summits. Permeability is moderately slow (0.6 to 2.0 inches/hour), and runoff is very rapid. The land is unsuited for crop cultivation.

Zahl Series

The Zahl series consists of deep, rolling to steep, well-drained soils that formed in loamy glacial till, and the corresponding range site are primarily categorized as silty or thin silty. These soils are typically found on glacial moraines and slope breaks. Shrink-swell potential is moderate, and the engineering index classification is A-6(11) and A-7-6(13) for the Bk1 and C horizons, respectively.

Zahl-Max loams, rolling 6 to 9 percent slopes (ZmC) – This complex is found on hilltops and slope breaks. Zahl loam makes up 50 to 75 percent of the complex, and Max loam makes up the remaining 25 to 50 percent. In general, the Zahl soil is located on hilltops and crests of side slopes, while the Max soil is on the smoother and lower parts of the side slopes. Permeability is moderate (0.63 to 2.0 inches/hour) to a depth of about 15 inches and moderately slow below that depth, and runoff is rapid. The land capability for crop cultivation is severely limited due to a slight potential erosion from wind.

3.5.1.5 Manning Series

The Manning series consists of level to rolling, well drained soils that formed in moderately coarse textured material that is underlain by sand and gravel, primarily at a depth of 12 to 24 inches. Permeability is moderately rapid to a depth of about 24 inches and is very rapid below that depth. The corresponding range site is primarily categorized as sandy and/or shallow to gravel. Shrink-swell potential is low, and the engineering index classification is A-2-4(0) and A-2-4(0) for the Bw2 and C1 horizons, respectively.

Manning sandy loam, 1 to 6 percent slopes (49B) – This is a deep, nearly level, gently sloping, and excessively drained soil typically located on flats and rises on outwash plains and terraces. Permeability is moderately rapid (2.0 to 6.3 inches/hour) in the upper part of the Manning soil and very rapid in the lower part (>20.0 inches/hour). Runoff is slow and the sand and gravel layer typically restricts the depth to which plant roots can penetrate. The land capability for crop cultivation is moderately limited due to potential erosion from wind.

3.5.1.6 Parnell Series

The Parnell Series consists of deep, level, poorly drained soils that formed in fine-textured formed in glacial alluvium, and the corresponding range site is primarily categorized as wetland. Shrink-swell potential is high, and the engineering index classification for the 3 to 16-inch horizon is A-7-5(19), 16 to 30-inch horizon is A-7-5(20), and 36 – 60-inch horizon is A-7-6(20).

Parnell silty clay loam, 0 to 1 percent slopes (Pa) – This soil is in basins and depressions and is usually inundated by water (for example, ponded) until mid-summer or later. It may sometimes be ponded all year after a series of wet seasons, but after a series of dry years, it may pond only for a few days following heavy rains. Permeability is slow (0.06 to 2.0 inches/hour), and runoff is slow. The land capability for crop cultivation is moderately limited due to potential impacts from water.

3.5.1.7 Wabek Series

The Wabex series consists of level to hilly, excessively drained soils that formed in sand and gravel outwash material, and the corresponding range site is primarily categorized as very shallow. These soils are primarily associated with outwash plains. Permeability is very rapid below the surface layer. Shrink-swell potential is low, and the engineering index classification is A-1-b(0) for the C horizon.

Wabek loam, 1 to 35 percent slopes (54E) – This is a deep, nearly level to steep, excessively drained soil that is primarily located on flats, knolls, and ridges on outwash plains and terraces. Permeability is very rapid (2.0 to >20 inches/hour) and runoff is rapid. As with the Manning soil, the sand and gravel layer typically restricts the depth to which plant roots can penetrate. The land capability for crop cultivation is severely limited due to steep slope and stony soil. This also limits construction potential.

3.5.2 Poor Revegetation Potential

Soils are grouped according to their limitations for field crops, the risk of damage if used for agriculture, and response to management. Capability classes are divided into eight groups (Roman Numerals I through VIII), with Class I soils having few limitations and Class VIII soils having multiple limitations that prevent commercial crop production. Therefore, Class VII and Class VIII soils are determined to have poor revegetation potential. Soils with poor revegetation potential were identified using the land capability classification given in the County soil surveys. Table 3–5 details soils with poor revegetation potential in the project area.

Table 3-5 Soil Series with Poor Revegetation Potential

Series/Unit	Slope	Class
Wabek loam	1 to 35 percent	Class VII
Zahl – Williams	9 to 25 percent	Class VIIe

3.6 Vegetation

Five cover types were identified in the project area: palustrine emergent wetlands, riverine wetlands, mixed-grass prairie, agricultural lands, and developed land. These broad categories often represent several vegetation community types that are generally defined by both species composition and relative abundance. The acres of occurrence and relative distribution of vegetation types within the project area are presented on Table 3–6. The vegetative community types described below generally correlate with wildlife habitat types.

Table 3-6 Summary of Cover Types Identified for the Project Site

Classification	Areal Extent (acres)
Wetlands	34
Agricultural Land	373
Mixed-grass Prairie	48
Developed	5
Total	**460**

3.6.1 Wetlands

Executive Order 11990 - Protection of Wetlands (May 24, 1977) directs each federal agency to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for: (1) acquiring, managing, and disposing of federal land and facilities; (2) providing federally undertaken, financed, or assisted construction and improvement; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin et al. 1979). In general, wetlands are areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods during the year, including during the growing season. Saturation with water largely determines how the soil develops and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants and promote the development of characteristic wetlands soils.

Wetlands and their associated habitats are grouped into classifications that provide several functions and values unique to each wetland complex. Wetlands perform many important hydrologic functions, such as floodwater storage, maintaining stream flows, slowing and storing floodwaters, stabilizing stream banks, nutrient removal and uptake, and ground water recharge.

A number of wetland classification systems have been developed, but the Cowardin et al. (1979) classification method is the most widely recognized system. Using the Cowardin et al. 1979, system of wetland classification, one type of wetlands was identified on the project site — palustrine. The following sections describe these wetlands.

3.6.1.1 Palustrine Wetlands

Palustrine wetlands are non-tidal and tidal-freshwater wetlands in which vegetation is predominantly trees (forested wetlands); shrubs (scrub-shrub wetlands); persistent or non-persistent emergent, erect, rooted herbaceous plants (persistent- and non-persistent-emergent wetlands); or submersed and (or) floating plants (aquatic beds). Also included in this category are intermittently to permanently flooded open-water bodies of less than 20 acres in which water is less than 6.6 feet deep.

Palustrine wetlands can be further divided based on the dominant plant life form or the physiography and composition of the substrate (e.g., aquatic bed, emergent, forested, scrub-shrub, unconsolidated bottom, or unconsolidated shore) and the seasonal water regime (e.g., intermittently exposed, semi-permanently flooded, seasonally flooded, saturated, or temporarily flooded) (Cowardin et al. 1979).

Palustrine wetlands within the project area occur in a variety of forms, sizes, depths, and type/classification. The wetlands can range from a few feet across and only inches deep, to basins 500 acres in size with depths of more than 10 feet. Most of the plants within the small to medium sized seasonal wetlands contain facultative wetland (FACW) species interspersed with a few obligate (OBL) species in the deeper portions of the basin.

In the higher elevation margins (typically unfarmed) of the basins, facultative (FAC) and to a lesser degree, facultative upland (FACU) plant species are the dominant constituents within the plant community. These species typically include smooth brome (*Bromus inermis*), kochia (*Kochia scoparia*), Russian thistle (*Salsola kali*), meadow foxtail (*Alopecurus pratensis*), quackgrass (*Elymus canadensis*), Kentucky bluegrass (*Poa pratensis*), and goldenrod (*Solidago missouriensis*). Conversely, in the saturated portions of the basin, characteristic FACW and OBL vegetation primarily consists of reed canarygrass (*Phalaris arundinacea*), curly dock (*Rumex crispus*), needle spike rush (*Eleocharis acicularis*), Baltic rush (*Juncus balticus*), American sloughgrass (*Beckmannia syzigachne*), smartweed (*Polygonum persicaria*), beggarticks (*Bidens frondosa*), bluejoint reedgrass (*Calamagrostis canadensis*), and wooly sedge (*Carex lanuginosa*).

Wetlands within this region possess unique environmental and biotic characteristics that add to the overall regional diversity and production of the aquatic invertebrates and the vertebrate wildlife that depend upon them as a food source. The PPR is a unique area that is of critical importance to migratory birds in North America. Wetlands within the region also support countless recreational opportunities such as hunting, fishing, trapping, bird watching, and photography. They also provide valuable livestock water and produce an abundance of forage.

Hydrology for wetlands follows a yearly cycle, beginning with the spring snow melt runoff draining into the depressional basins and ponding (depth of inundation is highly dependent on the amount of snow cover). Through the summer months, wetlands may receive direct precipitation and subsequent runoff from their surrounding watershed(s), while simultaneously exporting water through evapotranspiration and losing surface water through seepage. By late summer, the wetlands are generally drawn down or dry and enter the fall and winter months in a condition that prepares them to repeat the cycle the following spring.

Plant communities within prairie wetlands are dynamic and continually changing as a result of short- and long-term fluctuations in water levels, salinity, and anthropogenic disturbance (Kantrud et al. 1989). In general, marsh sediments and seed banks are exposed during drought periods. During this dry marsh phase, seeds of many mud flat annual and emergent plant species germinate on exposed mudflats, with annual species usually forming the dominant component (Davis and Brinson 1980). When water returns, the annuals are lost but the emergent macrophytes survive and expand by vegetative propagation (e.g., regenerating marsh). Depth and duration of the flooding period, combined with the tolerances of the individual species will determine how wetland communities develop over time. The resulting vegetation communities established within most area seasonal and semi-permanent wetlands consists of a mixture of tall grasses and forbs intermixed with a combination of emergent macrophytes.

3.6.1.2 Types, Distribution, and Areal Extent of Wetlands on the Project Site

According to the FWS — Habitat and Population Evaluation Team (HAPET) (which reclassified and processed original National Wetland Inventory data into basin class coverages that include temporary, seasonal, semi-permanent, lake and riverine, total wetland acreages by basin classes), both Mountrail and Ward Counties have 140,005 and 191,833 acres of wetlands, respectively (Reynolds et al. 1996).

The numerous topographical depressions and basins that capture snowmelt and rainwater or are within reach of subsurface waters generally support palustrine emergent wetlands (freshwater marshes, wet meadows, prairie potholes, and sloughs). In Mountrail County, temporary and seasonal basin classes (which correspond to palustrine wetlands) cover approximately 40,120 acres, or about 28 percent of the total wetland acreage, while in Ward County, they cover approximately 103,128 acres, or about 54 percent of the total wetland acreage (Reynolds et al. 1996). Extensive tracts of palustrine wetlands exist throughout the two counties in isolated depressions within mixed-grass prairies and agricultural fields; in lowlands adjacent to drainages, rivers, and lakes; and adjacent to springs or seeps. In the region, riverine wetlands occur in much less frequency than palustrine wetlands. In Mountrail and Ward Counties, riverine wetlands cover approximately 612 acres and 2,424 acres, respectively (Reynolds et al. 1996).

Sixteen wetlands were delineated within Sections 19 and 20 of the project site. Wetlands occupy a total of 33.6 acres within the project study area (Figure 3-13). Table 3–7 provides an acreage summary.

As detailed in Table 3–7, seasonal, temporarily flooded wetlands (PEMA and PEMC) were the most dominant wetland types delineated on the project site. Most of these wetlands are characterized as depressional basins that are generally less than 1.5 acre in size. One large, seasonal, persistent wetland (PEMF#2) was identified within the northwest corner of the Project Site within Section 19.

Project Site – PEMF #2 Wetland

Wetland PEMF#2 will be directly affected by the proposed project. This wetland is located in the northwest corner of the site and is associated with the lowest elevation contour within the NW¼ of Section 19. The source of water to this feature is primarily from spring runoff of snowmelt and precipitation from the adjacent local watershed. Additional water is supplied by a north to south drainage channel that empties into the southern boundary of the wetland. The watershed for wetland PEMF #2 is approximately 400 acres. This wetland is approximately 11.7 acres in size and was classified as a palustrine emergent semi-permanently flooded. This wetland was generally characterized by a predominance of emergent and obligate wetland vegetation on the outer margins and contains areas of open water (during spring and wet years) within the center portion of this basin. Additionally, this delineated wetland drains into a culvert constructed under Highway 23 that is tributary to the East Fork of Shell Creek. A distinct band of mixed-grass prairie immediately borders the basin associated within this wetland.

Table 3-7 Summary of Jurisdictional Wetlands and Waters of the U.S. Inventoried on the Project Site

Location/Identifier[1,2]	Areal Extent (acres)
Section 19	
PEMC #1	2.5
PEMF #2	11.7
PEM/ABF #3	1.4
PEMC #4	0.7
Section 20	
PEMA #1	0.6
PEMA #2	0.8
PEMA #3	0.3
PEMC #4	0.7
PEMC #5	3.1
PEMC #6	6.0
PEMA #7	1.7
PEMA #8	0.4
PEMA #9	0.3
PEMA #10	1.1
PEMA #11	1.1
PEMA #12	1.0
Total	**33.6**

Notes:
1. Wetland classifications followed the Cowardin et al (1979) Classification System.
2. PEMA = Palustrine-Emergent-Temporarily Flooded, PEMC = Palustrine-Emergent-Seasonally Flooded, PEMF = Palustrine-Emergent-Semi-permanently flooded, and PEM/ABF = Palustrine-Emergent-Aquatic-Bed-Semi-permanently flooded.

The USACE has determined that wetland PEMF#2 is subject to CWA jurisdiction. Wetland PEMF#2 includes the pond wetland and the connected swale. The other wetlands (Figure 3-13) are isolated and not determined to be jurisdictional wetlands.

PEMF #2 Wetland Hydrology

During mid-August 2005 (when the isotope samples were collected), there was no discharge from the wetland (Wireman 2005). Isotope samples were collected from the up-gradient end (south) and the down-gradient end (north) of the wetland. The delta 18 O values shown for the two wetland locations are much more enriched in 18 O (-4.85 and -5.16) than the ground water in the till and underlying Fort Union Formation (Wireman 2005). This enrichment is caused by extensive evaporation of water in the wetland. These values are also a strong indication that the wetland does not receive ground water discharge (Wireman 2005).

3.6.2 Mixed-Grass Prairie

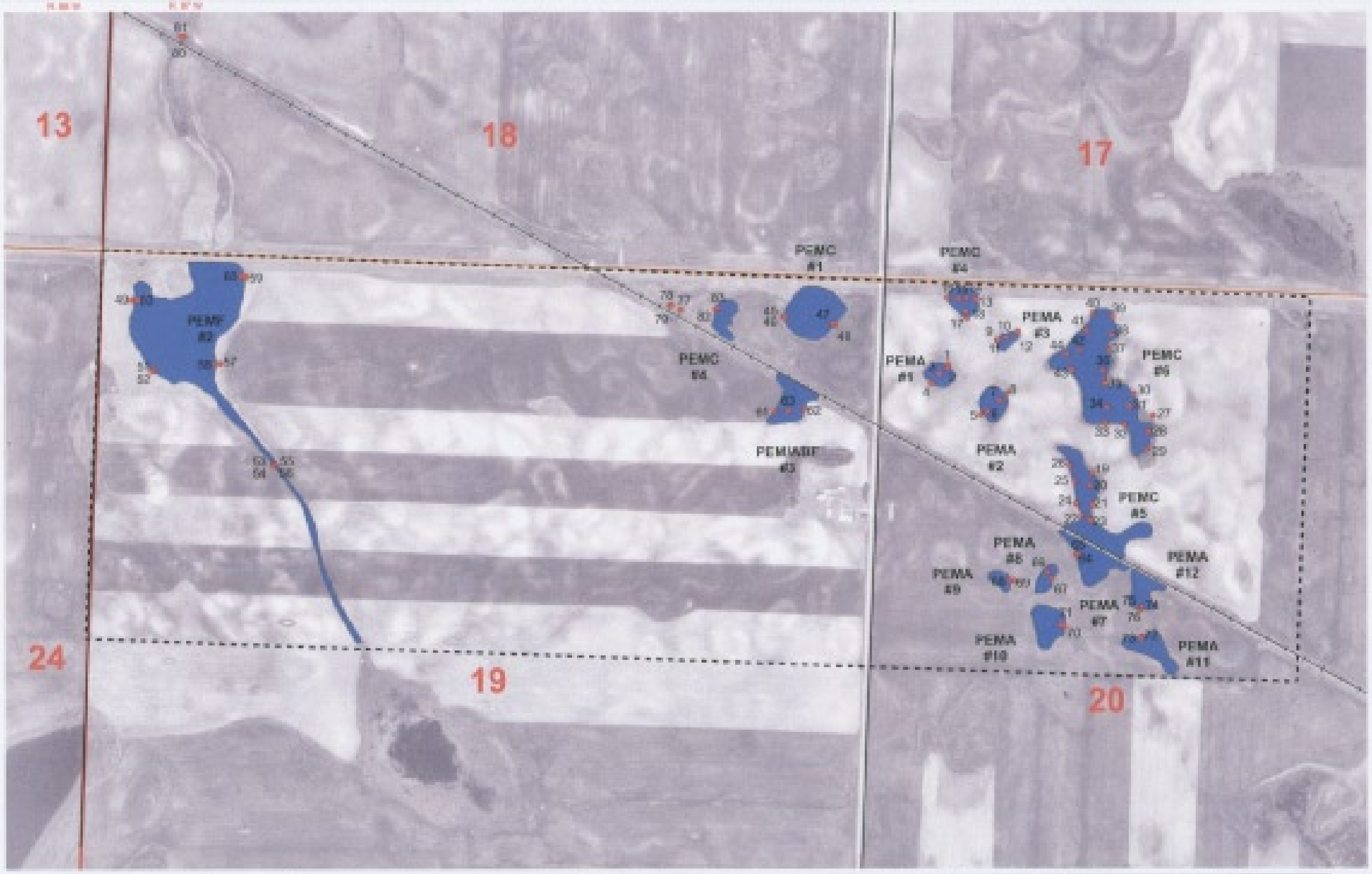
The mixed-grass prairie ecoregion occupies the northern limits of the boreal forests of Manitoba, Saskatchewan and Alberta, south to north-central Nebraska, and was historically one of the largest ecosystems in North America, originally covering about 69 million hectares or 171 million acres (Samson et al. 1998). Within both Ward and Mountrail Counties, most of the remaining mixed-grass prairie is used for rangeland[3]. A substantial amount of the remnant mixed-grass prairie occurs on hills or very steep slopes, well drained or excessively drained soils, and moderately well drained to poorly drained alkali soils. These lands and subsequent soils are generally unsuited or, at best, poorly suited for producing cultivated agricultural crops. Mixed-grass prairie landscapes are further divided into ecological range sites for the purposes of inventory, evaluation, and management. An ecological range site, as defined for rangeland, is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation (Butler et al. 1997). Ecological range sites have characteristic soils that have developed over time throughout the soil development process. Also, an ecological range site has a characteristic hydrology, particularly infiltration and runoff that has developed over time. The development of the hydrology is influenced by development of the soil and plant community. Therefore, the ecological range site descriptions contain information about soils, physical features, climatic features, associated hydrologic features, plant communities possible on the site, plant community dynamics, annual production estimates and distribution of production throughout the year, associated animal communities, associated and similar sites, and interpretations for management (Butler et al. 1997).

Ecological range sites are distinctive types of rangeland identifiable by a characteristic plant community that changes with the growing season (for example, cool season and warm season). An ecological range site is recognized and described based on the characteristics that differentiate it from other sites in its ability to produce and support a characteristic plant community. Ecological range sites are based on soil data compiled in soil surveys. Soil surveys for both Ward and Mountrail Counties classify the following ecological range sites as occurring within the region: clayey, claypan, limy sub-irrigated, overflow, saline lowland, sandy, shallow, silty, thin claypan, thin upland, very shallow, and wet meadow.

3.6.3 Agricultural Land

Agricultural land may be defined broadly as land used primarily for production of cultivated crops. However, pasture and other cultivated land may be infrequently included in this classification.

[3] Rangeland is defined as a kind of land on which the historic climax vegetation was predominantly grasses, grass-like plants, forbs, or shrubs and is a primary source of forage for domestic livestock and for wildlife (Butler et al. 1997).



Legend

- GPS Waypoint
- Railroads
- City/County Road
- State/Federal Road
- Fee-to-Trust Area
- GPS-Delineated Wetlands

PEMA--Palustrine-Emergent-Temporarily flooded

PEMC--Palustrine-Emergent-Seasonally flooded

PEMA--Palustrine-Emergent-Semi-permanently flooded

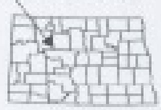
Source: wetland delineation, Greystone, 2003.

Notes:
1. Wetland classifications followed the Cowardin et al (1979) Classification System.
2. PEMA = Palustrine-Emergent-Temporarily Flooded; PEMC = Palustrine-Emergent-Seasonally Flooded; PEMF = Palustrine-Emergent-Semi-permanently flooded; and PEMABF = Palustrine-Emergent-Aquatic-Bed-Semi-permanently flooded.

0 250 500 1,000 Feet

Geographic Projection
1983 North American Datum

Area of Detail



Waypoint	Description	Waypoint	Description	Waypoint	Description	Waypoint	Description	Waypoint	Description	Waypoint	Description	Waypoint	Description	Waypoint	Description	Waypoint	Description
1	[illegible]	11	[illegible]	21	[illegible]	31	[illegible]	41	[illegible]	51	[illegible]	61	[illegible]	71	[illegible]	81	[illegible]
2	[illegible]	12	[illegible]	22	[illegible]	32	[illegible]	42	[illegible]	52	[illegible]	62	[illegible]	72	[illegible]	82	[illegible]
3	[illegible]	13	[illegible]	23	[illegible]	33	[illegible]	43	[illegible]	53	[illegible]	63	[illegible]	73	[illegible]	83	[illegible]
4	[illegible]	14	[illegible]	24	[illegible]	34	[illegible]	44	[illegible]	54	[illegible]	64	[illegible]	74	[illegible]		
5	[illegible]	15	[illegible]	25	[illegible]	35	[illegible]	45	[illegible]	55	[illegible]	65	[illegible]	75	[illegible]		
6	[illegible]	16	[illegible]	26	[illegible]	36	[illegible]	46	[illegible]	56	[illegible]	66	[illegible]	76	[illegible]		
7	[illegible]	17	[illegible]	27	[illegible]	37	[illegible]	47	[illegible]	57	[illegible]	67	[illegible]	77	[illegible]		
8	[illegible]	18	[illegible]	28	[illegible]	38	[illegible]	48	[illegible]	58	[illegible]	68	[illegible]	78	[illegible]		
9	[illegible]	19	[illegible]	29	[illegible]	39	[illegible]	49	[illegible]	59	[illegible]	69	[illegible]	79	[illegible]		
10	[illegible]	20	[illegible]	30	[illegible]	40	[illegible]	50	[illegible]	60	[illegible]	70	[illegible]	80	[illegible]		

MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 3-13
WETLANDS DELINEATION MAP

ANALYSIS AREA, MOUNTRAIL & WARD COUNTIES, ND
Date: 11/2005
Drawn By: MRH

In 1997, Ward County had 1,172 farms. The average size farm had 1,030 acres, with a median size of 700 acres (National Agricultural Statistics Service 1997). In 1997, 829 farms harvested 11,144,094 bushels of wheat for grain on 512,545 planted acres (National Agricultural Statistics Service 1997). The average wheat for grain production is equal to about 21.7 bushels per acre. Durum wheat accounted for the second highest harvested crop. In 1997, 665 farms planted 332,340 acres that produced 7,337,044 bushels (National Agricultural Statistics Service 1997). This translates into 22.1 bushels per acre. The average market value of agricultural products sold per farm in 1997 within Ward County amounted to $70,742 (National Agricultural Statistics Service 1997). This value is well below the statewide average per farm of $124,424.

According to the 2002 agricultural statistics for Ward County, each acre planted in barley yields and average of 59.1 bushels. An estimated 400 acres of the project site are planted with malt barley, which would have a potential yield of 23,600 bushels (North Dakota Agricultural Statistics Service 2002). As of January 16, 2003, the average price for malt-barley grown in North Dakota was $2.10 per bushel. At this price, barley grown on the project site would sell for an estimated $49,500.

3.6.4 Developed Land

Developed land is composed of areas of intensive use with much of the land covered by constructed structures (for example, houses, outbuildings, and retail buildings). Included in this category are towns and cities; transportation infrastructure ROW including roads and railways; communication facilities; and areas such as those occupied by agricultural, industrial and commercial complexes; and industrial infrastructure that may, in some instances, be isolated from the urban areas.

3.6.5 Existing Disturbance

The agricultural value of the two “ecoregions” has tremendously affected prairie grasslands and wetlands, and the resulting landscape has been substantially altered since settlement in the late 1800s. Economic incentives to convert natural landscapes to agriculture have been intensive and resulted in the loss of significant amounts of mixed grass prairie grassland and wetland habitats. Wetland drainage (both surface and tile) to enhance agricultural production has been the primary factor resulting in the loss of wetlands in this region (Euliss et al. 1999).

Substantial areas of vegetation have been altered from their natural condition by past and current human activities. The primary surface disturbing activities for native vegetation communities are agriculture, intensive grazing, haying, oil and gas development, sand and gravel mining, road and railroad construction, and rural and urban development. Prior to the land use conversion, this extent of the northern prairie was predominantly mixed-grass prairie, which consisted of a mixture of cool and warm season mid-grasses (and, to a lesser extent, short and tall grasses), broad-leaved annual and perennial forbs, intermixed with numerous legumes.

3.7 Wildlife

Common Wildlife

The vegetative communities described above serve as reproduction, nesting, cover, shelter, and foraging/feeding habitats for a variety of wildlife species. Wildlife within this area is closely associated with the remnant mixed-grass prairie and wetlands including areas of open water. Agricultural land is the most common habitat type, while wetlands and mixed grass prairie make up a small percentage of the total land within the project area. However, the grasslands and wetlands are the most biologically diverse areas and support a greater density of northern prairie species.

3.7.1 Mammals

A number of terrestrial mammalian species may occur in the project area. Big game mammals, such as pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), elk (*Cervus elaphania*) and other prairie-adapted species primarily occur as transients because of the conversion to agricultural lands from prairie grassland. Mammals adapted to agricultural habitats, such as the white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), raccoon (*Procyon rotor*), and other small mammals are likely to occur in the project area. These mammals typically use agricultural lands for forage and use wetlands and shelterbelts for shelter.

Muskrat (*Ondatra zibethicus*), raccoon (*Procyon rotor*), and mink (*Mustela vison*) proliferate within wetlands, and beaver (*Castor canadensis*) may occur along watercourses. Grasslands and agricultural fields are anticipated to have varying densities of western harvest mouse (*Reithrodontomys megalotis*), meadow vole (*Microtus pennsylvanicus*), meadow jumping mouse (*Zapus hudsonius*), western jumping mouse (*Zapus princeps*), and long-tailed weasel (*Mustela frenata*). Badger (*Taxidea taxus*) and striped skunk (*Mephitis mephitis*) are also expected to occur throughout the area.

3.7.2 Avifauna (Birds)

Three hundred and sixty-five species of birds occur or potentially occur in the various habitats present in North Dakota (Faanes and Stewart 1982). Of the 365 bird species, 207 species are known to nest or have nested in the State, 95 occur primarily as migrants, 28 are accidental and 21 are occasional species that have been observed in North Dakota (Faanes and Stewart 1982). Birds occurring throughout the project area include raptors, waterfowl, wading birds, shorebirds, gallinaceous birds, and migrants.

Passerine

The open and sparsely vegetated agricultural fields of the project area do not typically support diverse species of birds because most passerines are usually associated with the remnant tracts of mixed-grass prairie grasslands and the structurally taller and denser riparian and woodland habitats. In general, bird diversity increases in the project area during the spring and fall when neotropical migrants pass through the general area in route to summer breeding or wintering grounds.

The occurrence of the various species of passerine birds inhabiting the area corresponds to the habitat types present. In agricultural areas, narrow strips of weedy habitats frequently border cropland and hayland fields and tracts of grazed prairie. These usually occur along fencerows, section lines, roadsides, and railroad rights-of-way. Vegetation in these situations is often composed of native prairie grasses and forbs in combination with many coarse, introduced weeds including species of grass and forbs that are characteristic of sites with disturbed soils. Occasional native trees or shrubs are also present.

Common passerine species that may occur within the agricultural fields include western meadowlark (*Sturnella neglecta*), American goldfinch (*Carduelis tristis*), western kingbird (*Tyrannus verticalis*), eastern kingbird (*Tyrannus tyrannus*), and horned lark (*Eremophila alpestris*). Common grassland species may include bobolink (*Dolichonyx oryzivorus*), savannah sparrow (*Passerculus sandwichensis*), clay-colored sparrow (*Spizella pallida*), grasshopper sparrow (*Ammodramus savannarum*), chestnut-collared longspur (*Calcarius ornatus*), and lark bunting (*Calamospiza melanocorys*). Riparian and woodland passerine species may include mourning dove (*Zenaida macroura*), lazuli bunting (*Passerina amoena*), common grackle (*Quiscalus quiscula*), song sparrow (*Melospiza melodia*), least flycatcher (*Empidonax minimus*), house wren (*Troglodytes aedon*), gray catbird (*Dumetella carolinensis*), red-eyed vireo (*Vireo olivaceus*), and yellow warbler (*Dendroica petechia*). Passerine birds associated with the various types of wetland vegetation may include red-winged blackbird (*Agelaius phoeniceus*), marsh wren (*Cistothorus palustris*), common yellowthroat (*Geothlypis trichas*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*).

Gallinaceous Birds

Gallinaceous birds are upland birds that are ground-dwelling, usually quite secretive, and often found in small flocks. These birds are commonly hunted as game birds. Gallinaceous birds that occur throughout the project area include the ring-necked pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), and sharp-tailed grouse (*Tympanuchus phasianellus*).

Raptors

Species typically associated with grasslands and agricultural fields include the northern harrier (*Circus cyaneus*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco sparverius*). The great-horned owl (*Bubo virginianus*) is also a common resident of the region. One of the most common raptors in the area, the northern harrier, is a ground-nesting species.

Waterfowl and Shorebirds

Wetlands habitats in North Dakota include natural ponds and lakes, man-made ponds, reservoirs, natural fluviatile wetlands, and road ditches and drainage channels that support a breeding avifauna as rich and varied as the wetlands themselves. Most of these wetland-associated birds are short-distance migrants, wintering primarily north of the United States-Mexico border (Stewart 1975). Also, many wetlands in the region are important fall staging and rest areas during the migrations. The shallow, open wetlands associated with cultivated fields are used as forage sources by spring and fall migrant waterfowl (Kantrud 1990).

Wetlands are critical to this area, and they support a very rich and varied breeding avifauna. Almost 40 percent of the species on the North Dakota bird list use wetlands (Faanes and Stewart 1982). In addition, of the 223 species with known or inferred breeding status in North Dakota, 57 (26 percent) are marsh or aquatic birds other than waterfowl (Faanes and Stewart 1982). Finally, Stewart (1975) identified 63 breeding bird species as wetland associates in North Dakota alone.

The gadwall (*Anas strepera*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), and blue-winged teal (*Anas discors*) are the most commonly observed species of waterfowl. The American bittern (*Botaurus lentiginosus*), great blue heron (*Ardea herodias*), and lesser yellowlegs (*Tringa flavipes*) are the most common wading birds expected to occur in the project area. The upland sandpiper (*Bartramia longicauda*), Wilson's phalarope (*Phalaropus tricolor*), willet (*Catoptrophorus semipalmatus*), marbled godwit (*Limosa fedoa*), black tern (*Chlidonias niger*), and killdeer (*Charadrius vociferus*) are common shorebirds.

3.7.3 Amphibians and Reptiles

North Dakota does not support a diverse array of reptiles and amphibians. The semi-arid climate provides only marginal conditions for amphibian breeding and hibernation, whereas the low winter temperatures and the short growing season appear to be primary limiting factors for reptiles. According to Hoberg and Gause (1992), the herpetofauna of North Dakota includes 25 species (11 amphibians and 14 reptiles). Of these, only the tiger salamander (Ambystoma tigrinum), American toad (*Bufo americanus*), Great Plains toad (*B. cognatus*), Dakota toad (*B. hemiophrys*), Rocky Mountain toad (*B. woodhousei*), chorus frog (*Pseudacris nigrita*), leopard frog (*Rena pipiens*), wood frog (*R. sylvatica*), painted turtle (*Chrysemys picta*), plains garter snake (*Thamnophis radix*), and red-sided garter snake (*T. sirtalis*) use prairie basin wetlands. The only species intimately associated with wetlands are the tiger salamander, leopard frog, and chorus frog.

3.7.4 Fish

According to Kantrud et al. (1989), fathead minnows (*Pimephales promelas*) and brook sticklebacks (*Culaea inconstans*) are the only two native fishes that can tolerate shallow water depths (less than 5 feet), low concentrations of dissolved oxygen, and occasionally high concentrations of sulfates and bicarbonates found in these wetlands. They also noted that most wetlands in the region lie in closed drainage basins, thereby limiting dispersal of fish.

3.7.5 Invertebrates

According to Cvancara (1983), the aquatic mollusks of North Dakota consist of 44 species, of which 13 are mussels, nine are pill clams, and 22 are snails. Characteristic groups of wetland invertebrates can be associated with four major habitat types. These groups include benthic invertebrates that live in mud or in association with the mud-water interface, pelagic invertebrates that occupy the water column, macrophyte associated invertebrates that live in or on vascular plants in association with periphyton communities, and neustonic invertebrates that live on the surface film.

3.7.6 Special-Status Species

Several species that occur or potentially occur within the project area are classified as federally threatened or endangered because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. These species receive specific protection defined in the ESA of 1973, as amended. Other species have been designated as candidate or sensitive on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise. Table 3–8 summarizes the known occurrence or potential occurrence of each species within Ward and Mountrail Counties.

3.7.6.1 Whooping Crane

Historically, the primary breeding range of whooping cranes extended from Alberta to Manitoba south to Illinois. Whooping cranes are believed to have wintered along the Atlantic coast, the southern U.S., and down into central Mexico (U.S. Fish and Wildlife Service 2004). Whooping cranes were extirpated from north-central U.S. by the 1890s and from Saskatchewan by 1929.

Currently, the Aransas-Wood Buffalo flock remains the only self-sustaining wild population and migratory group. The breeding pairs nest almost exclusively within the borders of Wood Buffalo National Park in Northwest Territories, Canada. The wintering grounds are found within and near the Aransas National Wildlife Refuge in Texas.

The 2,400-mile migration route between the Wood Buffalo National Park and Aransas National Wildlife Refuge generally cuts across northeastern Alberta and southwestern Saskatchewan, through northeastern Montana, the western half of North Dakota, central South Dakota, Nebraska and Oklahoma and east-central Texas. The primary migration route through Nebraska is a narrow swath approximately 140 miles wide. Migration may take 2 to 6 weeks. During the fall 2003 migration, seven observations of whooping cranes in North Dakota were confirmed (Stehn 2004b). During the spring 2004 migration, nine observations of whooping cranes in North Dakota were confirmed (Stehn 2004a).

Whooping cranes breed and nest in wetlands along lake margins or among rushes and sedges in marshes and meadows. The water in these wetlands ranges in depth from 8 to 10 inches (20 to 25 cm) to as much as 18 inches (46 cm) (U.S. Fish and Wildlife Service 2004). Many of the ponds have border growths of bulrushes and cattails, which occasionally cover entire bays and arms of the larger lakes. Nesting has also been reported on muskrat houses and on damp prairie sites. Whooping cranes feed on crabs, crayfish, frogs, and other small aquatic life as well as plants. Whooping cranes use native grasslands, wet meadows, and agricultural lands as upland feeding areas. They prefer sites with minimal human disturbance.

3.7.6.2 Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was listed as endangered on February 14, 1978, in all of the conterminous United States with the exception of Minnesota, Wisconsin, Michigan, Oregon, and Washington, where it was classified as threatened (U.S. Fish and Wildlife Service 1978). On July 12, 1995, the FWS reclassified the bald eagle from endangered to threatened throughout its range in the lower 48 states (U.S. Fish and Wildlife Service 1995). On July 6, 1999, the bald eagle was proposed for delisting (U.S. Fish and Wildlife Service 1999), and this proposal was made effective August 8, 2007, (72 *Federal Register* 37345-37372). While the bald eagle has been removed from the list of threatened and endangered species, it is still afforded special protections under the Bald Eagle Protection Act, the Migratory Bird Treaty Act and is a special status species for many states, tribes and agencies.

Table 3-8 Federal Threatened, Endangered, and Candidate Species Occur or Potentially Occur in the Project Area

Species	Federal Listing Status	Habitat	Critical Habitat
Interior least tern (*Sterna antillarum*)	May 28, 1985; Endangered (50 *Federal Register* 21784–21792)	Nests along midstream sandbars of the Missouri and Yellowstone Rivers.	None designated.
Whooping crane (*Grus Americana*)	March 11, 1967; Endangered (32 *Federal Register* 4001)	Migrates through west and central counties during the spring and fall. Prefers to roost on wetlands and stockdams with good visibility.	None designated.
Pallid sturgeon (*Scaphirhynchus albus*)	September 6, 1990; Endangered (55 *Federal Register* 36641–36647)	Known only to occur in the Missouri and Yellowstone Rivers.	None designated.

Species	Federal Listing Status	Habitat	Critical Habitat
Bald eagle (*Haliaeetus leucocephalus*)	February 14, 1978; Threatened (43 *Federal Register* 6233) Delisted August 8, 2007 (42 *Federal Register* 37346-37372)	Migrates spring and fall statewide, but primarily along the major river courses.	None designated.
Piping plover (*Charadrius melodus*)	December 11, 1985; Threatened (*Federal Register* 50726–50734)	Nests on midstream sandbars of the Missouri and Yellowstone Rivers and along shorelines of saline wetlands.	September 11, 2002 (67 *Federal Register* 57637 – 57717) Critical habitat includes prairie alkali wetlands and surrounding shoreline, including 200 feet (61 meters) of uplands above the high water mark; river channels and associated sandbars, and islands; reservoirs and their sparsely vegetated shorelines, peninsulas, and islands; and inland lakes and their sparsely vegetated shorelines and peninsulas.
Gray wolf (*Canis lupus*)	Threatened	Occasional visitor in North Dakota and is most frequently observed in the Turtle Mountains area.	None designated.
Dakota skipper (*Hesperia dacotae*)	Candidate	Found in native mixed-grass prairie containing a high diversity of wildflowers and grasses. Primary habitat includes two prairie types: 1) low (wet) prairie dominated by bluestem grasses, wood lily, harebell, and smooth camas; 2) upland (dry) prairie on ridges and hillsides dominated by bluestem grasses, needlegrasses, pale purple and upright coneflowers and blanketflower.	None designated

Source: Towner, 2003.

Bald eagles occur throughout North America from Alaska to Newfoundland and from the southern tip of Florida to southern California. The bald eagle is a bird of aquatic ecosystems. It frequents estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats.

Bald eagles usually nest in trees near water, but are known to nest on cliffs and (rarely) on the ground. Nest sites are usually in large trees near shorelines in relatively remote areas that are free of disturbance. The trees must be sturdy and open to support a nest that is often 5 feet wide and 3 feet deep. Adults tend to use the same breeding areas year after year and often use the same nest, though a breeding area may include one or more alternate nests.

In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and offer good perch trees and night roosts. Bald eagles tend to nest and roost away from residential development and human activity.

Fish and waterfowl are the primary sources of food where eagles occur along rivers and lakes. Big game and livestock carrion, as well as larger rodents (for example, prairie dogs) can also be important dietary components where these resources are available (Ehrlich et al. 1988).

Feeding areas, diurnal perches, and night roosts are fundamental elements of bald eagle winter habitats. Although eagles can fly as far as 15 miles (24 kilometers) to and from these elements, they primarily occur where all three elements are available in comparatively close proximity (Swisher 1964). The availability of food is probably the single most important factor in the winter distribution and abundance of the eagle (Steenhof 1978). The population of the bald eagles within the region is expected to increase during the winter, when migrating individuals and winter residents use roosts sites and suitable foraging areas. Winter roost sites are typically associated with large cottonwood galleries located near areas of open water along the Missouri River.

This species is becoming a more common breeding resident in North Dakota, using mixed coniferous and mature cottonwood riparian areas near large lakes or rivers as nesting habitat (Collins 2004). The bald eagle is a documented breeder and winter resident along the Missouri River, primarily between Garrison and Bismarck (Collins 2004). Nesting bald eagles are fairly common along the Missouri River between Bismarck and Garrison, as nine to ten pairs are known to nest along this stretch of river (Collins 2004). Depending on the amount of open water and availability of prey, the winter population along the Missouri River has varied between two and 60 individuals (Collins 2004).

The occurrence of winter roosts or nests in the project area has not been documented (Collins 2004). Data from the Breeding Bird Survey Trend Analysis indicate a non-significant trend for populations of this species in North Dakota during the period between 1966 and 2003 (Sauer et al. 2004). However, the trend for the United States during the same period is highly significant and positive.

3.7.6.3 Pallid Sturgeon

The pallid sturgeon was listed as endangered on September 6, 1990. Historically, the sturgeon was found in the Missouri River from Fort Benton, Montana, to St. Louis, Missouri; in the Mississippi River from above St. Louis to the Gulf of Mexico; and in the lower reaches of other large tributaries, such as the Yellowstone, Platte, Kansas, Ohio, Arkansas, Red, and Sunflower Rivers; and in the first 60 miles of the Atchafalaya River (U.S. Fish and Wildlife Service 2004). Dams on the Missouri River now fragment populations of the sturgeon.

Preferred habitat includes large rivers with high turbidity and a natural flow. The pallid sturgeon occurs in strong current over firm gravel or sandy substrate (U.S. Fish and Wildlife Service 1989). It feeds opportunistically on aquatic insects, crustaceans, mollusks, annelids, eggs of other fish, and sometimes other fish (U.S. Fish and Wildlife Service 1989).

Potential pallid sturgeon habitat occurs in the Yellowstone and Missouri Rivers in North Dakota (U.S. Fish and Wildlife Service 2004). However, the project site does not contain suitable habitat or occurrences of the pallid sturgeon.

3.7.6.4 Piping Plover

Piping plovers are known to breed in the Great Plains and Great Lakes region, and along the Atlantic Coast (Newfoundland to North Carolina). They winter on the Atlantic and Gulf of Mexico Coasts from North Carolina to Mexico and in the Bahamas (U.S. Fish and Wildlife Service 2004). In the Great Plains, it appears that the piping plover formerly was more widely distributed than it is today. Historically, breeding piping plovers occurred in at least 28 North Dakota counties. Plovers were observed in 20 counties during the 1990s (U.S. Fish and Wildlife Service 2004).

Piping plovers historically nest on prairie alkali lakes and along the Missouri River, Yellowstone, and Niobrara Rivers in North Dakota, South Dakota, and Nebraska (U.S. Fish and Wildlife

Service 2004). Piping plover breeding habitat is composed of open, sparsely vegetated areas with alkali or unconsolidated substrate. In north-central North America, piping plovers nest on alkali wetlands, gravel shorelines, and river sandbars in the Great Plains. Several studies have suggested that beach width may affect habitat use by piping plovers breeding on inland lakes. Recorded minimum nest-to-water distances have ranged from 10 to 40 meters at various studies sites in the Great Plains. In addition, the amount and distribution of beach vegetation affects piping plover habitat selection and reproductive success. Substrate composition may also affect habitat selection by piping plovers and influence nest success.

Piping plovers nesting on the Missouri, Platte, Niobrara, Yellowstone, and other rivers use reservoir beaches and large, dry, barren sandbars in wide, open channel beds. Vegetative cover on nesting islands is usually less than 25 percent (U.S. Fish and Wildlife Service 2004).

Open, wet, sandy areas provide feeding habitat for plovers on river systems and throughout most of the birds' nesting range. Piping plovers feed primarily on exposed substrates by pecking for invertebrates at or just below the surface (U.S. Fish and Wildlife Service 2004). The plover's diet consists of worms, fly larvae, beetles, crustaceans, mollusks, and other invertebrates. Breeding territories of piping plovers generally include a feeding area such as a pond, slough, or lakeshore (U.S. Fish and Wildlife Service 2004).

FWS designated critical habitat for the Great Plains breeding population of piping plovers on September 11, 2002. North Dakota, Nebraska, and South Dakota contain critical habitat for the piping plover. Habitat included in the federal designation includes midstream sandbars of the Missouri and Yellowstone Rivers and along shorelines of saline wetlands (U.S. Fish and Wildlife Service 2004). North Dakota is the most important State in the U.S. Great Plains for nesting piping plovers. The State's population of piping plovers was 496 breeding pairs in 1991 and 399 breeding pairs in 1996 (U.S. Fish and Wildlife Service 2004). Several areas of designated piping plover critical habitat are located within a 7-mile radius of the project site. The closest area of critical habitat (Section 9, T. 152N., R 87W., Ward County) is approximately 3 miles northeast of the project site.

3.7.6.5 Interior Least Tern

The interior least tern nests along the major tributaries throughout the interior U.S. from Montana to Texas and New Mexico to Louisiana (U.S. Fish and Wildlife Service 2004). In North Dakota, interior least terns occur throughout the Yellowstone and Missouri River drainages.

The interior least tern has distinct breeding and wintering areas. Most breeding occurs on the interior rivers. The occurrence of breeding interior least terns is localized and is highly dependent on the presence of dry, exposed sandbars, and favorable river flows that support a forage fish supply and that isolate the sandbars from the riverbanks. Characteristic riverine nesting sites are dry, flat, sparsely vegetated sand and gravel bars within a wide, unobstructed, water-filled river channel. The population is thought to winter on beaches along the Central American coast and along the northern coast of South America from Venezuela to northeastern Brazil.

The interior least tern population was estimated at about 7,000 individuals around 1990 (U.S. Fish and Wildlife Service 2004). In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea. Approximately 100 pairs breed in North Dakota (U.S. Fish and Wildlife Service 2004).

3.7.6.6 Gray Wolf

On March 9, 1978, gray wolves were listed as endangered in the lower 48 states and threatened in Minnesota (U.S. Fish and Wildlife Service 2004). The Great Lakes population of gray wolves has been downlisted to a threatened status. In North America, gray wolves once ranged from coast to coast and from Canada to Mexico (U.S. Fish and Wildlife Service 2004). Today, the gray wolf is extirpated from the lower 48 states with the exceptions of Minnesota, Wisconsin, Michigan, Montana, Idaho, Washington, and an experimental population in Wyoming.

Historically, the gray wolf occupied almost all habitats in North America, including the Great Plains. In modern times, the gray wolf has been restricted to habitats with low densities of roads and people. Habitat for the gray wolf in North Dakota includes the forested areas in north central and northeast North Dakota. However, they may appear anywhere throughout the State (U.S. Fish and Wildlife Service 2004).

Gray wolves are a territorial, pack species that will keep other gray wolves and coyotes out of their 50- to 100-square-mile home range. Indirectly, wolves support a wide variety of other animals. Ravens, foxes, wolverines, vultures, and bears will feed on the remains of animals killed by wolves. Wolf prey includes antelope, elk, and mountain goats (U.S. Fish and Wildlife Service 2004).

The gray wolf is an occasional visitor in North Dakota and has been most frequently observed in the Turtle Mountains area, which is in north-central North Dakota along the Canadian border. The gray wolf has also been observed in McKenzie and Williams Counties (U.S. Fish and Wildlife Service 2004). The high densities of roads and humans in the eastern portion of North Dakota suggest that the rate of human-caused wolf mortality will remain high. The western portion of the state provides low densities of roads and humans; however, the non-forested habitat throughout this region makes wolves highly vulnerable to humans. The presence of wolves in most of North Dakota will likely remain sporadic and will only consist of occasional dispersed animals from Minnesota and Manitoba (U.S. Fish and Wildlife Service 2004).

3.7.6.7 Dakota Skipper

The Dakota skipper likely occurred throughout a relatively unbroken area of grassland in the north-central United States and south-central Canada. Currently, populations of the butterfly are restricted to small patches of natural habitat where they form metapopulations. A metapopulation is a set of local populations within some larger area where dispersal from one local population to at least some other patches is possible. Extant metapopulations of Dakota skippers are found in high-quality native prairie tracts that contain a high diversity of wildflowers and grasses. Habitats include two prairie types: 1) low (wet) prairie dominated by bluestem grasses, wood lily, harebell, and smooth camas; and 2) upland (dry) prairie dominated by bluestem grasses, needlegrass, coneflowers (*Echinacea spp.*), and blanket flower (*Gaillardia spp.*).

Nectar provides the Dakota skipper with both water and food and is crucial for the survival of both sexes during the flight period. Dakota skippers appear to prefer plants, such as purple coneflowers, whose nectar cannot be obtained by insects without a relatively long, slender feeding tube (proboscis). In the absence of preferred plant species, Dakota skippers attempt to obtain sufficient nectar from less preferred plants. Its current distribution straddles the border between tall-grass prairie ecoregions to the east and mixed-grass prairie ecoregions to the west.

In North Dakota, metapopulations exist in the north-central and southeastern regions. Specifically, Dakota skippers have been reported from 43 sites in 17 North Dakota counties, of which at least 11 sites and three county records have been extirpated since the 1980s and early 1990s. Of the 32 extant or possibly extant sites in North Dakota, 17 occur within two complexes: Towner–Karlsruhe in McHenry County (13 sites) and Sheyenne Grasslands in Ransom and Richland Counties. The other 15 sites presumed extant are isolated from other sites. Land ownership of extant sites is largely private (19 sites); North Dakota Department of Lands owns five sites, FWS, U.S. Forest Service, and The Nature Conservancy each own two sites, and the state highway department owns one site. The extant metapopulation closest to the project site is the Eagle Nest Butte population in McKenzie County, which is more than 50 miles southwest of the project area. This population occurs on the very western edge of the Dakota skipper range, but it may be too small and isolated to be secure (Cochrane and Delphey 2002).

3.7.7 Sensitive Communities

Sensitive habitats/communities are those that are considered rare in the region, support sensitive species of plants and animals, and/or which are subject to regulatory protection through various federal, state, or local policies or regulations. In the case of sensitive habitats within the region, The Nature Conservancy, in a preliminary survey, identified rare plant assemblages across the Great Plains (Ostlie et al. 1997). Of the 633 assemblages in the Great Plains, 107 (17 percent) are considered rare (Ostlie et al. 1997). Great Plains forest assemblages include 16 rare assemblages that are largely cottonwood and oak floodplain forests on the eastern and western edges of the plains (Ostlie et al. 1997). Nineteen rare shrub land assemblages include many sagebrush, hawthorn, and willow species, and 13 rare grassland assemblages occur in the mixed-grass prairie.

3.8 Cultural Resources

3.8.1 Cultural Context

When European fur traders first entered what is now North Dakota, the area was occupied by several distinct Indian groups that were already involved at varying levels in the fur trade. The groups represented two adaptations to the plains environment. The Mandan, Hidatsa, and Arikara lived in relatively permanent earthlodge villages near the Missouri River. These groups maintained extensive gardens and hunted individually or in small groups. Some of their larger villages were already hubs in the fur trade, and European traders adopted a few of those locations.

In contrast, the Dakota, Lakota, Assiniboine, and Cheyenne were nomadic groups that focused on bison products for international trade and subsistence. When the horse became available in some numbers in the early 1800s, these nomadic groups quickly adapted this animal as a symbol of wealth and as an advantage in warfare and hunting. They also developed or expanded a pattern of raiding their trading competitors who had settled in villages.

All of the Native groups, settled or nomadic, focused their productive efforts on accumulating meat and hides of bison and other animals to trade for valued and exotic European trade goods. Emerging industries, in turn, depended on bison hides for belts and whale oil for lubrication.

3.8.2 Prehistoric Context

The project area is within the Middle Missouri subarea of the Plains culture area. Evidence of Native American occupation of North Dakota can be traced back to the withdrawal of the last major ice advance of the Pleistocene about 12,000 years ago. The chronology of the Middle Missouri subarea is divided into four cultural periods: Paleoindian (11, 500 to 8,000 years ago);

Archaic (8,000 to 2,000 years ago); Woodland (2,000 to 1,000 years ago); and Plains Village (1,000 to 100 years ago).

Prehistoric cultural resources are scarce in pothole till plains areas like the present project area. Furthermore, these settings have little Holocene deposition that might contain buried cultural materials, and most have been cultivated.

Interaction between the Native tribes and European traders in the fur trade had been mostly peaceful. Armed skirmishes and raids involving trade goods and trading rights were often between tribes or between European trading groups. But conflicts increased as Euroamerican settlement moved west, emigrant wagon trains began leaving larger corridors of devegetation across the landscape, and the American government began seeking a route for a Pacific railroad. In the 1850s, increasing large emigrant wagon trains and military outposts disrupted the bison herds that the tribes had come to depend on for trade. By the 1860s, armed conflicts were increasingly breaking out, and Euroamericans began to settle in the plains in ever-increasing numbers, not just passing through to the west coast.

The Fort Berthold Indian Reservation was established early in this process under the Fort Laramie Treaty of 1851. However, the reservation boundaries have changed several times since then. First, a large tract was conveyed to the U.S. Government for roads, highways, and telegraphs pursuant to the Fort Berthold Agreement of July 27, 1866. Later, President Ulysses S. Grant established a far smaller reservation by Executive Order of April 12, 1870. Further, pursuant to the Agreement of December 14, 1886, a large tract was removed from the Reservation in exchange for an annual payment of $80,000.00 for ten years and individual allotments. Congress ratified this 1886 Agreement by the Act of March 3, 1891. Finally, in 1949, the federal government took 156,000 acres of prime bottomland for the Garrison Dam and Reservoir Project to create the reservoir known as Lake Sakakawea. In addition to flooding traditional communities and prime agricultural land, the reservoir divided the reservation. Lake Sakakawea can only be crossed at the Four Bears Bridges west of New Town on State Highway 23 and about 60 miles east-southeast along the Garrison Dam in Pick City on State Highway 200.

3.8.3 Historic Context

Sustained Euroamerican settlement in North Dakota began with the organization of the Dakota Territory in 1861 and accelerated with the completion of the Northern Pacific Railway to the Missouri River in 1872. Stimulated by the Homestead Act of 1862 and an operational railroad to eastern markets, farming expanded in North Dakota. Additional railroads entered the state in the late 1870s and the 1880s, and there were additional booms in settlement. Many of these waves of immigrants were distinctive ethnic groups, including many of Scandinavian or Germanic origin. North Dakota was predominantly a farm-market economy.

The Allotment Act of 1888 allotted homestead-like lots of Indian land to Indian families. After the allotments to Indian families lands deemed excess were opened to non-Indians. Over the years, interactions between the Allotment Act and the various Homestead Acts and some other actions have reduced individual and tribal holdings on the reservation leaving much of the area east of the Missouri River fee status land. The project site and large portions of the project area are fee status lands instead of lands held in trust by the U.S. government for individual Indians or Indian Tribes.

The Minneapolis, St. Paul, and Sault Ste. Marie Railway (MStP&SSM) was known by the trade name Soo Line Railway. The main line of the Soo Line was completed from Fairmont, in the southeast corner of North Dakota, to Portal on the Canadian border in 1893. The line west to

Wishek and northwest to Garrison was completed around 1900. The branch line from Max to Plaza, which crosses through the property, was built in 1910. Makoti was established along the Soo Line, now the C.P.R., in 1911.

From 1905 through 1911, many land parcels in the area of the branch line were obtained as cash entry homesteads, anticipating the benefits of a railroad line. There was another brief peak in cash entries in 1914, after the line was completed to Plaza. After construction of the railroad began from Max, between 1910 and 1920, there were a few conventional homestead entries each year in the project area. At the project site, the northwest quarter of Section 20 and the northeast quarter of Section 19 were obtained by cash entries in 1914. The northwest quarter of Section 19 was patented in 1918, under the original Homestead Act of 1862.

Much of the rural settlement and development of agriculture took place in this area after the construction of the railroad to Plaza. In addition, the years between 1905 and 1920 represented a comparatively moist period on the northern plains, and many immigrants were seeking new starts in life by entering the agricultural market. The droughts and economic depression of the 1920s and 1930s devastated the state's economy. Many banks closed and farms failed. Surviving farms had to expand in size and mechanize their operations.

The location of the project area near Makoti and Plaza provided access to major agricultural markets by way of the railroad. On the project site, the northeast quarter of Section 19 is higher and better drained than the quarter sections to the east and west. Farm buildings with a windbreak of trees to the northwest are still present on this parcel. It is likely that this farm complex, some outlying farming-related features, and, possibly, some remains of failed homesteads will constitute the bulk of cultural resources on the project site.

Along the pipeline and power line corridors, most of the farm complexes and windbreaks visible on topographic maps or aerial photographs are located 1,000 feet or more from the proposed corridors. However, there is one complex along the pipeline corridor and three along the eastern power line corridor that are much closer to the project. These areas are likely to have historical resources similar to the project site. The farm complex along the pipeline corridor (T152N, R88W, Section 11) is within a parcel adjacent to the railroad that was homesteaded by cash entry in 1914. The three along the power line (T152N, R87W, Sections 13, 14, and 15) were all cash entries in 1905, 1906, and 1907. These locations along highway 23 have good access to the railroad at Makoti. The area of T152N, R86W crossed by the power line corridor has many more pothole ponds and lakes than the rest of the project area and is not likely to have prehistoric or historic cultural resources because of the presence of water.

The small towns along the Soo Line north of Garrison and west of Drake owe their existence to the branch line to Plaza. In the 1950s, an additional branch line was built from the west end of the project area at Prairie Junction, west to Parshall and New Town. With the expansion of railroads and settlement, North Dakota's coal reserves also became important for in-state consumption and eventually for large-scale export. In more recent years, oil and gas development has also become a major element of the North Dakota economy.

3.8.4 National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires that federal agencies take into account the effects of a federal undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. According to Section 301 of the act, "undertaking" means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including (a) those carried out by or on behalf of the agency, (b) those carried out with federal financial assistance, (c) those requiring a federal permit license, or approval, and (d) those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency. Section 106 compliance also applies to non-federal lands when federal funding, licensing, permitting, and approval are required.

A records search for the project site was completed through the North Dakota State Historical Society. The records search indicated that no cultural resource investigations and no known sites are on file for the project area. A search of the land patent records of the General Land Office for the project area yielded 71 patent entries filed between 1905 and 1920. Fifty of these 71 patent entries were cash entries.

The project area is in an area of upland glacial till dotted with ponds and pothole lakes. The soils of the area are dominated by Williams series loams with local pockets of Bowbells, Parnell, Tonka, and Zahl-Max series loams (Howey et al. 1974: map 127). Williams series loams form on areas of deep, level to undulating glacial loam. The other soil series form in poorly to moderately well drained swales, basins and depressions in the till plain, including drainage ways and potholes. These soils are generally good for cultivation, but support a comparatively low diversity of natural resources. These conditions would generally correspond to a low potential for prehistoric cultural resources.

Unrecorded historic resources on the project site are the historic Soo Line Railway, a farm complex in Section 19, and, possibly, the remains of two failed farms. In the larger project area, there are also at least four farm complexes close to the pipeline and power line corridors. Additional rural agrarian resources may also be present. The potential for prehistoric resources in the project area is low.

3.9 Land Use

3.9.1 Project Area

Land uses within the project area include agriculture, transportation facilities, and rural residential. Agriculture in Mountrail and Ward Counties consists of field crops, such as barley, wheat, and corn (Souris Basin Planning Council 2002). Barley accounts for the majority of crops produced in the project area.

Six residences occur within 1 mile of the project site. All of these are isolated rural residences that are part of the agricultural operations surrounding the project site. Table 3–9 shows the distance and direction of each residence from the boundary of the project site.

Table 3-9 Residences within 1 Mile of Project Site Boundary

Number of Residences	Distance (miles)	Direction
1	0.42	E-NE
1	0.57	S
1	0.60	N
2	0.91	E-SE
1	0.98	W

Transportation facilities include a network of interstate and state highways and county roads. These facilities are discussed in more detail in the Transportation section. The proposed pipeline corridor would be located along the short line C.P.R. to the intersection of 62nd Avenue. The corridor is located along 62nd Avenue north of the railroad. The short line connects to the main line northeast of the project site, and provides freight stops at grain elevators in Parshall and New Town. 62nd Avenue north of the short line is a gravel-surfaced county road (North Dakota Geographic Information Systems 2004). Cropland is the dominant land use along the road ROW.

The proposed power line corridor is located along highway 23 and 59th Avenue, which is a gravel-surface county road. Cropland is the dominant land use along the road rights-of-way.

3.9.2 Project Site

Land uses within the project site include agriculture, transportation facilities, and rural residential. The project site has been used for barley and forage production. Secondary uses of the site are transportation and rural residential. A branch line of the C.P.R. crosses the project site. A single residence and outbuildings used in farming operations are located within the project site. Some hunting may occur on the project site or in the general area during the fall months.

According to the 2002 agricultural statistics for Ward County, each acre planted in barley yields and average of 59.1 bushels. An estimated 400 acres of the project site are planted with malt barley, which would have a potential yield of 23,600 bushels (North Dakota Agricultural Statistics Service 2002). As of January 16, 2003, the average price for malt-barley grown in North Dakota was $2.10 per bushel. At this price, barley grown on the project site would sell for an estimated $49,500.

3.10 Transportation

The analysis area for transportation includes roads and railroads in the transportation system that may serve as primary or alternative transportation routes for the construction and operation of the proposed refinery. The regional transportation system that serves the project area includes an established network of interstate and state highways and county roads. These roads provide access to U.S. Highway 83 (U.S. 83) and Interstate 94 (I–94), which are key routes for hauling freight and they connect communities in North Dakota with regional economic centers in the United States and Canada.

Roads that provide access to the project site and to U.S. 83 and I–94 include U.S. 85, highway 23, and highway 200. The project site is bounded on the north by highway 23, which would be the primary access route for the site. highway 23 connects the site with U.S 83 to the east. U.S. 83 is the primary north-south transportation route in central North Dakota and connects with Minot to the north, and I–94 and Bismarck to the south. Highway 23 also connects with highway 22, which provides an alternate connection with I–94 to the south. Highway 22 north of the town of Killdeer to the McKenzie County line is the Killdeer Scenic Byway and provides scenic views of the Killdeer Mountains and the Little Missouri River breaks.

The North Dakota Department of Transportation (NDDOT) measures annual average daily traffic (AADT) on federal and state highways in North Dakota. Not surprisingly, U.S. 83 has the highest AADT for roads in the project area (Table 3–10). The relatively high AADT on highway 200 at Hazen is a result of traffic associated with the coal mines and other facilities present around Hazen.

Table 3-10 Highway Access, Annual Average Daily Traffic, 2003

Highway Segment	AADT	Commercial Truck Traffic (# of vehicles)
U.S. 83 north of junction with highway 23	4,400	700
U.S. 83 north of junction with highway 200	2,900	470
U.S. 85 south of Watford City (highway 23)	2,250	525
Highway 23 between Makoti and highway 37	1,550	180
Highway 23 at intersection with U.S. 83	1,175	160
Highway 22 north of Killdeer (and highway 200)	1,000	95
Highway 200 at Killdeer	500	75
Highway 200 at Hazen	3,400	300
Highway 200A at intersection with U.S.83	1,110	190

Source: North Dakota Department of Transportation 2003

Lake Sakakawea bisects the Reservation, which limits the north-south flow of traffic between these portions of the Reservation. The only crossing of Lake Sakakawea on the Reservation is the Four Bears Bridge (highway 23), which is west of New Town in the northwest corner of the Reservation. The southern crossing is almost 100 miles south east along the Garrison Dam on highway 200. North south travel on the west side of the Reservation is primarily along highway 22. North south travel on the east side of Lake Sakakawea is along U.S. 83.

In 2003, the NDDOT began replacing the Four Bears Bridge, which was built in 1955. The new Four Bears Bridge was constructed 100 feet north of the old bridge and was scheduled completed in 2005. Following completion of the new bridge, NDDOT demolished the old bridge. The new bridge is designed to accommodate more traffic than the old bridge, and it has two 12-foot-wide driving lanes with 8-foot-wide shoulders and a 10-foot-wide walkway. The new bridge replaces the old 20-foot-wide roadway that had a vertical clearance at the portals of 15 feet, 7 inches.

NDDOT has developed restrictions for loads and sizes of vehicles for state highways. General restrictions for width, height, length, weight, and loads are shown on Table 3-11. These restrictions apply to all vehicles on state highways unless otherwise stated.

Table 3-11 North Dakota General Vehicular Size and Load Restrictions

Parameter	Restrictions
Width	Total outside width of vehicle may not exceed 8 feet, 6 inches.
	Loads may not extend beyond fender lines on the left side of the vehicle or more than 12 inches beyond the right fender lines.
Height	Maximum height for vehicles is 14 feet.
Length	A single-unit vehicle may not exceed 60 feet in length.
	A towed vehicle may not exceed a length of 60 feet.
	A three- or four-unit combination may not exceed 75 feet in length.
	Equipment designed to move buildings is exempt from length restrictions.
Weight	Single axle – maximum load of 20,000 lbs. or a wheel load of 10,000 lbs.
	Tandem axle – maximum load of 19,000 lbs. per axle but gross weight of a tandem grouping may not exceed 34,000 lbs. or 48,000 lbs. on a grouping of three or more axles.
	Maximum gross weight on state highways is 105,000 lbs., unless posted for less.
	Maximum gross weight on interstate highways is 80,000 lbs. without a permit.
	The wheel load may not exceed 550 pounds per inch of tire width. Wheel load must not exceed one-half.
	Vehicles may not be operated in excess of the registered gross weight. The minimum gross weight for which a vehicle can be registered is double the unloaded weight of the vehicle.
Load[1]	In daylight hours, tie a 12-inch-square red cloth to the end of the load.
	At night or in times of poor visibility, attach a red light on the end of the load. The light must be visible for 600 feet.
	No load may extend beyond the fender lines on the left side of vehicle, or more than 12 inches beyond right fender lines.

Note:
1. Requirements are for loads projecting 4 or more feet beyond rear of the vehicle.

Table 3-12 summarizes load restrictions for specific state highways that are in the transportation project area. Loads that exceed the North Dakota size and load restrictions require special transit permits. Restrictions on oversized loads include limiting travel on highways to certain times and requiring the use of special equipment, such as “wide load” signs, flashing lights, and flags. Pilot vehicles or police escorts may be required for some oversized loads.

A branch line of the C.P.R. crosses the project site. The line through the project site connects freight stops at grain elevators in local communities, including New Town, Parshall, Plaza, and Makoti, to C.P.R.’s main line at a point near Velva, which is east of the project area and U.S. 83. C.P.R. transports freight in Canada and the Midwestern United States and the lines in North Dakota provide transportation to Minneapolis to the southeast and Canada to the north. The only shipper on the line is the Plaza-Makoti Equity Elevator, located at Plaza. The elevator annually ships 500 to 800 carloads of grain via C.P.R. on an as-needed basis. (Surface Transportation Board 1997)

Table 3-12 Load Restrictions for Highways in the Project Area

Highway	Load weight restricted by:	Load restriction on gross weight			
				Three axles or more on divisible loads	
		Single axle not to exceed (lbs/axle)	Tandem axles not to exceed (lbs/axle)	Individual axles not to exceed (lbs/axle)	Axle group not to exceed (lbs)
U.S. 83	Legal weight	20,000	17,000	17,000	48,000
U.S. 85	Legal weight	20,000	17,000	17,000	48,000
Highway 23	Class A load restriction	18,000	16,000	14,000	42,000
Highway 22	No. 1 Load restriction	15,000	15,000	12,000	36,000
Highway 200	Class A load restriction	18,000	16,000	14,000	42,000
Highway 200A	No. 1 Load restriction	15,000	15,000	12,000	36,000

3.11 Aesthetics

The affected viewshed for the visual resource assessment is the refinery site and the surrounding area that is within a 6-mile radius of the site. This area includes most if not all of the potential viewing areas from which the proposed refinery may be visible. Communities included in the viewshed are Makoti and Plaza. Makoti is 2 miles southeast of the project site's boundary and Plaza is slightly more than 5 miles northwest of the project site.

No unique lands, unique vistas, or other special areas that require protection of scenic resources occur at or near the project site. The site does not occupy public lands that are managed for visual resources. The project site and the surrounding area east consist of flat to gently rolling, glaciated, hummocky landscape. Topographic relief is generally less than 25 feet.

Typical views are expansive panoramas that are irregularly interrupted by vegetation, topography, or man-made structures. The dominant vegetation types in the wetland areas that are not cultivated are grasses and forbs. Predominant vegetation colors in early spring are green and gray green, changing to buff/ochre as grasses and forbs cure in the summer and fall. Trees and shrubs are sparse, located intermittently along drainages and wetland areas.

The affected viewshed has been highly modified by agricultural and other human activities, and is characterized by a rural/agricultural landscape setting. Existing visual modification to the natural setting of the affected viewshed consists of agriculture, transportation facilities, utilities, oil development, and rural residential uses. The quality of the landscape is low because of the lack of variety and contrast in landform, vegetation, and interesting features, and because the characteristic rural/agricultural setting is common throughout the affected viewshed and the surrounding alluvial plain. The sensitivity level, which is a measure of public concern for quality, is low because of the small number of people that would view the refinery site and because there are no significant scenic resources near the refinery site. The nearest location that would provide views of the plant site to a significant number of people is more than two miles from the site.

Most of the land within the analysis area and in the general region is cropland planted with barley, wheat, and other dryland crops. Other agricultural modifications include grain silos and other farm structures.

Transportation facilities in the analysis area consist of paved highways, unpaved local roads, and a railroad. The refinery site is bound on the north side by highway 23. Other roads in the analysis area are unpaved BIA or county roads. The C.P.R. crosses through the project site.

Isolated rural residences are scattered throughout the analysis area at an approximate density of one to two residences per 640-acre section. These residences are generally associated with other agricultural structures. The Town of Makoti is located about 2.5 miles southeast of the project site along the C.P.R. corridor.

Oil wells are located primarily in the northwest quadrant of the analysis area. Some of the wells are abandoned.

Sensitive viewpoints consist of locations from which a significant number of people who have a concern for scenic resources will view a landscape, or will be exposed to project activities. Sensitive viewpoints are generally located on transportation routes, residential areas, and recreational use areas. There are recreational or other special management areas that provide views of the refinery site.

The primary views of the refinery site would be from Highway 23, surrounding local roads, and rural residences. The project site is within the foreground to middleground views of motorists traveling east or west on Highway 23. Foreground views are within 0 to 0.5 miles between the viewer and the site. Middleground views are between 0.5 to 5 miles from the viewer. The site is also within the viewshed of BIA and county roads within the analysis area.

The rural residence closest to the site is slightly less than 0.5 miles northeast of the site on the north side of highway 23. In addition, there is a residence about 0.5 miles south of the southeast property boundary. The project site is within foreground views of these two residences.

The site is within the middleground of views from several rural residences within the affected viewshed. Residences in the east and northeast parts of the Town of Makoti are also within the middleground distance zone of the viewshed.

At night, the affected viewshed is characterized by a low level of ambient lighting. The area is sparsely populated, so residential lighting is sparse. Existing nighttime lighting is from safety lighting at some transportation facilities. There is no ambient night lighting on the refinery site, with the exception of lights from residential and farm buildings at the east side of the project site.

The pipeline corridor is located along the C.P.R. short line and 62nd Avenue. The corridor is within the foreground views of motorists on 62nd Avenue and ten rural residences that are located within 0.5 mile of the corridor.

The proposed power line corridor is located along Highway 23 for about 8 miles east of the project site, and south along 59th Avenue for about 2 miles. Four residences and one commercial retail business are located within 0.5 mile of the corridor along Highway 23, and three residences are located along the corridor along 59th Avenue.

3.12 Air Quality

3.12.1 Climate

North Dakota’s location at the geographic center of North America results in a typical continental climate. Primarily because of location, the climate of the state is characterized by wide annual and day-to-day fluctuations in temperature; light to moderate precipitation, which tends to be irregular in time and coverage; low relative humidity; plentiful sunshine; and nearly continuous air movement (Jensen 1998).

The Rocky Mountains act as a barrier to the prevailing westerly flow of air in the atmosphere. This mountain barrier modifies the temperature and moisture characteristics of air masses originating over the Pacific Ocean when they flow over the mountains in ways that reinforce the continental characteristics of the climate (Jensen 1998). Conversely, there are no mountainous barriers to air mass originating in the polar areas to the north or the Gulf of Mexico to the south. Therefore, air masses originating in these regions easily overflow North Dakota, sometimes with only minor changes in the basic weather pattern.

North Dakota has varied weather in all seasons based on cold and dry air masses that originate in the polar regions; warm and moist air masses from tropical regions; or mild and dry air from the northern Pacific (Jensen 1998). The rapid progression of these air masses over North Dakota from the different source regions usually results in frequent and rapid changes of weather patterns.

3.12.1.1 Precipitation

In Ward and Mountrail Counties, the occurrence of precipitation varies seasonally. Most of the annual precipitation (70 percent) occurs during the May to September growing season (Table 3–13). The more limited precipitation that occurs during the rest of the year may fall as rain or snow. The 100-year, 24-hour storm event for the portion of North Dakota that encompasses the project site is about 5 inches (Hershfield 1961).

With the arrival of spring, the amount of precipitation begins to increase. Monthly precipitation amounts increase as spring wears on because the storm systems that traveled south of the state in winter tend to follow more northerly tracks during spring and summer. The first substantial rains of spring sometimes occur in late March, but usually occur in early April.

Both counties are usually quite warm in the summer, with frequent spells of hot weather and occasional cool days interspersed. Thunderstorms, which occur on about 34 calendar days per year, become more frequent (VanderBusch 1991). These thunderstorms deliver most of the total annual precipitation. Rainfall typically hits its peak in June (Table 3–13).

Table 3-13 Summary of Monthly Precipitation at the National Weather Service and North Dakota Agricultural Weather Network Meteorological Stations

	Precipitation by Station (inches)		
Period	**Plaza**	**Parshall**	**Ryder**
January	0.47	0.38	0.39
February	0.4	0.33	0.42
March	0.67	0.42	0.56
April	1.37	1.35	1.47
May	2.24	2.3	2.12
June	3.2	3.66	3.61
July	2.58	2.27	2.52
August	1.68	1.89	1.79
September	1.7	1.95	1.65
October	1.28	0.72	0.68
November	0.65	0.42	0.44
December	0.42	0.38	0.38
Annual (total)	16.66	16.06	16.04

Sources: High Plains Regional Climate Center 2004a, High Plains Regional Climate Center 2004b, North Dakota Agricultural Weather Network 2004

Precipitation decreases rapidly through the fall months and is minimal during the winter. Winter precipitation typically occurs as snowstorms and the occasional blizzard. The first significant snowfall of the season usually occurs during the middle or latter part of November. However, measurable amounts of snow (0.1 inch or more) may fall in September about once every 10 years. In this portion of North Dakota, the average seasonal snowfall is 40 inches (VanderBusch 1991). On average, 43 days of the calendar year have at least 1 inch of snow on the ground.

3.12.1.2 Temperature

Temperature data from the weather stations also show a seasonal pattern that is characteristic of a continental climate. Average temperatures peak during July and August (Table 3–14). In contrast, January is the coldest month. The difference between the average temperatures for January and July is more than 60°F (Table 3–14). The highest temperature ever recorded at the Parshall station was 107°F on August 7, 1949 and the lowest temperature recorded was -45°F on January 18, 1950.

Table 3-14 Summary of Monthly Temperatures at the National Weather Service and North Dakota Agricultural Weather Network Meteorological Stations

Month	Temperature by Station[1] (°F) Plaza	Parshall
January	9	5.3
February	17	12.7
March	28	24.3
April	42	40.8
May	55	53.6
June	64	62.9
July	69	68.6
August	68	67.3
September	57	56.2
October	44	45.3
November	26	27.3
December	14	13.4
Average	41	39.8

Notes:
1. Data from the Ryder Station were insufficient for inclusion in the tabular summary.
Sources: High Plains Climate Center 2004a and 2004b, North Dakota Agricultural Weather Network 2004

3.12.1.3 Wind Speed and Wind Direction

Figure 3-14 presents a wind rose that was generated from the 4 years of meteorological data described above for the Minot Airport which is about 30 miles from the project site. In this figure, each wind vector is apportioned by wind speed categories. Thus, the prevailing winds are from the west-northwest.

3.12.2 Clean Air Act Regulations and Permit Requirements

3.12.2.1 Criteria Pollutants – National Ambient Air Quality Standards (NAAQS)

EPA has established NAAQS for the “criteria pollutants”: ozone, nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), particles finer than 10 microns in size (PM_{10}), particles finer than 2.5 microns in size ($PM_{2.5}$) and airborne lead (Pb). These standards were developed to protect public health with an adequate margin of safety and to protect public welfare.

The CAA also directed EPA to develop regulatory programs aimed at reducing criteria pollutant emissions from stationary sources. EPA developed regulations that apply to both large and small sources of criteria pollutants.

Large Sources of Criteria Pollutants

Large sources of criteria pollutants are called "major sources." The term "major source" means any stationary source that has the potential to emit 100 tons per year or more of any criteria pollutant from specifically identified sources such as coal-fired power plants, refineries, and chemical plants and 250 tons per year or more for those sources not specifically listed by EPA.

Small Sources of Criteria Pollutants
Small sources of criteria pollutants are called "minor sources." The term "minor source" means any stationary source of criteria pollutants that is not considered a major source (see above). The proposed Clean Fuels Refinery would be classified as a new minor source.

EPA has developed requirements for specific categories of criteria pollutant emitting stationary sources at 40 CFR Part 60 of the EPA regulations. Approximately 100 different regulations have been developed for sources emitting criteria pollutants. These regulations apply to both major and minor sources.

3.12.2.2 Hazardous Air Pollutants

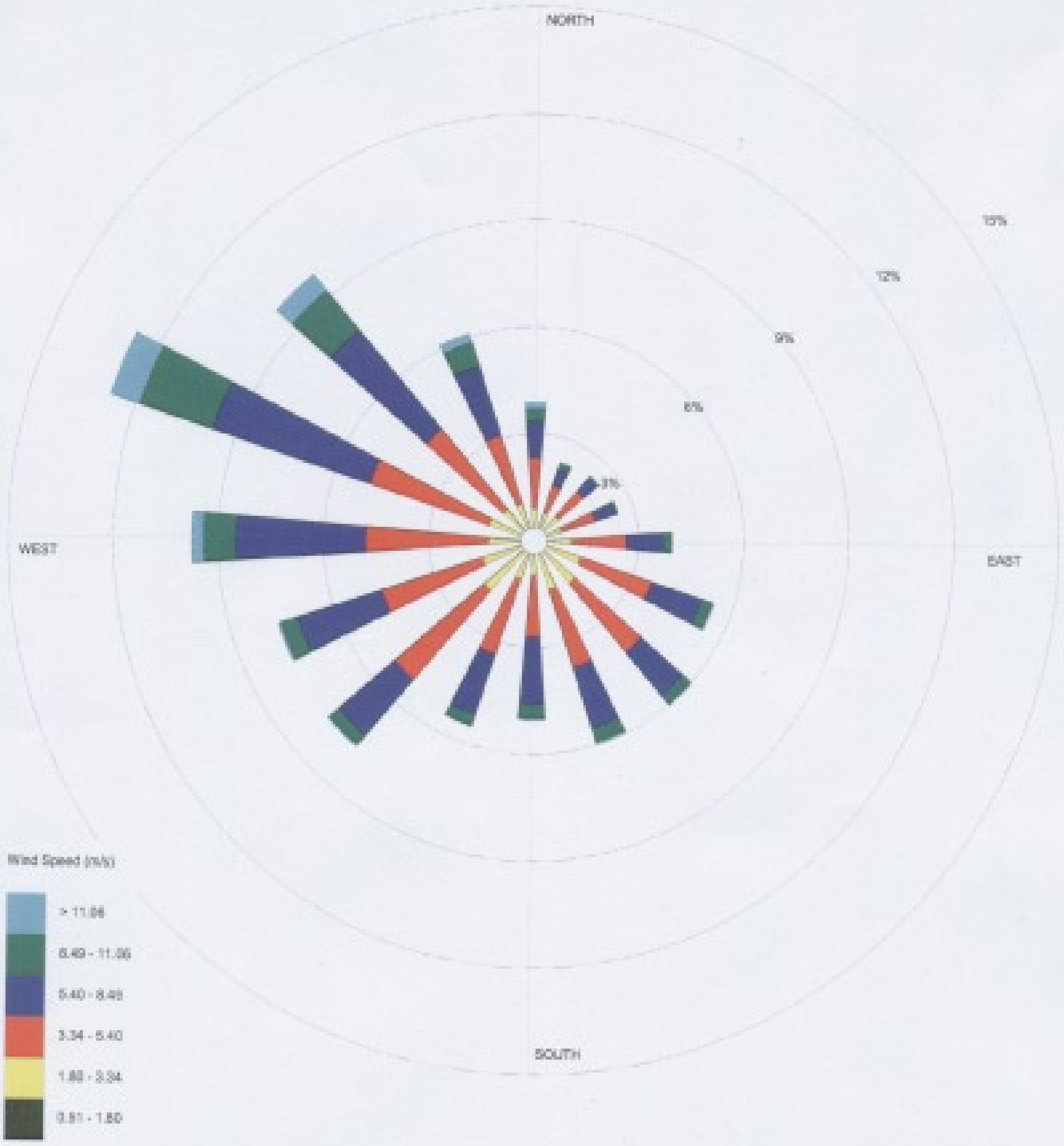
HAPs are regulated by EPA under authority of Title I, part A, Section 112 of the CAA. HAPs are those pollutants that are known to cause or are suspected of causing cancer, birth defects, reproduction problems, and other serious illnesses. Exposure to certain levels of some of these HAPs can cause difficulty in breathing, nausea or other illnesses. Exposure to certain HAPs can even cause death. The CAA identifies 189 individual HAPs and directs EPA to develop regulations to mitigate these HAPs. The list of HAPs can be found in the CAA at Section 112(b).

The majority of HAPs come from manmade sources, such as factory smokestack emissions and motor vehicle exhaust. HAPs are also released from industrial sources, such as chemical factories, refineries, and incinerators, and even from small industrial and commercial sources, such as gas stations, dry cleaners and printing shops. EPA has developed regulations for both large and small sources of HAPs, but has mainly focused its efforts on larger sources.

Large Sources of HAPs
Large sources of HAPs are called "major sources." The term "major source" means any stationary source that has the potential to emit 10 tons per year or more of any single HAP or 25 tons per year or more of all combined HAPs emitted from a stationary source.

Small Sources of HAPs
Small sources of HAPs are called "area sources." The term "area source" means any stationary source of HAPs that is not a considered a major source (see above). These are minor sources of HAPs, but are referred to as “area sources.” Based on the information submitted, the refinery is expected to be an "area source".

EPA has developed requirements for specific categories of HAP emitting stationary sources at 40 CFR Part 63 of the EPA regulations. Approximately 118 different types of sources have HAP regulations that apply to them and each one of those regulations may have requirements for both major and area sources of HAPs.



Station 24013 (Minot/FAA Airport, ND)		
Avg. Wind Speed	5.49	m/s
Percent Calm Winds	3.16	percent
Wind Direction	Blowing From	
Years: 1984, 1985, 1987, 1988		

MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 3-14

SURFACE WIND SPEED WIND ROSE

Date: 9/21/2004 File: min-rose.xls

3.12.2.3 Clean Air Act Permitting

There are three different types of permits that are issued to stationary sources of air pollution:

- Major source pre-construction permits (Major New Source Review (NSR) or more commonly called a PSD permit);
- Minor source pre-construction permits (Minor NSR); and
- Major source operating permits (Title V).

Major NSR or PSD Permitting
Major NSR permitting is required for proposed new or modified major sources of criteria pollutants before the source has been constructed. Both EPA and States have the authority to issue these permits. EPA issues these permits in Indian Country, which are not expected to apply to the refinery.

Minor NSR Permitting
Minor NSR permitting is required for proposed new or modified minor sources of criteria pollutants and new or modified area sources of HAPs before the source has been constructed. Minor NSR permitting can also be used by proposed major sources of criteria and HAP pollutants to create artificially minor sources.

States have minor NSR permitting programs and those programs vary considerably from state to state. However, there is no minor NSR permitting program for sources proposing to operate in Indian Country, although EPA has developed a program that has not yet become a final rule.

Title V Operating Permits
Title V permits apply emission limits, operational controls and practices, equipment requirements, reporting etc., to sources within the facility during day-to-day operations, after it has been built. The permitting agencies (State, Local, Tribal, and EPA) must issue Title V operating permits for all sources that emit 100 tons per year or more of criteria air pollutants, all major HAPs sources, and some smaller criteria and HAP sources as specified in regulation.

Emission limits and requirements to install air pollution control equipment are generally not created in Title V permits. Unlike NSR permits, Title V permits generally do not create new requirements. Basically, the Title V permits consolidate all the federally enforceable applicable requirements from the CAA for a particular facility. This makes it easier for facilities to comply with their air quality obligations, for agencies to track compliance, and for the public to review permits and monitoring data for specific facilities. The proposed refinery will need a Title V permit.

3.12.2.4 Criteria Pollutants and Ambient Air Quality Standards

The NAAQS and the State of North Dakota's ambient air quality standards are presented in Table 3–15. These are the regulatory limits that concentrations of pollutants must not exceed during the specific averaging period for an area to be considered in attainment for air quality.

Table 3-15 Summary of Regulatory Ambient Air Quality Concentrations ($\mu g/m^3$)[1]

Pollutant	Averaging Period[2,3]	NAAQS[4]	North Dakota AAQS[5]
NO_2	Annual	100	100
CO	1-Hour	40,000	40,000
	8-Hour	10,000	10,000
$PM_{2.5}$	24-Hour	35	
	Annual	15	
PM_{10}	24-Hour	150	150
SO_2	1-Hour		715
	3-Hour	1,300	
	24-Hour	365	260
	Annual	80	60
Ozone	1-Hour	235	235
	8-Hour	157	
Pb	Calendar Quarter	1.5	1.5
H_2S	1-Hour		280
	24-Hour		140

Notes:
1. $\mu g/m^3$ = micrograms per cubic meter
2. For 1-, and 8-, and 24-hour standards the modeled impacts are 1st highest short term values, except $PM_{2.5}$.
3. For the 24-hour $PM_{2.5}$ standard the modeled impacts are the 98th percentile value, per the standard requirements.
4. National Ambient Air Quality Standards (40 CFR 50).
5. AAQS = Ambient Air Quality Standards

Federal PSD requirements provide three area classifications that establish the amount of allowable air quality deterioration in areas where the air quality meets the NAAQS. Deterioration is determined by the increase of a pollutant's ambient concentration above a baseline concentration. This allowable increase is referred to as an "increment".

In practice, only two classifications are currently used throughout the U.S. – Class I areas and Class II areas. Class I areas are undeveloped public areas that include many of the National Parks and Wilderness Areas. Class II areas are all other PSD areas that are not Class I. As shown in Table 3–16, the CAA and PSD regulations have established much lower increments for Class I areas than for Class II areas

Table 3-16 Summary of PSD Increment Standards ($\mu g/m^3$)

Pollutant	Averaging Period	PSD Increments	
		Class I	Class II
NO_2	Annual	2.5	25
PM_{10}	24-Hour	8	30
SO_2	3-Hour	25	512
	24-Hour	5	91
	Annual	2	20

The general vicinity surrounding the project site is classified as Class II. Regional Class I areas include Lostwood Wilderness (LW) (58 kilometers north of the project site) and Theodore Roosevelt National Park (TRNP) (112 kilometers southwest of the project site).

Existing Ambient Air Quality

SO_2 and PM_{10} ambient air quality data have been collected at White Shield, North Dakota. This location is 25 miles (40 kilometers) south of the project site.

Figure 3-15 shows the location of the White Shield monitoring station relative to the project site as well as other major sources in North Dakota. Because White Shield is closer to most of the existing major sources than the proposed refinery would be, it can be assumed that these data are a conservative representation of the existing air quality at the project site. Table 3–17 and Table 3–18 present summaries of the data collected at this monitoring site.

Table 3-17 Summary of White Shield SO_2 Monitoring Data

	SO_2 Ambient Concentrations ($\mu g/m^3$)[1]		
Year	**3-Hour Maximum**	**24-Hour Maximum**	**Annual Average**
2006	42.6	16.0	3.7
2005	45.3	16.0	3.7
2004	66.6	24.0	4.0
2003	53.2	21.3	3.7
2002	53.2	16.0	3.5
2001	87.9	29.3	4.0
2000	61.2	31.9	4.3
1999	106.5	26.6	4.3
Maximum	**106.5**	**31.9**	**4.3**

Note: 1 ($\mu g/m^3$) = micrograms per cubic meter

Table 3-18 Summary of White Shield PM_{10} Monitoring Data

	PM_{10} Ambient Concentrations ($\mu g/m^3$) [1]
Year	**24-Hour Maximum**
2006	29
2005	16
2004	16
2003	33
2002	27
2001	37
2000	23
1999	19
Maximum	**37**

Note: 1 ($\mu g/m^3$) = micrograms per cubic meter

The nearest nitrogen dioxide (NO_2) and $PM_{2.5}$ monitoring sites are in Beulah, North Dakota, which is 47 miles (76 kilometers) south of the project site. Table 3–19 and Table 3-20 present summaries of the ambient concentration data collected at this monitoring site.

Table 3-19 Summary of Beulah $PM_{2.5}$ Monitoring Data

	$PM_{2.5}$ Ambient Concentrations ($\mu g/m^3$) [1]	
Year	**24-Hour 98th Percentile**	**Annual Arithmetic Mean**
2006	18.9	6.26
2005	18.5	5.58
2004	10.8	5.63
2003	24.5	7.24
2002	15.5	5.93
2001	16.1	5.86
2000	11.5	6.12
1999	20.9	6.91

Note: 1 ($\mu g/m^3$) = micrograms per cubic meter

Table 3-20 Summary of Beulah NO_2 Monitoring Data

Year	NO_2 Ambient Concentrations Annual Average ($\mu g/m^3$)
2006	5.0
2005	4.8
2004	5.7
2003	5.7
2002	6.5
2001	6.9
2000	7.1
1999	6.9
Maximum	**7.1**

Note: 1 ($\mu g/m^3$) = micrograms per cubic meter

Ambient concentration data for CO is presented in Table 3-21 for the monitoring site in Fargo, North Dakota.

Table 3-21 Summary of Fargo CO Monitoring Data

	CO Ambient Concentrations ($\mu g/m^3$) [1]	
Year	1-Hour Maximum	8-Hour Maximum
1994	8386	5474
1993	10,832	3727
1992	6290	3378
1991	6988	4309
1990	4193	2097
Maximum	**10,832**	**5474**

Note: 1 ($\mu g/m^3$) = micrograms per cubic meter

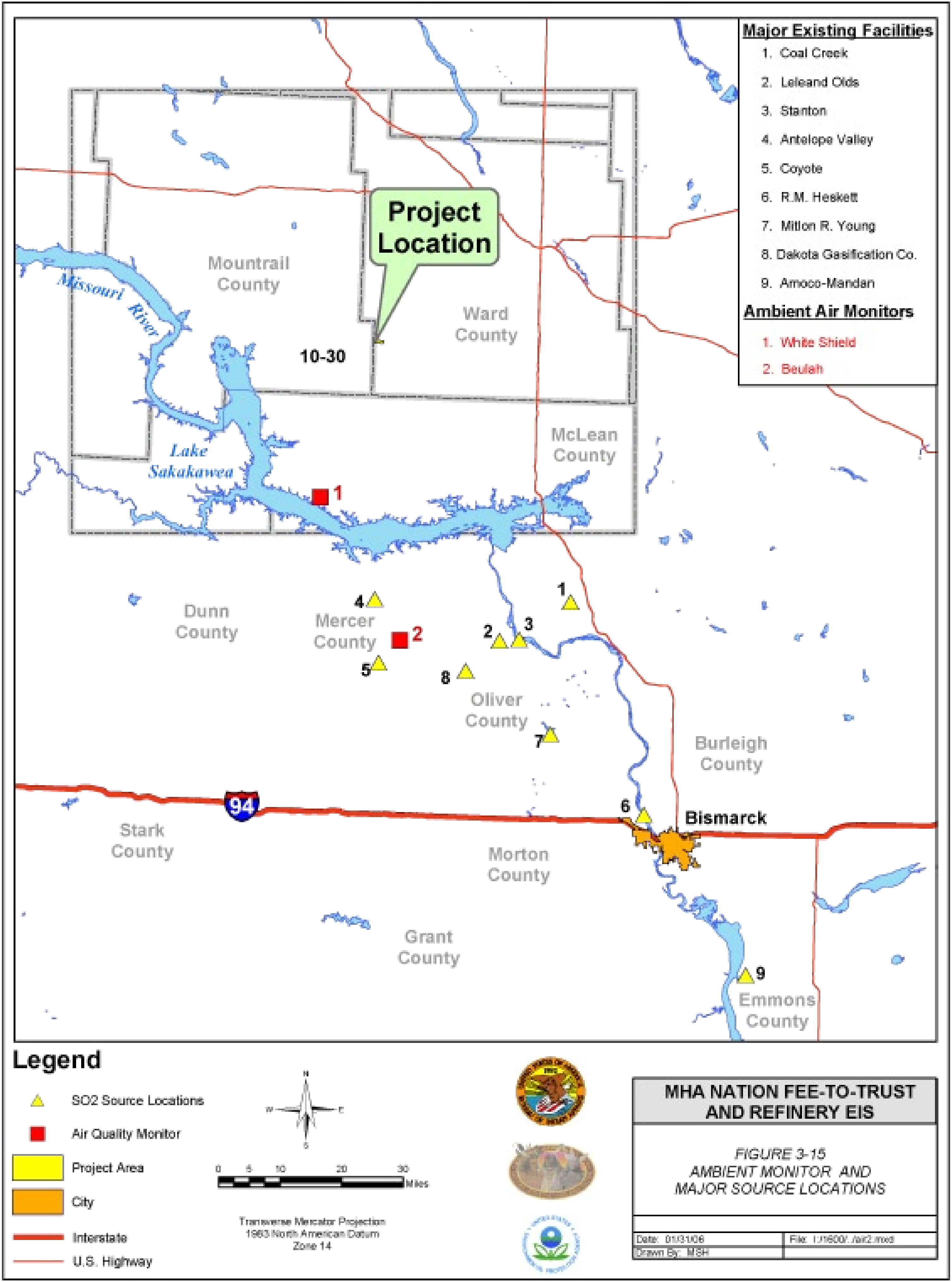


FIGURE 3-15
AMBIENT MONITOR AND MAJOR SOURCE LOCATIONS

3.12.3 Air Quality Designation

According to federal air quality criteria, the air quality in the general vicinity of the project site has a federal designation of attainment or unclassifiable for all criteria air pollutants. Table 3-22 shows the federal air quality designations for criteria pollutants for the project site and its environs.

Table 3-22 Federal Air Quality Designations

Pollutant	Designation[1]
NO_2	Unclassifiable/Attainment
CO	Unclassifiable/Attainment
$PM_{2.5}$	Unclassifiable/Attainment
PM_{10}	Unclassifiable
SO_2	Attainment
Ozone	Unclassifiable/Attainment

Note:
1. Unclassifiable/Attainment = monitoring of the pollutant is insufficient to classify and the pollutant is assumed to be in attainment of the NAAQS. Attainment = monitoring and modeling demonstrates the pollutant is in attainment of the NAAQS.

Source: 40 CFR 81.335

3.12.3.1 Class I Area Air Quality Related Values

Class I area air quality related values (AQRVs) include visual range and sulfur (S) and nitrogen (N) deposition. Table 3–23 presents recent measurements of standard visual range (SVR) and N and S deposition at Theodore Roosevelt National Park and Lostwood Wilderness.

SVR is defined as the greatest distance at which a standard observer can discern a large black object against the horizon sky under uniform lighting conditions. This value is calculated (rather than measured), using Interagency Monitoring of Protected Visual Environments (IMPROVE) methodology. This calculation uses measured ambient air concentrations of aerosols that include sulfate, nitrate, organic carbon, elemental carbon, and soil material.

Wet deposition is measured as concentrations of sulfate ion (SO_4) and nitrate ion (NO_3) in precipitation. The wet deposition values shown in Table 3-23 are also presented as elemental nitrogen and sulfur, using the ratios of molecular weights, since deposition impacts are referenced in terms of elemental nitrogen and sulfur.

Table 3-23 Measurements of Standard Visual Range

Year	Class I Area	Standard Visual Range (SVR) (km)[3] Best 20% SVR	Mid 20% SVR	Worst 20% SVR	Wet Deposition – Annual Total (kg/ha)[4] Nitrogen NO_3	As N	Sulfur SO_4	As S
2001	TRNP[1]	182.2	112.1	65.3	3.43	0.77	2.51	0.84
2002	TRNP	181.5	123.6	72.6	4.17	0.94	2.77	0.92
2003	TRNP	187.4	114.8	64.8	4.42	1.00	3.15	1.05
2004	TRNP	188.4	125.8	71.3	2.07	0.47	1.67	0.56
2001	LW[2]	173.5	98.5	51.6	NA[5]	NA	NA	NA
2002	LW	181.5	109.3	60.5	NA	NA	NA	NA
2003	LW	179.3	103.0	61.6	NA	NA	NA	NA
2004	LW	179.0	114.5	55.6	NA	NA	NA	NA

1 TRNP=Teddy Roosevelt National Park
2 LW=Lostwood Wilderness
3 Source: Interagency Monitoring of Protected Visual Environments (IMPROVE) Aerosol data, Visibility Information Exchange Web System (VIEWS) (http://vista.cira.colostate.edu/views/)
4 Source: National Atmospheric Deposition Program (NADP) (http://nadp.sws.uiuc.edu/)
5 NA – Data not available

3.12.4 Global Climate Change

Over the past 200 plus years, the burning of fossil fuels, such as coal and oil, and deforestation has caused the concentrations of heat-trapping "greenhouse gases" to increase significantly in our atmosphere. These gases prevent heat from escaping to space, somewhat like the glass panels of a greenhouse.

Greenhouse gases are necessary to life as we know it, because they keep the planet's surface warmer than it otherwise would be. But, as the concentrations of these gases continue to increase in the atmosphere, the Earth's temperature is climbing above past levels. According to National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) data, the Earth's average surface temperature has increased by about 1.2 to 1.4ºF (0.7 to 0.8ºC) since 1900. The warmest global average temperatures on record have all occurred within the past 15 years, with the warmest two years being 1998 and 2005. Figure 3-16 shows mean annual temperatures trends from 1880-2006. Most of the warming in recent decades is likely the result of human activities. Other aspects of the climate are also changing such as rainfall patterns, snow and ice cover, and sea level.

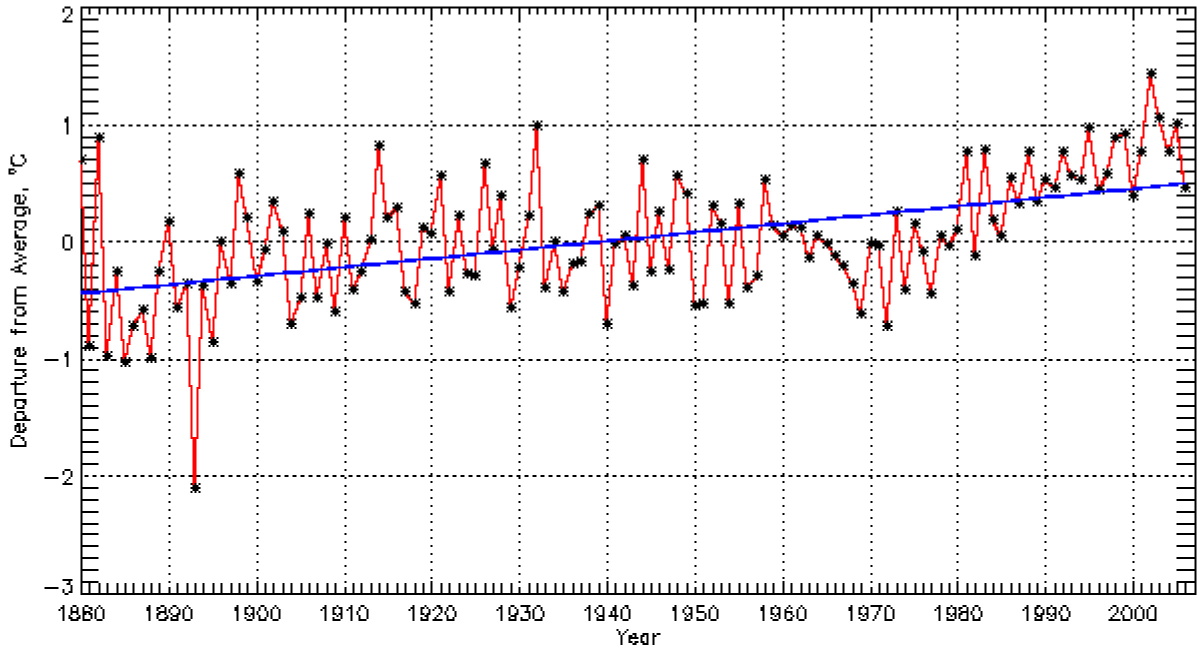


Figure 3-16 Global Mean Annual Land Temperatures 1880-2006, NOAA, NCDC
(NOAA- National Oceanic and Atmospheric Administration, NCDC - National Climate Data Center)

The Intergovernmental Panel on Climate Change (IPCC) has recently completed a comprehensive assessment of the current state of knowledge on climate change, its potential impacts and options for adaptation and mitigation. This assessment is available on the IPCC website at http://www.ipcc.ch/

The primary greenhouse gas emitted by human activities in the U.S. is carbon dioxide (CO_2). As shown in Figure 3-17, CO_2 is about 84% of U.S. greenhouse gas emissions. Other greenhouse gases include: methane (CH_4), nitrous oxide (N_20), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6). As shown in Figure 3-18, the largest source of CO_2 is from the combustion of fossil fuels such as coal and gasoline for generating electricity and transportation.

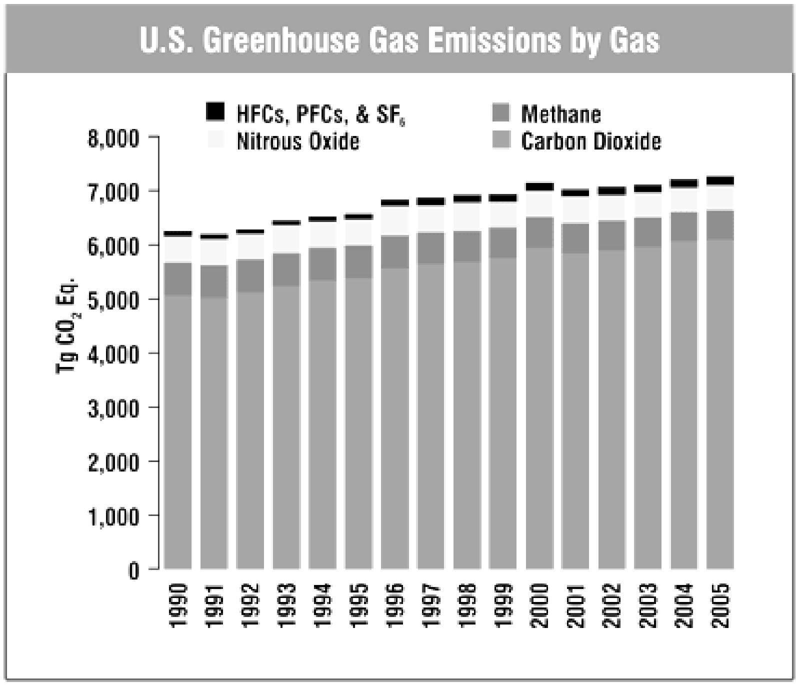


Figure 3-17 **US Greenhouse Gas Emissions by Gas in teragrams (1 teragram = 1 million metric tones) USEPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005**

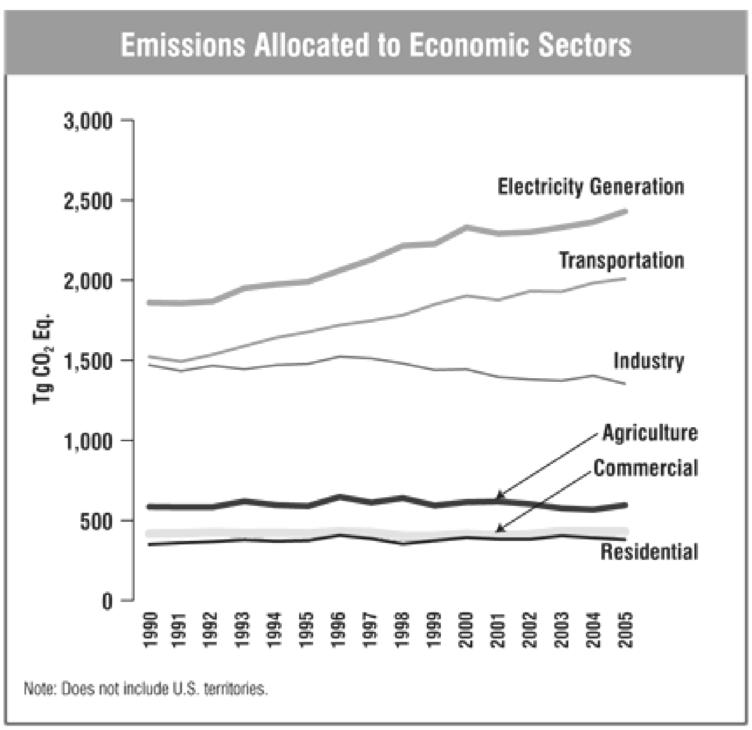


Figure 3-18 **US Greenhouse Gas Emissions by Sector in teragrams or millions of metric tonnes, USEPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005**

The IPCC has documented ongoing global climate change and projected that climate change will continue as atmospheric concentrations of greenhouse gases increase. (IPCC 2007, Summary for Policymakers. Impacts, Adaptation and Vulnerability; Contribution of Working Group II to the Fourth Assessment Report of the IPCC). If greenhouse gases continue to increase, climate models predict that the average temperature at the Earth's surface could increase from 3.2 to 7.2ºF (1.8 to 4.0ºC) above 1990 levels by the end of this century. (EPA's Climate Change –Basic Information website at http://www.epa.gov/climatechange/basicinfo.html). There is consensus among climate scientists that human activities are changing the composition of the atmosphere, and that increasing the concentration of greenhouse gases has changed, and will continue to change the planet's climate.

Observational evidence from all continents and most oceans indicates that many natural systems are being affected by regional changes in climate, specifically increases in air and water temperatures. Some of the observed impacts in marine and freshwater ecosystems associated with rising water temperatures as well as changes in ice cover, salinity and oxygen levels have lead to shifts in the aquatic biological community (e.g., phytoplankton, zooplankton, and fish). Increased air temperatures have been observed to affect the terrestrial biological community. As an example, there has been a shift to an earlier timing of spring events such as bird migration and egg-laying. (IPCC 2007).

Direct observations of recent climate change identify an overall increase in the average global temperature and sea level rise and a decrease in snow cover, especially in the Northern Hemisphere. During the 20th century, glaciers and ice caps have experienced widespread losses, contributing to sea level rise. Numerous long-term climate change observations include decrease in arctic temperature, snow, ice and frozen ground cover, increase in precipitation amounts, decrease in ocean salinity, and an increase in wind patterns, intensity and duration of extreme weather events like droughts, heat waves, and tropical cyclones.

The IPCC anticipates that the global effects of future climate change will include increased temperatures, changes in precipitation, and sea level rise. Further decline of mountain glaciers is projected to reduce the availability of water in many regions. These changes will impact water resources, forestry, agriculture, ecosystems, coastal management, human health, industry, settlements, and societies on a global scale, and could lead to some impacts that are abrupt or irreversible. (EPA's Climate Change, Health and Environmental Effects website at http://www.epa.gov/climatechange/effects/index.html)

Projected climate changes are expected to affect human health and an increase in the incidence of some infectious diseases like malaria is predicted as a result of the altered spatial distribution of some infectious disease vectors. (IPCC 2007, Summary for Policymakers. Impacts, Adaptation and Vulnerability; Contribution of Working Group II to the Fourth Assessment Report of the IPCC).

Coastal communities and habitats are projected to be increasingly stressed by climate change impacts interacting with development and pollution. For human communities in the Arctic, impacts, particularly those resulting from changing snow and ice conditions are projected to be mixed; detrimental impacts would include those on infrastructure and traditional indigenous ways of life. (IPCC 2007)

The projected climate changes for most areas of North America include a warming trend and an increase in precipitation, as well as a decrease in snow season length and depth on an annual basis. (IPCC 2007, The Physical Science Basis. Contribution of Working Group I to the Fourth

Assessment Report of the IPCC). Among other things, the IPCC report projects the following specific changes in North America:

- Warming in the 2010 to 2039 time period was modeled to be in the range of 1 to 3 °C.
- Simulated future surface and bottom water temperatures of lakes, reservoirs, rivers, and estuaries throughout North America consistently increase from 2 degrees to 7 °C. Warming is likely to extend and intensify summer thermal stratification, contributing to oxygen depletion.
- Decreases in snow cover and more winter rain on bare soil are likely to lengthen the erosion season and enhance erosion, increasing the potential for water quality impacts in agricultural areas.
- Moderate climate change will likely increase yields of North American rain-fed agriculture. Most studies project likely climate-related yield increases of 5 to 20% over the first decades of the century, with overall positive effects of climate on agriculture persisting through much or all of the 21st century.
- Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilized water resources.
- During the course of this century, cities that currently experience heat waves are expected to be further challenged by an increased number, intensity, and duration of heat waves during the course of the century, with potential for adverse health impacts.

A comprehensive summary of the health and environmental effects of climate change is on EPA's Climate Change, Health and Environmental Effects website at http://www.epa.gov/climatechange/effects/index.html. The website also includes links to more detailed information on impacts to specific resource areas such as human health, agriculture, and water resources.

3.13 Socioeconomics

The socioeconomic analysis area includes the Reservation and Ward County. Ward County is included in the analysis, because most of the goods and services for the project would come from the Reservation or the City of Minot. Minot, which is about 30 miles from the project site, is the closest center for population and trade. It is also the seat for Ward County, the home of Minot Air Force Base, and the center of economic activity in north-central North Dakota. Data for the State of North Dakota are also included in the analysis, to provide a point of reference for the area experiencing socioeconomic impacts from the proposed project.

3.13.1 Population, Employment, Earnings and Income

3.13.1.1 Population, Employment, Earnings and Income

The existing population, employment, earnings, and income characteristics for the socioeconomic analysis area are summarized in this section.

3.13.1.2 Population

Recent population figures for the socioeconomic analysis area are shown on Table 3-24. The table includes recent population data for the Reservation, Ward County, and the State of North

Dakota. Minot has historically been a farm and ranch community, and is the home of the Minot Air Force Base, which is an integral part of the local economy.

The 1990s were a period of low population growth in North Dakota and Ward County (Table 3-24). The modest growth rates of the 1990s reversed the declining growth rates of 1980 through 1990, when the state lost population. However, population projections indicate that the population of North Dakota will continue to decline over the next 20 years (Table 3-24). The projected decline in population for the state is small, indicating that declines will level off to some extent relative to the declines in population for the last two decades. However, in Ward County, population declines are projected to increase relative to the past two decades. This is because it is anticipated that the rural population will continue to follow current trends of migration to urban areas. Declining population in North Dakota mirrors similar trends throughout the Great Plains states. Rural residents have been migrating to larger cities, depopulating the largely rural Great Plains states. Many of the people migrating out of the state are young adults and families, which results in fewer people of childbearing age, and therefore, fewer children. This trend also contributes to the increasing proportion of the elderly population in the state (North Dakota State Data Center 2002).

Table 3-24 Changes in the Populations of the Fort Berthold Indian Reservation, Ward County, and State of North Dakota, 1980–2002

	Population				Change in Population (percent)		
Area	1980	1990	2000	2004	1980–1990	1990–2000	2000–2004
Fort Berthold Indian Reservation	5,577	5,395	5,874	5,915	-3.3	8.9	0.20
Ward County	58,392	57,921	58,795	56,224	-0.8	1.5	-4.4
State of North Dakota	652,717	638,800	642,200	634,366	-2.1	0.5	-1.2

Note:
Source: North Dakota State Data Center 2006, North Dakota Indian Affairs Commission, 2006.

Table 3-25 Projections of Changes in the Populations of the Fort Berthold Indian Reservation, Ward County, and North Dakota, 2000–2020

	Population			Change in Population (percent)	
Area	2000	2010	2020	2000–2010	2010–2020
Fort Berthold Indian Reservation	5,874	NA[1]	NA	NA	NA
Ward County	58,795	56,728	55,809	-3.5	-1.6
North Dakota	642,200	645,325	651,291	<0.01	<0.01

Note:
1. NA = not available.
Source: North Dakota State Data Center 2002b

The Reservation has an estimated population of more than 5,900. In 2004, there were 10,400 enrolled members of the Three Affiliated Tribes. The majority of these members live outside of the Reservation. Members account for 3,986 (67.4%) of the total population living on the Reservation. Between 1980 and 1990, the population of the Reservation declined, mirroring the declines of the state and Ward County (Table 3-24). However, the Reservation's population grew considerably faster than those of the state or Ward County during the 1990s. This is likely because increased economic opportunities on the Reservation have made it a more attractive place to live and may also reflect improvements in census data reporting. There are no population projections for the Reservation; however, recent census socioeconomic data indicate that there are different economic factors affecting population growth from those factors identified for the state and the county.

The City of Makoti is the community closest to the project site. The population of Makoti was 145 in 2000. The population declined to 141 (2.9 percent) by 2004. Makoti is not located on the Reservation.

The racial composition of the populations of the State of North Dakota and Ward County are similar, but differs considerably from that of the Reservation (Table 3-26). In 2000, the minority population was low in the state as a whole, accounting for 7.6 percent of the total population. The American Indian component of this total was 4.9 percent. In contrast, American Indians were the majority on the Reservation, accounting for 67.4 percent of the Reservation's total population. The white population accounted for 26.9 percent and the Hispanic population was 2.6 percent. Other populations of a single race each accounted for less than 1 percent (Table 3-26). People of two or more races accounted for 5.0 percent of the Reservation's population.

The age structure of the population in Ward County is comparable to that of the State of North Dakota (Table 3-26) and to the country as a whole. The middle age group of the population (35 to 64) increased in number between 1990 and 2000, while the youngest third (under 5 to 34) decreased, which is consistent with the aging of the general population. The median age of the population on the Reservation was 30, younger than the state median of 36.2 and the Ward County median of 32.4. Nearly 40 percent of the population on the Reservation was under the age of 20 in 2000, a considerably higher percentage than Ward County or the state, which both have less than 30 percent of the population under 20 (Table 3-26).

Table 3-26 Demographic Characteristics of Fort Berthold Indian Reservation and Ward County, 2000

	Fort Berthold Indian Reservation		Ward County		North Dakota	
	Number	Portion (percent)	Number	Portion (percent)	Number	Portion (percent)
Total Population	5,195		58,795		642,200	
Sex Distribution						
Male	2,877	48.6	29,284	49.8	320,524	49.9
Female	3,038	51.4	29,511	50.2	321,676	50.1
Age Distribution						
Under 5 years	536	9.1	4,348	7.4	39,400	6.1
5-19	1,782	30.1	13,158	22.4	144,064	22.4
20-44	1,778	30.1	22,667	38.6	225,394	35.1
45-64	1,171	19.8	11,281	19.2	138,864	21.6
65 +	648	11.0	7,341	12.5	94,478	14.7
Race Distribution						
White	1,594	26.9	54,327	92.4	593,181	92.4
Black	6	0.1	1,305	2.2	3,916	0.6
American Indian, or Alaska Native	3,986	67.4	1,215	2.1	31,329	4.9
Asian or Pacific Islander	9	0.1	519	0.9	3,836	0.6
Other	26	0.4	428	0.7	2,540	0.4
Two or more races	294	5.0	1,001	1.7	7,398	1.2
Hispanic Origin (of any race)	152	2.6	1,125	0.0	7,786	1.2

Source: U.S. Census Bureau 2001

3.13.1.3 Housing

The total number of housing units available, the rates of vacancy, and median rents vary for the Reservation and Ward County. Ward County has almost 9 times as many housing units as the Reservation (Table 3-27). However, a much larger portion of housing units are vacant on the Reservation (34 percent) compared with Ward County (8 percent). On both the Reservation and in Ward County, more than half of the occupied housing units are occupied by owners rather than renters (Table 3-27). In 2000, median monthly rent in Ward County was $408 whereas median rent on the Reservation was $245 (U.S. Census Bureau 2001).

In addition to permanent housing, the Reservation and Ward County have temporary housing, such as motels and campgrounds. Temporary housing present near the project site includes four motels in New Town, one motel in Parshall, and one motel in Garrison. No motels exist in Makoti; however, a campground provides 100 sites with electrical hookups. The City of Minot provides a wide range of motels and campgrounds.

Table 3-27 Summary of Housing Units on the Fort Berthold Indian Reservation and in Ward County, North Dakota, 2000

	Housing Units			
	Fort Berthold Indian Reservation		Ward County	
Status of Housing Unit	Total Number of Units	Portion of Total (percent)	Total Number of Units	Portion of Total (percent)
Occupied by:				
Owner	1,122	58.8	14,434	62.6
Renter	786	41.2	8,607	37.4
Total	1,908	66.2	23,041	91.8
Vacant	973	33.8	2,056	8.2
Total (occupied/vacant)	2,881	100.0	25,097	100.0

Source: U.S. Census Bureau 2001

3.13.1.4 Employment

The economies of the Reservation and Ward County largely are based on natural resources. Basic economic sectors that bring revenues into the Reservation and county include agriculture, oil production, some manufacturing, and recreational opportunities.

Agriculture historically has been and currently is the primary base industry in North Dakota, including on the Reservation and in Ward County. Fifty-five percent of that portion of the Reservation that is not covered by Lake Sakakawea is used for grazing (cattle and buffalo) and cropland. Consequently, livestock ranching and farming are primary economic activities on the Reservation. Nearly 94 percent of the land use in Ward County is in farms (North Dakota Agricultural Statistics Service 1997).

Beyond agricultural activities, few economic opportunities exist on the Reservation. The Four Bears Casino and Lodge, which is on the shore of Lake Sakakawea west of New Town, is owned and operated by the MHA Nation. The Casino and Lodge employ more than 300 people, of which more than 90 percent are tribal members. Industrial economic activity includes two tribally chartered corporations (Fort Berthold Library 1994). Although there are large deposits of coal that have the potential for economically feasible development on the Reservation, they have not been leased or developed. Reserves of oil also exist, and some historical and recent development of this resource has occurred on the Reservation.

In 2000, the labor force participation rate on the Reservation was 57.6 percent. This means that the proportion of all people age 16 years or older who are employed or available for work was 2,301 out of 3,993 people. The labor force participation rate for Indians living on the Reservation was 56.9 percent.

The unemployment rate on the Reservation decreased 29 percent between 1990 and 2000 (Table 3-28). This decrease occurred because of an increase in economic opportunities. These opportunities included the opening of the Four Bears Casino and Lodge in 1994, a large increase in the number of people employed by the Three Affiliated Tribes Lumber Construction Manufacturing Corporation (a tribally owned corporation), and the establishment of the Mandaree Enterprise Corporation (formerly the Mandaree Electronics Corporation). The Mandaree Enterprise Corporation manufactures electronics and provides information technology services, hardware/software, and supplies.

In contrast with the decrease in unemployment on the Reservation, statewide unemployment rose slightly, and unemployment in Ward County remained constant between 1990 and 2000 (Table 3-28). However, even with the reduction in unemployment on the Reservation, the unemployment rate on the Reservation in 2000 was 6.6 percent higher than for Ward County.

Table 3-28 Resident Labor Force, Employment and Unemployment for the State of North Dakota, Ward County, and the Fort Berthold Indian Reservation, 1990-2000

Category	1990	2000	Change 1990–2000
North Dakota			
Labor Force	318,054	338,982	3.72%
Employed	305,272	316,632	19.36%
Unemployed	12,782	15,257	15.00%
Unemployment Rate	4.0	4.6	15.0%
Ward County			
Labor Force	26,420	31,374	3.32%
Employed	25,264	26,102	7.27%
Unemployed	1,156	1,240	2.27%
Unemployment Rate	4.4	4.5	2.3%
Fort Berthold Indian Reservation			
Labor Force (all people)	2,130	2,301	13.93%
Employed	1,795	2,045	-23.88%
Unemployed	335	255	-29.30%
Unemployment Rate	15.7	11.1	-29.9%

Source: U.S. Census Bureau 2001

BIA publishes biennially the American Indian Population and Labor Force Report. This report compiles data on tribal enrollment, service population and labor force information for federally recognized Indian tribes. The 2005 version of this report for the Fort Berthold Indian Reservation (BIA 2005), included as Table 3-29, identified 8,773 Indian people in the area on or near the reservation eligible for BIA services. The report also includes information on the available work force. In 2005, the MHA Nation estimated the available work force from the service population to be 4,381. Of the available MHA Nation work force, 71% were not employed.

Table 3-29 Local Estimates of Indian Service Population and Labor Market Information -- Three Affiliated Tribes

	Service Population: on-or-near Reservation	
	Population	**Percent**
Tribal Enrollment	11,897	
Total Eligible for Services	8,773	
Age Distribution		
Under 16	3,962	
16-64	4,509	
65 & Over	302	
Labor Force Data		
Not Available for Work	430	
Available for Work (Total Workforce)	4,381	
Employed	1,287	
Not Employed	3,094	
Not Employed as Percent of Available Work Force		71%
Total Employment	1,287	
Tribal	1,169	
Private	118	
Employed, but Below Poverty Guidelines	708	55%

Source: American Indian Population and Labor Force Report, BIA 2005

The North Dakota Department of Commerce (North Dakota Department of Commerce 2002) conducted a study of available labor for the area within a 60-mile radius of Minot. This geographic area included portions of Ward, Bottineau, McHenry, McLean, Mountrail, and Renville counties. The Reservation east of Lake Sakakawea is also included in this study area. The 60-mile radius was identified as the median maximum distance that those people involved in the study were willing to commute.

The study characterized the available labor force within the geographic area and identified the individuals' desirability of employment in different types of industries. The available labor force included those individuals looking for work, planning to seek work, or who would consider a different or alternative job. There were 21,160 individuals in the available labor force in the geographic area (North Dakota Department of Commerce 2002). Approximately 2,870 of these individuals were actively seeking work during the time the study was conducted.

The study determined that individuals in the available labor force most desired jobs in the information computer technology and business services operation industries (Table 3-30), followed by jobs in health services and manufacturing. Finally, jobs in engineering and machine trades or construction were the least desirable to individuals in the available labor force.

Table 3-30 Industries of Interest to the Available Labor Force

Industry	Number of Individuals[1]	Portion of Available Labor (percent)
Information Computer Technology	14,114	66.7
Business Services Operation	12,992	61.4
Health Services	9,755	46.1
Manufacturing	9,755	46.1
Engineering	8,125	38.4
Machine Trades or Construction	7,702	36.4

Note:
1. The number of individuals does not add up to the total available labor force because individuals may be interested in more than one industry.

Source: North Dakota Department of Commerce 2002

Employment by economic sector is another common measure of economic activity. On the Reservation, the largest annual average change in job sectors between 1990 and 2000 was in the government and services sectors. Although it involved a relatively small number of jobs, the number of jobs in the government sector increased by 73 percent. Government employers on the Reservation include the MHA Nation, Fort Berthold Community College, BIA, and the IHS. In the services sector, the number of jobs increased by 59 percent.

In addition to experiencing one of the largest increases in the number of jobs, industries in the services sector employed the largest number of individuals in the decade between 1990 and 2000 (Table 3-31). The services sector represented 37.8 percent of the jobs on the Reservation in 1990 and grew to 48.4 percent of all employment on the Reservation by 2000. The primary stimulus for growth in the services sector was the 1994 opening of the Four Bears Casino and Lodge, one of the largest employers on the Reservation.

In contrast with the government and service sectors, employment in most of the other sectors declined from 1990 to 2000 (Table 3-31). Employment in the retail trade declined 26.9 percent, and employment in the agriculture, forestry, and mining sector declined 45.1 percent. Despite the decline in these sectors, overall employment on the Reservation increased from 1990 to 2000 (Table 3-31).

In Ward County, the largest employment sector from 1990 to 2000 was the service sector, which represented 30.6 percent and 42.6 percent of the employed workforce in those years, respectively. The government sector represented 32 to 37 percent of the jobs during the 1990s. The Minot Air Force Base is the largest government employer in the county, accounting for nearly 80 percent of federal employment and nearly 40 percent of all government employment in Ward County.

Table 3-31 Summary of Total Estimated Employment on the Fort Berthold Indian Reservation and in Ward County, 1990 and 2000

	Ft. Berthold Indian Reservation				Ward County			
	Number of Employees		Portion of Total (percent)		Number of Employees		Portion of Total (percent)	
Sector	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**
Agriculture, Forestry and Mining	308	169	17.2	8.3	1,271	1,154	4.5	3.8
Construction	118	78	6.6	3.8	1,204	1,445	4.3	4.8
Manufacturing	119	113	6.6	5.5	794	723	2.8	2.4
Transportation, Communication, and Utilities	111	162	6.2	7.9	1,790	2,047	7.3	6.8
Wholesale	23	14	1.3	0.7	1,303	1,085	4.7	3.6
Retail Trade	216	158	12.0	7.7	5,978	3,935	21.4	13.1
Finance, Insurance, and Real Estate	63	89	3.5	4.4	1,194	1,593	4.3	5.3
Services	679	989	37.8	48.4	8,540	12,832	30.6	42.6
Public Administration	158	273	8.8	13.3	1,504	1,289	5.4	4.3
Military Service (Based)					4,357	4,032	15.6	13.4
Total	**1,795**	**2,045**			**27,935**	**30,134**		

Source: U.S. Census Bureau 2001, 1990

The services and retail trade sectors also were sources of substantial employment in the county. Considered together, the government, services, and retail trade sectors accounted for almost 80 percent of employment in Ward County between 1990 and 2000. The services sector experienced the largest gain in employment (50.3 percent) during the decade (Table 3-31). The retail trade sector experienced a decrease in employment over the same period.

3.13.1.5 Income

In 1990 and 2000, the per capita personal income in the socioeconomic analysis area trailed that of Ward County and the State of North Dakota (Table 3-32). Although per capita personal income in Ward County was less than that for the state in both years, the difference increased from 1990 (3 percent less) to 2000 (5 percent less). In both years, the per capita personal income on the Reservation was substantially lower than that for the state and Ward County (Table 3-32).

In both 1990 and 2000, a high portion of all people living on the Reservation had incomes that placed them below the poverty line (Table 3-32). In addition, one-third to one-half of tribal members on the Reservation had incomes that placed them below the poverty line. During the same period, 11 to 14 percent of residents of Ward County and North Dakota had incomes that placed them below the poverty line (Table 3-32).

Table 3-32 Per Capita Personal Income and Poverty Rates in Analysis Area

Area	Per Capita Personal Income ($)		Poverty Rate (percent)	
	1990	2000	1990	2000
North Dakota	11,051	17,767	14.40	11.90
Ward County	10,708	16,926	12.70	10.80
Forth Berthold Indian Reservation				
American Indians	6,925	8,414	51	36
All people	10,667	10,940	35	28

Source: U.S. Census Bureau 2001

3.13.2 Facilities and Services

Development has the potential to affect existing community facilities and infrastructure. The use of existing facilities or infrastructure, including roads, may affect the capacity of service agencies or transportation systems, or may require installation of new facilities. Growth in population and employment may also affect local community services in the project area. The following paragraphs characterize existing infrastructure and services in the project area.

- Fire protection on the Reservation is provided in the communities and rural areas by volunteers using BIA equipment. The nearest Fire Protection District is the Minot Rural Fire District, which serves a portion of Ward County that does not include the project site.
- The Fort Berthold Rural Water Project provides water to the Four Bears, Mandaree, White Shield, and Twin Buttes locations on the Reservation. Construction on the project began in the late 1990s, and consists of water intake systems and small water treatment plants at Mandaree, White Shield, Twin Buttes, and Four Bears. Other communities and rural areas on the Reservation use water supply wells. Individuals in some areas use untreated surface water.
- Educational facilities on the Reservation provide primary, secondary, and some post-secondary education. Primary and secondary education is provided by three BIA Contract Schools, which are located at Mandaree, Twin Buttes, and White Shield. These schools provide education for grades 1 through 12. Nearby schools include a high school in Makoti and an elementary school in Ryder. Post-secondary education is provided by the Fort Berthold Community College in New Town and at satellite locations.
- Health care on the Reservation is provided by IHS. The primary health care facility is the Minne-Tohe Health Center in New Town. However, IHS also has satellite health stations at Mandaree, White Shield, and Twin Buttes. The Tribal Health Department provides a Community Health Representative Program and the Ambulance Service for emergency health care services. There is also a Dialysis Center on the Reservation. Hospitals and a wide range of other health services are available in Minot.
- An Emergency Action Plan for the Reservation in general is under development that will provide direction, including mitigation, for a variety of hazards (Federal Emergency Management Agency 2003).

3.13.3 Social Values

The quality of life in a particular area and the reasons people live there are subjective measures of a person's happiness with a geographic location, based on a variety of self-defined values. The socioeconomic analysis area and the west, central North Dakota, have experienced impacts to air and water quality from nearby coal-fired power plants, energy development, and other industrial activities. There is a perception among some individuals that other energy-related industrial activities may be incompatible with maintaining the quality of the natural environment. Other people, however, in the area support industrial development for its positive economic effects.

3.14 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was published in February 1994 and requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Since its issuance in 1994, EPA's Office of Environmental Justice (EJ) has developed policies and guidance further clarifying the intent of the Executive Order and the Agency's strategy for incorporating EJ concerns into its actions. Such actions include the issuance of a wastewater discharge permit, as the MHA Nation has requested for the proposed refinery.

EPA defines EJ as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Because of the infinitely variable nature of EJ problems and stakeholders, as well as the resources available to address any particular situation, there are no nationally applicable standards that identify specific tools and data for performing an EJ analysis. Rather, the Agency must develop them on a case-by-case basis. For purposes of this EJ analysis, EPA based the identification of the affected area on an evaluation of the potential impacts to air, surface water, ground water, soils, and the community resulting from construction and operation of the proposed refinery. The socioeconomic sections of this chapter and Chapter 4 further discuss data used to identify socioeconomic impact areas and the nature of those impacts.

Three different geographic regions were considered for the potentially affected area. The area within a 1-mile radius of the project site is the area where environmental impacts are most likely to occur. This is based on an evaluation of modeled air emissions from the proposed refinery and a determination that, while well below health-based standards, there is some potential for exposures to occur in this area. In order to provide a conservative analysis of possible environmental and socioeconomic impacts, the DEIS expanded the affected area to include a 10-mile radius around the site. The FEIS, in response to comments on the DEIS, has broadened the geographic scope of the affected area, so that it now extends beyond 10 miles to the four zip code areas surrounding the project site: 58756, 58770, 58771, and 58779. This expanded scope allows comparisons of potentially impacted populations to reference populations based on U.S. Census data, which are sorted by zip codes, allows the FEIS to include relatively populated areas in the analysis, and provides a conservative analysis for both environmental and socioeconomic impacts, as they relate to potential EJ populations.

As stated above, EPA must select which data it will use for each EJ analysis on a case-by-case basis. These data, referred to as Environmental Justice Indicators, may include: environmental indicators, health indicators, social indicators, and economic indicators. These indicators highlight some aspect of current conditions and trends in the environment or within a community. They provide information that can be used in the EJ analysis to supplement, as appropriate, information more specific to the environmental decision being evaluated (e.g., impacts from a facility being sited or permitted). For this EJ analysis, EPA is basing its identification of communities with potential EJ indicators on two types of data: ethnicity and income status. This analysis assumes that populations residing within the affected area constitute indicators of an EJ community, if the percentage of population in minority and/or poverty status is greater than that of the reference community, which in this case is the State of North Dakota. Since the Executive Order on EJ explicitly identifies "low-income populations" as groups of concern regarding EJ issues, it is important to point out that this EJ analysis incorporates poverty threshold levels determined by the U.S. Census as a proxy for low income populations in the affected area and in the reference community.

Taking into account the indicators described above, EPA used relevant census data on the four zip code areas to determine whether any populations residing within the affected area constitute a potential "environmental justice population." This was done by comparing the affected area to the reference community, which is defined as the state of North Dakota.

Figure 3-19 depicts the project site, 1- and 10-mile radii, and the four zip code areas surrounding the project site. Six residences occur within a 1-mile radius of the project site. All of these are isolated rural residences that are part of the agricultural operations surrounding the project site. Table 3-33 shows population numbers and percentages of the non-white, American Indian, and poverty populations for the four zip code area comprising the affected area and for the reference community. The non-white population data are defined by the U.S. Census to include Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and other Pacific Islander, and Hispanic or Latino populations. American Indian data captures only single ethnicity populations and does not include people with two or more ethnicities. Therefore, the U.S. Census estimates of Native American populations are lower than actual population figures.

Table 3-33 Affected Area Environmental Justice Indicators

	Population	Non-White Population*	American Indian	% Non-White*	% American Indian	Poverty Population	% in Poverty
Zip Codes Within 10-Mile Radius and Major Towns Within Each Zip Code							
58756 *(includes Makoti)*	260	34	1	13%	0%	45	18%
58771 *(includes Plaza)*	463	22	14	5%	3%	54	11%
58770 *(includes Parshall)*	1,273	706	559	55%	44%	286	23%
58779 *(includes Ryder)*	477	30	22	6%	23%	111	22%
4 Zip Code Area	**2,473**	**792**	**596**	**32%**	**24%**	**496**	**20%**
State Statistics							
North Dakota	**642,200**	**49,019**	**31,329**	**8%**	**5%**	**73,457**	**12%**

American Indian population is included in the non-white population
Source: American Fact Finder, Census 2000

The information shown in Table 3-33 suggests that each of the zip codes demonstrate indicators of an EJ community. Overall, the four zip code areas comprise 32 percent non-white and 24 percent American Indian population (compared to eight percent and five percent for the State, respectively) and 20 percent poverty population (compared to 12 percent for the State). The communities that fall closest to the project location within these zip codes are Makoti (2.5 miles) and Plaza (6 miles).

The affected area includes 596 Native Americans, which represents 24 percent of the total population. This is a higher concentration of Native Americans than is represented throughout North Dakota, which reports five percent of the population as Native American. The affected area also has a higher percentage of population that is considered low income compared to the State. In North Dakota, 12 percent of the population is considered living below the poverty threshold, while 20 percent of the population in the affected area has been characterized as living in poverty.

The median age in the affected area ranges from 36.4 years (zip code 58770) to 48.8 years (zip code 58756) (compared to 36.2 years for the State). The median value of homes among the four zip codes ranged from $34,156 (zip code 58771) to $66,611 (zip code 58756) in 2007 dollars (compared to $105,443 in 2007 dollars for the State.).

The following section provides additional information on each of the four zip code areas, with respect to demographic, social, and economic statistics. The source of the data was the 2000 census.

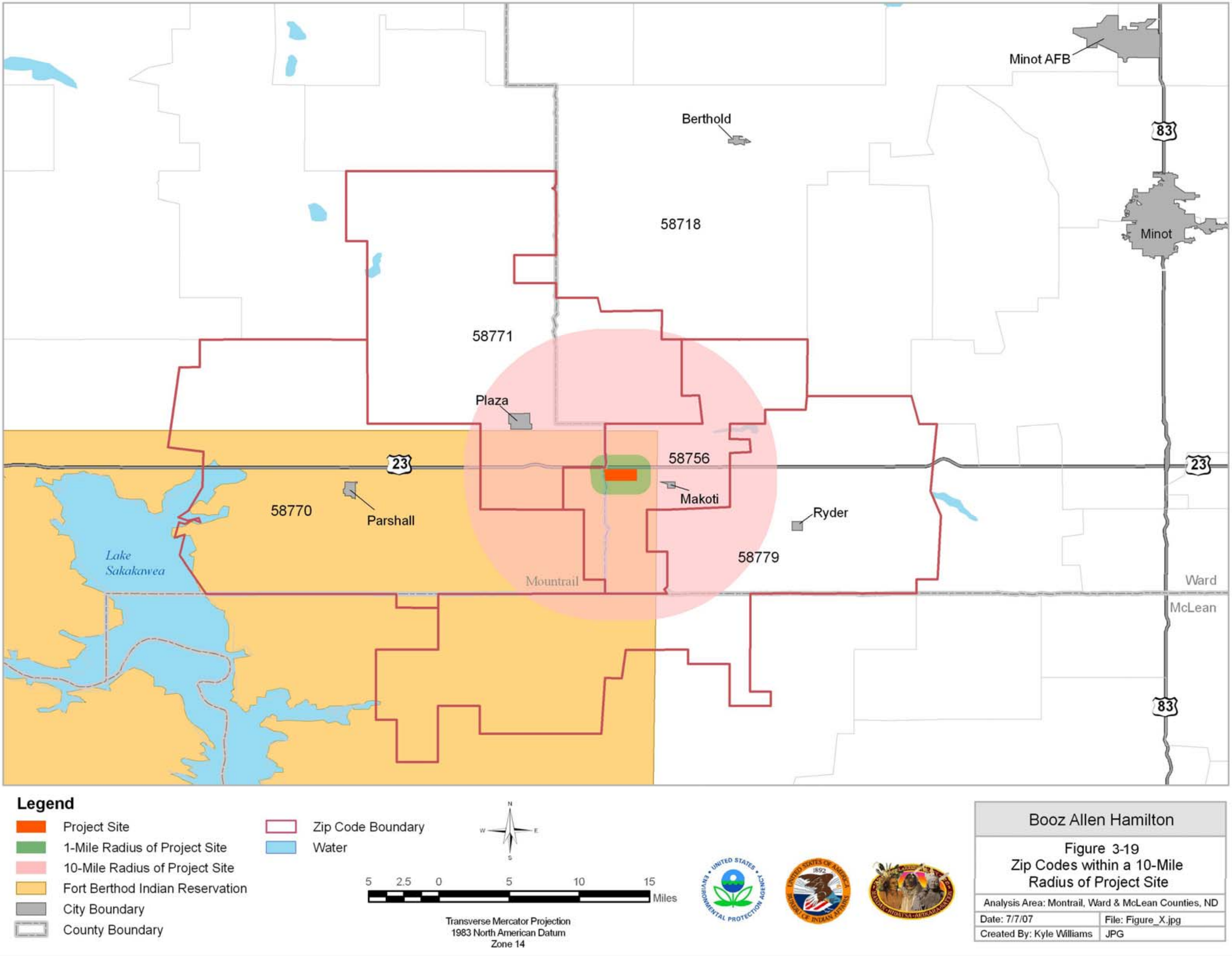
58756: Zip code 58756 encompasses the project location and the community of Makoti. The population of this area in 1999 was 260, with over half of the population residing in Makoti. This area has a very low population density, approximately two people per square mile. Makoti is 2.5 miles southeast of the proposed refinery and is the closest community to the site. It has 145 residents, of which 95.9 percent are white and 4.1 percent are non-white. Nineteen percent of the population falls within poverty status. The median age in Makoti is 47.3 years. The community has a lower unemployment rate of 2.5 percent compared to 3.0 percent for the State (1999). The largest percentages of employment by industry are in education, health, and social sciences (27.8%), agriculture (22.2%), and wholesale trade (11.1%).

58771: Zip code 58771 is located to the northwest of the project site, encompassing the community of Plaza. Plaza is located 6 miles northwest of the proposed refinery. In 1999 there were 167 residents within the community of Plaza. Of these, 91 percent are white and 7.3 percent fall below the poverty threshold. The median age in Plaza is 42.7 years. The community has a lower unemployment rate of 1.4 percent compared to 3.0 percent for the State (1999). The three largest employers by industry are education, health, and social sciences (31.6%), retail trade (13.2%), and wholesale trade (11.8%).

58770: Zip code 58770 is located west and southwest of the project site and includes the town of Parshall, which is located approximately 13 miles west of the project location on Fort Berthold Indian Reservation. Parshall is the closest community on Tribal Land. It reported 981 residents in the 2000 census. Of these, 58.2 percent are non-white, and 27.7 percent fall below the poverty threshold. The median age in Parshall is 32.7 years. The community has a higher unemployment rate of 3.7 percent compared to 3.0 percent for the State (1999). The three largest employers by industry are education, health, and social science (30.4%), arts, entertainment, recreation, accommodation and food services (14.2%), and information (11.7%).

58779: Zip code 58779, which includes the town of Ryder and a small portion of Fort Berthold Indian Reservation, is located south to southeast of the project location. Ryder is located approximately 10 miles from the project location with a recorded population of 92 residents in the 2000 Census. The population is 97.8 percent white, and 30 percent fall below the poverty threshold. The median age in Ryder is 46.0 years. The community has a lower unemployment rate of 2.4 percent compared to 3.0 percent for the State (1999). The three largest employers by industry are education, health, and social sciences (27.1%), retail trade (14.6%), and transportation and warehousing, and utilities (14.6%).

For more information, see EPA's Environmental Justice Tier One Analysis for the Mandan, Hidatsa, and Arikara Nation's "Clean Fuels Refinery" Project (Tier One Analysis), December, 2007.



Booz Allen Hamilton

Figure 3-19
Zip Codes within a 10-Mile Radius of Project Site

Analysis Area: Montrail, Ward & McLean Counties, ND

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Health and Safety

Several factors contribute to the health and safety of Native Americans in North Dakota including poverty, access to adequate healthcare, sanitation, proximity of pollution sources, and social behaviors.

According to the North Dakota Indian Affairs Commission (1999):

- 78 percent of young Indian women, ages 14 to 24, are at high risk for contracting the Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS).
- Indian youth, ages 15 to 24 years, have a 382 percent higher suicide rate than the white suicide rate. (67.5/100,000 compared with 17.7/100,000)
- The poverty rate for Indians in North Dakota is more than three times the rate for North Dakota all-races population - 38 percent compared with 11 percent.
- In the Northern Plains, the Median Household Income for Indians is $12,310 as compared with the U.S. all-races median of $30,056.
- Indians are nearly 7.5 times as likely to live in households without adequate sanitation facilities as the general North Dakota population.

The Socioeconomic and EJ sections of Chapter 3 and Chapter 4 of this FEIS discuss the current status and potential impacts of factors such as employment/income, housing, access to health care, and proximity to pollution sources. In addition, the ATSDR has compiled baseline data on the health status of Native Americans living on the Fort Berthold Reservation, with an emphasis on asthma and specific types of cancer. These data are included in Appendix D.

Safety issues affecting populations living near the refinery are discussed in the Transportation, Spills and Releases, and Human Health sections of this FEIS. Occupational safety issues for refinery workers are discussed in the Human Health section of Chapter 4 of this FEIS.

Chapter 4 — Environmental Consequences

This chapter of the EIS provides an analysis of the effects or environmental impacts that would result from implementation of the Proposed Action or alternatives. Environmental effects include ecological, aesthetic, historic, cultural, economic, social, or health impacts. Effects can be direct, indirect, or cumulative and can be temporary (short-term) or permanent (long-term). Effects can vary in degree, ranging from only a slight discernable change to a drastic change in the environment. For this EIS, short-term effects are defined as occurring during the construction phase. Long-term effects are caused by operations that would remain longer.

This chapter combines the project proponent's proposed construction action (Alternative 1) with the proponent's proposed effluent discharge action (Alternative A) for purposes of analyzing the various environmental impacts associated with the combined proposal. This approach facilitates analysis and disclosure of the environmental impacts associated with all aspects of the proposed action. The remaining construction alternatives (Alternatives 2 through 5) and effluent discharge alternatives (Alternatives B through D) are discussed in comparison to the combined Alternatives 1 and A analysis for each section of this chapter.

4.1 Geology

4.1.1 Alternatives 1 and A — Original Proposed Actions

Under this alternative the site would be accepted into trust status for the purposes of constructing and operating the clean fuels refinery and producing forage for buffalo. The construction phase would begin with the stripping of topsoil, grading of the site and foundation excavations. Cut and fill and other standard construction techniques would be used to develop access roads and to install pipelines, power lines, water wells, and railroad spur. All of these construction activities would alter existing topography. In total, an estimated 190 acres would be affected by permanent surface-disturbing activities and alteration. There would be 78 acres of short term surface-disturbing activities (e.g. pipeline construction). Use of proper construction techniques, as described in Chapter 2, would reduce the effects associated with topographic alteration.

As discussed in Chapter 3, no major geologic hazards have been mapped in the project area. Seismic activity is very low (or non-existent) in the project area and no evidence of active faults or earthquakes of significant intensity have been documented. Although the landslide incidence is mapped as moderate in the general vicinity, it is not anticipated that the construction activities would activate any landslides. Identification of potentially suitable sites for the proposed refinery was performed using screening search criteria, including but not limited to suitable topography. The search criteria are described in Chapter 2.

Impacts to the geologic environment would be limited to near surface resources. No impacts would be anticipated to the subsurface geologic environment. Potential impacts related to geologic resources would be localized and limited to the time of construction.

4.1.2 Construction Alternatives

4.1.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the entire 468.39-acre site would be accepted into trust status, but construction and operation of the proposed refinery and production of buffalo forage would not proceed. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. Based on the foregoing, there would be no impacts to geologic resources related to refinery construction, operation, and maintenance.

4.1.2.2 Alternative 3 — No transfer to Trust, Refinery Constructed

Under this alternative, the entire 468.39-acre site would not be accepted into trust status, but construction and operation of the proposed refinery and production of buffalo forage would proceed. The impacts to geologic resources from the implementation of this alternative would be the same as described for Alternatives 1 and A. The MHA Nation would construct and operate the refinery and associated facilities and the same impacts would occur.

4.1.2.3 Alternative 4 — Modified Proposed Action

Under this alternative, the entire 468.39-acre site would be accepted into trust status for construction and operation of the proposed refinery with refinery design modifications and production of buffalo forage. Implementation of this alternative would result in the same effects as described in Alternatives 1 and A. The revised site refinery layout, pipelines and power lines would be constructed, so effects attributed to these facilities would be the same.

4.1.2.4 Alternative 5 — No Action

Under this alternative, the entire 468.39-acre site would not be accepted into trust status. The proposed refinery would not be constructed. Therefore, the 468.39-acre project site would continue to be used for agricultural purposes, which have occurred for decades. There would be no impacts to geologic resources related to refinery construction, operation, and maintenance.

4.1.3 Effluent Discharge Alternatives

4.1.3.1 Alternative B — Partial Discharge through an NPDES Permit and Some Storage and Irrigation

Under this alternative, wastewater would be treated and, then either discharged through a NPDES permit or stored and used for irrigation. These effluent discharges would have no effects to geologic resources.

4.1.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this Alternative, the effluent from the WWTP would be discharged to a Class I, Non-hazardous UIC well that would be drilled on the project site. This well would dispose of non-hazardous fluids into isolated formations beneath the lowermost existing or potential future underground source of drinking water. The proposed injection zone would likely be located at great depth; below the lowest potential underground source of drinking water. The injection formation would be tested to evaluate its suitability for disposal. Maximum pressure requirements to prevent initiation and propagation of fractures through overlying strata would be determined. The injectivity tests would be used to determine the fracture pressure limits on overlying material.

The above-described measures would aid in selection of a proper disposal formation; thus, minimizing the potential for effects to subsurface geological resources under this alternative.

4.1.3.3 Alternative D — No Action

Implementation of this alternative would have no effects to geologic resources. No effluent would be generated or discharged because the refinery would not be constructed. Continued use of the project site for agricultural purposes would not affect geologic resources.

4.1.4 Cumulative Impacts

Existing, proposed, and reasonably foreseeable future actions would be unlikely to trigger events such as landslides, mudslides, debris flows, or slumps. Therefore, no incremental increase in cumulative effects associated with geologic hazards would occur.

Because any project impacts related to geology would be localized and limited to the time of construction, cumulative impacts would occur only if another project is planned for construction in proximity or adjacent to the clean fuels refinery project. Currently, there are no other known projects planned in the project area, consequently, there are no anticipated cumulative impacts to geologic resources.

In the event of future new construction in the area, the cumulative effects to the surface geologic environment would be minimized through following proper techniques for facilities construction, operation, and reclamation. Proposed actions and future activities would require reclamation of disturbed lands and would minimize alterations to topography.

4.2 Ground Water Resources

4.2.1 Alternatives 1 and A — Original Proposed Actions

4.2.1.1 Water Quantity

In western North Dakota, the major aquifer groups are: bedrock aquifers, buried valley aquifers, and glacial till deposits that immediately underlie the ground surface. The bedrock aquifers include the Fox Hills-Hell Creek Formation, Tongue River and Sentinel Butte Members of Fort Union Formation. The buried valley aquifers consist of Pleistocene sand and gravel deposits of the Coleharbor Formation present in the major valleys in the general vicinity of the project area. The last aquifer group is represented by the surficial till deposits of the Coleharbor Formation.

Water Supply for the Project

The projected source of water for the refinery would be four water wells finished in the deeper Fox Hills-Hell Creek bedrock aquifer. The maximum projected withdrawal of water from the four on-site wells would be 10 gpm from each or 40 gpm total. Maximum withdrawal would only occur during refinery startup.

During operations, the facility anticipates using recycled water and stormwater runoff which would normally limit makeup water needed from the wells. Normal withdrawal from the wells with recycling of water would be 10 gpm. Ground water would be pumped from the wells to a 5,000-bbl raw water-holding tank and additional water would be stored in the evaporation and discharge ponds. The initial water requirement for startup would be approximately 10 acre-feet.

Water Well Drawdown

Water level changes in the aquifers are not expected to be significant. The proposed withdrawal of up to 40 gpm during startup and 10 gpm under the full recycling option would probably have minimal effects on depth to water or availability of water in the Fox Hills-Hell Creek aquifer because the withdrawal would be over a period of time and recharge to the aquifer is greater than discharge. Potential impacts to individual water wells would depend on proximity to the refinery, depth and completion interval of the water well, and the yield required to maintain the well as a usable source.

Impacts to the Fox Hills-Hell Creek aquifer in terms of well yield or availability would not be significant due to the small magnitude and duration of withdrawals. Approximately 51 million acre-feet of ground water is stored in that portion of the Fox Hills aquifer beneath the Reservation and 24 million acre-feet of ground water is stored in that portion of the Tongue River member beneath the Reservation (Cates and Macek-Rowland 1998). Well yields from the Fox Hills aquifer vary significantly. Wells within Mountrail County yield as little as 3 gpm of water (Armstrong 1971). In contrast, yields of 200 to 400 gpm have been reported in Dunn County (Klausing 1979 as cited in Cates and Macek-Rowland 1998). Only a few Fox Hills wells have been drilled within the Reservation and data on yields for these wells is not available.

The refinery would use the water recycling option following initial startup, thus reducing overall aquifer drawdown. The nearest well completed in the Fox Hills aquifer by the City of Plaza is located approximately four miles from the refinery site. There are no other users of this aquifer located in the immediate vicinity of the project area. The short-term drawdown of the aquifer for initial startup is not anticipated to have any effects on other proximate aquifers or water users. If the refinery does not recycle process wastewater, there would be a long-term water use of 40 gpm or 64.5 acre-feet/year. Depending on conditions in the Fox Hills-Hell Creek aquifer under the site, the no recycling of water option (or limited recycling) may cause greater than expected localized drawdown in the aquifer or additional wells may be needed for water supply.

The majority of the water supply wells used by individuals are finished in shallow glacial aquifers. Typically, the wells do not exceed 150 feet in depth and are usually finished in buried valley aquifers or in the glacial till. No impacts in terms of drawdown are expected to these shallow aquifers due to no direct water withdrawal from these units as well as hydraulic isolation from the deeper units.

4.2.1.2 Water Discharge

Under the Proposed Actions, process water from the refinery would first undergo treatment in the WWTU and then would be directed to holding ponds prior to recycling or discharge through a permitted NPDES outfall. The exact location of the NPDES outfall has not been determined. Potentially contaminated (oily) stormwater would be collected in the holding pond and depending on quality may be sent directly to the additional effluent holding ponds and recycled to the refinery process, discharged through a permitted NPDES outfall, or undergo further treatment in the WWTU.

The facility plans to recycle most wastewater. Under full recycling, Alternative 1 would discharge an average of 10 gpm of treated wastewater and potentially contaminated (oily) stormwater via NPDES permitted Outfall 002. Discharge rates could vary from 0 to a projected maximum of 24.4 gpm. Uncontaminated (non-oily) stormwater would be collected in lined holding ponds (evaporation pond) and used as makeup water for the fire water system or recycled back to the refinery processes, or discharged through NPDES permitted Outfall 001. The discharge from Outfall 001 would be dependent upon precipitation events. Discharge rates could vary from 0 to a projected maximum of 65 gpm.

If the refinery does not recycle wastewater, the facility would discharge an average of 20.4 gpm of treated wastewater and potentially contaminated (oily) stormwater via NPDES permitted Outfall 002. Discharge rates could vary from 0 to a projected maximum of 34.4 gpm. Uncontaminated (non-oily) stormwater would be discharged via NPDES permitted Outfall 001 at 30 gpm on an average with a projected maximum of 95 gpm during certain times of the year. Because of the more continuous nature of NPDES discharges under this option, there could be more recharge to ground water occurring than under the full recycle option.

The flow rates for each potential outfall scenario described above are summarized in Table 4-1.

Table 4-1 Estimated Flow Rates and NPDES Permit Outfalls for Proposed Refinery

	Alternatives 1 and A		Alternative 4 and A
	Full Recycling	Without Recycling	
Outfall 001 - uncontaminated stormwater	Generally no flow, water used to fill the fire water ponds or recycled up to 65 gpm	30 gpm average 0.0 – 95 gpm, flow range	Generally no flow, water used at refinery and to fill the firewater ponds. up to 55 gpm
Outfall 002 - treated waste-water oily stormwater for Alternative 1; treated wastewater only for Alternative 4.	10 gpm average 0.0 - 24.4 gpm, flow range	20.4 gpm average 0.0 – 34.4 gpm, flow range	16 gpm average 0.0 – 34.4 gpm
Outfall 002a - potentially contaminated (oily) stormwater	N/A, included in outfall 002	N/A, included in outfall 002	4.4 gpm average 0.0 – 18.4 gpm
Outfall 003 employee wastewater	N/A, septic tank	N/A, septic tank	3.5 gpm
Total flows from site	10 gpm average, maximum of 89 gpm	50 gpm average, maximum of 130 gpm	20 gpm average maximum of 108 gpm

Note:
1. N/A = not applicable.

Operation of the project septic system would discharge approximately 3.5 gpm into the shallow till in the area of the leach field. This would create a slight mounding of ground water within the till in the area, but it is not expected to result in seepage to the surface. The constant flow of this water would increase the seasonal water levels in the alluvium of the unnamed tributary that drains the site and may contribute to downstream flow during wet periods of the year. Minimal effects would be observed in the East Fork of Shell Creek aquifer. There is a concern whether soils and ground water conditions would accommodate this septic system. During final design, the MHA Nation would perform additional soils evaluation to determine if the septic system would accommodate the discharge. If not, sanitary wastewater may be collected in a tank and pumped into a truck for transport and disposal into the City of Minot Wastewater Treatment Facility or treated in a package wastewater facility and discharged through NPDES permitted Outfall 003 as described in Alternative 4.

Recharge to the upper water bearing zones of the Coleharbor Formation as well as underlying Fort Union Formation is primarily by direct precipitation and infiltration. There is a downward vertical gradient between the till and the underlying Fort Union Formation. Direct discharge into the surface stream would have insignificant effects on water levels in these shallow aquifers primarily due to the low volume of discharge and low hydraulic conductivity of the shallow till material. The hydraulic conductivity in the water table wells screened in the glacial till ranges from 5x10-5 cm/s to 3x10-6 cm/s (GeoTrans, Inc. 2005). Additionally, the majority of the discharge during the winter months would freeze and evaporate before it would infiltrate. During the summer months, a portion of the discharged water would either be used by plants or evaporate and only a small portion would infiltrate into underlying sediments.

Recharge to the Fox Hills-Hell Creek aquifer would not be affected by the discharge as it is minimally recharged by leakage through overlying layers due to its depth (greater than 1,000 feet). Direct recharge of these aquifers occurs outside of the Reservation where the aquifer crops out in the extreme southwestern corner of North Dakota and in eastern Montana (Cates and Macek-Rowland 1998).

4.2.1.3 Construction

Water would be used for construction dust control and earthen compaction. The requirement would be minimal and the source would be runoff stored in the ponds. Construction activities are not expected to impact ground water quantity in any of the three major aquifer groups.

4.2.1.4 Operation

The impacts of daily operations on ground water quantity would be related to the water withdrawal and discharge. Ground water withdrawal from the Fox Hills-Hell Creek aquifer would have an insignificant effect on water table elevations in shallow aquifers. This is primarily because of the relatively small yields and the significant depths to the top of the Fox Hills aquifer. The anticipated withdrawals would not impact the wetland, PEMF#2, because the wetland is a prairie pothole wetland and does not rely significantly on ground water discharge. In addition, the withdrawal of water from the Fox Hills-Hell Creek would be limited to project startup and periods of operation when recycling is not possible.

Minimal impacts are anticipated from effluent discharge to the shallow till and buried valley aquifers primarily due to the low volume of discharge and low hydraulic conductivity of the overlying till material. No impacts to the Fox Hills-Hell Creek aquifer are anticipated from the effluent discharge due to its great depth and hydraulic isolation of the shallow and the deep aquifers.

Another potential impact that could result from ground water extraction is ground surface subsidence. The elevation of the ground surface has the potential to be reduced as the water table is lowered or as the pressure in a confined aquifer is reduced. However, due to the limited drawdown expected in the aquifer and recharge replacing the used water, no subsidence impacts are anticipated.

4.2.1.5 Water Quality

The proposed refinery site is underlain by glacial deposits called till. Based on geologic logs, the till layer ranges from 107 to more than 125 feet in thickness and overlies the Fort Union Formation across the proposed refinery site. The till is composed almost entirely of clay except for a 5- to 10-foot-thick sandy to sandy silt layer that occurs at a depth of about 95 to 105 feet below the surface. The first lignite deposit in the Fort Union Formation was encountered at about 105 to 110 feet. The relatively thick till deposits would retard the migration of contaminants to the underlying Fort Union Formation.

The potential impacts to ground water quality are primarily related to the effluent discharge and accidental spills and leaks.

4.2.1.6 Effluent Discharge

Under the Proposed Actions, all the water discharged through permitted NPDES outfalls would have to meet refinery's effluent discharge criteria. Because all the treated effluent discharged from the outfall would meet the refinery's NPDES permit effluent limits, it would likely be of higher quality than the formation water.

EPA has developed preliminary NPDES effluent limits for wastewater discharges anticipated at the refinery. The draft permit is in Appendix C. These limits have been developed in consideration of Tribally-adopted (Tribal Business Council adopted on May 11, 2000) surface water quality standards for the Reservation, as well as standards for the State of North Dakota and are discussed in more detail in Surface Water section of this Chapter. As stated in Chapter 3, EPA does not have the statutory authority to regulate ground water quality. In addition, the MHA Nation has not promulgated Tribal standards for ground water, does not have a ground water classification system, or a ground water discharge permit system in place.

Accidental Spills and Leaks

Normal refinery operations during the life of the refinery would result in some contamination of ground water and soils underneath the refinery. Ground water contamination could extend off-site if leaks and spills are not addressed properly or if a catastrophic spill occurred. Modern refinery design, construction, and operation practices would be more protective of ground water than historic construction practices at old refineries, such as paving and installing curbing in the loading area, segregating oily wastewater, spill containment and inspection requirements, and equipment and tank standards.

The potential exists for impacts to ground water quality from accidental spills and leaks that are inherent in any refinery operation. For more information on ground water impacts from spills, see the Spills section in this Chapter. Impacts to ground water in the till would be minimized by designing the refinery to prevent and contain leaks and spills. Holding ponds would be lined to prevent or minimize leakage into the ground water.

Measures to implement prompt cleanup and repair of leaks and spills would further minimize potential impacts to ground water underlying the site in the till. In the SWPPP, SPCC plan, and RCRA TSD permit as applicable, there would be requirements to implement prompt cleanup and repair of leaks and spills, and develop contingency planning and reporting, which would further minimize potential impacts to ground water quality underneath the refinery site. The low permeability of the till would also retard movement of contaminants. Ground water in the till is estimated to flow at a rate of 0.4 to 2.4 feet per year (GeoTrans, Inc. 2005). Over a period of 20 years using those flow rates, ground water contamination would be estimated to migrate 8 to 48 feet from the initial point of contamination.

4.2.1.7 Construction

Construction activities are not expected to impact ground water quality, even though there may be potential impacts to soils from inadvertent spills of hazardous materials such as fuel and oil. Protective measures, such as Best Management Practices (BMPs) and the SWPPP, required by the Stormwater Construction General NPDES permit and the SPCC plan would minimize introduction of undesired substances into soils and consequently shallow ground water at the site. No impacts to water quality in deeper aquifers are anticipated during construction activities.

4.2.1.8 Operation

The potential impacts of daily operations on ground water quality are primarily related to water discharge and oil spills and leaks. Contamination could result from the dissolution and mobilization of exposed oil and refined products by precipitation and subsequent infiltration into the surficial aquifers. By following design engineering and operating practices (e.g., promptly implementing spill response plans), impacts on ground water quality would be minimized. Protective measures, such as BMPs and the SWPPP required by the NPDES permit during operations, would also reduce the potential for unanticipated impacts to ground water from spills.

4.2.1.9 Impacts to Drinking Water

Adverse impacts to drinking water quality of individual well users and public supply systems are not anticipated under this alternative.

The nearest well completed in the Fox Hills-Hell Creek aquifer is by the City of Plaza and is located approximately four miles from the refinery site. Impacts to the Fox Hills-Hell Creek in terms of water quality would be insignificant due to its great depth and hydraulic isolation from the shallow aquifers. No other water users of this aquifer are located in the immediate vicinity of the project area.

Residents of Plaza use two additional ground water wells to meet the demand during high usage periods. These wells are completed at depths of 88 and 91 feet in Coleharbor Formation and are located approximately 5 miles northwest of the refinery. Water from these formations is of poor quality and requires treatment prior to distribution. Residents of Makoti obtain water from two ground water wells completed in the Vang aquifer (buried valley aquifer) at depths of 22 and 41 feet. These wells are located approximately 5 miles northeast of the project site. Impacts to water quality are not likely to occur due to the distance of these wells from the refinery site, the limited local extent of these buried valley aquifers, low hydraulic conductivity of the till, and poor formation water quality.

The majority of the domestic wells used by individuals are completed in surficial deposits, primarily the till. Six residences are located within 1 mile of the project area. Two of these residences include the O__ well just north of Highway 23 and the S__ well located south of the property. Wells are completed at depths of 103 and 189 feet respectively, and water has brownish-red appearance with high TDS values. Well water can be used for cattle and horses, although some people haul water for their livestock. These residences haul in water to fill their cisterns for domestic use. Drinking water is purchased separately. There are two water wells located at the east side of the property at the farmhouse. Neither of these wells is currently used, nor are they anticipated to be used in the future.

Impacts to water quality in the shallow till and valley aquifers from project discharges are not anticipated primarily because all the discharged water would be of better quality (meeting the NPDES requirements) than the formation water in the shallow aquifers. Additionally, low volume of discharges and low hydraulic conductivity of the overlying till material would minimize the infiltration rates and volumes.

Potential impacts to shallow ground water might occur because of inadvertent spills or leaks. Protective measures as provided in the SPCC plan, the SWPPP, FRP, and application of BMPs would minimize introduction of undesired substances into soils and consequently shallow ground water.

4.2.1.10 Recharge

Impacts to water quality from recharge to the Fox Hills-Hell Creek aquifer are not anticipated as it is minimally recharged by infiltration through overlying layers and is overlain by low permeability sedimentary rocks and till.

Impacts to water quality from recharge to the upper water bearing zones of the Fort Union Formation would be minimal, primarily because of the low infiltration rates through the overlying till. Impacts to shallow ground water in the till resulting from spills or leaks would be localized, generally underneath the refinery site. If a catastrophic spill occurred, plumes could extend off-site. However, the low permeability of the till would retard movement of contaminants. Ground water in the till is estimated to flow at a rate of 0.4 to 2.4 feet per year (GeoTrans, Inc. 2005). Over a period of 20 years using those flow rates, ground water contamination would be estimated to migrate 8 to 48 feet from the initial point of contamination. Protective measures as provided in the SPCC plan, FRP, the SWPPP, RCRA TSD permit, application of BMPs, and meeting NPDES requirements would minimize introduction of undesired substances into soils and consequently shallow ground water.

4.2.1.11 Reclamation/Closure Impacts

At some point in the life of the refinery, the decision would be made to cease refinery operations and permanently close the facility. The closure of the refinery would be expected to follow a process of decommissioning, decontamination, and demolition, followed by cleanup of any remaining soil and ground water contamination and final reclamation of the site. These activities would be carefully managed in order to minimize impacts to the environment and other receptors such as area residents. Under Alternatives 1 and A, the proposed refinery would be a TSD Facility, and thus part of the overall closure and reclamation planning would be outlined in the required RCRA “closure plan”. For more information about the RCRA “closure plan” see the Solid and Hazardous Waste section in this Chapter.

Over time, normal refinery operations would be expected to result in local (generally underneath the refinery site) contamination of soils and ground water. However, impacts should be minimized through effective design considerations, operating practices and environmental management systems, as well as adherence to the FRP, SPCC, and SWPP plans. As a RCRA TSD Facility monitoring would be required for ground water contamination throughout the life of the refinery and cleanup activities would have to commence at the time when any contamination was discovered. Depending on the constituents in the ground water and the extent of contamination, ground water cleanup activities can take a long time (years) delaying final closure and cleanup which can be very costly. The site would need to be cleaned up to levels that are protective of human health and the environment. If the hazardous waste surface impoundments are not clean-closed, a RCRA post-closure permit would be required.

4.2.2 Construction Alternatives

4.2.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the entire 468.39-acre site would be accepted into trust status, but construction and operation of the refinery project would not go forward. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. The MHA Nation could decide to use the entire project site to produce feed or forage hay for buffalo, or the land could be included in BIA’s leasing program. Based on the foregoing, impacts to ground water resources would be similar to the existing conditions.

4.2.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Under this alternative, the magnitude and type of effects would be similar to those presented under Alternative 1.

4.2.2.3 Alternative 4 — Modified Proposed Action

Under this alternative, the entire 468.39-acre site would be accepted into trust status for construction and operation of the proposed refinery with refinery design modifications and production of buffalo forage. The process water from the refinery would first undergo treatment in the WWTU and then would be directed to release tanks prior to discharge through the permitted NPDES Outfall 002 to the wetlands area and an unnamed tributary to the East Fork of Shell Creek. The main difference from the Proposed Action is that there would be no process wastewater recycling under this alternative.

Potentially contaminated (oily) stormwater would be directly conveyed to a group of surge tanks instead of the retention ponds described in Alternative 1. After testing, the water would be routed to WWTU or directed to release tanks and discharged through NPDES permitted Outfall 002a. The surge tanks would be underground and made of double wall steel or equivalent in compliance with 40 CFR 265 subpart J. Multiple surge tanks would be used to minimize the size and risk of potential leakage. Leak detection would be part of the tank design.

This alternative would discharge an average of 20.4 gpm via Outfalls 002 and 002a (Table 4-1). Discharge rates could however vary up to a maximum of 52.8 gpm. Impacts to ground water resources would be similar to those described in Alternative 1 with the following exceptions. There would be a potential for slightly higher recharge from the increased discharge under this alternative. However, storage in multiple double wall (including double floor) steel surge tanks with leak detection systems would provide some storage capacity and minimize risk and size of potential leaks.

Another difference between Alternatives 4 and A, and Alternatives 1 and A; is the level of reuse of contaminated (oily) stormwater. In replacing the holding ponds with tanks, storage volume would be reduced. For this alternative under the normal operation, up to 40 gpm would be recycled to the plant and any excess (up to 55 gpm) would be discharged via NPDES permitted Outfall 001. There is also a difference in that all of the recycle (makeup) water would be coming from the uncontaminated stormwater. Stormwater available for makeup water would be the runoff from normal precipitation, minus evaporative losses from the fire ponds and the quantity of water needed to maintain the integrity of the evaporation pond liner through dry spells.

Sanitary wastewater would either be collected in a holding tank and transferred by truck to a municipal wastewater treatment facility (i.e. City of Minot) or treated on site in a package WWTP. If the wastewater is trucked off site there would be no impact to ground water. If the package plant option is selected, an additional 3.5 gpm of flow of treated sanitary wastewater would be discharged via NPDES permitted Outfall 003. The effect of this additional flow on ground water quality and quantity is not anticipated to be significantly different from the impacts discussed for Alternatives 1 and A.

Overall, under this alternative the impacts to ground water quantity and quality from recharge would be essentially the same as the no recycle option under the Alternatives 1 and A. Flows from this alternative would average 20 gpm and peak at 53 gpm from Outfalls 002 and 002a and 0 gpm average and 55 gpm from Outfall 001 for a total of 20 gpm average and 108 gpm maximum for all discharges (Table 4-1). Under the Alternatives 1 and A, flows were 10 gpm average and 89 gpm maximum (full recycle) and 50 gpm average and 130 gpm maximum (no recycle).

After the refinery ceases operations, the ground water cleanup could be delayed because the refinery would not be subject to RCRA requirements and thus a RCRA “closure plan” would not be in place nor would there be any funding set aside for implementing RCRA corrective action.

4.2.2.4 Alternative 5 — No Action

Under this alternative, the entire 468.39-acre site would not be accepted into trust status. The proposed refinery would not be constructed. Therefore, the 468.39-acre project site would continue to be used for agricultural purposes, which have occurred for decades. The types of direct and indirect effects occurring to ground water resources from agricultural practices would continue under existing conditions.

4.2.3 Effluent Discharge Alternatives

The effluent discharge alternative analysis addresses impacts to ground water resources from different water handling discharge alternatives. The effluent discharge alternatives include options to discharge treated wastewater to surface water through permitted NPDES outfalls, use in irrigation/land application, and disposal in an UIC well.

4.2.3.1 Alternative B — Partial Discharge through an NPDES Permit and Some Storage and Irrigation

Under this alternative, the wastewater, including treated process water, potentially contaminated (oily) stormwater, and uncontaminated (non-oily) stormwater, would be discharged into the wetland area and the unnamed tributary of the East Fork of Shell Creek through NPDES permitted outfalls or used for irrigation. Impacts to ground water resources under this alternative would be the same as those described in Alternative A when wastewater is discharged through the NPDES permitted outfalls. There would be less flow when water is used for irrigation.

Based on the shallow depth to ground water it is likely that some percentage of the wastewater applied as irrigation water would infiltrate vertically downward to the water table. The impacts from this recharge would depend on the degree of treatment prior to land application and whether or not agricultural chemicals would be used on the cropland to be irrigated.

4.2.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, all the wastewater including treated process water, potentially contaminated (oily) stormwater, and uncontaminated (non-oily) stormwater would be discharged to a Class I, Non-hazardous UIC well that would be drilled on the project site. This well would dispose of non-hazardous fluids into isolated formations beneath the lowermost existing or potential source of drinking water. Discharge through injection is controlled by the UIC Program administered by EPA that is designed to protect underground sources of drinking water.

The proposed injection zone would likely be located at a depth below the lowest potential underground source of drinking water. The injection formation would be tested to evaluate its suitability for disposal. Maximum pressure requirements to prevent initiation and propagation of fractures through overlying strata to any zones of fresh water would be determined. The injectivity tests would be used to determine the fracture pressure limits on overlying material.

Since the treated effluent would be non-hazardous, it is anticipated that it would be of equal or higher quality in regards to class of use than the water in the proposed injection formation. Injection of wastewater is not expected to cause any deterioration in ground water quality in the injection formation. The primary effect on the injection formation would be an increase in the hydraulic head emanating from the injection well, which would dissipate with distance away from the well bore. In terms of water quantity and quality, the effects on the injection formation would be minimal.

4.2.3.3 Alternative D — No Action

Implementation of this alternative would result in no effects to ground water resources. The refinery would not be constructed, thus no impacts due to effluent discharge would occur.

4.2.4 Cumulative Impacts

A number of foreseeable actions have been identified that could produce impacts to ground water resources on the Reservation. These actions could interact cumulatively with impacts from the Proposed Action. Impacts to ground water resources include reduced quantities of water available and degraded water quality.

Oil and gas exploration, development, production, and transportation; continued agricultural activities, and community use of ground water could cumulatively affect the quantity and quality of ground water. While ground water resources could be used for such activities as drilling, road construction, industrial construction, dust control, agricultural purposes, and human consumption, future water needs on the Reservation would most likely be met by using surface water resources or Lake Sakakawea water. Therefore, cumulative impacts to the available ground water supply for other reasonably foreseeable actions would be negligible.

The majority of cumulative impacts to ground water quality are from the direct and indirect impacts to shallow ground water from the proposed refinery. Ground water quality impacts will be localized, generally remaining underneath the refinery. Other existing and reasonably foreseeable actions in the area would be negligible or minor sources of additional ground water quality impacts.

4.3 Surface Water Resources

Surface water resources of the Reservation consist of many perennial, intermittent, and ephemeral streams and the Missouri River (Lake Sakakawea). The project site is located in the Shell Creek and the East Fork Shell Creek drainages. These streams are intermittent in the project area and have extended periods without flow. An unnamed tributary of the East Fork Shell Creek drains the project site. This tributary consists of a man modified wetland swale that connects two wetland areas on the western end of the site. The wetland swale is generally dry for most of the year.

4.3.1 Alternatives 1 and A — Original Proposed Actions

During construction of the project, all site runoff would be captured and routed to the retention ponds constructed at the beginning of construction activities. This measure would allow for the capture of surface runoff to reduce the discharge of sediments in the stormwater. The ponds would be sized to retain a 100-year, 24-hour storm event. Release of stormwater would be from the ponds after settling has occurred and the water meets NPDES permitted effluent limitations established for the site. Upon completion of construction activities, all sediment captured within the retention ponds would be dredged and disposed of within a properly permitted off-site disposal site. The retention ponds would be lined prior to operation of the refinery. This drainage control system would be established at the start of the construction phase of the project to minimize contributions of sediment to the wetland and the East Fork Shell Creek. Silt fences and/or straw bales would also be used to control runoff from areas outside of the drainage control system. Disturbed areas not used for operational facilities would be revegetated as soon as possible to reduce runoff and sedimentation. Specific controls would be established in a SWPPP for the construction phase of the project.

During operations of the project, all uncontaminated (non-oily) site runoff would continue to be captured and used to maintain the fire water system. Recycling of this wastewater would occur to the extent possible or wastewater would be discharged through NPDES permitted Outfall 001. Potentially contaminated (oily) wastewater would be treated in the WWTU and recycled to the extent possible as makeup water in the refinery process or discharged through NPDES permitted Outfall 002. Depending on the water balance at the facility, there would be periods of zero discharge except during major storm events. In all cases, any discharge from the site would meet NPDES permitted effluent limitations established for the project. The net effect of the project on surface water flow would be the reduction of 190 acres of drainage basin area from the East Fork of Shell Creek. This reduction of stream flow contribution would have minimal effects on the hydrologic characteristics of the onsite wetland swale or the East Fork Shell Creek. Any discharges from the WWTP effluent holding ponds or evaporation pond would offset a portion of the reduced flow.

Facilities would be placed and operations would be conducted on impermeable surfaces such as concrete, asphalt, or geotextile that are curbed and guttered. This would minimize the possibility of surface water contamination from spills. Spills or accidents that may jeopardize the integrity of the impermeable layers would be remediated and/or repaired as appropriate. Monitoring plans with appropriate contingencies mandated, as well as BMPs by various statutes are required for the operation of the facility.

4.3.1.1 Construction

Construction of the refinery, pipelines, and transmission lines would require disturbance of soils and could potentially result in transport of sediment during precipitation events. This potential transport of sediment could enter nearby drainages or wetlands and cause an adverse effect on surface water quality. The potential is somewhat limited because of the relative flatness of the terrain and existing vegetation, which would slow or stop sediment movement. However, in construction areas immediately adjacent to surface water drainages or wetlands, there would be increased potential for sediment in stormwater or degradation of stormwater quality.

Stormwater Management

Construction activities utilize vehicles, equipment, and petroleum products to conduct daily operations. The use of petroleum products could potentially result in leaks or spills to soils, which could cause surface water contamination. Surface waters are typically indirectly affected by receiving potentially contaminated (oily) runoff from construction sites. Stormwater runoff from these areas would be controlled by an NPDES stormwater permit and a SWPPP, which includes a stormwater management and sedimentation control plan designed to minimize the potential discharge of silt, solids, and other contaminants to surface water streams from the runoff. Provisions would be made to collect stormwater where appropriate to control silt and suspended solids before discharge to a surface stream, such as East Fork of Shell Creek.

The project would implement several programs to minimize the potential for construction activities to impact surface water quality. The project would be required to develop and implement a SWPPP for the construction phase. The SWPPP would identify all of the possible activities and incidents that could contaminate storm or surface water and would contain BMPs that would be implemented to prevent contamination. Examples of BMPs and related measures include installation of silt fences, installation of hay bales in drainages, installation of a stormwater retention pond to collect water generated on the project site, procedures for handling chemicals and oil spills, emergency response procedures and maintenance of spill response equipment. By following BMPs and requirements in the SWPPP (e.g., stockpiling materials away from surface drainage paths, covering construction materials with tarps, and containing and cleaning up spills), direct and indirect impacts to surface water quality would be minimized.

Pipeline Hydrostatic Test Water

It is envisioned that the proposed project may generate hydrostatic test water in the later phases of the construction schedule. Water is used to fill certain pipelines and tanks to confirm their structural integrity and to test for leaks. Raw water would be used for this purpose, and the resulting water, after testing, may have the potential to contain concentrations of oil and suspended solids. Depending on where and when the hydrostatic testing occurs, the water may be disposed of in the refinery's water treatment system and be recycled or discharged under an NPDES discharge permit, which would be a permit separate from the refinery's NPDES operational and stormwater construction permits. Discharge under the permit would require that the hydrostatic test water meet specific NPDES permitted discharge limits.

4.3.1.2 Operation

Effluent Discharge

As detailed in Chapter 2, the refinery would generate three types of wastewater: (1) sanitary waste water, (2) uncontaminated (non-oily) water, and (3) contaminated (process wastewater) and potentially contaminated (oily) water. Each of these streams of waste water would be handled separately. They would also receive different levels of treatment. Operation of the project would generate process waste water effluent which combined with potentially contaminated (oily) stormwater would generate an average of 10 gpm or about 5.1 million gallons of effluent per year. Discharge rates could however vary from 0 to a maximum of 24.4 gpm (wastewater treatment with full recycling). Uncontaminated (non-oily) stormwater would not normally be discharged, but at certain times as much as 65 gpm could be discharged. Under the no recycling option discharges through NPDES permitted Outfall 002 are expected to be 20 gpm on an average with a projected maximum of 34 gpm. Uncontaminated (non-oily) stormwater would be discharged via NPDES permitted Outfall 001 at an average rate of 30 gpm with a projected maximum of 95 gpm. The total flows for the full recycle option average 10 gpm with a maximum of 89 gpm and for the no recycle option average 50 gpm with a maximum of 130 gpm. The various discharge rates are summarized in Table 4-1. Because of minimal flow conditions in the wetland swale, discharge effluent would only be diluted during the spring runoff period and major precipitation events where runoff is generated. Some dilution is available at certain times of the year at the confluence with the East Fork of Shell Creek and additional dilution would occur year round at the confluence with the Missouri River (Lake Sakakawea).

Sanitary Waste Water

Because the project would be designed to operate with a small staff of operating personnel (86 employees), the volume of sanitary sewage generated daily would be relatively small, estimated at 3.5 gpm. Sanitary sewage would be treated using an on-site septic system and leach field. This septic system would be designed and installed according to the EPA's standards and regulations. Treated sewage from the septic system would slowly percolate into the ground and would not have a significant effect on surface water quality or quantity.

Uncontaminated Water

Uncontaminated (non-oily) water would consist of wastewater from certain isolated refinery processes, i.e. boiler blowdown. This wastewater would be routed to the WRP for treatment and recycling. Because uncontaminated (non-oily) water would be fully recycled, there would be no discharge to surface waters.

Uncontaminated (non-oily) stormwater would be collected from the maintenance facility, administration building, roads and parking lot areas. This stormwater would be collected in an evaporation pond and either recycled to the refinery process, or routed to the firewater reservoirs to maintain the levels of water in these facilities. Uncontaminated (non-oily) stormwater would not normally be discharged, but at certain times of the year or during high precipitation periods as much as 65 gpm could be discharged via NPDES permitted Outfall 001. Contribution to stream flow from these occasional discharges is not anticipated to have significant impact on East Fork of Shell Creek and downstream wetlands. Because uncontaminated (non-oily) stormwater would be recycled, evaporated, or discharged under the NPDES Permit, the effects on surface water quality would be minimal.

Process Wastewater and Potentially Contaminated Stormwater

The third stream of wastewater would consist of process wastewater that is collected from process units directly and potentially contaminated (oily) stormwater collected from the process area, product loading area, and tank farm. All process wastewater would be routed to the WWTU for treatment. There would be no direct discharge of untreated process wastewater to surface waters.

Potentially contaminated (oily) stormwater collected from the process area, product loading area, and tank farm would be collected and routed to a holding pond designed to store water from a 100-year, 24-hour storm event. Depending on the quality of the holding pond water, it would either be routed directly to additional effluent holding ponds prior to recycle or discharge to surface water or to the WWTU for further treatment. Accumulated potentially contaminated (oily) stormwater that is to be directed to the WWTU would first pass through an API separator. From the API separator, the water would be routed to a DAF system. Wastewater effluent from the DAF system would then be directed to the bio-treatment plant. Wastewater effluent from the bio-treatment plant would be held in the two holding ponds and tested. If testing suggests that additional treatment is needed, the water would be rerouted back through the WWTU. The effluent would then be recycled back to the refinery process as much as possible. If the water meets the refinery's criteria for discharge, it would be released through NPDES permitted Outfall 002.

The project would be required to develop and implement a SWPPP under the NPDES permit for the operations at the facility. The SWPPP would identify areas that have a potential for pollutants entering into the stormwater systems at the facility and BMPs to minimize pollutant introductions from those identified sources. These areas at the proposed facility include raw material, intermediate and final product storage facilities, loading and unloading operations and refinery process areas.

This alternative would discharge an average of 10 gpm via Outfall 002. Discharge rates could however vary from 0 to a maximum of 24.4 gpm (wastewater treatment with full recycling). The discharged water would likely flow from the on-site wetland into the wetland north of the project site and continue to the East Fork of Shell Creek. Quantitative impacts to stream flows are not anticipated to be significant and are discussed in more detail under the Wetland section of this Chapter. Because all contaminated (oily) wastewater and potentially contaminated (oily) stormwater would be treated prior to discharge under the NPDES permit, the effects on surface water quality would be minimal.

Recharge

Near-surface water tables would likely experience increases in water levels from operation-produced water discharges. The increase in water level may be exhibited as standing or flowing water in areas not previously displaying these conditions and additional wetland development. A portion of the water released to the local surface drainage may recharge shallow aquifers, however, this recharge would be minimal due to the low permeability of the till and presence of the clay layer underlying the site.

Flow Alterations

Construction of project facilities including stormwater diversion ditches would result in alteration of surface water flow across the site. Runoff flow from upslope would be diverted and flow onsite from precipitation events would be directed to the stormwater collection system, thus reducing the direct runoff to wetland PEMF#2. Any discharges from the WWTP effluent holding ponds or stormwater holding ponds would offset a portion of the reduced flow.

The primary potential impact to surface water would be related to diversion of the section of the unnamed tributary wetland to East Fork Shell Creek. The unnamed tributary is characterized as an intermittent stream, primarily regulated by periods of snowmelt, direct precipitation, and surface runoff. Diversion of the stream channel could potentially increase sedimentation due to lack of vegetative cover and channel slope erosion. BMPs would be implemented to prevent these impacts. A SWPPP detailing the sediment and erosion control measures and any BMPs would be developed in accordance with the construction General Stormwater NPDES permit.

As with other facilities, any access/maintenance roads and pipelines would result in immediate alteration of surface water flows in the immediate vicinity of the roads and pipeline. BMPs would be implemented to mitigate these impacts.

Water Quality

Water quality of the unnamed tributary to the East Fork Shell Creek would be affected by the discharges from the refinery operations. Contribution of treated effluent and stormwater from the refinery would substitute a portion of the runoff from the agricultural lands. Refinery wastewater and potentially contaminated (oily) storm water would be treated extensively prior to discharge, however there would be some changes in water quality from existing conditions.

EPA has developed NPDES effluent limitations for wastewater discharges anticipated at the refinery (see draft NPDES permit in Appendix C). These limitations have been developed in consideration of Tribal water quality standards for the Reservation, as well as standards for the State of North Dakota. All water discharged from the refinery outfalls would meet the effluent limits, thus would have no adverse impacts on surface water quality.

Table 4-2 lists the EPA Effluent Limitations and the Monitoring Schedule is provided in Table 4-3. In addition to the requirements shown in Table 4-3, monitoring would be required at 90 and 270 days after startup of the facility for total metals found on Table III of 40 CFR §122, Appendix D and volatile, acid, and base/neutral compounds found on Table II of 40 CFR §122, Appendix D.

Additionally, the uncontaminated (non-oily) stormwater discharges would also be covered under the permitted NPDES outfall with effluent limits developed in consideration of Tribal and State water quality standards as well as EPA water quality criteria. Specific effluent limitations applicable to each potential outfall are contained in the NPDES permit in Appendix C.

The potential exists for impacts to water quality either from sediment loading during the construction phase or from accidental spills and leaks during construction and operation. A SWPPP and any additional BMPs needed would be developed in accordance with the construction stormwater NPDES permit and operational NPDES permit. The SWPPPs and BMPs would detail the sediment and erosion control measures and prevent/limit clean water becoming contaminated with spilt synthetic crude oil, product or oily waste. The SPCC plan and FRP require containment of petroleum-based products and require prompt and effective cleanups if spills occur.

Wetlands

Under this alternative discharge effluent from the refinery would flow into wetland PEMF#2. This wetland is on the western side of the site next to Highway 23 in the NW ¼ of Section 19. The total area including the ponded wetland and swale is approximately 11.7 acres. The wetland connects to an unnamed tributary of the East Fork of Shell Creek, located about a mile downstream of the proposed outfalls. The wetland has been classified as a palustrine emergent semi-permanently flooded (PEMF#2) (Wetlands Technical Report, BIA, November, 2005). Wetland PEMF#2 is an ephemeral prairie pothole wetland that has been altered by road construction and construction of a drainage system in the 1970's. The wetland is fed by surface runoff from precipitation. Field inspection and water quality data indicate that the wetland is in a healthy, functioning condition.

Table 4-2 Preliminary Draft Effluent Limitation for Refinery Process Wastewater and Oily Stormwater

Effluent Characteristic	30-day Average	Daily Maximum
Flow (million gallons/day)	0.02	0.05
Biochemical Oxygen Demand (BOD) (lbs/day)[a]	43	81
Total Suspended Solids (lbs/day)[a]	35	55
Chemical Oxygen Demand (lbs/day)[a]	255	500
Oil and Grease (lbs/day)[a]	13.8	25.4
Phenolic Compounds (lbs/day)[a]	0.29	0.59
Total Chromium (lbs/day)[a]	0.35	0.99
Hexavalent Chromium (lbs/day)[b]	0.0018	0.0067
Ammonia as N (mg/L)[b,e]	1.1	3.2
Benzene (µg/L)[b]	2.2	NA
Ethyl Benzene (µg/L)[b]	530	NA
Toluene (µg/L)[b]	1,300	NA
Phenol (µg/L)[b]	300	NA
Sulfide (µg/L)[b]	2	NA
Fluoride (µg/L)[c]	4,000	NA
Nitrate (µg/L)[b]	10,000	NA
Nitrite (µg/L)[b]	1,000	NA
Aluminum (tr) (µg/L)[b,h]	87	750
Barium (tr) (µg/L)[b,h]	1,000	NA
Chromium VI (d) (µg/L)[b,h]	11	16
Iron (tr) (µg/L)[b,h]	300	NA
Manganese (tr) (µg/L)[b,h]	50	NA
Mercury (T) (µg/L)[b,h]	0.012[f]	1.4
Nickel (d) (µg/L) [b,g,h]	132	1,186
Selenium (µg/L)[b,h]	5	20

The pH of the effluent shall not be less than 7.0 standard units or greater than 9.0 standard units in any single sample or analysis

From April 1 through September 30, the concentration of dissolved oxygen in the effluent shall be greater than 8.0 mg/L (1-day minimum), 9.5 mg/L (7-day mean), and 6.5 mg/L (30-day mean).

From October 1 through March 31, the concentration of dissolved oxygen in the effluent shall be greater than 4.0 mg/L (1-day minimum), 5.0 mg/L (7-day mean), and 6.5 mg/L (30-day mean).[c]

There shall be no Acute Toxicity in 100% effluent. The LC_{50} shall be > 100%.[d]

There shall be no Chronic Toxicity in 100% effluent. The IC_{25} shall be > 100%.[d]

Notes:

a. The limits are based on 40 CFR §419, Effluent Guidelines for the Petroleum Refining Point Source Category.
b. The limits are based on EPA recommended §304(a) water quality criteria, November 2002 and December 2003.
c. The limits are based on Three Affiliated Tribes adopted Water Quality Standards.
d. The limits are based on 1997 EPA Region 8 WET Policy.
e. Ammonia limits are based on an estimated effluent pH of 8.5 standard units and temperature 15ºC.
f. Limit is based on Region 8 recommended criteria for protection of fish tissue.
g. Limit is calculated using an estimated hardness value of 300 mg/L as $CaCO_3$.
h. (d) = dissolved, (T) = total, (tr) = total recoverable, NA = not applicable.

Table 4-3 Preliminary Draft Monitoring Schedule for Refinery Process Wastewater and Oily Stormwater

Parameter	Monitoring Frequency	Sample Type
Flow (million gallons/day)	Daily	Continuous
Biochemical Oxygen Demand (BOD) (lbs/day)	2 times per week	Composite
Total Suspended Solids (lbs/day)	2 times per week	Composite
Chemical Oxygen Demand (lbs/day)	Monthly	Composite
Oil and Grease (lbs/day)	Weekly	Grab
Phenolic Compounds (lbs/day)	Monthly	Grab
Total Chromium (lbs/day)	Monthly	Composite
Hexavalent Chromium (lbs/day)	Monthly	Grab
Ammonia as N (mg/L)	Weekly	Composite
Benzene (µg/L)	Monthly	Grab
Ethyl Benzene (µg/L)	Monthly	Grab
Toluene (µg/L)	Monthly	Grab
Phenol (µg/L)	Monthly	Grab
Sulfide (µg/L)	Weekly	Grab
Fluoride (µg/L)	Monthly	Composite
Nitrate (µg/L)	Monthly	Composite
Nitrite (µg/L)	Monthly	Composite
Aluminum (tr) (µg/L)	Monthly	Composite
Barium (tr) (µg/L)	Monthly	Composite
Chromium VI (d) (µg/L)	Monthly	Composite
Iron (tr) (µg/L)	Monthly	Composite
Manganese (tr) (µg/L)	Monthly	Composite
Mercury (T) (µg/L)	Monthly	Composite
Nickel (d) (µg/L)	Monthly	Composite
Selenium (µg/L)	Monthly	Composite
pH (standard units)	Daily	Continuous or Grab
Dissolved Oxygen (mg/L)	Daily	Grab
Whole Effluent Toxicity (Chronic)	Quarterly	Composite
Whole Effluent Toxicity (Acute)	Quarterly	Grab

The proposed refinery would change flow conditions in the wetland PEMF#2 and the unnamed tributary to the East Fork of Shell Creek. Flow would be discharged more continuously throughout the year, depending on the how much water is being recycled at the refinery. When the refinery is recycling water, the average discharge rate would be 10 gpm (5.1 million gallons per year or 16 acre feet) with a peak discharge rate of 89 gpm. If water is not being recycled, the average discharge rate would be 50 gpm (26 million gallons per year or 80 acre feet) and the peak discharge rate would be 130 gpm.

Under a full recycle scenario it is expected that much of the runoff water would be used by the refinery. This would reduce the volume that flows into wetland PEMF#2 from the refinery site.

If the refinery does not recycle process water or use runoff, the additional water to wetland PEMF#2 would likely cause the wetland area to become more permanently flooded. This would result in changes to wetland characteristics such as increasing obligate vegetation (cattails) within the wetland or increasing open water areas. The size of the wetland would be controlled by discharge through the culvert under Highway 23. The wetlands to the north of Highway 23 would also be impacted by the additional water. As a result of the development of the refinery, the amount of surface runoff and/or shallow subsurface water discharge to the wetland would likely increase. This would contribute to the likelihood of a shift from a semi-permanent wetland with periodic drying to permanent wetland type for PEMF#2. This would change typical conditions in the wetland. The upper areas of the wetland have been observed to dry out periodically. Most prairie pothole wetlands periodically dry out or partially dry out. There would be a similar shift to the unnamed tributary of the East Fork of Shell Creek.

Erosion and sedimentation impacts would not be anticipated to the wetlands and the unnamed tributary from increased average discharge flows rates. However, erosion and sedimentation would be greater during peak flows, which are estimated to be as high as 130 gpm. The drainage channels would adjust to changes that result from erosion and sedimentation from peak flows. A SWPPP detailing sediment and erosion control measures and any BMPs would be developed in accordance with the facility’s NPDES permit.

4.3.2 Construction Alternatives

4.3.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the entire 468.39-acre site would be accepted into trust status, but construction and operation of the refinery project would not go forward. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. The MHA Nation could decide to use the entire project site to produce feed for forage for buffalo or the land could be included in BIA’s leasing program. Based on the foregoing, impacts to surface water resources would be similar to the existing conditions.

4.3.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Under this alternative, the magnitude and type of effects would be the same as those presented under Alternatives 1 and A.

4.3.2.3 Alternative 4 — Modified Proposed Action

Under this alternative, the refinery layout would be reconfigured such that the final design would impact less than 0.1 acre of the PEMF#2 wetland reducing direct wetland impacts. The wetland swale would not be diverted and reconstructed around the refinery units as proposed in Alternative 1, reducing construction disturbance and wetland impacts.

As in Alternatives 1 and A, effluent from the refinery would flow into the PEMF#2 wetland connecting to an unnamed tributary of the East Fork of Shell Creek. Flow would be discharged more continuously throughout the year similar to Alternative A under the no recycle option as there would be no process wastewater recycling under this alternative. The average discharge rate would be from all of the outfalls would be 24 gpm (12.6 million gallons per year) and the peak discharge rate would be 111 gpm (58 million gallons per year).

The individual outfalls would undergo different treatments and have different flow amounts. The process water from the refinery would first undergo treatment in the WWTU and then would be directed to release tanks prior to discharge through permitted NPDES Outfall 002 to the PEMF#2 wetland. The flow from this outfall would be from 0 to 34.4 gpm with an average of 16 gpm.

Potentially contaminated (oily) stormwater would be directly conveyed to a group of surge tanks, which would replace the retention ponds from the Proposed Action alternative (Alternative 1). After testing, the water would be recycled to WWTU or directed to Release Tanks and discharged through Outfall 002a at a rate range of 0 to 18.4 gpm with an average discharge of 4.4 gpm. The surge tanks would be underground shallow tanks made of double walled steel or equivalent in compliance with 40 CFR 265, Subpart J. The advantage of multiple surge tanks is that individual tanks can be removed from use for repair or cleaning without interrupting the entire facility operation.

The sanitary waste handling has not been determined for Alternative 4. There are two options being considered: capturing employee wastewater in a holding tank to be trucked off-site or treating the wastewater on-site with the commercial package treatment plant that would discharge at the rate of approximately 3.5 gpm through Outfall 003.

The difference between this alternative and Alternatives 1 and A is that there is a slightly smaller footprint for the facility, therefore, less stormwater capture from uncontaminated areas of the facility. There would still be recycling of the captured stormwater to the fire ponds and plant processes. The discharge rate from Outfall 001 ranges from 0 to 55 gpm with an average of 0 gpm

4.3.2.4 Alternative 5 — No Action

Under this alternative, the entire 468.39-acre site would not be accepted into trust status. The proposed refinery would not be constructed. Therefore, the 468.39-acre project site would continue to be used for agricultural purposes, which have occurred for decades. The types of direct and indirect effects occurring to surface water resources from agricultural practices would continue under existing conditions.

4.3.3 Effluent Discharge Alternatives

4.3.3.1 Alternative B — Partial Discharge through an NPDES permit and Some Storage and Irrigation

Under this alternative, all the wastewater including process water and potentially contaminated (oily) and uncontaminated (non-oily) stormwater would be discharged through NPDES permitted outfalls or used for irrigation. Thus, surface water impacts related to this alternative would be slightly less than those described for Alternative A. The land application site would be designed and operated to prevent runoff of land applied wastewater into surface waters.

4.3.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this Alternative, all the wastewater including process water and potentially contaminated (oily) and uncontaminated (non-oily) stormwater would be discharged to a Class I, Non-hazardous UIC well that would be drilled on the project site. This well would dispose of non-hazardous fluids into isolated formations beneath the lowermost existing or potential future source of drinking water. Discharge through injection is controlled by the UIC Program that is designed to protect underground sources of drinking water. Because all of the wastewater would be disposed through injection into a deep underground formation, no impacts to surface water quality would be anticipated under this alternative. The water would be lost for surface uses such as irrigation or water additions to the East Fork of Shell Creek drainage.

4.3.3.3 Alternative D — No Action

Implementation of this alternative would result in no effects to surface water resources. The refinery would not be constructed and no effluent would be discharged. Sheet flow from precipitation events would continue to affect surface water on the project side just as it does now.

4.3.4 Cumulative Impacts

Cumulative impacts to surface water could occur from any ongoing and reasonably foreseeable future activities. The majority of activities contributing to surface water cumulative impacts would be related to historic and ongoing agricultural activities. These activities could interact cumulatively with impacts from the proposed action and the no-action alternatives. Impacting factors related to these foreseeable activities include water discharges; erosion and sedimentation; bank and channel modifications; water use and accidental spills. Potential impacts of these factors on surface water resources include reduced quantities of water and degraded water quality.

Regional agricultural practices (including runoff) are the primary source of impacts to surface water quality. By following guidelines established by the appropriate discharge permits, meeting restrictions on the storage of toxic construction and operation materials, and meeting requirements for cleanup of toxic materials as part of construction and normal operations, cumulative impacts on water quality would be minimized.

4.4 Spills

4.4.1 Alternatives 1 and A — Original Proposed Actions

Chemicals, raw crude oil, and refined products would be stored at the refinery facility in aboveground storage tanks, containers, or drums. The movement and storage of raw crude oil and processed product within the tank farm, processing area, and product loading area is part of the complex bulk product distribution, refining, and storage system on the refinery. The complexity of the refining process and amount of stored oil, product, and chemicals moving through the system provides opportunities for accidents, spills, leaks, and losses from simple volatilization.

Petroleum products are released to the environment through accidents, as managed releases, or as unintended by-products of industrial, commercial, or private actions or accidents. Most spills involve either crude or bulk fuels (e.g., distillates) such as fuel oils. Consistent national statistics are lacking for many stages in the overall oil refining and distribution system. The main exceptions involve larger leaks and spills, especially those in coastal areas or on larger rivers and streams.

Because many releases of petroleum to environmental resources involve unintentional leakage or spillage, it can be helpful to present some rough estimates of release from various categories of activities or components within the overall petroleum production and distribution system. The ATSDR (1999) estimated the total amount of leakage or spillage related to petroleum product production, processing, and distribution to end users at around 134 million bbl per year. Table 4-4 details the estimated releases from the petroleum industry.

As detailed on Table 4-4, the major components from the oil production and distribution system that cause releases include: above ground tanks (47 percent), tank bottoms and refinery waste (18 percent), evaporative losses (14 percent), and used motor oil (10 percent). Also, Table 4-4 shows that the total amount of leakage or spillage related to the petroleum product production, processing, and distribution was estimated to be around 134 million bbl per year.

Yoshioka and Carpenter (2002) analyzed Oil Spill Intelligence Report (OSIR) and Emergency Response Notification System (ERNS) data on reported oil spills on inland and coastal spill characteristics such as the number of spills, spill sizes, spill sources, and the types of oil spilled. Previous studies indicated that vessels are a major source of inland oil spills and that refined petroleum products dominate inland spills whereas crude oil spills are common in coastal areas.

However, their examination of data on large spills indicates that pipelines are the most significant spill source in inland waters. In addition, recent reports indicated that large spills of crude oil often occur in inland areas. Their analysis found that while coastal spills tend to be highly publicized, the majority of large oil spills in the United States occur in inland areas.

Yoshioka and Carpenter (2002) also concluded that most reported oil spills are small. ERNS data showed that more than 95 percent of inland spills were less than 1,000 gallons. API data, which emphasize spills from vessels because those are most often reported to the U.S. Coast Guard, showed an even larger fraction of spills below 1,000 gallons. However, it is important to note that each year the OSIR summaries contained several dozen spills of more than 10,000 gallons in the United States. Their study also found that larger spills were caused by pipelines, crude oil, and inland spills.

Table 4-4 Estimated Releases from Components of the Oil System

Type of release	Size of release (millions of bbl/year)	Major Media Impacted	Description of Category
Oilfield spills	1.1 (<1%)	Soil Surface Water Ground Water	Producing wells and tank batteries.
Leaking of wells	3.6 (2.7%)	Soil Surface Water Ground Water	Older “abandoned” wells never capped. Up to 1.2 million wells in the U.S.
Oil in waste pits or produced water	1.2 (<1%)	Soil Ground Water	Buried or land applied wastes from producing wells or exploration activities.
Aboveground tanks	63.8 (47.4%)	Soil Air Ground Water	Usually larger tank batteries, often part of interstate pipeline systems.
Existing underground plumes	1.2 (<1%)	Ground Water Soil	Tank farms, transshipment terminals with large amounts of “free product” beneath the facilities. At least 356 facilities currently pump from the largest plumes.
Pipelines	0.7 (<1%)	Surface Water Soil	Larger interstate pipelines and low pressure gathering systems from smaller tank batteries.
Leaks from gas stations	5.2 (3.9%)	Soil Ground Water	At least 25% of the nation’s filling stations may face remediation under the UST program.
Tank bottoms and refinery waste	24.2 (17.9%)	Soil	Heavier residuals and sludges from refineries.
Used motor oil	14.0 (10.4%)	Water Soil	The U.S. generates about 1.4 billion gallons of used motor oil per year. Less than half is re-refined. Much “home fix-it” oil is not disposed of properly.
Oil spills in Waters of the U.S.	1.1 (<1%)	Surface Water	Tankers, barge, and pipeline accidents, mostly during vessel loading or unloading operations.
Oil and grease discharge	0.1 (<1%)	Surface Water	Mostly from offshore drilling in near coastal waters.
Operational discharges from tankers	0.2 (<1%)	Surface Water	Discharge of cargo and bilge oil in near coastal waters.
Evaporative losses	18.4 (13.7%)	Air	Transfers at refineries or tankers, losses at storage facilities, and during vehicle fueling. Up to 18 grams of hydrocarbons vented to air for each gallon of gasoline used.
Total	**134.8**		

Source: Agency for Toxic Substances and Disease Registry 1999

Table 4-5 Number of Spills that Exceed 10,000 Gallons by EPA Region (1995–1999)

	Number of Spills by Size and Location				Total Number of Spills
	10,000 to 99,000 gallons		100,000 gallons		
EPA Region	Inland	Coastal	Inland	Coastal	
1	6	0	0	2	8
2	18	4	1	1	24
3	15	3	2	1	21
4	34	6	4	0	44
5	30	0	11	0	41
6	129	16	41	5	191
7	29	0	4	0	33
8	28	0	2	0	30
9	37	10	7	0	54
10	10	7	2	0	19
Total	**336**	**46**	**74**	**9**	**465**

Source: Yoshioka and Carpenter 2002

Table 4-5 shows that 41 percent of the total number of spills of more than 10,000 gallons reported in the United States occurred in EPA Region 6 located in the Southern Plains region. In contrast, Region 8 had 30 reported spills of more than 10,000 gallons between 1995 and 1999 (6 percent of the total), where the proposed project is located.

In addition, the ATSDR (1999) summarizes releases from facilities using data from API (American Petroleum Institute 1996). The results of reported spills from facilities for the reporting period between 1984 and 1996 are presented on Table 4-6.

The average annual number of spills reported between 1984 and 1996 was 4,043 (Table 4-6). Most of these (70 percent) involved less than 10 gallons. The distribution of spills by size suggests that because most of the spills involved less than 10 gallons, a majority of the reported spills were caused by human error or mechanical failure.

In 2001, the EPA updated the information collected under its Sector Facility Indexing Project (SFIP). The petroleum refining industry sector data summarizes spill and pollution release information reported to the federal government by individual facilities. The refinery sector data shows that nearly 77 percent of the petroleum refineries (129 of 168) in the United States reported spills between January 1997 and November 1998. Furthermore, at the 129 refineries reporting spills, an average of almost 18 spills occurred during this period, which is nearly nine per year.

4.4.1.1 Spills — Fate and Transport Processes

Petroleum products released to the environment migrate through soil via two general pathways: (1) as bulk oil flow infiltrating the soil under the forces of gravity and capillary action, and (2) as individual compounds separating from the bulk petroleum mixture and dissolving in air or water. When bulk oil flow occurs, it results in little or no separation of the individual compounds from the product mixture, and the infiltration rate is usually fast relative to the dissolution rate. Many compounds that are insoluble and immobile in water are soluble in bulk oil and would migrate along with the bulk oil flow. Factors affecting the rate of bulk oil infiltration include soil moisture content, vegetation, terrain, climate, rate of release (catastrophic versus slow leakage), soil particle size (sand versus clay), and oil viscosity (gasoline versus motor oil).

Table 4-6 Total Number of Oil Spills from Facilities, 1984–1996

	Number of Spills by Size					
Year	< 10 gal	10–999 gal	1,000–9,999 gal	10,000–99,999 gal	> 100,000 gal	Total
1984	4,113	2,194	288	53	3	6,651
1985	3,032	1,619	252	39	2	4,944
1986	2,076	1,025	54	10	3	3,168
1987	1,821	1,022	66	10	1	2,920
1988	1,730	939	68	6	4	2,747
1989	2,827	1,140	70	12	2	4,051
1990	3,904	1,187	72	15	4	5,182
1991	4,102	1,174	68	13	1	5,358
1992	2,412	869	56	16	2	3,355
1993	2,799	796	53	8	1	3,657
1994	2,900	831	76	10	6	3,823
1995	2,716	800	31	3	0	3,550
1996	2,460	642	45	6	2	3,155
Average	**2,838**	**1,095**	**92**	**15**	**2**	**4,043**

Source: Agency for Toxic Substances and Disease Registry 1999

As bulk oil migrates through the soil column, a small amount of the product mass is retained by soil particles. The bulk product retained by the soil particles is known as “residual saturation.” Depending on the persistence of the bulk oil, residual saturation can potentially reside in the soil for years. Residual saturation is important, as it determines the degree of soil contamination and can act as a continuing source of contamination for individual compounds to separate from the bulk product and migrate independently in air or ground water. If the release is persistent in the environment, there can be impacts to extensive areas as the individual compounds continue to separate and migrate away from the spill area via air or ground water.

When the amount of product released to the environment is small relative to the volume of available soil, most if not all of the product is converted to residual saturation and downward migration of the bulk product usually ceases prior to affecting ground water resources. Adverse impacts to ground water may still occur if rainwater infiltrates through soil containing residual saturation and initiates the downward migration of individual compounds.

When the amount of product released is large relative to the volume of available soil, the downward migration of bulk product ceases as water-saturated pore spaces are encountered. If the density of the bulk product is less than that of water, the product tends to “float” along the interface between the water saturated and unsaturated zones and spread horizontally in a pancake-like layer, usually in the direction of ground water flow. Conversely, if the density of the bulk product is greater than that of water, the product would continue to migrate downward through the water table aquifer under the continued influence of gravity. Downward migration ceases when the product is converted to residual saturation or when an impermeable surface is encountered.

In reality, bulk oil flow is affected by numerous product-specific and site-specific factors. Consequently, product distribution in the subsurface can be quite complex.

Compound Migration

As the bulk product migrates through the soil column, individual compounds may separate from the mixture and migrate independently. Chemical transport properties such as volatility, solubility, and sorption potential are often used to evaluate and predict which compounds would likely separate from the mixture.

Volatility

Volatility is defined as the propensity of a chemical to partition to air and migrate as a vapor. It is primarily a function of the vapor pressure of the compound. Vapor pressure is defined as the pressure of a chemical exerted by its vapor when in equilibrium with the solid or liquid form of that chemical.

Because petroleum products are complex mixtures of numerous compounds, the compounds characterized by relatively high vapor pressures tend to volatilize and enter the vapor phase. The exact composition of these vapors depends on the composition of the original product. Because volatility represents transfer of the compound from the product or liquid phase to the air phase, it is expected that the concentration of that compound in the product or liquid phase would decrease as the concentration in the air phase increases.

Although volatility is a function of vapor pressure, environmental factors affect the rate of volatilization. For example, higher summer temperatures enhance volatilization. The rate of volatilization is also a function of air and soil temperature, humidity, wind speed, soil type, moisture content, oil composition, solar radiation, and thickness of the oil layer.

Solubility

Solubility is one of the key factors in determining compound behavior, and thus the impact of a chemical in the environment. Solubility is expressed in terms of the number of milligrams of pure chemical that can be dissolved in 1 liter of water under standard conditions of 25ºC and one atmosphere of pressure. The solubility of an organic compound determines its propensity to dissolve into water. The greater the compound's solubility, the greater the likelihood the chemical would dissolve into infiltrating rain water or ground water and migrate away from the release area. Stated another way, solubility generally decreases with increasing molecular weight of the hydrocarbon compounds.

In summary, the environmental fate of petroleum products is based on the environmental partitioning of the major hydrocarbon fractions. However, the environmental fate of chemicals in mixtures and/or bulk oil releases may be different from that observed for releases of individual petroleum chemicals. The more soluble and volatile fractions (such as, the low molecular weight aliphatic and aromatic fractions) are more likely to leach to ground water, volatilize to the air, or biodegrade than the larger petroleum product compounds. Conversely, the higher molecular weight compounds tend to be held in soil and persist at the site of release.

Organic Carbon-Water Partition Coefficient

The organic carbon-water partition coefficient (Koc) describes the propensity for an organic compound to partition between water and organic carbon in the soil. Chemical mobility can be determined based on the likelihood of a chemical to partition more strongly to either the organic carbon in the substrate or the water. If the chemical is strongly associated with the substrate, the chemical is relatively immobile and would not be leached or transported great distances from the area of the release. In contrast, if the chemical is weakly held by the substrate, the chemical has the potential to be transported greater distances and has a greater chance to contact human receptors. The degree of sorption not only affects the mobility of the compound, it can also affect other transport and transformation reactions.

In general, lighter petroleum products such as gasoline contain constituents with higher water solubility and volatility and lower sorption potential than heavier petroleum products such as fuel oil. In contrast, petroleum products with heavier molecular weight constituents, such as fuel oil, are generally more persistent in soils because of their relatively low water solubility and volatility and high sorption capacity.

Biodegradation

Indigenous microbes found in many natural settings (such as, soils, ground water, ponds) have been shown to be capable of degrading organic compounds. Biodegradation occurs as microbes use organic compounds as a source of energy. Unlike other fate processes that disperse contaminants in the environment, biodegradation can eliminate the contaminants without transferring them across media. The final products of microbial degradation are carbon dioxide, water, and microbial biomass.

The rate of hydrocarbon degradation depends on the chemical composition of the product released to the environment as well as site-specific environmental factors. Environmental factors such as oxygen content, pH, moisture content, temperature, nutrient concentrations, and the microbiota also affect the rate of biodegradation. In almost all cases, the presence of oxygen is essential for effective biodegradation of oil.

The moisture content of the contaminated soil would also affect biodegradation of oils caused by dissolution of the residual compounds, dispersive actions, and the need for microbial metabolism to sustain high activity. The moisture content in soil affects microbial locomotion, solute diffusion, substrate supply, and the removal of metabolic by-products.

All biological transformations are affected by temperature. Generally, as the temperature increases, biological activity tends to increase up to a temperature where enzyme denaturation occurs. The presence of oil should increase soil temperature, particularly at the surface. The darker color increases the heat capacity by adsorbing more radiation.

At least 11 essential macronutrient and micronutrient elements must be present in the soil in proper amounts, forms, and ratios to sustain microbe growth. These 11 elements are nitrogen, phosphorus, potassium, sodium, sulfur, calcium, magnesium, iron, manganese, zinc, and copper. Nitrogen is usually the main limiting nutrient governing the rate of decomposition of petroleum hydrocarbons.

Biodegradation rates in soils are also affected by the volume of product released to the environment. At lower concentrations of oil by volume, the degradation rate in soil is fairly independent of oil concentrations. However, as oil concentration rises, the first order degradation rate decreases and the oil degradation half-life increases. Ultimately, when the oil reaches saturation conditions in the soil, biodegradation virtually ceases.

4.4.1.2 Spill Scenarios

The prevention of a release[4] or spill of petroleum products is inherent to the engineered design of the refinery. All storage containers would be located within constructed containment features or within secondary containment tanks. Secondary containment structures have been designed to hold the entire contents of the container if a spill or leak occurred plus precipitation. If a spill or leak occurred outside secondary containment during transport of the container or filling of a tank, the spill would flow into the storm water collection system. The holding ponds in Alternative 1 and A would contain the spill until cleanup measures could be implemented. The refinery would also have spill response equipment on hand to be able to contain and clean up spills immediately. Spills to the impervious ground surface would be cleaned up immediately by trained plant personnel.

Additional controls would also be implemented once the refinery is operating, and may include monitoring fluid flow parameters, instituting operational procedures and controls, and performing periodic maintenance procedures, which are typically used as industry spill prevention best practices. As with all engineered systems, process or material failures and human error leading to material loss are anticipated. The environmental consequences from these occurrences, such as an accidental spill, cannot be evaluated without reference to a known or expected release of a specific size, location, and duration. Therefore, spill scenarios have been developed in a spill analysis that represent credible potential events for use in assessing impacts from accidental releases or spills during refinery operations.

The spill scenario environmental impacts assessed under the proposed action in this analysis do not imply that these spills are expected refinery events. A spill event that actually occurs may or may not occur in the same sequence or combination of events as detailed in the assessed spill scenarios. An underlying principle in this spills analysis is that conditions would constantly change over the life of the refinery. The spill volume and frequency vary because of (1) varying conditions such as climate and changing seasons, soil conditions, potential for damaging storm systems, and potential for third-party damages; and (2) varying refinery system characteristics, operating and production yields, and maintenance practices.

This spill analysis focuses on potential spills associated with the operation and maintenance of the refinery. The potential environmental impacts of the various types of petroleum products, such as crude oil stock, and finished products including gasoline and diesel fuel are the primary products included in the spills analysis.

The severity and overall risk to the environment from petroleum product spills are direct functions of the following factors:

- Type of petroleum product spilled;
- Location, duration, and size of the spill;
- Frequency of spill events;
- Time of the year or the season in which the spill occurs;

[4] The term release used in the context of an oil spill or petroleum spill has specific regulatory meaning and triggers reporting requirements. Therefore, any spill of oil must be reported if the petroleum product or oil seeps or overflows from the process area following the SPCC plan and FRP. If a material that has been identified as a hazardous substance is spilled anywhere on the site and the spill is greater than the reportable quantity, then additional reporting requirements apply.

- Local environmental conditions (e.g., wind or river speed, surface roughness, and porosity) at the time and place of the spill;
- Location and susceptibility of downstream or downwind receptors; and
- Effectiveness of emergency response and cleanup measures.

The developed spill scenarios attempt to take into account spill location, duration, magnitude, and frequency. Sensitive receptor locations and environmental media, such as the unnamed tributary, which serve as spill transport-enhancing media to a sensitive receptor were identified as affecting factors near the proposed refinery site. The spill magnitude and duration were computed when defining each spill scenario.

Frequency of occurrence allows the estimated environmental consequences from spill events to be put into perspective relative to likelihood of occurrence. The various spill scenarios developed for assessment in this EIS are forecast to occur at frequencies ranging from several times a year to once in 1 million years. In general, the greater the volume of material released and the greater the expected consequences, the more unlikely it would be for a spill to occur (the lower its probability). Each spill scenario was assigned to one of the following four frequency categories:

- Anticipated: Spills estimated to occur one or more times every 2 years of operations (frequency ≥ 0.5 per year).
- Likely: Spills estimated to occur between once in 2 years and once in 30 years of operations (frequency = from 0.5 per year to 0.03 per year).
- Unlikely: Spills estimated to occur between once in 30 years and once in 1,000 years of operations (frequency = from 0.03 per year to 1 × 10-3 per year).
- Very Unlikely: Spills estimated to occur between once in 1,000 years and once in 1 million years of operations (frequency = from 1 × 10-3 per year to 1 × 10-6 per year).

In addition, one of three spill release duration ranges is assigned to each spill scenario identified in the tables.

- Instantaneous release: if a release is estimated to occur very quickly, with duration on the order of 1 hour or less;
- Short duration: releases are assumed to occur over periods of a few hours up to a couple of days; and
- Prolonged releases are assumed to take place over several days to several months.

Leaks resulting in spills may range from a small leak, where chemicals, oil, or product escapes for an extended period of time until detected, to a large rupture, where chemicals, oil, or product is released into the environment over a relatively short time but in potentially large quantities. The volume of a leak depends on the size of the opening in the pipe or storage tank, the crude oil or product density, topography, seasonal timing, and leak duration. The spill volumes for each scenario were determined by the duration of the release multiplied by the flow rate through an assumed hole size (bbl or gallons per hour), and the line drain-down volume subsequent to shutdown of the pipeline or storage tank. The spill duration accounts for the time required to detect a leak, locate it if it is not immediately obvious, and shut down the pipeline or storage tank. The drain-down volume is the estimated quantity of chemical, oil, or product that could be released from a pipeline or storage tank rupture based on valve location and response time.

Spills that occur very frequently (because of incorrect hose placement or equipment or human error) result in liquid releases in less than 1 hour. For example, a valve that is incorrectly turned could cause a leak, but it is assumed that the operator would notice the liquid on the ground and manually close the valve. Such a leak typically occurs in a period of less than 1 hour. Short-duration releases could include the complete break or rupture (a guillotine break) scenarios. Conversely, a release from events such as an underground corrosion crack leak could occur over several days before it was noticed.

Although each of these spill scenarios poses an environmental risk, the larger potential volume of released material would likely result in the largest environmental consequences. This observation, however, does not necessarily imply that these spills would represent the largest risk events for the refinery project. In this analysis, risk is represented by the product of the annual frequency of a spill event and its severity consequences. Therefore, if a particular postulated event is calculated to potentially cause large consequences but occurs with low frequency, the calculated risk would be small.

Table 4-7 details spill scenarios that were originally developed for the Valdez Marine Terminal within the FEIS: Renewal of the Federal Grant for the Trans-Alaska Pipeline System ROW and subsequently revised for this analysis. All spill scenarios were modeled after the Valdez Marine Terminal (VMT) EIS probable spill scenarios. A major assumption for this analysis was that all of the MHA Nation scenarios would be comparable on both a scenario description and estimated frequency of occurrence. In addition to giving the release duration, the spill scenarios provide (1) a brief description of the spill scenario, (2) frequency range, (3) type of material spilled, (4) range in spill volume, (5) release point (above and/or below ground), and (6) release duration.

4.4.1.3 Emergency Response Plan

A SPCC plan, FRP, HWCP, Superfund Amendments Reauthorization Act (SARA) Emergency Plan and, as applicable, a CAA Risk Management Plan and HMTA Response Plan, would be an integral part of the refinery's Emergency Response Plan in responding to releases of oil and hazardous substances. The plan would provide for an organized response to incidents and emergencies to protect the environment, employees, and public. Emergency Response Team members, as well as other designated refinery staff members, would be properly trained in the plan requirements and spill/release response and cleanup techniques and procedures.

On-Site Incidents

Minor spills and releases would typically be contained and managed by refinery personnel assigned to a specific work area, as long as they were not exposed to significant risks, (e.g., hydraulic fluid leak from machinery). Such actions typically would not require the assistance of emergency response personnel. For major spills or releases, such as a significant release of crude oil or product material such as diesel, the refinery's Emergency Response Plan would be activated, with the Emergency Response Team responding. These team members would be trained in spill response measures. As required, the Emergency Response Team would obtain the assistance of refinery operations and maintenance staff in obtaining information on the type and quantity of spilled material, shutting down or moving equipment as needed, acquisition of equipment and supplies, and providing access to areas where entry is needed to respond to the spill or release. If an emergency release exceeded the capability of the response team, or posed as an unacceptable safety risk, assistance would be requested from professional spill response specialists and contractors and the appropriate state and/or federal environmental agencies, such as, EPA and the NDDH. This would be documented in the Emergency Response Plan.

Table 4-7 Spill Scenarios Developed for the Valdez Marine Terminal

Event No.	VMT Scenario Description	MHA Nation Scenario Description	Estimated Frequency (per year)	Anticipated (>0.5/yr)	Likely (0.03 to 0.5/yr)	Unlikely (10^{-3} to 0.03/yr)	Very Unlikely (10^{-6} to 10^{-3}/yr)	Crude/ Oil Products	Spill Volume (bbl)	Release Duration	Release Point/Environmental Media	Spill Reaches Water?
1[a]	Small leak of crude oil VMT operations	Small leak of crude oil supply MHA operations	~0.5	X				Crude Oil	50	Short	Land, outside containment	No
2[a]	Small leak of diesel fuel during VMT operations	Small leak of diesel, jet or regular fuel during MHA operations	~0.5	X				Diesel, Jet, or Regular Fuel	15	Short	Land, outside containment	No
3[a]	Moderate leak of crude oil during VMT operations	Moderate leak of crude oil supply during MHA operations	3.0×10^{-2}		X			Crude Oil	5,000	Short	Land, outside containment	No
4[a]	Moderate leak of diesel fuel during VMT operations	Moderate leak of diesel, jet or regular fuel during MHA operations	4.7×10^{-2}		X			Diesel, Jet, or Regular Fuel	300	Short	Land, outside containment	No
5[b]	Cargo tank vessel cracks discovered while loading crude oil	Storage tank vessel cracks discovered while loading crude oil	4.7×10^{-2}		X			Crude Oil	500	Short	Land, outside containment	Yes
6[b]	Failure of loading system between terminal dock and ship	Failure of loading system between product fuel station and truck or train	1.7×10^{-3}			X		Crude Oil	80	Instanta-neous	Land, outside containment	Yes
7[b]	Diesel fuel line rupture	Diesel, jet or regular fuel line rupture	1.0×10^{-4}			X		Diesel, Jet, or Regular Fuel	450	Short	Land	No
8[c]	Pipeline failure between the east tank farm and the west manifold	Pipeline failure between the process area and tank farm	1.3×10^{-5}				X	Crude Oil	5,000	Short	Land	No
9[c]	Pipeline failure between west metering and Berth 5	Pipeline failure between the tank farm and product loading area	1.3×10^{-5}				X	Crude Oil	5,000	Short	Land	No
10[d]	Aircraft crash into crude oil tank at East Tank Farm, w/fire	Aircraft crash into tank farm with fire	2.1×10^{-5}				X	Crude Oil	100,000	Prolonged	Air (dike fire)	No
11[d]	Catastrophic rupture of a crude oil storage tank (e.g., foundation or weld failure)	Catastrophic rupture of a crude oil storage tank (e.g., foundation or weld failure)	1.8×10^{-6}				X	Crude Oil	50,000	Instanta-neous	Land, outside containment; Water	Yes
12[d]	Catastrophic rupture of a diesel fuel tank	Catastrophic rupture of a diesel, jet, or regular fuel tank	2.2×10^{-6}				X	Diesel, Jet, or Regular Fuel	25,000	Short	Land	No

Table 4-7 Spill Scenarios Developed for the Valdez Marine Terminal

Event No.	VMT Scenario Description	MHA Nation Scenario Description	Estimated Frequency (per year)	Anticipated (>0.5/yr)	Likely (0.03 to 0.5/yr)	Unlikely (10^{-3} to 0.03/yr)	Very Unlikely (10^{-6} to 10^{-3}/yr)	Crude/ Oil Products	Spill Volume (bbl)	Release Duration	Release Point/Environmental Media	Spill Reaches Water?

Notes:

a. VMT Scenarios 1 - 4 were developed from more than 250 documented spills at the terminal during the first 25 years of operation of the pipeline. The scenarios covered spills of North Slope crude oil and diesel fuel. The spill volumes for these scenarios ranged from about 15 bbl of diesel fuel to 3,200 bbl of crude oil, all of short spill duration. Spill initiators or causes and spill size ranged from relatively small fuel line ruptures to large valve leaks at storage tanks.

b. VMT Scenarios 5 - 7 were developed from data reported in previously identified Valdez Marine Terminal specific spill analyses or risk assessments and historical data compiled by Department of Transportation (DOT) for other marine terminals. Scenario 5 is in the likely category, whereas Scenarios 6 and 7 have frequencies in the unlikely category, with spill totals ranging from 80 to 500 bbl of oil.

c. VMT Scenarios 8 - 9 are over-pressurization pipeline ruptures caused by inadvertent valve closure.

d. VMT Scenarios 10 - 12 were developed from statistical data for potential spill event initiating activities at the Valdez Marine Terminal and data or guidance from DOT, Department of Energy (DOE), and the Federal Aviation Administration (FAA). These types of events would generally be considered to lead to catastrophic spills. A total of three scenarios were developed as very unlikely events, including (1) aircraft crash with subsequent fire followed by a prolonged secondary containment area fire in the east tank farm, (2) a failure of a 510,000-bbl crude oil tank, and (3) a rupture of a diesel fuel tank.

Source: Bureau of Land Management 2002

Off-Site Incidents

Typically all minor or major off-site spills or releases would be responded to by the local Emergency Response Teams within its geographic jurisdiction. Assistance from the Refinery Emergency Response Team may be required for providing information on the spilled material, acquisition of equipment and supplies, and assisting with containment at the source of the spill or release. Only trained personnel would be allowed to participate in any cleanup activities with the potential for exposure. If any spill or release is significant enough that it exceeded the capability of the Emergency Response Teams to adequately respond, assistance would be requested from professional spill response specialists and contractors and the appropriate state and federal environmental agencies.

4.4.1.4 Spill Analysis — Ground Water

Ground water resources in proximity to the refinery could be affected by spills, particularly if a spill occurred directly or close to an underlying aquifer. Generally, ground water could be impacted if this type of spill occurred within the process area, tank farm, and product loading area and traveled off the impervious surfaces or a leak occurred within a buried pipeline.

The spill scenarios detailed on Table 4-7 were grouped into four spill event frequency scenarios and were analyzed for their effects on ground water resources. The spill event frequency categories are:

- Anticipated Spill Events – Scenarios 1 and 2: This category consists of spills that are anticipated. This spill would result from a small leak and would involve a maximum oil release of 50 bbl.
- Likely Spill Events – Scenarios 3, 4, and 5: This category involves spills considered to be likely. These spill scenarios include a moderate, instantaneous leak of crude oil; a very short-duration leak caused by maintenance-related damage; a short-duration (e.g., 8 hours) leak caused by over-pressurization from inadvertent remote gate valve closure; and a prolonged (2 days) leak resulting from corrosion-related damage.
- Unlikely Spill Events – Scenarios 6 and 7: This category was performed for spill scenarios that are considered to be unlikely. These scenarios consist of a leak resulting from pipeline settling; or a crack resulting from tank corrosion or failure.
- Very Unlikely Spill Events – Scenarios 8, 9, 10, 11, and 12: This category was performed for a very unlikely spill scenario. It consists of an above ground guillotine break caused by a major storm event (e.g., tornado), an aircraft collision, pipeline failure, and catastrophic ruptures of tanks. This spill would release the greatest amount of chemical, oil, or product.

Anticipated Spills — Scenarios 1 and 2

An anticipated spill event would discharge chemicals, oil, or product either above or below the ground surface from a small leak. The volume of oil released is assumed to be 50 bbl, and the release period is assumed to be instantaneous. An underground release could occur along buried sections of pipeline or from valve leaks in storage containers and the spill volume infiltrates the soil.

If the leak occurs above ground, it is assumes that in most cases the leak would occur on an impervious surface and in a containment structure, and the leak would be detected and spill response plans would be implemented to contain and mitigate the spill. Therefore, the spill should not result in any localized impacts to ground water. For leaks on pervious surfaces, the spill volume would infiltrate into the soil.

If a buried section of pipeline results in a leak, the volume of oil released for the anticipated scenario would be very small (50 bbl). Therefore, it is unlikely that any of the oil would emerge at the surface, although it would be released under pressure and under some conditions could migrate to the surface. If the leak occurs during the winter or spring season, the oil released could be within the soil layer where the soil is frozen. Because of the presence of frozen soil, the oil would probably stay within the pipeline's gravel pack or disturbed trench area and affect the quality of water contained in thaw areas present at the location of the leak. Impacts would thus be localized. For this case, the released oil could migrate downward under the influence of gravity and contaminate the local ground water system. Because of the small volume of oil released, impacts to the ground water system should be localized.

Likely Spills — Scenarios 3, 4, and 5

For the likely category of spills, a prolonged leak resulting from corrosion-related damage was selected for analysis because it would release a significant volume of oil (up to 5,000 bbl over a 2-day period). Because this type of leak could occur anywhere within the tank farm, process, or product loading area, evaluations of the impacts to ground water were made for the 190 acre proposed refinery footprint. If the spill occurred within the project footprint, impacts to the ground water system should be localized because of the presence of impervious surfaces and containment structures that would slow and in some cases prevent oil from migrating to local ground water systems.

Conversely, if the volume of oil, chemical or product migrated off or under the impervious surface, impacts would occur when the spill volume infiltrated the soil column and reached the underlying ground water. The 2-day duration of the spill should allow some response activities to commence and limit the amount of oil, chemical, or product available for infiltration. These impacts would, however, be potentially very large because of the volume of oil, chemical, or product released. For scenario 5, some of the spill would be expected to reach surface waters, impacting water quality.

Unlikely Spill Events — Scenarios 6 and 7

The third analysis was for a release of oil through a pipeline failure resulting in a short-term spill scenario. This spill is considered unlikely because the frequency of occurrence is estimated as once in 1,000 years to once in about 30 years. Because the most likely scenario would occur with buried pipelines, it is assumed that the spill would occur in areas of the refinery that are not likely to be detected. The release would result in a spill of up to 5,000 bbl of oil over a short period (hours to several days).

Because these scenarios are primarily associated with pipeline failures, crude oil or product released from a crack would be under pressure. Because of the volume of oil released and the system pressure, it is probable that the released oil would rapidly migrate to the surface and contaminate the land. Even with losses to the land surface, the underlying ground water system could experience severe water quality impacts because of the large volume of oil released. There is presently a risk of pipeline failure in the project area. The refinery would increase the existing pipeline system by 4 miles.

Very Unlikely Spill Events — Scenarios 8, 9, 10, 11, and 12

An instantaneous, guillotine break resulting from a catastrophic rupture, tornado, or plane crash was analyzed for the very unlikely spill scenarios. This type of event would be expected to occur only between once in 1 million years to once in 1,000 years. A 1989 API survey indicated that there were approximately 700,000 aboveground diesel fuel storage tanks in the United States. Tank rupture accounted for only 5.4 percent of the 132 releases that occurred worldwide between

1970 and 1988. However, tank rupture accounted for almost 19 percent of the released material. This analysis considers a spill scenario involving a catastrophic rupture of tanks containing fuel at the refinery. The frequency of such an event is estimated to be 1.1 × 10-6 per tank-year. Two tanks, each with a shell storage capacity of 25,000 bbl, store fuel at the refinery.

These scenarios are associated with catastrophic pipeline and tank failures, releasing large volumes of crude oil or product. Because of the volume of oil released and the system pressure, it is probable that the released oil would rapidly migrate to the surface and contaminate the land. The underlying ground water system could experience severe water quality impacts because of the large volume of oil or product released.

4.4.1.5 Surface Water

Anticipated Spills — Scenarios 1 and 2

Scenarios 1 and 2 could affect surface waters. However, because these spills would occur only at pump stations or at valves, it is highly unlikely that they would affect surface waters. If the leak occurs above ground, it is assumed that in most cases the leak would occur on an impervious surface and in a containment structure, and the leak would be detected and spill response plans would be implemented to contain and mitigate the spill. Therefore, the spill should not result in any localized impacts to surface water.

Likely Spills — Scenarios 3, 4, and 5

For the likely category of spills, Scenario 3 (up to 3,200 bbl over a 2-day period) would result in a prolonged leak caused by corrosion-related damage that could potentially result in a significant volume of oil released into a surface water feature. Because the release would occur from the crude oil supply pipeline, it is assumed that the spill would occur outside of the refinery boundary.

Because the released oil would occur outside spill containment areas, the spill volume would infiltrate the soil column. The ability to reach a surface drainage or wetland feature would depend on numerous variables. The 2-day duration of the spill would allow some response activities to commence and limit the amount of crude oil available for infiltration. These impacts would, however, be potentially very large because of the volume of oil released.

Even under ideal conditions, it is unlikely that 100 percent of the oil in the surface water feature at a containment site would be removed by a remedial activity, even if the response team were able to arrive at the containment site and set up its equipment prior to the arrival of the leading edge of the oil spill. Therefore, the release of up to 3,200 bbl of oil in the local surface waters would be a significant, but not irreparable impact.

Unlikely Spill Events — Scenarios 6 and 7

Scenarios 6 and 7 are estimated as accidents that are unlikely (frequency of occurrence of 1 × 10-3 to 0.03/yr). Both scenarios could affect surface water resources. Of these scenarios, scenario 7 would cause the greatest impact to surface water resources because it would release the largest volume of oil. However, the chance of either of these scenarios reaching the unnamed tributary is extremely remote because there is no large source of runoff water upstream of the project storage areas, and secondary containment drainage would be well controlled.

Very Unlikely Spill Events — Scenarios 8, 9, 10, 11, and 12

The last frequency range of spill scenarios is described as very unlikely to occur (frequency of occurrence of 1 × 10-6 to 1 × 10-3/yr). Five scenarios are included in this frequency range that could affect surface waters. Of these scenarios, Scenario 11 would produce the largest impact to surface water resources because it would release the largest volume of oil (about 50,000 bbl).

The analyses performed to determine the impacts of the spill scenarios mentioned above depend on a number of estimated and measured quantities: the volume of fluid spilled during an event, the time needed for the fluid to discharge to the environment, the velocity of the current in the receiving river that would transport the fluid downstream, and the response time required to initiate appropriate contingency measures.

The potential exists for a large release of oil or refined product contaminants because of a catastrophic rupture of crude oil storage tanks at the refinery. These tanks, with individual tank storage capacities of around 460,000 bbl, are located in two primary areas, the tank farm and process area.

Catastrophic storage tank failure or rupture is extremely rare. Eight cases of crude oil tank rupture are known from around the world: three caused by foundation failure, one caused by weld failure, one caused by impact of a rail truck, and three caused by flooding (Bureau of Land Management 2002).

The chance of a guillotine break reaching the unnamed tributary is extremely remote because the storm water design of the refinery would contain a 5-inch precipitation event. In addition, the engineered secondary containments are designed to contain the entire contents of the storage containers, and the subsequent site drainage is well controlled. For the present purpose, however, the possibility is considered. If a tank were to rupture, the most likely consequence would be a major flow of oil to the secondary containment. In the case of a very large rupture, it may be likely that the oil would follow the refinery surface, drain into the containment structures, overflow, and wash into the unnamed surface tributary.

Based on the estimated frequency of a storage tank failure spill event at the Valdez Marine Terminal (Bureau of Land Management 2002), the same probability for the refinery is assumed, which was 1.8 × 10-6. Based on the probability, such tank failures were determined to be very unlikely events that could produce spill magnitudes ranging from approximately a 5,000-bbl spill on land outside secondary containment to a spill of about 25,000 bbl of crude oil into the unnamed tributary. This analysis considers a spill scenario involving a catastrophic rupture of tanks containing either gasoline or diesel fuel at the refinery. Three tanks, each with a storage capacity of 25,000 bbl, store gasoline at the refinery. Two tanks with an 8,000-bbl capacity each would store diesel at the refinery.

It is assumed that both the crude oil and refined products would be less dense than water (1.0 g/cm3 for water), and any oil or product spilled into surface waters would tend to float on the surface and spread. If the surface water is moving or flowing, the oil would be transported downstream by the surface flow. The combined motions of spreading and surface flow would produce an elongated oil slick. The slick would, in general, move downstream at the speed of the surface current; however, winds may alter the direction of transport. In addition, some light hydrocarbons in the crude oil may dissolve or evaporate.

It is assumed that once the crude oil or refined product reaches the unnamed tributary, it would move downstream with distinct leading and trailing edges (plug flow) and a slick length that remained constant in time. During low flow conditions, the spill would pond in the wetland. During an oil spill into water, a sheen is likely to develop. An oil sheen is a very thin layer of oil that floats on the water surface and is transported downstream with the surface flow. In general, the color of the sheen corresponds with its thickness. While moving as an oil slick, crude oil can be affected by a number of physical processes. These include advection (moving along with the current); mechanical spreading because of the balance among gravitational, viscous (viscosity is a measure of a fluid's internal resistance to flow), and surface-tension forces; horizontal turbulent diffusion (spreading driven by a difference in concentration); evaporation; dissolution; and shoreline deposition. Photochemical reactions and microbial biodegradation are also possible. The effect of these processes depends on the properties of the oil and environmental conditions. Spreading, dissolution, evaporation, and photochemical reactions of the crude oil usually occur within hours after the spill. Evaporation and dissolution are particularly important processes for the light hydrocarbon components of the crude oil.

The difference in surface flow (i.e., current) speed and the resulting shearing forces between water layers is typically the major mixing mechanism that spreads oil as it moves downstream. The leading edge of the slick may move as a relatively sharp front; however, mixing would continuously exchange water and oil between the slower, near-bank regions and the faster-flowing regions of the stream or river. Many river channel profiles are highly irregular, with rapids at one extreme and quiet bays at the other. These features either accelerate or decelerate the average flow in the stream or river and contribute to the shear in the current pattern, thus increasing the along-channel spreading of the oil. Oil would reach a shoreline and be deposited sometime after the spill event. In sands and gravels, the lighter-weight crude oil components may then penetrate the surface, contaminating deeper layers of soil and possibly the underlying ground water. Some of this deposited oil would be re-entrained by the water and transported farther downstream. Oil is expected to continue to be released from soil and gravel and the stream or riverbed itself for years to come, causing potential contamination problems.

4.4.1.6 Spill Analysis — Soils

Soil contamination could occur during the construction and operation of the refinery. Contaminated soils would typically include natural materials such as soils, subsoils, overburden, or gravel that have been contaminated with crude oil; refined petroleum products, such as gasoline, diesel, and jet fuel; lubricating oils; hydraulic oils or sludge contained in storage tanks or equipment. The immediate potential effect would be direct contamination of the soil, which could result from the release of fuels and crude oil at the refinery site, along the pipeline corridor, or accidents during delivery of product. The anticipated causes of spills on land could include traffic accidents, operational errors, corrosion, mechanical failures, and vandalism.

Several factors control the spread of spilled crude oil on land. Once a spill occurs, the light components in the crude oil evaporate. The rate of evaporation can be affected by weather. Low temperatures reduce the evaporation rate, whereas high winds increase it. The terrain and the surface features of a spill site, as well as human response to a spill, control the spreading of the rest of the spilled oil or product. It should be noted that cleanup responses immediately after the releases can significantly reduce the number of contaminated sites that require long-term cleanup.

On a sloped terrain, part of the spilled oil would flow down slope; while the remainder infiltrates to the subsurface or is absorbed by or coats vegetation or snow. The down slope spreading of the oil is partly restrained by the viscous drag on the crude oil from contact with the ground surface and vegetation, liquid surface tension, and local depressions. Downward infiltration of the oil into the soil depends on the permeability of the ground surface, which, in turn, is controlled by the texture of local soil, the presence of snow, and the water table. A frozen soil has a low permeability that limits downward infiltration. Down slope spreading dominates the spreading process until the oil is intercepted by either human intervention or natural features, such as depressions, rivers, streams, ponds, or lakes. If an anthropogenic structure, such as a work-pad, access road, or highway, is in the path of a migrating oil plume, it can divert the flow. In addition, spilled oil can spread laterally as it moves down slope. Therefore, the magnitude of the lateral spreading increases with decreasing slope.

On flat terrain, the slope is of less importance in controlling the spreading of a spill. Local surface features, such as depressions on patterned ground and vegetative cover, would control the extent of a spill.

It is anticipated that the extent of soil contamination on a spill site would be localized, and limited at a maximum to a few acres. However, contaminants could spread to subsurface water at sites where there is a shallow ground water table. These sites may require additional cleanup and monitoring.

In general, the management of all spill debris and contaminated media first involves their characterization as hazardous or non-hazardous wastes. This is carried out by the application of circumstantial factors (i.e., the material spilled) or as a result of sampling and analyses when process knowledge is insufficient to support a complete waste evaluation. Waste determined to be hazardous would be incorporated into the hazardous waste management program as dictated by logistics of the spill. Waste determined to be non-hazardous would be evaluated against the soil cleanup levels contained in the specified tribal and federal regulations. Case-by-case decisions would be made regarding the management of non-hazardous wastes after this evaluation is completed. Options may include incineration, in-situ remediation through the application of such technologies as biological treatment or soil venting, stockpiling for later thermal treatment, or placement in municipal landfills.

Finally, within the context of any approved remediation and restoration plan for each spill event, special provisions may also be included for the interim storage of spill debris or contaminated media at or near the spill site. Acceptable levels of treatment would be determined by specified regulations and are specific to material spilled, potential for migration, potential receptors, and various other site-specific parameters. These levels define the allowable residual levels of specific chemical constituents that would be allowed to remain at the location where a release has occurred. Options for disposition of successfully treated soils include returning them to the spill location, sending them to a landfill to be used as clean cover material, or using them in other circumstances as fill.

The spill scenarios detailed on Table 4-7 were grouped into four spill event frequency scenarios and were analyzed for their effects on soil resources. The spill event frequency categories are:

- Anticipated Spill Events – Scenarios 1, and 2: This category consists of spills that are anticipated. This spill would result from a small leak and would involve a maximum oil release of 50 bbl.
- Likely Spill Events – Scenarios 3, 4, and 5: This category involves spills considered likely. These spill scenarios include a moderate, instantaneous leak of crude oil; a very short-duration leak caused by maintenance-related damage; a short-duration (e.g., 8 hours) leak caused by over-pressurization from inadvertent remote gate valve closure; and a prolonged (2 days) leak resulting from corrosion-related damage.
- Unlikely Spill Events – Scenarios 6 and 7: This category was performed for spill scenarios that are considered unlikely. These scenarios consist of a leak resulting from pipeline settling; or a crack resulting from tank corrosion or failure.
- Very Unlikely Spill Events – Scenarios 8, 9, 10, 11, and 12: This category was performed for a very unlikely spill scenario. It consists of an above ground guillotine break caused by a major storm event (such as, tornado), an aircraft collision, pipeline failure, and catastrophic ruptures of tanks. This spill would release the most amount of chemical, oil, or product.

Anticipated Spills

Anticipated spills are defined as spills caused by events with an expected frequency range of 0.5 per year or more (Table 4-7). The scenarios include two types of small leaks that could cause a land-based release of 0 to 50 bbl (0 to 2,100 gallons) of crude oil or 0 to 50 bbl of diesel fuel, gasoline, or jet fuel. The worst event among the anticipated spill scenarios would be an instantaneous leak of 100 bbl of diesel fuel during pipeline or pump station operations. On the basis of the parametric method (e.g., the size of the contaminated area created by the spill is estimated by dividing the volume of the spill by an assumed depth of the spilled liquid pool of one inch), the maximum size of the potentially contaminated area would be about 0.1 acre at an assumed oil pool depth of one inch. This level of impact on soils would be very small and local. Prompt cleanup would reduce the impacts to negligible.

Likely Spills

Likely spills are defined as spills caused by events with an expected frequency range of 0.03 to 0.5 per year (Table 4-7). The scenarios evaluated represent three types of events that could cause a land-based release of up to 5,000 bbl (210,000 gallons) of crude oil or up to 300 bbl (12,600 gallons) of diesel, regular, or jet fuel. The worst event in this category would be a leak that might cause the release of 5,000 bbl of crude oil over a period of 48 hours. This event is used to evaluate the maximum impact in the likely spill category. To ensure that the evaluation results would not underestimate the consequences, a release of 5,000 bbl of oil onto the ground was assumed. The maximum extent of spreading would be expected if no interceptor was present near a spill site. Based on the parametric method, the maximum potentially contaminated area would be about 7.7 acres at an assumed oil pool depth of one inch. Because of the small size, this impact on soils would be small and localized if prompt cleanup occurred after the spill.

Unlikely Spills

Unlikely spills are defined as spills caused by events with expected frequencies of 10-3 (0.001) to 0.03 per year (Table 4-7). The scenarios evaluated include two types of events that could cause a land-based release of crude oil ranging from 80 to about 450 bbl (3,360 to 18,900 gallons). The worst event in this category would be a spill caused by a rupture in the fuel line. Up to 450 bbl of diesel, regular, or jet fuel could be released in a short period. This scenario was used to evaluate the maximum impact for the unlikely spill category. Therefore, the maximum size of a potentially contaminated area of 450 bbl would be expected to be about 0.7 acre at an assumed oil pool depth of one inch.

Very Unlikely Spills

Very unlikely spills are defined as spills caused by events with an expected frequency range of 10-6 (0.000001) to 10-3 per year. The scenarios evaluated for this category of spill include nine types of events that could cause a land-based release of a volume of crude oil ranging from 5,000 to about 100,000 bbl (210,000 to 4,200,000 gallons), depending on both the location of the spill and the amount of storage volume used at the time of the spill. The worst event in the very unlikely spill category would be a guillotine break of the pipeline from the impact of an airplane or helicopter. Up to 100,000 bbl of crude oil could be released in a short period. This scenario is used to evaluate the maximum impact in the very unlikely spill category.

Based on the parametric method of calculation, the estimated size of a potentially contaminated area would be 155 acres for the 4.2 million gallon spill at an assumed spill pool thickness of one inch. However, the refinery is adjacent and in proximity to an unnamed tributary. In a worst-case scenario, the crude oil released from the refinery site could drain into the tributary, resulting in a smaller area due to the confinement of the channel. Most of the potentially contaminated land would be confined to the ordinary high water mark along the tributary channel and downstream reaches. To estimate the maximum size of a potentially contaminated land-based area for the very unlikely spill scenarios, both release volume and local terrain were considered. At this location, the spreading of spilled oil would be limited by the quantity of a spill. The worst-case maximum volume of a land-based spill is estimated to be about 100,000 bbl. The impact on soils could potentially range from small and localized due to amount of impervious surface associated with the refinery footprint, or extremely more severe if the spill made its way into the unnamed tributary. As stated previously, cleanup responses that occur immediately after the release reduces the number of potentially contaminated sites that require long-term cleanup.

4.4.2 Construction Alternatives

4.4.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the entire 468.39-acre site would be conveyed into trust status, but construction and operation of the refinery project would not go forward. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. The MHA Nation could decide to use the entire project site to produce feed or forage hay for buffalo, or the land could be included in a tenant farm-leasing program. Based on the foregoing, there would be no impacts from spills in the project area associated with a refinery.

4.4.2.2 Alternative 3 — No transfer to Trust, Refinery Constructed

The impacts from spills from the implementation of this alternative would be the same as described for Alternatives 1 and A. The MHA Nation would construct and operate the refinery and associated facilities and the same impacts would occur.

4.4.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in the same impacts as described in Alternatives 1 and A. The revised site refinery layout would be constructed, so impacts from spills would be the same. However, instead of holding ponds, the surge tanks described earlier in Alternative 4 would contain any spills until cleanup measures could be implemented.

4.4.2.4 Alternative 5 — No Action

Under this alternative, the 468.39-acre site would not be conveyed into trust status and the refinery would not be built. The 468.39-acre project site would continue to be used for agricultural purposes, which have occurred for decades. There would be no impacts from spills in the project area.

4.4.3 Effluent Discharge Alternatives

4.4.3.1 Alternative B — Partial Discharge through an NPDES Permit and Some Storage and Irrigation

Under this alternative, wastewater would be treated, then discharged through an NPDES permit or stored and used for irrigation. Impacts from spills in the project area would be similar to those described under Alternatives 1 and A due to construction of the refinery.

4.4.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, the effluent from the WWTP would be discharged to a Class I, Non-hazardous UIC well that would be drilled on the project site. This well would dispose of non-hazardous fluids into isolated formations beneath the lowermost existing or potential future underground source of drinking water. The impacts from spills would be similar to those described under Alternatives 1 and A.

4.4.3.3 Alternative D — No Action

No effluent would be generated or discharged because the refinery would not be constructed under this alternative. There would be no impacts from spills in the project area under this alternative.

4.5 Solid and Hazardous Wastes

Hazardous and non-hazardous wastes will be produced from refinery operations and stormwater. A waste inventory appears in Chapter 2 and the Solid and Hazardous Wastes Management Report identifies the nature, source, and potential risks associated with these wastes. The proposed refinery is likely to be a LQG of hazardous wastes. Depending on facility design and operation, the facility may also be regulated under the RCRA, a federal hazardous waste law, as a RCRA TSD Facility. RCRA TSD facilities must obtain a RCRA TSD permit. Regulation pursuant to RCRA is discussed in detail in the interim final EPA document entitled: “Discussion of Regulatory Applicability of RCRA /NPDES/UIC to Three Affiliated Tribes Refinery Alternatives” (March 2008) (Regulatory Applicability Discussion).

Generators of hazardous waste are classified according to the amount of hazardous waste they generate each month. Generators that generate less than 100 kilograms per month and accumulate less than 6,000 kilograms of hazardous waste at any time are small quantity generators (SQG). Generators that generate more than 1,000 kilograms per month (approximately 5 fifty-five gallon drums of waste per month) or more than 1 kilogram of acutely hazardous waste per calendar month are LQGs. Regulatory requirements for small and LQGs are found in 40 CFR Part 262.

Generators of hazardous wastes may not treat or accumulate hazardous wastes in surface impoundments (ponds) without a RCRA TSD permit. LQGs, such as the proposed refinery, may accumulate wastes on site up to 90 days in tanks and containers without a RCRA TSD permit as long as the generator complies with training, design, preparedness and prevention requirements, contingency plans, and emergency procedures found in 40 CFR Part 265.

Generators of hazardous wastes may not treat or accumulate hazardous wastes in surface impoundments (ponds) without a RCRA permit. However, if the treatment and accumulation of hazardous wastes occurs in tanks instead of ponds and the wastes are discharge under an NPDES permit, the facility would most likely not need a TSD permit.

Hazardous wastes generated at the proposed refinery will be stored temporarily (for up to 90 days) onsite following the requirements at 40 CFR Part 265 until being sent off-site for disposal. These wastes will be sent to a third-party, licensed, off-site hazardous waste disposal site. No hazardous wastes will be disposed of in or on the refinery site. Impacts from transporting hazardous waste will be controlled and/or mitigated through the RCRA transporter requirements under 40 CFR Part 263. Transporters of hazardous waste are required to be licensed under these regulations and transport the waste in appropriate containers and vehicles to approved waste management facilities. Both hazardous waste and solid waste will be disposed of properly at approved waste management facilities. The RCRA regulations for solid and hazardous wastes management facilities will control and/or mitigate potential environmental impacts.

4.5.1 Alternatives 1 and A — Original Proposed Actions

Under this alternative, process wastewater from the refinery and contaminated (oily) water from the refinery process areas would be collected and treated at a WWTP. Following treatment, wastewater would be stored in two downstream effluent holding ponds (700,000 gallons each/1.4 million gallons total). Contaminated (oily) stormwater would be collected from process areas (i.e. loading area, tank farm (Figure 2-5) and routed directly to a 1.4 million gallon holding pond upstream of the WWTU. Depending on quality, the wastewater from the holding pond would be sent directly to the two effluent holding ponds described above or sent to the WWTU for treatment and then into the effluent holding ponds (Figures 2-3 and 2-4). The effluent from the holding ponds would be recycled back to the refinery processes as needed or discharged through a permitted NPDES outfall.

The proposed alternative is expected to generate and store FO37 hazardous waste in the holding pond upstream of the WWTU aggressive biological treatment unit ABTU. A RCRA TSD permit is required for surface impoundments which receive and/or generate hazardous waste, and that do not conduct aggressive biological treatment. A RCRA TSD permit can also be required for downstream units from ABTUs that do not conduct aggressive biological treatment and land dispose of hazardous waste. Therefore, a RCRA TSD permit would be required under this alternative. In addition to the holding pond upstream of the ABTU, the holding ponds downstream of the ABTU could also require the refinery to be subject to a TSD permit if regulated hazardous wastes were to enter or accumulate in these ponds (e.g. if the ABTU is not designed and operated on a continuous basis as required by 40 CFR 261.31(b)(2). For more information see the “Discussion of Regulatory Applicability” document (EPA, March 2008).

Holding ponds which generate and accumulate hazardous wastes are required to have a RCRA TSD permit under 40 CFR Parts 264 and 270 before they are constructed. The permit application must be submitted at least 180-days prior to construction. The TSD permitting requirements under 40 CFR Part 264 would include double-liner and leak detection requirements, operating requirements, ground water, training plans, preparedness and prevention requirements, contingency plans, emergency procedures, air emissions standards, closure plans, post-closure plans, financial assurance for closure and post-closure, and liability insurance for sudden and non-sudden accidental occurrences. The entire facility would also be subject to corrective action requirements for releases to soil, ground water, and surface water from all SWMUs. A post-closure permit would be required if the holding pond could not be “clean-closed” at the end of operations.

Air impacts from hazardous waste ponds could be significant within the facility. As discussed in the air quality section in this chapter, the air impacts will generally be confined to the refinery site. The RCRA TSD permit would have provisions to control and/or treat VOCs in the wastewater surface impoundments and/or tanks. Similarly, the RCRA hazardous waste generator requirements contain provisions to control air emissions from tanks.

Failures or leaks in surface impoundment liners would result in contamination of soils and ground water beneath the facility. Contamination of soils and ground water would result in the requirement to implement corrective action measures to eliminate the source of contamination and to restore ground water quality.

Hazardous waste container storage areas would be on concrete pads with concrete curbing to contain any spills or leaks. This should allow for spills or leaks to be readily detected and addressed. Therefore, limited impacts to soils or ground water are anticipated from these areas. Hazardous waste generator requirements under 40 CFR Part 262 would apply as appropriate.

Reclamation/Closure Impacts

At some point in the life of the refinery, the decision would be made to cease refinery operations and permanently close the facility. The closure of the refinery would be expected to follow a process of decommissioning, decontamination and demolition, followed by cleanup of any remaining soil and ground water contamination and final reclamation of the site. One component of closure planning is the RCRA "closure plan" which is required for facilities regulated as TSD Facilities under a RCRA permit. Closure performance standards are also required of RCRA generators under RCRA. The "closure plan" would need to include a range of potential closure and reclamation scenarios developed specifically for the proposed refinery. The RCRA closure plan would only cover the HWMU. The closure activities would be carefully managed in order to minimize impacts to the environment and other receptors such as area residents.

Some level of cleanup would be anticipated at the proposed refinery; as normal refinery operations over time result in some local contamination of soils and ground water. However, as discussed in the proposed alternatives, impacts would be minimized through effective design considerations, operating practices and environmental management systems. The discovery of any release(s) of hazardous wastes or constituents prior to closure would be addressed through the implementation of applicable RCRA permit requirements or an enforcement order.

The basic procedures that would be followed in closing the facility under an approved RCRA closure plan include:

- Field checks and review of refinery drawings, piping location maps and aerial photos to identify all known or suspected piping and subsurface structures as well as areas of "high risk" for spills and releases throughout the refinery;
- Removal of any remaining hazardous waste sludge, liners, contaminated soils in or beneath all hazardous waste surface impoundments. If the hazardous waste surface impoundments are not clean-closed, a RCRA post-closure permit would be required.
- Removal of any waste;
- Decontamination as appropriate;
- Evaluation to determine if there was a possibility that hazardous waste/constituents have been released;
- Collection and analysis of soil and ground water samples, as appropriate, to determine if hazardous wastes/constituents have been released – data from existing monitor wells would be utilized;
- Determination, as appropriate, of the extent of any soil and ground water contamination which may be present beneath and around a given area;
- Determination of the need for soil and/or ground water remediation by developing remediation objectives;
- Development, execution, and completion of any required remediation efforts;
- Verification that the required remediation efforts met the remediation objectives established in the approved plan;
- Certification by the owner/operator that the requirements of the approved plan were met; and
- Appropriate remediation of all contaminated soil and ground water.

Once the site has met the appropriate regulatory requirements and designated cleanup standards, the site should be reclaimed in a manner that would be consistent with its intended use. Ground water monitoring wells no longer needed for their intended purposes (e.g., regulatory compliance) would be closed/plugged as per the appropriate regulatory requirements. See Soils Section of this Chapter for additional discussions of soils reclamation.

As per any corrective action, requirement/agreement from EPA, the facility could have the flexibility of using those portions of the RCRA corrective action process deemed to be appropriate at the site. The five major steps that would be considered during RCRA corrective action would be:

- RCRA Facility Assessments (RFA) including identification of potential or actual releases from SWMUs;
- Interim/Stabilization Measures including short-term actions to address any immediate threats to human health and the environment;
- RCRA Facility Investigation (RFI) including compilation of information to fully characterize the release in order to better determine the appropriate response action;
- Corrective Measures Study (CMS) including identification of appropriate measures to appropriately address the release, following completion of the RFI; and
- Corrective Measure Implementation (CMI) including design and implementation of the cleanup remedy that is protective of human health and the environment.

4.5.2 Construction Alternatives

4.5.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the entire 468.39-acre site would be accepted into trust status, but construction and operation of the refinery project would not go forward. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. Based on the foregoing, there would be no solid and hazardous waste impacts associated with a refinery.

4.5.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Under this alternative, the hazardous and solid waste impacts will be the same as Alternatives 1 and A.

4.5.2.3 Alternative 4 — Modified Proposed Action

Under Alternative 4, solid waste and hazardous waste would be managed as generally described under the proposed Alternative 1. However, the contaminated (oily) stormwater holding pond and effluent holding ponds would be replaced with tank systems (Figure 2-16). The tank systems would be designed to meet specific regulatory requirements under RCRA. The tanks would be underground, shallow tanks to accommodate gravity filling following the site gradient. The tanks would be made of double wall steel or equivalent in compliance with 40 CFR 264/265 Subpart J as applicable. The use of tanks rather than surface impoundments (ponds) should provide greater protection for soils and ground water. The use of tanks would allow for further recycling/treatment of wastewaters. Also, the sludge thickening process would be designed to minimize hazardous wastes generated for offsite disposal by use of a centrifuge with naphtha solvent wash or similar process. Figure 2-17 shows how wastes generated from the redesigned wastewater treatment unit would be handled. Hazardous waste generator requirements under 40 CFR Part 262 would apply as appropriate.

Under Alternatives 4 and A, the refinery would be redesigned so the facility would be regulated as a hazardous waste generator under RCRA but would not be regulated as a RCRA TSD facility. Alternatives 4 and A rely exclusively on tanks in the wastewater treatment system to manage hazardous wastes. Such tanks are typically exempt from RCRA permitting under the RCRA wastewater treatment unit (WWTU) exemption because wastewater is treated and discharged pursuant to a CWA NPDES permit; see 40 CFR 264.1(g)(6), 260.10 and 270.1(c)(2)(v). Even if no RCRA permit were required, the following selected wastes could be generated in the wastewater treatment system: DO18, KO48, KO49, KO51, FO37, and FO38. However, compliance with hazardous waste generator requirements will minimize the impact of wastes on the facility environs. Spills, leaks, and unanticipated releases would be the main sources potential impacts. Generator plans prepared in compliance with regulatory requirements found in 40 CFR Part 265 and implemented after releases would assure proper responses to such events. As there would be no RCRA permit, there would be fewer RCRA requirements applicable to the facility. For example, there would be no RCRA permitting requirements for ground water monitoring, and corrective action. Under this alternative, there is no requirement for financial assurance under EPA's RCRA regulations. However, RCRA generators are required to demonstrate “clean closure” of areas used to temporarily store hazardous waste. Without the funding available through financial assurance, cleanup activities and other remedial actions may be delayed or may not be implemented. Ground water monitoring programs and RCRA corrective action are not required for non-TSD facilities. [Note: In accordance with 40 CFR Parts 262.34, 265.111, and 265.197, all hazardous waste tanks must be clean-closed at the time of closure, or a RCRA post-closure TSD permit will be required.]

All hazardous waste tanks and tank systems would be required to meet applicable RCRA requirements including: appropriate construction materials, double-wall construction (including double-floor construction as appropriate), liners, leak detection systems, and secondary containment. These requirements would reduce the likelihood of releases to soils and ground water.

Hazardous waste container storage areas would be on concrete pads with concrete curbing to contain any spills or leaks. This would allow for spills or leaks to be readily detected and addressed. Therefore, only minor impacts to soils or ground water are anticipated from these areas.

4.5.2.4 Alternative 5 — No Action

Under this alternative, the 468.39-acre site would not be accepted into trust status and the refinery would not be built. The 468.39-acre project site would continue to be used for agricultural purposes, which have occurred for decades. There would be no impacts from solid or hazardous wastes.

4.5.3 Effluent Discharge Alternatives

4.5.3.1 Alternative B —Partial Discharge through an NPDES permit and Some Storage and Irrigation

Under this alternative the hazardous waste impacts would be similar to those described under Alternatives 1 and A.

Under this alternative, the wastewater from the holding ponds (Alterative 1 and B and Alternative 3 and B) or tanks (Alternative 4 and B) would be discharged through a permitted NPDES outfall or used for irrigation water. Prior to discharge or use for irrigation, the process wastewater would be treated in the WWTU and then sent to holding ponds or tanks. Depending on its quality, the potentially contaminated (oily) stormwater may be sent directly to the holding ponds or tanks for the treated process water or first sent to the WWTU for treatment and then routed to the holding ponds or tanks. The uncontaminated (non-oily) stormwater would be stored in a holding pond prior to discharge through a permitted NPDES outfall or to use for make up water for the fire water system.

A RCRA TSD permit is required for all alternatives involving land application of wastewater regardless of construction alternative used. The wastewater treatment unit exemption does not apply to facilities which land applies wastewater because the proposed irrigation is not subject to the NPDES permit. The RCRA TSD permit would include the entire WWTU.

Treated wastewater that is land applied would be considered to be a "solid waste" under RCRA regulations. This means that wastewater proposed to be used for irrigation should be treated to meet appropriate standards to protect human health and the environment. In addition, unless the wastewater is treated sufficiently, it would continue to be considered a “solid waste containing hazardous waste constituents”, and RCRA corrective action requirements would apply for the irrigated land parcel. This is because the irrigated land parcel would be considered a SWMU. The RCRA TSD permit may establish additional treatment levels for irrigation water.

RCRA hazardous waste regulations would also apply if wastewater is not treated to proper levels prior to land application. If the wastewater is not properly treated prior to irrigation, the irrigated land parcel could potentially become a RCRA hazardous waste land treatment unit (LTU). Such a designation would significantly change the nature of the proposal under this alternative, as there would be a greater likelihood of releases to soils, ground water and surface water, and there would be additional requirements related to human food-chain considerations. In order for the treated wastewater to be used as irrigation water for human food-chain crops, it should meet strict standards in order to be protective of human health and the environment. Requirements for RCRA hazardous waste LTUs include: preparedness and prevention, land treatment program, design and operating requirements, food-chain crop requirements, unsaturated zone monitoring, ground water monitoring, financial assurance, corrective action, and closure and post-closure care.

Hazardous waste generator requirements under 40 CFR Part 262 would apply as appropriate.

4.5.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, all the wastewater including treated process water, potentially contaminated (oily) stormwater, and uncontaminated (non-oily) stormwater would be discharged to a Class I, Non-hazardous UIC well that would be drilled on the project site. The hazardous waste impacts would be similar to those described under the associated construction alternative. The UIC alternative raises some regulatory issues under RCRA. The facility could become a RCRA TSD if a NPDES permit is not obtained (and the “wastewater treatment unit” exemption at 40 CFR 264.1(g)(6) does not apply).

4.5.3.3 Alternative D — No Action

Implementation of this alternative would have no effects to the project area. No solid or hazardous waste would be generated because the refinery would not be constructed.

4.6 Soils

4.6.1 Alternatives 1 and A — Original Proposed Actions

Effects to soils under the proposed action would be associated with the following components: construction, operation, and maintenance of the clean fuels refinery, and the production of forage for the MHA Nation's buffalo.

4.6.1.1 Construction Impacts

Effects to soil resources from the construction phase of the refinery would be related to activities that include grading, construction traffic, equipment storage, and excavation associated within the refinery footprint. Effects to soil resources in the project area would also result from oil and natural gas pipeline construction activities, including the operation of heavy equipment, clearing and grading, trenching, excavation, and pipe and pole installation. Potential effects during the construction phase could include contamination of soils by fuel spills or accidental release of toxic or hazardous chemicals. Therefore, all contractors would have individual Emergency Response Plans that would include preparations for quick and safe cleanup of accidental spills. It would prescribe hazardous materials handling procedures to reduce the potential for a spill during construction, and would include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan would identify areas where refueling, vehicle maintenance, and storage of hazardous materials, if any, would be permitted. These directions and requirements would also be reiterated in the SWPPP for Stormwater Construction NPDES permit.

Refinery

Overall, implementation of Alternative 1 would result in the disturbance of 190 acres related to construction activities associated with the refinery. The refinery construction footprint area represents approximately 40 percent of the project area. In an effort to reduce overall long-term impacts to soil resources, the A horizon would be removed, separately segregated, and stored for site closure reclamation activities. The B horizon would be treated in the same manner. Storage locations for topsoil would be located outside the influence of construction activities and located where full retrieval of topsoil is feasible. Topsoil would be stored as a berm around the north property boundary in a manner that maximizes surface area and minimizes depth. A vegetative cover would be seeded or other comparable erosion control practices would be applied to the stored soil to reduce erosion losses. In addition, sediment controls (e.g. silt fences, straw bales, berms, sediment traps) would be installed to prevent sediment transport to undisturbed lands, stream, rivers, and drainages.

Water erosion that could occur during construction activities would be controlled through a SWPPP required by the Stormwater Construction NPDES permit. Storm water generated during the construction phase would be controlled and collected, treated if necessary, and discharged under conditions issued through the permit. The implementation of the permit conditions and standard construction practices is expected to prevent the proposed project from generating significant impacts caused by wind or water erosion.

Erosion

Although all soils are prone to erosion to some degree, factors that would influence the rate of erosion include soil texture and structure, the length and percent of slope, vegetative cover, and rainfall or wind intensity. The most erosion-prone soils are generally bare or sparsely vegetated, non-cohesive, fine textured, and situated on moderate to steep slopes. Soils more resistant to erosion include those that are well vegetated, well structured with adequate percolation rates, and located in nearly level terrain. Because of the varied weather patterns and seasonal timing of precipitation events, water erosion at the site would be generally limited to periods of rainfall precipitation or the spring runoff period.

Soil erosion from wind or water could occur during construction because of earthmoving and grading activities. Construction activities occurring where vegetation is removed and the soil is broken up present the greatest threat to soils with potential for wind erosion. Excavation associated with facility foundations and ROW cleared for pipelines could break down soil aggregates, increasing runoff and rill and gully formation. Pipeline trenches could change erosion patterns and form gullies if soils settle in the backfilled trench after reclamation.

Oil and Natural Gas Pipeline Impacts

Enbridge would construct a pipeline to connect the terminus of its Wabek/Plaza field pipeline to the crude oil storage tanks in the refinery's tank farm (Figure 2–12). Additionally, Enbridge would construct four new 30,000-bbl storage tanks between Outlook, Montana and the refinery (Figure 2–1). Construction of the oil storage facilities would occur within existing pads that have previously been developed, thereby avoiding additional soil resource impacts.

Two options are provided to deliver natural gas to the refinery: MDU Resources Group, Inc. and Bear Paw Natural Gas Company. MDU would supply natural gas using a new pipeline that would connect its existing Williston Basin Interstate Pipeline to the refinery (Figure 2–12 and Figure 2–13). Under the second option, Bear Paw Natural Gas Company would supply natural gas using a new pipeline that would connect its existing Plaza pipeline to the refinery (Figure 2–12).

Erosion

Pipeline construction activities such as clearing, grading, trench excavation, backfilling, and movement of construction equipment along the ROW would affect soil resources. Erosion is a continuing, natural process that can be accelerated by human activities. Clearing, grading, and moving equipment on the ROW would remove the protective vegetation cover and expose soils to the effects of wind, rain, and runoff. These effects would accelerate the erosion process and, without adequate protection, could result in discharges of sediment to wetlands and waterbodies, and could potentially lower soil fertility.

The construction of both of the buried pipelines would temporarily disturb about 24 acres of topsoil, and would expose the substratum soils. Therefore, to minimize soil impacts, an erosion control and sediment transport control plan would be prepared in association with the SWPPP as required by the Stormwater Construction NPDES permit. This plan would be prepared in accordance with EPA guidelines and other applicable standard construction practices. At a minimum, the applicant would install and maintain various erosion control measures during construction of the project site and active construction ROW. These measures may include temporary slope breaks on slopes and temporary sediment barriers, such as straw bales or silt fences, across the ROW during construction at the base of slopes; adjacent to waterbodies, wetlands, and roadways; and along the edge of the ROW as necessary to prevent sediment from flowing off the ROW. In addition, the applicant would install erosion control netting on waterbody banks, very steep slopes, and in drainages that may be susceptible to erosion. To protect topsoil from wind erosion, water would be applied to active construction areas in all areas identified as highly susceptible to wind erosion and in all areas where soil conditions warrant. Implementation of the SWPPP would reduce the overall short-term and long-term erosion impacts associated with the pipeline construction.

Soil Compaction

Construction equipment operating and traveling on the construction ROW can compact the soil, especially during wet periods and on poorly drained soils. Soil compaction can also result from the storage of heavy spoil piles on certain types of soil for extended periods. Soil compaction destroys soil structure, reduces pore space and the moisture-holding capacity of the soil, and increases runoff potential. If unmitigated, compaction results in soil with a reduced revegetation potential and an increased erosion hazard. The degree of compaction depends on the moisture content and texture of the soil. Wet soils with fine clay textures are the most susceptible to compaction.

Measures to reduce soil compaction would be developed in the SWPPP. The applicant would attempt to minimize compaction by adjusting construction schedules to avoid compaction-prone areas during short-term weather events. In addition, compaction impacts may be avoided or minimized by limiting operating heavy equipment within or across minor tributaries, adjacent to wetlands, and other areas as deemed necessary during construction. Should compaction occur, soils would be plowed with a paratill, paraplow, or other deep-tillage device. Implementation of conditions in the SWPPP would reduce impacts associated with compaction.

Topsoil Mixing

In addition to erosion and compaction, construction activities such as grading, trenching, and backfilling can cause mixing of soil horizons. Mixing of topsoil with subsoil, particularly in agricultural lands, leaves less productive soils in the root zone, which lowers soil fertility and the ability of disturbed areas to revegetate. Another result of soil mixing and disturbance can be a change in appearance of the surface disturbed soils when viewed in comparison with the adjacent undisturbed soils. Introducing stones or rock fragments to the surface could result from mixing of topsoil and stony subsoil layers; excess rock brought to the surface could adversely affect agricultural land and restoration efforts.

To reduce the mixing of soil horizons on its construction ROW and any other construction location, the applicant would segregate topsoil and subsoil. Topsoil segregation generally helps to preserve the chemical and physical properties of the topsoil and would protect any native seed sources. At a minimum, the applicant would segregate topsoil in all annually cultivated or rotated agricultural lands, hay fields, and residential areas.

Revegetation would be initiated as soon as possible or within 1 month after completion of ground-disturbing activities, whichever is shorter. Reclamation plans would identify quantities and re-spread depths of topsoil (A and B horizons). Seeding would be completed as either a fall dormant seeding or an active spring seeding. A seed mixture would be developed with appropriate input from the local agencies. At a minimum, the seed mixture would designate species and the applied pure live seed (PLS) rate. All areas would be mulched with certified weed-free hay at a rate of 2 tons per acre. Hay would be crimped into the soil surface on slopes greater than 20 percent. Woody nursery stock would be used where revegetation limitations are severe and the pre-disturbance community is composed of woody vegetation.

Poor Revegetation Potential

Poor revegetation potential is a concern with the Wabek (1 to 35 percent slopes) and Zahl – Williams (9 to 25 percent slopes) soil series. These series have capability classes indicating that the soil would respond poorly to reclamation. These series are primarily limited to the pipeline routes.

Mixing of soil materials during excavation or compaction, especially in the soil series listed above, could have an effect on reclamation and future productivity. Therefore, construction activities should be limited in areas where the soil is shallow or on steep slopes, as these series have poor revegetation potential.

Natural Gas and Crude Oil Pipeline and Power Lines

Both pipelines would cross Wabek and the Zahl – Williams series. Table 4-8 details the acreage of the project area ROW that would be disturbed by construction activities on soils with poor revegetation potential.

Table 4-8 Soils with Poor Revegetation Potential and Associated Right-of-Way

ROW	Sum Of Acres	Description	Map Soil Type	County
Gas Pipeline	1	Zahl-Williams (9 to 25 percent slope)	24E	Mountrail
Gas Pipeline	1	Wabek (1 to 35 percent slope)	54E	Mountrail
Gas Pipeline	1	Williams Loam, Undulating	WlC	Ward
Oil Pipeline	2	Wabek (1 to 35 percent slope)	54E	Mountrail
Oil Pipeline	28	Zahl-Williams (9 to 25 percent slope)	24E	Mountrail
Oil Pipeline	4	Max-Bowbells-Zahl Loams, Hilly	MlE	Ward
Oil Pipeline	10	Max-Williams Loams, Rolling	MmC	Ward
Oil Pipeline	1	Max-Williams Loams, Strongly Sloping	MmD	Ward
Oil Pipeline	1	Max-Zahl Loams, Rolling	MoC	Ward
Oil Pipeline	12	Williams Loam, Undulating	WlC	Ward
Oil Pipeline	3	Williams Clay Loam, Strongly Sloping	WmD	Ward
Oil Pipeline	1	Zahl Loam, Hilly	ZaE	Ward
Oil Pipeline	1	Zahl-Max Loams, Hilly	ZmE	Ward
Transmission Line	2	Williams Loam, Undulating	WlC	Ward
Transmission Line	7	Max-Bowbells-Zahl Loams, Hilly	MlE	Ward
Transmission Line	6	Max-Williams Loams, Rolling	MmC	Ward

Reclamation efforts would be implemented to enhance revegetation and address soils with poor revegetation potential. These efforts would include topsoil segregation, recontouring, applying erosion control mulch on slopes, respreading cut vegetation or preserved rock mulch, imprinting the surface of the ROW, installing permanent slope breaks, and seeding with species adaptable to the climate. These measures would also reduce soil impacts associated with poor revegetation potential.

Power Lines

The entire length of the transmission alignment would be constructed within either the Highway 23 or the local road ditch ROW. Therefore, the overall amount of disturbance is expected to be minimal, and direct compaction effects would be limited to the access point and tower pad excavation areas.

Impacts associated with soil disturbance would be short-term, and the potential significance of these impacts would be reduced by the implementation of erosion control measures and permit conditions associated with the SWPPP.

Construction of the proposed project is expected to result in only temporary impacts on near-surface soil resources from construction activities. Soil erosion from all construction activities is expected to be minimal because the proposed project would be constructed following standard practices and permit conditions to control wind erosion by limiting the removal of vegetation, avoiding construction on steep and erosive slopes, revegetating or covering any topsoil that was removed and stockpiled, surfacing roads, and reclaiming areas in a timely manner. In addition, active construction sites would be watered, as necessary (except during periods of rain), to minimize the potential for wind erosion.

4.6.1.2 Operation Impacts

The refinery would use a number of hazardous materials at the site to manufacture clean fuels. Shipping, handling, storing, and disposing of hazardous materials inherently pose a certain risk of a release to the soil layer. The toxic substances handled by the refinery include hydrogen sulfide, ammonia, and spent sulfuric acid. Additionally, the refinery handles regulated flammable substances including propane, butane, isobutene, and pentane; and other petroleum products including gasoline, fuel oils, diesel, and other products, which pose a risk of spill.

In general, oil or petroleum product dumped or spilled onto soils can saturate the soil matrix. This type of concentrated contamination can be problematic to remediate. If oil or petroleum product is introduced at any depth within the soil matrix, natural weather and biodegradation processes can be rendered less effective and the chances may increase that some of the oil or petroleum product may contaminate ground water, if present. Because many oil or petroleum product components have densities lower than or close to that of water, the lighter non-aqueous phase liquids (LNAPLs) generally pose less potential for ground water pollution that most chlorinated solvents (e.g., PCBs or TCE) that are denser than water (denser non-aqueous phase liquids [DNAPLs]).

A spill of hazardous materials (generally petroleum products and by-products from the refining process) could occur under normal operating conditions. Spills could also occur from corrosion of containers, piping, and process equipment; and leaks from seals or gaskets at pumps and flanges. The overall spill hazards associated with the handling and transport of processed fuel oils are expected to be less than at refineries based on older technologies. It is anticipated that if an event occurred, it would be either a human or a mechanical error.

All facilities (refinery, pipelines, tanks associated with the pipeline) would have a SPCC plan or equivalent as required under Oil Pollution Act and HMTA. The SPCC plans would be designed to prevent spills from on-site facilities, and include requirements for secondary containment, provides emergency response procedures, establishes training requirements, and so forth. In addition, construction of the tanks, vessels, and foundations have been designed to incorporate spill containment systems to reduce the impacts of spills of petroleum products. Specifically, the refinery has been designed to minimize impacts to soil resources by constructing an impervious layer under all refinery processing and handling facilities. In addition, all storage containers would be double-lined, constructed on an impervious surface, and constructed within a self-containing berm. Therefore, all of the structures would be built to contain and control accidental spills and releases.

In the event of a spill or accidental release, all materials would be collected within designed containment facilities and pumped to an appropriate tank, or sent off-site if the materials cannot be used on-site. Conversely, large spills outside of designed containment areas would be captured by impervious surfaces and directed to the process water system where they would be collected, controlled, and treated or separated.

The project would be required to develop and implement a SWPPP under the NPDES permit for the operations at the facility. The SWPPP would identify areas that have a potential for pollutants entering into the stormwater systems at the facility and BMPs to minimize pollutant introductions from those identified sources. These areas at the proposed facility include raw material, intermediate and final product storage facilities, loading and unloading operations, and refinery process areas.

4.6.1.3 Buffalo Forage

There would be no effects to soil resources from buffalo forage production. Approximately 279 acres of previously disturbed agricultural land would be initially seeded with oats and crested wheatgrass, and then later converted to alfalfa and a mixture of grasses. Soils in the area are currently being used for agricultural purposes, which is not significantly different from the proposed use. Therefore, no impacts to soil resources would occur.

4.6.1.4 Treated Wastewater and Stormwater Discharges

Effects to soils would be limited to the outfall locations and downstream reaches and sediment deposition on aquatic and wetland vegetation. Implementation of this alternative would modify soil and topographic conditions at the outfall sites to accommodate the outfall locations and changes to hydraulics. Construction activities and discharge volumes are of particular concern as soil erosion is an important problem both at its source and downstream of the outfall location sites. Lost soil would be deposited somewhere downstream, and the location of the deposition could have the potential to alter downstream hydrology and deposit on aquatic and emergent vegetation. Sedimentation may also pose a water quality issue directly as a result of siltation and indirectly from contaminants carried with or attached to soil particles. Excess soil can increase the turbidity within the downstream reaches, causing deposition on plants and reducing the amount of sunlight that reaches the plants growing in the water.

During operations, the proposed project would change the hydrology of the watershed, increasing flows rates and changing the system to more of continuous flow régime. Over time, the wetlands and the tributary to the East Fork of Shell Creek would adjust through erosion or additional sediment deposition to the changes in hydrologic conditions.

4.6.1.5 Reclamation/Closure Impacts

At some point in the life of the refinery, the decision would be made to cease refinery operations and permanently close the facility. The closure of the refinery would be expected to follow a process of decommissioning, decontamination, and demolition, followed by cleanup of any remaining soil and ground water contamination and final reclamation of the site. These activities would be carefully managed in order to minimize impacts to the environment and other receptors such as area residents. A part of the overall closure and reclamation planning would be the RCRA "closure plan" which is required if the refinery is regulated as a TSD Facility under RCRA. The preliminary design for Alternatives 1 and A would be a TSD Facility. For more information about the RCRA "closure plan" please see the Solid and Hazardous Waste section in this Chapter.

Normal refinery operations would over time be expected to result in some local contamination of soils and ground water. However, impacts should be minimized through effective design considerations, operating practices and environmental management systems. Current plans are to monitor for contamination throughout the life of the refinery and to begin cleanup activities at the time when the contamination is discovered. Typically activities that may be needed during cleanup at refineries are the removal of contaminated soils or the treatment of contaminated soils. Soil cleanup activities serve two main purposes: removal/treatment of contaminants within the soils that are sources of contamination to underlying ground water and the cleanup or removal of surface soils would be to protect human health and the environment on the sites after closure of the facility. If the hazardous waste surface impoundments are not clean-closed, a RCRA post-closure permit would be required.

After the removal of the refinery units, tanks, buildings, roads, surface cleanup activities, etc., revegetation would be initiated as soon as possible or within 1 month after completion of recontouring and topsoil placement. Reclamation plans would identify quantities and re-spread depths of topsoil (A and B horizons). These efforts would include topsoil segregation, recontouring, applying erosion control mulch on slopes, respreading cut vegetation or preserved rock mulch, imprinting the surface of the ROW, installing permanent slope breaks, and seeding with species adaptable to the climate. These measures would also reduce soil impacts associated with poor revegetation potential. Seeding would be completed as either a fall dormant seeding or an active spring seeding. A seed mixture would be developed with appropriate input from the local agencies. At a minimum, the seed mixture would designate species and the applied PLS rate. All areas would be mulched with certified weed-free hay at a rate of 2 tons per acre. Hay would be crimped into the soil surface on slopes greater than 20 percent. Woody nursery stock would be used where revegetation limitations are severe and the pre-disturbance community is composed of woody vegetation. The revegetated areas would be irrigated as needed for reestablishment of the vegetation. The reclaimed area will be inspected regularly in order to identify any actions needed for proper propagation of the vegetation.

4.6.2 Construction Alternatives

4.6.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the entire 468.39-acre site would be accepted into trust status, but construction and operation of the refinery project would not go forward. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. Therefore, there would be no effect to soil resources from continuing agricultural uses such as buffalo forage production.

4.6.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

The effects to soils of the implementation of this alternative would be the same as those described for Alternatives 1 and A. The MHA Nation would construct and operate the refinery and associated facilities, and the same effects to soils would occur. Also, the production of forage for the MHA Nation’s herd of buffalo would be the same.

4.6.2.3 Alternative 4 — Modified Proposed Action

The effects to soils of the implementation of this alternative would be the same as those described for Alternatives 1 and A. The MHA Nation would construct and operate the refinery and associated facilities, and the same effects to soils would occur. However, the RCRA "closure plan" would not be required as the refinery would not be regulated as a TSD Facility under RCRA. The production of forage for the MHA Nation’s herd of buffalo would be the same as in Alternative 1 and A.

4.6.2.4 Alternative 5 — No Action

There would be no changes to soil resources in the project area under the No Action alternative. Soils with hazards and limitations would remain, but they would not be affected beyond the current condition. The effects on soil resources would depend on future and current management activities.

4.6.3 Effluent Discharge Alternatives

4.6.3.1 Alternative B — Partial Discharge through an NPDES permit and Some Storage and Irrigation

Under this alternative, wastewater would be treated, then discharged through an NPDES permit or stored and used for irrigation. During the growing season, treated wastewater could be land applied. During wet weather or when it is too cold to irrigate, the wastewater would be discharged under the NPDES permit or stored for future irrigation.

If this alternative is selected, an irrigation plan would need to be developed to configure the land application site to prevent runoff, to determine appropriate rates of land application for the soils and the size of the land application site. Soils on the site are generally moderately well-drained at the surface, decreasing to moderately slow below 30 inches. Water application must not exceed soil infiltration rates or unwanted surface runoff might occur. The impacts from land application of treated wastewater would depend on the degree of treatment prior to land application and rate of land application.

The use of treated wastewater for irrigation could potentially impact soil, if the wastewater was high in salt. Wastewater has the potential to become saline, because the refinery plans to reuse wastewater which could concentrate salts due to refinery processes and evaporation. Also one of the water sources for the facility, the Fox Hills-Hell Creek aquifer, is typically salty. The refinery would need to pretreat water from the Fox Hills-Hell Creek aquifer prior to refinery use to reduce salinity. During normal precipitation periods, the refinery, as proposed in Alternative 1, generally would not need to use the Fox Hills-Hell Creek aquifer. Under Alternative 4, more well water would be used and the wastewater would be saltier as less stormwater is available for makeup water.

4.6.3.2 Alternative C — Effluent Discharge to an UIC Well

Implementation of this alternative would not affect soils other than through construction of the well and associated piping. These types of impacts are common to all refinery construction alternatives. Water sent to the UIC well would be discharged to a deep aquifer where it would be contained for thousands of years. Thus, soils would not be exposed to the discharged effluent.

4.6.3.3 Alternative D — No Action

Under this alternative, the proposed Refinery would not be constructed. Thus, no discharges of water of any kind would be permitted and no additional impacts to soils.

4.6.4 Cumulative Impacts

Regional agriculture is the most common disturbance to vegetative cover and is the biggest impact to regional soil resources. These activities primarily include agricultural equipment disturbing soils. As the vegetative cover is disturbed and removed, the topsoil, and subsoil (in some circumstances) below the ground surface is degraded, causing changes in the local hydrology, slope stability problems, and surface erosion. Vegetation can also be affected by road dust generated by traffic on unpaved roads; snowmelt due to dust deposition can lead to flooding, ponding, and hydrological changes in soil. Where roads are not paved, all activities that generate vehicle traffic on roadways generate dust. Thus, continuing regional agricultural activities requiring road travel add cumulatively to the volume of road dust generated. The quantitative increase in the settled dust layer, as well as increases in the frequency of dusting may increase effects on vegetation and snow cover, thus ultimately affecting soils and vegetation.

Because any project impacts related to soil resources would be highly localized and primarily limited to the time of construction, cumulative impacts on soil resources would occur only if another project is planned for construction in proximity or adjacent to the proposed refinery. Currently, there are no other known projects planned in the project area. Consequently, there are no cumulative impacts to soil resources anticipated.

4.7 Vegetation

Vegetation removal and soil handling associated with the construction of the refinery facilities and installation of pipelines, access roads, transmission lines, water wells, and railroad spur infrastructure would affect vegetation resources both directly and indirectly. Construction of the refinery would generally correspond to the following sequence: (1) identifying and constructing access roads; (2) blading/grading of the footprint, clearing of the ROW, trench area and structure sites including material staging construction yards; (3) installing foundations; (4) assembling/erecting the linear infrastructure and appurtenant facilities; and (5) cleanup and disturbed site reclamation. Various phases of construction would occur simultaneously at different locations throughout the construction process. This may require several construction crews operating in these different locations.

Construction, operation, and maintenance activities that could result in the temporary or permanent loss or degradation of vegetation communities include:

- Blading/grading of access roads, construction footprint clearance, and material staging areas;
- Improvements to some portions of the existing access roads;
- Vegetation removal where needed for construction vehicle access, transmission tower installation, and pipeline trenching activities;
- Excavations resulting from hole augering for transmission tower footings;
- Utilization of temporary construction material staging areas;
- Soil compaction;
- Introduction and proliferation of noxious weeds;
- Loss of topsoil;
- Alteration of soil horizons and structure at pipeline trenching and transmission pole locations; and
- Equipment access through stream channels.

4.7.1 Alternatives 1 and A — Original Proposed Actions

4.7.1.1 General Vegetation

Construction of the proposed project would require vegetation crushing, clearing, or other ground disturbance that would result in both temporary disturbance and permanent conversion of existing vegetation and habitat within the refinery footprint and appurtenant linear infrastructure (note that potential impacts to wetland habitats are discussed below). Clearing of mixed-grass prairie vegetation community types is not expected to occur within the footprint of the proposed refinery. Table 4-9 summarizes the amount of temporary and permanent disturbance that would be associated with various project components.

4.7.1.2 Refinery

Table 4-9 shows that an estimated 190 acres of cultivated agricultural fields would be affected by surface disturbance associated with the refinery footprint over the long-term operation of the refinery. The proposed refinery footprint would disturb approximately 41 percent of the project area. The primary vegetation community impact is to cultivated agricultural fields, which occupy 81 percent of the project area. As stated above, clearing of mixed-grass prairie vegetation community types is not anticipated to occur from the refinery footprint. In addition, approximately 3 acres of developed land (existing farm house and outbuildings) would be used as maintenance buildings and during construction of the facility.

Direct impacts to vegetation communities would include the short-term loss of vegetation (modification of structure, species composition, and areal extent of cover types) caused by soil disturbance and grading. Indirect impacts would include the short-term and long-term increased potential for non-native species invasion, establishment, and expansion; exposure of soils to accelerated erosion; shifts in species composition and/or changes in vegetative density; reduction of wildlife habitat; and changes in visual aesthetics.

If any of the remnant patches of the mixed-grass prairie vegetation community were to be developed, direct impacts would include the short-term loss of vegetation, primarily modification of structure, species composition, and areal extent of cover types. Indirect impacts would include the short-term and long-term increased potential for non-native species invasion, establishment, and expansion; exposure of soils to accelerated erosion; shifts in species composition and/or changes in vegetative density; reduction of wildlife habitat; reduction of livestock forage; and changes in visual aesthetics.

Table 4-9 Estimated Temporary and Permanent Vegetative Community Disturbance Associated with Project Components

Activity/ Project Component Disturbance	Disturbance by Vegetative Community (acres)					
	Agriculture Land		Developed Land		Wetland[3, 4, 5]	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Refinery	190	190	3	3	0	0.8
Oil Pipeline[1]	0	0	24	0	0.7	0
Natural Gas Pipeline[1]	0	0	26	0	27/3	0
Transmission Lines[2]	0	0	>1	<1	0.4	0
Total	**190**	**190**	**54**	**4**	**28/4.1**	**0.8**

Note:
1. ROW widths for the transmission line were estimated at 25 feet, and both the oil and natural gas pipeline were estimated at 50 feet.
2. The estimated average distance between transmission towers is 300 feet or 18 structures per mile. Temporary disturbance acreage was estimated to equal 300 square feet, and permanent disturbance acreage was estimated to equal 50 square feet at each tower location.
3. Wetlands within the 468.39-acre fee to trust property were formally delineated using 1987 USACE methodology.
4. The refinery footprint would require the fill of approximately 2,000 feet of wetland PEMF#2 at approximately 10 feet in Section 19 or 0.5 acres. The upper portion of the wetland would be re-routed by constructing a ditch approximately 2,650 linear feet and 10 feet of width or 0.6 acres. There would be an additional impact to PEM/ABF#3 of 0.3 acres. Wetlands impacts would be avoided or mitigated following the 404 permit (CWA).
5. Wetlands within the three linear project ROW corridors were not formally delineated. FWS - National Wetland Inventory data were used to estimate wetland impacts, as all three linear projects would be constructed within existing road, section line, or railroad rights-of-way.

In general, the duration of effects on cultivated agricultural land and mixed-grass prairie vegetation are significantly different. Cropland areas can be readily returned to production through fertilizer treatments and compaction relief. However, disturbed native prairie tracts require reclamation treatments and natural succession to return to predisturbance conditions of diversity (both species and structural). Reestablishment of mixed-grass prairie to predisturbance conditions would be influenced by factors that are both climatic (growing season, temperature, and precipitation patterns) and edaphic (physical, chemical, and biological) conditions in the soil.

Construction activities, increased soil disturbance, and higher traffic volumes could stimulate the introduction and spread of undesirable and invasive, noxious species within the project area. Noxious species invasion and establishment has become an increasingly important result of previous and current disturbance in western states. Noxious species often out-compete desirable species, rendering an area less productive as a source of forage for livestock and wildlife. Additionally, sites dominated by invasive, noxious species often have a different visual character that may negatively contrast with surrounding undisturbed vegetation. Currently, the project area is relatively free of noxious weeds; however, the cultivated fields and wetland basin margins are dominated by numerous invasive, non-native weed species.

Construction, operation, and maintenance activities could introduce or spread noxious weeds into currently uninfested areas. Construction equipment, vehicles, or imported materials may disperse plants, seeds, or pests if the appropriate preventative measures are not taken. The introduction of noxious weeds can have direct or indirect long-term effects on vegetation resources, wildlife and wildlife habitat, and special-status plants and animals in more mesic environments, including river and stream channels, burned areas, and eroded slopes. Noxious species are largely confined to road edges, newly graded areas, and other areas where existing vegetation is crushed and soils are impacted. Potential impacts associated with noxious weed introductions and spread would be minimized through the implementation of the prescribed mitigation measures listed in Section 4.17.

4.7.1.3 Wetlands and Riparian Areas

The dominant native plant communities in this region are native mixed-grass prairie interspersed with wetland and riparian communities located in moist swales and along watercourses. Agricultural land consists largely of croplands interspersed between low-lying basins which typically contain prairie pothole wetlands. Most of the soils in the wetlands are silty clay loam with some silt loams and loams. In most cases, wetlands are bordered by agricultural or other developed land uses, which may have altered the extent and quality of the wetlands.

Land ownership along the pipeline and transmission lines is primarily private. The proposed pipeline and transmission routes have not been surveyed for wetlands or navigable waters of the U.S. However, wetland acreages were estimated using FWS - National Wetland Inventory (NWI) wetland data coverage.

Temporary and permanent impacts related to project construction and access road clearing, and new transmission line and oil and natural gas pipeline construction may potentially impact wetlands and ephemeral and intermittent drainages.

Refinery

A wetland delineation was conducted on the 468.39-acre proposed project site. The USACE determined that wetland PEMF#2 is a jurisdictional water of the United States (Figure 3–12) (Cimarosti 2005). A portion of wetland PEMF#2 was reportedly constructed in 1976 under NDSWC Permit #661 and Ward County Agricultural Stabilization and Conservation Service authorized maintenance of the drainage in 1994. The other fifteen delineated wetland basins are isolated, intrastate, non-navigable waters not subject to jurisdiction under Section 404 of the CWA (Cimarosti 2005).

Construction of the refinery facilities under Alternative 1 is expected to directly result in the loss of approximately 2,000 linear feet and an approximate ten feet of width or approximately 0.5 acre of waters of the United States delineated as part of wetland PEMF#2. The loss of the jurisdictional wetland due to discharge of dredge and fill material would be addressed through the CWA 404 permit process.

It is important to note that wetland PEMF#2 would be re-routed and constructed around the wastewater storage facilities. The proposed reroute of the drainage would consist of grading and excavation to create a new channel and outfall in wetland PEMF#2. The reroute of the drainage would be approximately 2,650 linear feet, extending west from the upper portion of wetland along the half section line, then due north approximately 2,650 linear feet rerouting flow to the lower portion of wetland PEMF#2. The channel would be trapezoidal, and depths would vary from 5 to 15 feet. The side slopes and bottom would be hydroseeded to establish a grass-lined channel. The outfall would be constructed with energy dissipaters and bank armor for erosion control to prevent channel scour in the wetland outfall area.

The refinery site plan may impact wetland PEM/ABF#3, which is 0.3 acres in size and adjacent to the existing railroad. The proposed rail spur would be built on this wetland. The USACE identified Wetland PEM/ABF#3 as isolated, intrastate non-navigable water that is not subject to jurisdiction under Section 404 of the CWA. This wetland is not located within a 100-year floodplain nor is it adjacent to the jurisdictional wetland PEMF#2.

There would be a loss of 0.5 acres of jurisdictional wetland and a loss of 0.3 acres of non-jurisdictional wetland with this alternative. These losses may require compensatory mitigation.

Transmission Lines

Construction of the transmission line would occur within the existing Highway 23 road ditch ROW for a majority of its length, with the remaining segment built within the ROW of 366th Street. Construction of the transmission line is not expected to directly or indirectly result in the loss of any waters of the United States, including wetlands. The average span between transmission poles would average approximately 300 feet. Therefore, most, if not all wetlands would be avoided by placing transmission towers outside of wetland boundaries. If a large wetland is encountered, in which the linear extent is greater than 300 feet, the transmission line route would switch to the opposite side of the road ROW to avoid affecting the wetland. Therefore, construction of the transmission line is not likely to impact any waters of the United States, including wetlands.

Oil Pipeline

Enbridge would construct a pipeline to connect the terminus of its Wabek/Plaza field pipeline to the crude oil storage tanks in the refinery's tank farm (Figure 2–12). Additionally, Enbridge would construct four new 30,000-bbl storage tanks between Outlook, Montana and the refinery (Figure 2–1).

Construction of the oil pipeline would require approximately 4 miles of new pipeline. A significant portion of the pipeline would be constructed on the north side of the existing C.P.R. ROW, with the remaining portion constructed on the east side of the gravel road ROW.

As detailed in Table 4-10, the oil pipeline route would cross a total of 5 wetland sites. Since the centerline of the oil pipeline route would be within the railroad ditch, it would not cross any designated NWI wetlands. Assuming a 50 foot construction ROW, construction would result in a maximum total temporary disturbance area of approximately 0.7 acres. Temporary disturbance would primarily occur in palustrine emergent wetlands or wetlands that include the palustrine emergent community type.

Table 4-10 NWI Wetlands Potentially Affected by Construction and Operation of Linear Infrastructure including Pipelines and Transmission Lines

Project Component	Emergent Wetland # of wetlands crossed	Emergent Wetland Construction area (acres)[1]
Transmission Lines	14	0.4
Oil Pipeline[2]	5	0.7
MDU Resources Natural Gas Pipeline[2]	42	26.9
Bear Paw Natural Gas Pipeline	11	3.0

Note:
[1] Construction impacts are based on a proposed 50-foot wide construction ROW. The calculated acreage assumed impacts to the entire 50-foot wide construction ROW.
[2] The Enbridge oil pipeline and the MDU Resources natural gas pipeline would share the same corridor. Therefore, the impacts to certain wetlands are overestimated.
Source: FWS National Wetland Inventory metadata.

Natural Gas Pipeline

Two options are provided to deliver natural gas to the refinery: MDU Resources Group, Inc. and Bear Paw Natural Gas Company. MDU would supply natural gas using a new pipeline that would connect its existing Williston Basin Interstate Pipeline to the refinery (Figure 2–12 and Figure 2–13). Under the second option, Bear Paw Natural Gas Company would supply natural gas using a new pipeline that would connect its existing Plaza pipeline to the refinery (Figure 2–12). Construction of the natural gas pipeline would require 4 or 29 miles of new pipeline, depending on which option is constructed. Part of the pipeline would be constructed on the south side of the existing C.P.R. ROW. The remainder of the MDU Resources pipeline option would primarily follow the Ward and Mountrail County border until it interconnects with the existing MDU Resource pipeline in Section 24, Township 156 North, Range 88 West.

Numerous NWI wetlands would be intersected by the construction of the gas pipeline. Based on wetlands indicated on the NWI, it is anticipated that temporary impacts would occur to numerous palustrine emergent wetlands. Temporary wetland loss would primarily occur from the active pipeline trench, temporary workspace/pads, and access roads.

The MDU natural gas pipeline corridor route would cross a total of 42 wetland sites resulting in a maximum total temporary disturbance area of approximately 26.9 acres. In addition, the centerline of the MDU pipeline would cross approximately 3,030 feet of wetlands, Temporary disturbance would primarily occur in palustrine emergent wetlands or wetlands that include the palustrine emergent community type.

Conversely, the Bear Paw natural gas pipeline route would cross a total of 11 wetland sites resulting in a maximum total potential disturbance of 3.0 acres. The centerline of the Bear Paw would cross approximately 2,611 feet of wetlands. Because the new pipeline would be classified as a utility line[5], it is anticipated that a USACE Nationwide 12 permit would be required prior to

[5] A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone and telegraph messages, and radio and television communication. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile; however, it does apply to pipes conveying drainage from another area.

initiation of any construction activities. Nationwide 12 permits generally cover discharges of dredged or fill material associated with excavation, backfill, or bedding for utility lines, including outfall and intake structures, provided there is no change in preconstruction contours.

Oil Storage Facilities

In addition to the pipeline which would supply synthetic crude oil feedstock to the refinery, Enbridge would also construct four new 30,000-bbl storage tanks between Outlook, Montana and the refinery. Construction of the oil storage facilities would occur on existing pads that have previously been developed, thereby avoiding additional wetland impacts.

Current and Potential Site Conditions

Cattails and reed canary grass are plants that currently dominate many of the wetlands the pipelines and transmission would disturb. Cattails comprise one recognized type of wetland habitat, and although not valued as highly as a sedge meadow or other wetland types, they nevertheless form an important component of the wetland ecosystems in the region.

It is anticipated that all areas affected by the pipeline and transmission line ROWs would be returned to their current land uses following completion of construction and restoration activities. The temporary nature of planned construction and restoration activities should not result in any conflicts with existing land uses. Implementation of the mitigation measures would ensure that construction of the pipelines and transmission lines would result in no permanent impacts to jurisdictional wetland sites. Invasion by other non-native species may also be difficult to control, considering the long history of disturbance in many of these wetlands. Lastly, all wetlands affected by the project pipelines and transmission lines would be restored to pre-construction conditions following construction.

4.7.1.4 Effluent Discharges

Under this alternative (Alternative 1 and A), all wastewater would be treated to meet the refinery's discharge limits in the NPDES permit and discharged into wetland PEMF#2. PEMF#2 is on the western side of the site next to Highway 23 in the NW ¼ of Section 19. The total area for wetland PEMF#2 is approximately 11.7 acres. The wetland connects to an unnamed tributary of the East Fork of Shell Creek, located about a mile downstream of the proposed outfalls. The wetland has been classified as a palustrine emergent semi-permanently flooded (PEMF#2) (Wetlands Technical Report, BIA, November, 2005). It is an ephemeral prairie pothole wetland that has been altered by road construction and construction of a drainage system in the 1970's. The wetland is fed by surface runoff from precipitation.

The proposed refinery would change flow conditions in the wetland PEMF#2 and the unnamed tributary to the East Fork of Shell Creek. Flow would be discharged more continuously throughout the year, depending on the how much water is being recycled at the refinery. When the refinery is recycling water, the average discharge rate would be 10 gpm (5.1 million gallons per year or 16 acre feet), with a peak discharge rate of 89 gpm. If water is not being recycled, the average discharge rate would be 50 gpm (26 million gallons per year or 80 acre feet) and the peak discharge rate would be 130 gpm.

The primary impacts from the proposed effluent discharges to vegetation would be to the riparian/wetland resources on-site and downstream of the site. Vegetation would be affected by changes in hydrology and water quality. The proposed refinery would change flow conditions in the wetland PEMF#2 and the unnamed tributary to the East Fork of Shell Creek. Flow would be discharged more continuously throughout the year, depending on the how much water is being recycled at the refinery. When the refinery is recycling water, the average discharge rate would be

10 gpm (5.1 million gallons per year or 16 acre feet) with a peak discharge rate of 89 gpm. If water is not being recycled, the average discharge rate would be 50 gpm (26 million gallons per year or 80 acre feet) and the peak discharge rate would be 130 gpm.

Under a full recycle scenario it is expected that much of the runoff water would be used by the refinery. This would reduce the volume that flows into wetland PEMF#2 from the refinery site. However, this decreased volume of is not anticipated to be significant as the flow from the south of the site will still be maintained through the created diversion channel.

If the refinery does not recycle process water or use runoff, the additional water to wetland PEMF#2 would likely cause the wetland area to become more permanently flooded. This would result in changes to wetland characteristics such as increasing obligate vegetation (cattails) within the wetland or increasing open water areas. The size of the wetland would be controlled by discharge through the culvert under Highway 23. The wetlands to the north of Highway 23 would also be impacted by the additional water. As a result of the development of the refinery, the amount of surface runoff and/or shallow subsurface water discharge to the wetland would likely increase. This would contribute to the likelihood of a shift from a semi-permanent wetland with periodic drying to permanent wetland type for PEMF#2. There would be a similar shift to the unnamed tributary of the East Fork of Shell Creek.

Wetlands/riparian areas may also be affected during the unlikely events of a pipeline failure or tank rupture. As discussed in the Spill Section of this Chapter, these events are very unlikely to occur.

Erosion and sedimentation impacts to wetland PEMF#2, and the unnamed tributary from increased stream flow are not expected due to the limited discharge volume. However, any potential impacts would be mitigated by implementing BMP for stream channel erosion prevention. Over time, the wetlands and the tributary to the East Fork of Shell Creek would adjust through erosion or additional sediment deposition to the changes in hydrologic conditions. Potential impacts would be mitigated by implementing BMPs for stream channel erosion prevention. A SWPPP detailing sediment and erosion control measures and any BMPs would be developed in accordance with the facility's NPDES permits.

4.7.2 Construction Alternatives

4.7.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the entire 468.39-acre site would be accepted into trust status, but construction and operation of the project would not go forward. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. The MHA Nation could decide to use the entire project site to produce feed or forage hay for buffalo, or the land could be included in BIA's leasing program. Based on the foregoing, impacts to vegetative resources would be similar to the existing conditions.

4.7.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Under this alternative, the magnitude and type of effects would be similar to those presented under Alternatives 1 and A.

4.7.2.3 Alternative 4 — Modified Proposed Action

The effects to vegetative resources from implementation of this alternative would be similar to the no recycle option for Alternatives 1 and A. The modification of the proposed refinery site plan would reduce the wetland impacts caused by filling wetland PEMF#2 from 0.5 acres in

Alternative 1 to 0.1 acres in Alternative 4. Wetland PEM/ABF#3 would still be impacted. Cumulative impacts to the PEMF#2 wetland are likely to be the same for both Alternatives 1 and Alternatives 4 if the refinery requires future expansion for technological and/or regulatory changes requiring additional process units or other modifications, as this was the space eliminated from the Alternative 1. The production of forage for the MHA Nation's herd of buffalo would be the same.

4.7.2.4 Alternative 5 — No Action

Under this alternative, the 468.39-acre site would not be accepted into trust status or apply for an NPDES permit. Therefore, the project site would continue to be used for agricultural purposes, which have occurred for decades. The types of direct and indirect effects occurring to vegetative resources from agricultural practices would continue under existing conditions.

4.7.3 Effluent Discharge Alternatives

4.7.3.1 Alternative B —Partial Discharge through an NPDES Permit and Some Storage and Irrigation

With this alternative, surplus treated wastewater would be disposed of through land application to irrigate crops as practicable otherwise wastewater would be discharge through NPDES permitted outfalls. There would be some reduction in flow to the wetlands. There would be impacts to vegetation from irrigation wastewaters. The land has not previously been irrigated, and irrigation could potentially cause changes in the types of crops grown and farming practices. The impacts from land application of treated wastewater would depend on the level of treatment prior to land application and rate of land application. The irrigation management plan should identify the appropriate land application rates and treatment levels necessary to protect vegetation, human health, and the environment.

4.7.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, the MHA Nation would discharge all effluent from the WWTP to a Class I, Non-hazardous UIC well that would be drilled on the project site. Since the well would be finished deep below the ground surface, no additional impacts would occur to vegetation.

4.7.3.3 Alternative D — No Action

Under this alternative, the proposed Refinery would not be constructed. Thus, no discharges of water of any kind would be permitted and no additional impacts would occur to vegetation or wetlands.

4.7.4 Cumulative Impacts

Wetlands in the area have been previously impacted through agricultural practices such as cultivation of uplands and wetlands. Wetland hydrology has also been affected by roads and railroad tracks; and agriculture; in particular, some farm fields have been recontoured to enhance drainage of wetlands. Ongoing agricultural practices would continue to be the primary contributor to cumulative impacts to wetlands. Long-term impacts to wetlands from this project affect a very minor portion of cumulative impacts to wetland resources in the area.

If Alternative 4 is selected, it is possible that future expansions of the petroleum refinery would increase wetland impacts to the same level as Alternative 1. Refinery operation expansions of the processing area are common due to new technologies and regulatory requirement changes.

Alternative 1 already includes an area for refinery expansion. The expansion area was not included in Alternative 4 to avoid direct wetland impacts.

4.8 Wildlife

4.8.1 Alternatives 1 and A — Original Proposed Actions

4.8.1.1 Big Game Mammals

A variety of big game mammals, as described in Chapter 3, inhabit the project area and make use of all habitats present. These habitats include wetlands, drainages, field edges, shelterbelts, agricultural fields, and mixed-grass prairie. This analysis of possible direct and indirect effects to big game mammal species include: (1) loss or degradation of habitats, (2) displacement, (3) vehicle collisions, (4) noise, (5) dust, (6) habitat fragmentation; and (7) population effects. Each of these effects is discussed below.

Loss or Degradation of Habitats

Habitat loss associated with construction and operation of facilities would result in a reduction of available forage and other habitat components in the affected area. Habitats adjacent to areas that are directly disturbed could be affected by changes in vegetation, including the potential invasion of noxious weeds. The exact location and concentration of this effect would vary depending on the timing and extent of development, but is not expected to result in the alteration of seasonal habitat use or herd movements of big game mammals within the project area.

The direct loss of habitats caused by construction of the refinery infrastructure is not anticipated to have significant adverse effects to big game mammals. In general, the direct habitat removal of approximately 190 acres is expected to have minimal impacts on big game mammals. The direct loss of cultivated field habitat would not result in any loss of wintering range or impact a major corridor in the region. Therefore, it is concluded that the capacity of the remaining undisturbed portions of the project site that could support big game populations should remain essentially unchanged from current conditions.

Displacement

Disturbances from construction of the linear facilities may affect utilization of habitat(s) immediately adjacent to these affected areas. Areas of habitat that are avoided because of human activities or the consequences of human activities are generally less effective at supporting populations of big game. The area subject to this impact is not lost to each species, but their use of this area is reduced by some unknown amount that depends on many factors such as the spatial and temporal scale of the disturbance, natural history characteristics of each species, and the habituation of individual animals to each type of disturbance.

It is envisioned that most big game mammal responses would consist of avoidance of areas proximal to the construction and operational areas, with most individuals carrying out normal activities of feeding and bedding within adjacent suitable habitats. However, big game mammals are adaptable and generally adjust to non-threatening, predictable human activity. It is anticipated that the magnitude of displacement would decrease over time as: (1) the animals have more time to adjust to the operational circumstances, and (2) the extent of the most intensive construction activities, such as pipeline trenching and transmission line construction, would be short-term. By the time the refinery is under full production, construction activities would have ceased, and traffic and human activities in general would be greatly reduced. As a result, this impact would be greatly reduced, and it is unlikely that big game mammals would be displaced under full project development. The level of big game mammal use of the project area is more likely to be determined by the quantity and quality of forage available.

Vehicle Collisions

Increased vehicle traffic is anticipated in association with all phases of the project. The potential for vehicle collisions with big game mammals would be directly correlated with the volume of traffic. The volume of project-related traffic is expected to be greatest during the construction phase and to gradually diminish during the production phase. Speed limits set for project roads would reduce the potential for collisions; however, most collisions occur on county roads and highways, where speeds are higher and are regulated by the state. Overall, a 30 percent or more increase in traffic is anticipated, which may result in additional collisions between big game mammals and vehicles. However, the incidence of vehicle collision impacts to big game mammals is anticipated to occur infrequently, and no long-term adverse effects are expected.

Noise

Noise is one factor in the displacement of big game mammals from areas of otherwise suitable habitat and was considered as part of this analysis. Elevated levels of noise associated with increased human activity and facility operations may affect big game. The effects would depend on the occurrence pattern and intensity of produced noise. Big game responses may vary from a developed tolerance over time to complete avoidance of affected habitats.

Dust

Dust would be generated and deposited on vegetation that provides forage for big game mammals along existing and any new access roads within the project area. Deposition of road dust on vegetation can affect vegetation health, nutrition, and palatability. These effects are typically most severe immediately adjacent to roads, but can extend up to ½ mile away. Vegetation within these areas represents a relatively small proportion of the total available forage within a typical big game mammal range. In general, habitats along roads are avoided because of the disturbance caused by vehicle traffic; therefore, the loss of forage productivity attributable to dust would have only minimal effects on big game because this forage is typically under-used.

Habitat Fragmentation

Construction of the proposed project and appurtenant facilities would result in some degree of habitat fragmentation throughout the project area. The effects of habitat fragmentation and the subsequent suitability of big game mammal ranges would depend on several factors, including current range condition, carrying capacity, current population levels, species habitat requirements, degree of disturbance, and availability of suitable habitats. In addition, critical life stages of big game mammals are tied to seasonal use patterns, migration corridors to spring and winter ranges, as these animals use different portions of their range at different times of the year. Habitat fragmentation is an issue for some wildlife species because of the creation of barriers between suitable and unsuitable habitats. These barriers often limit species occurrence and movement among habitats. Construction activities in some portions of the project area may make these areas less available or fragmented to a degree that they would be unsuitable to several species of big game mammals.

The pattern of fragmentation that would occur under this project alternative would consist of the loss of 190 acres of a seasonal, agricultural (cereal grain, row crop) field, and narrow strips of habitats within the pipeline and transmission line ROW. However, because the pipeline and transmission line would be constructed primarily within existing road and railroad ROW, these areas have already been fragmented. Therefore, any new disturbances to these corridors would have minimal effects on big game habitat.

Population Effects

The effects of the proposed project on big game mammal populations are difficult to predict because of the many unknown factors associated with each of the potential effects and the potential for a synergistic or antagonistic relationship among the individual effects. The scale and nature of the anticipated effects, particularly in terms of indirect effects, suggests that some minor declines in big game mammal populations may occur. The degree of this potential decline is not known, but is not likely to occur to the extent that viability of any local population is compromised in the project area or across the range of the species as a whole, due to the adaptability of local populations.

Based on the foregoing, neither short-term nor long-term adverse effects are expected to occur on any localized big game mammal populations.

4.8.1.2 Birds

A variety of passerine, waterfowl and raptors inhabits the project area and makes use of all habitats present. These habitat areas include wetlands, drainages, field edges, shelterbelts, trees and shrubs, agricultural fields, and mixed-grass prairie. Possible effects to passerine, waterfowl and raptor species include: (1) direct mortality (including vehicle collisions and collisions with power lines), (2) harassment and displacement, (3) habitat loss, (4) noise, (5) availability of prey, (6) population effects, and (7) habitat fragmentation. Each of these effects is discussed below.

Raptor, passerine, and waterfowl species may be affected in several ways. Vehicle collision and collision with and electrocution by power lines could cause direct mortality of raptor, passerine, and waterfowl species.

Vehicle Collisions

Raptor and Passerine Species

Access roads would be constructed as part of the proposed pipeline and transmission line construction. Based on the construction schedule, increased vehicle traffic is anticipated in association with all construction and operational phases of the project. The literature on avian mortality caused by collision with vehicles is reviewed by Erickson et al. (2001). Most birds killed by vehicle collision are passerines, although raptors, particularly owls, are also killed. Raptors may be struck by vehicles while they hunt or feed on carrion near roads. Most raptors, however, do not focus their foraging efforts on carrion (Ehrlich et al. 1988), thereby reducing their potential for being struck by vehicles along roads.

The potential for vehicle collisions would be directly correlated with the volume of traffic. Project-related traffic is expected to be greatest during the construction phase and to gradually diminish during the production phase. The use of speed limits on project roads would reduce the potential for collisions; however, most collisions occur on county roads and highways, where speeds are higher and regulated by the state. Foraging raptors may tend to avoid areas of heavy traffic, further reducing their potential for being struck by vehicles on busy roads. Overall, a 30 percent or more increase in traffic is anticipated, which may result in a similar increase in mortality to raptors. This impact is not expected to have a substantial effect on raptor or passerine populations because of the low incidence of mortalities from vehicle collisions compared with the relatively large size of the raptor and passerine populations in the region.

Waterfowl

It was estimated that 13,500 ducks are killed each year by vehicle collisions in the PPR of North and South Dakota (Erickson et al. 2001). An average number of 0.04 duck fatalities per mile of road has been used by several authors to estimate total waterfowl mortality from vehicle collisions in the PPR (Erickson et al. 2001). Most of these studies have been conducted along paved, high-speed roads, rather than low-speed dirt roads. The rate of mortality with mostly unpaved project roads in the project area would be much lower than reported for the study. Thus, the effects of collisions of waterfowl with vehicles on the local populations of waterfowl within the project area are anticipated to be much less than the study estimate.

Collisions with Power Lines

The presence of new aboveground power lines may increase the potential for birds to be killed by collision. Water birds and waterfowl are the most common groups of birds killed by collision with power lines. Raptors also collide with power lines; however, the proportion of raptor mortalities attributed to collision is minimal compared with mortalities attributed to electrocutions (Erickson et al. 2001). Specific measures that would help reduce the potential for raptor collision with power lines, such as avoiding areas of high avian use, would be implemented where feasible.

Raptors

The presence of new aboveground power lines also could increase the potential for raptor electrocutions. Support structures associated with aboveground power lines could be used as perches by raptors. These new perches would provide raptors with new opportunities for hunting and capturing prey, which could increase the efficiencies and success of raptors that hunt from perches. This increase in success could result in an increase in the local population of raptors that hunt from perches and reduce the populations of the species on which these raptors prey. Installing devices to prevent raptors from perching in or on structures supporting power lines near sensitive areas (e.g., grouse leks) could eliminate these facilities as perches for raptors. Therefore, all aboveground structures would be designed and equipped with Avian Power Line Interaction Committee (APLIC) (2006) devices intended to prevent and reduce the risk of electrocution to perching raptors.

Waterfowl

Few comprehensive studies have been conducted on collisions of birds with power lines. However, where nationwide annual estimates of avian mortality caused by such collisions have been made, they range widely from more than 10,000 to more than 174,000,000 birds per year (Erickson et al. 2001). Waterfowl are most susceptible to colliding with power lines that span or occur near streams, water bodies, and wetlands. Considering the existing distribution and proposed height of transmission lines, the potential for waterfowl colliding with power lines is limited.

Harassment and Displacement

Raptor species inhabiting the region are strongly drawn to mixed-grass prairie and cultivated agricultural fields, and they would often nest within proximate shelterbelts or woodland habitats. Therefore, raptors potentially occupying suitable habitats could be temporarily displaced from habitats in areas of human activity. Displacement during the construction phase could alter patterns of habitat use for foraging individuals. The extent of displacement would depend on the duration and intensity of the activity and on the sensitivity and habituation to disturbance of individual animals. In addition, construction may result in displacement from affected habitats during the entire construction phase (a time frame of weeks to months), while operation of the refinery would result in permanent displacement from the 190-acre project footprint. If raptors are displaced, it is anticipated that individuals would move to other adjacent habitats, but may encounter inter- and intra-specific competition for resources, depending on niche availability and density of raptors.

Disturbance associated with construction activities can cause nest failure, nest abandonment, and unsuccessful fledging of young to nesting raptors. It is also important to note that nests not used in 1 year may potentially be used in subsequent years. Subsequent development within close proximity to these nests may preclude use of the nest in following years. Therefore, protection of nests that may potentially be used in future years may require limiting construction activities within a specified line of distance to minimize impacts. In addition, ground-nesting raptors would experience a greater loss of nesting habitats relative to tree-nesting raptors because trees are less likely to be disturbed by the project.

Habitat Loss

Passerine and Raptor Species

The direct disturbance and loss of approximately 190 acres of wildlife habitat in the project area would likely reduce the availability and effectiveness of habitat for a variety of passerine bird and raptor species. The initial phases of surface disturbance and increased construction noise could result in some direct mortality to small and medium sized mammals and would displace some bird species. In addition, mortality from increased vehicle use of roads in the project area is expected.

The temporary disturbances that occur during the construction period would tend to favor generalist wildlife species such as ground squirrels and ground-dwelling passerine species (e.g., horned larks), and would have more impact on specialist species (e.g., lark buntings and grasshopper sparrows). Overall, it is believed that the long-term disturbance of 190 acres would have a minor effect on common wildlife species. This is because of the current land use and subsequent disturbance regimen. The production cycle of cereal crops requires extensive management treatments over the course of a growing season. Birds are highly mobile and tend to disperse into surrounding areas, using suitable habitats and open niches to the extent that they are available. In addition, because of the high reproductive potential of these species, they can rapidly repopulate vacant niches as those habitats become suitable. While there is no way to accurately quantify the changes associated with construction activities, the impact is likely to be minor in the short term.

Waterfowl

Wetlands are the habitat types of highest importance to the waterfowl in the project area. The amounts of these habitat types that would be lost are relatively small compared with the areal extent of these habitats that would not be affected. Thus, direct loss of habitats would have minimal effect on waterfowl. Most birds would avoid construction equipment, and most construction would not occur within or near wetland habitats. However, nests placed in locations subject to disturbance (agricultural field edges near wetlands) could be lost. This effect would be relatively minor because of the low potential for direct mortality, the short breeding season for waterfowl, and the small percentage of the project area that would be directly affected during the breeding season. It is anticipated that surface disturbance associated with the construction and operation of the facilities would have little potential to cause direct mortality to waterfowl.

Holding ponds would consist of rectangular 2-acre, 10-foot-deep ponds with 2:1 side slopes. The ponds are designed to handle discharge from the WWTP as well as storm water runoff from the refinery. If water depth is sufficient, the holding ponds may attract waterfowl and other avian species. To minimize the use of refinery retention ponds by birds, four inch to six inch rock should be used to line exposed in-slopes of all wastewater/storage ponds. In addition, any ponds having the potential to hold contaminated (oily) water should be netted. The larger rock and netting will prevent the creation of an attractive nuisance for waterfowl and other avian species.

Overall, impacts to waterfowl and avian species should be negligible. Because of the design of the side slopes, it is unlikely that any emergent vegetation would grow within the holding ponds. In addition, the ongoing pumping and discharge of the ponds would discourage use by waterfowl or other avian species.

Noise

Noise is one factor in the displacement of raptors from areas of otherwise suitable habitat. Elevated levels of noise associated with increased human activity and facility operations may affect raptors. The effects of project-related noise levels on raptors depend on the patterns of occurrence and intensity of the noise. Responses of individual raptors may vary from a high degree of tolerance to avoidance of affected habitats. Increased noise in areas adjacent to new noise sources is expected to have minimal effects because raptors would avoid these areas or may become accustomed to this type of disturbance.

Availability of Prey

The raptor species that occur in the project area rely on a variety of prey species that make use of different habitats. The primary small mammals found on the project area include, but are not limited to, eastern cottontail, deer mice, thirteen-lined ground squirrel, white-footed mouse, meadow jumping mouse, and northern pocket mouse. The development of the proposed refinery site would initially disturb an estimated 190 acres of potential habitat for several species of small mammals such as mice and rabbits that may serve as prey items for raptors. These prey species would experience localized population losses; because of direct mortality, and loss of habitat. Overall, the collective distribution and occurrence of these prey species would decrease in the project area and may be reduced to the extent that the availability of prey is reduced for foraging raptors, especially in areas of high and concentrated development. However, the small amount of short-term change in prey base populations created by the construction activities is minimal in comparison with the overall status of the small mammal populations in the region. Also the high reproductive potential of these small mammals would enable populations to quickly repopulate adjacent habitats. For these reasons, implementation of the project is not expected to produce any appreciable long-term negative changes to the raptor prey base.

Population Effects

The effects of the proposed project on avian populations are difficult to predict because of the many unknown factors associated with each of the potential effects, differing sensitivity of species to each of these effects, and the potential for synergistic or antagonistic relationships among the individual effects. The widespread nature of the anticipated impacts, particularly in terms of collisions, displacement, and availability of prey species, suggest that some minor declines in raptor populations may occur. The degree of this potential decline is not known, but is not likely to occur to the extent that any avian population viability is compromised in the project area or across the range of any specific species as a whole.

Habitat Fragmentation

In some areas, disturbance could also result in fragmentation of existing vegetation communities/habitats. Fragmentation occurs whenever a large continuous habitat is transformed into smaller patches that are isolated from each other by both natural and human-induced mechanisms. The changed landscape functions as a barrier to dispersal for species associated with the original vegetation community/habitat. These smaller and more isolated habitats also support smaller populations, which are more vulnerable to local, randomly determined extinction events, thereby causing smaller, more isolated habitats that ultimately contain fewer species and lower biodiversity. As more "edge" habitat becomes available because of fragmentation, the "edgedwelling" species have the opportunity to "invade" the interior vegetation community/habitat and become a major threat to the survival of the "interior-dwelling" species.

The potential effects of habitat fragmentation are dependent upon several factors, including current habitat condition, proximity of additional suitable habitats, degree of proposed disturbance, density and distribution of noxious weeds, and local population size. Given the sensitivity of wildlife species to the relationship to edge effects and noxious weed invasions, construction of the new natural gas and oil pipelines would create essentially all edge habitat and would therefore have a much higher potential for impact than construction of the refinery itself.

The siting of the proposed pipelines and transmission lines looked to maximize the linear extent of the lines along the existing C.P.R., Highway 23 ROW, and section lines to the maximum extent feasible because these ROW areas are devoid of native tracts of mixed-grass prairie that have a high susceptibility to impacts. The pattern of fragmentation that could occur from the proposed project would have minimal effects on raptors because their ability to make use of both disturbed and edge habitats would not be affected. However, an indirect affect may occur to populations of some prey species, especially smaller mammals, which could be affected by fragmentation, resulting in a decrease in population size, ultimately affecting the availability of prey for some raptor species. As a result, the effects of potential fragmentation would not likely adversely affect wildlife habitats, because of the minimal amounts of new habitat disturbance and the widespread occurrence and availability of suitable habitats adjacent to and throughout the project area.

Oily Ponds

Many bird species are attracted to open water including refinery ponds and tanks. Oily ponds may present a hazard to birds, and cause increased bird mortalities. The FWS Section 7 Consultation on the refinery dated August 22, 2006 and January 11, 2006 memorandums recommended, among other measures, that all potentially oily ponds be netted. Therefore, oily ponds should be netted to keep birds from coming into contact with oily waters.

4.8.1.3 Aquatic Species

This section describes the potential direct and indirect effects of each of the proposed alternatives on aquatic species in the project area. These effects include: (1) changes in timing and quantity of stream flows, (2) changes in temperatures, (3) accidental spills of fuels, and (4) changes in species diversity.

This analysis is based on the three types of wastewater effluent: (1) sanitary wastewater, (2) uncontaminated (non-oily) wastewater, and (3) contaminated (oily) or potentially contaminated (oily) water. Each of these streams of wastewater would be handled separately and would receive different levels of treatment as described briefly below.

(1) Sanitary wastewater from the offices and other buildings would be collected and disposed of via a sanitary sewer system. All water collected by this system would be discharged via a septic system into a leach field.

(2) Non-oily wastewater would consist of non-oily water from the boiler plant. This water would be routed to a WRP. This waste stream would be segregated from the potentially contaminated (oily) wastewater to minimize the production of hazardous sludge.

(3) The third stream of wastewater would consist of process wastewater and potentially contaminated (oily) water. This is water collected directly from process units or storm water collected from the process area, product loading area, and tank farm. All process

wastewater and potentially contaminated (oily) water would be routed to a WWTU for treatment. Following treatment, previously contaminated (oily) water would be held in the three holding ponds and tested. If the water meets the refinery's criteria for discharge, it would be released to a discharge outfall. If testing suggests that additional treatment is needed, the water would be recycled through the WWTU.

Wastewater Discharges

Treated wastewater and uncontaminated (non-oily) storm water would be discharged into or near the wetlands on site. The wastewater would be required to meet the NPDES permit limits (EPA issued permit). The limits have been developed to protect aquatic life, wildlife and birds, and other designated uses such as agricultural and livestock uses. However, the discharge of treated wastewater and storm water would change water quality from existing conditions. It is predicted that there would be some shifts in the aquatic life communities. For example, macro-invertebrate species that prefer more nutrients and additional flow would grow in preference to those communities that are more sensitive to nutrients levels and prefer dry conditions during most of the year.

Timing and Quantity of Stream Flows

Modification of flow is one of the most widespread human disturbances of stream environments (Bain and Finn 1988). A change in stream flow translates into a change in the water depth and velocity for any specific location in a stream. Consequently, changes in stream flow can be regarded as modifications to the physical composition of the aquatic habitat (Bain and Finn 1988). Fish that inhabit the East Fork of Shell Creek are frequently exposed to disturbances from both flood and drought periods, and must persist in environments that are characterized by fluctuating flows. Changes in the pattern of these fluctuating flows can be viewed as a disturbance in the stability of stream habitat. Potential negative effects to fish and invertebrates caused by changes in flow include physical, behavioral, habitat, and food changes that may occur if stream flows are increased or decreased substantially, especially during spawning.

Increased stream flows can make it difficult for certain species to migrate upstream to spawning and rearing areas. Increased flows in rearing areas may also make survival more difficult for young fish. Bain et al. (1988) and Fausch and Bramblett (1991) reported that the shallow and slow-water fishes were adversely affected by an artificially high variability in flow. Conversely, decreases in flow force fish that are restricted to shallow areas to relocate to maintain the specific habitat conditions. Rapid increases in flow may expose shallow-water fish to increased predation because shallow shoreline areas become accessible to larger fish-eating wildlife as depth increases (Bain and Finn 1988). In contrast, generalist species that use mid-stream type habitats responded positively to increased variability in flows (Bain and Finn 1988). Very few scientific studies have addressed the changes to macroinvertebrate populations caused by changes in stream flow (Gore 1987). It has been assumed that responses of macroinvertebrates to stream flow changes would closely match those of fish; however, macroinvertebrates lack the rapid reinvasion capabilities of fish when they live in an environment of fluctuating discharges (Gore 1987). More research is needed to support the general application of studies of macroinvertebrate response to instream flows for regulated flow management (Gore 1987).

Stream flows are expected to increase to varying degrees to the East Fork of Shell Creek under the proposed alternative. Increasing stream flows could have both positive and negative effects on aquatic species. The main positive effect would be to provide habitat to fish and macroinvertebrates in areas that are normally dry. This new habitat could provide opportunities for population growth. Conversely, aquatic species may be affected by the amount of water discharged to the surface receiving drainage under the proposed alternative, especially during periods of low flow and spawning. Based on the fish species found within the East Fork of Shell

Creek (Table 4 11), it is likely that an increase in stream flow would favor some species such as the Iowa darter. Other species that favor slower-moving streams, such as the fathead minnow, spottail shiner, brook stickleback, and white sucker may be negatively affected by an increase in stream flow. See Section 4.3, Surface Water Resources, for a complete discussion of anticipated effluent and storm water discharge flows.

Table 4-11 Fish sampled per site on East Fork of Shell Creek – June 2001

Species	East Fork of Shell Creek		
	Reach 2A	Reach 2B	Reach 2C
Brook stickleback	6	89	7
Fathead minnow	701	211	7
Iowa darter	1	0	0
Spottail shiner	1	0	0
White sucker	100	0	0
Total	**809**	**300**	**14**

Source: Confluence Consulting, Inc. 2001

Water Temperature

Water temperature can affect growth, metabolism, reproduction, emergence, and distribution of aquatic species (Vannote and Sweeney 1980). The magnitude and pattern of historical, annual, seasonal, and daily fluctuations in temperature may be important when selecting and maintaining a variety of aquatic insects in a stream reach (Vannote and Sweeney 1980). Sudden increases or decreases in water temperature could result in population- and community-level changes in aquatic insects within the project area.

The temperature of discharge water would vary seasonally. The discharge water is expected to be ambient temperature during spring, summer, and fall seasons. It is anticipated that the discharge effluent would range between 2 and 24°C with a median of 12°C. The temperature of streams within the project area can range from 1°C during winter to 24°C or more during summer; therefore, changes in temperature are not expected to be dramatic but would vary depending on the volume and timing of the discharge.

Spills and Surface Water Discharge

If a large spill occurs, there may be discharges of oil and petroleum fractions. [Gasoline and crude oil are complex mixtures of hydrocarbons. When spilt, the compounds in gasoline or crude oil tend to separate into “fractions” with similar chemistries.] See section 4.4 for more information about spills. The NPDES permit would also allow the discharge of minor concentrations of oil and grease (15 mg/L) during storm water events. The relatively low density of many petroleum fractions can pose short-term concerns, especially for fish and wildlife resources. Many petroleum fractions float in water and form thin surface films. Gasoline, diesel, or other fuel oils spilled into water quickly spread out into a film generally 0.1 millimeter thick. Therefore, a very small amount of refined fuel or oil product can create a film over a very large water surface area. While natural physical and biological weathering processes would dissipate or degrade such oil slicks in time frames ranging from days to a few weeks, there is considerable short-term opportunity for damage to waterfowl, aquatic mammals, fish, and other aquatic organisms.

Some heavier petroleum fractions show neutral buoyancy or may be heavier than water. Some fraction components may have the potential to accumulate in substrates. Depending on the frequency and clean-up of spills and leaks, the heavier (sinking) fractions can impact benthic organisms and bottom-feeding fish species. Other fish species may also be impacted through reductions in food supply.

The effluent holding ponds may attract waterfowl and other shorebirds. These birds and other aquatic animals (e.g. muskrats and mink) may become oiled in the event of a spill that is contained within these ponds prior to treatment, if mitigation measures such as hazing or netting are not employed to decrease wildlife use of the ponds.

Spills of oil and other contaminated waste material that may potentially reach the unnamed surface drainage and East Fork of Shell Creek could result in fish and macroinvertebrate kills and degradation of habitat. The severity and scope of a stream kill would depend on the volume of material spilled, the distance of the spill from surface water, and the chemical and toxicological properties of the materials spilled. However, it is important to note that the refinery has been designed with state-of-the-art technology to capture all surface water runoff, including oil spills and other potentially contaminated waste material. Site generated storm water and any subsequent waste material generated on the site would be captured and treated in the WWTU prior to being discharged into holding ponds. Therefore, potentially contaminated (oily) surface runoff generated on the site would be treated, stored, and tested prior to discharge into the East Fork of Shell Creek Basin.

Species Diversity

As discussed previously, the effects of the surface discharge on aquatic species, such as changes in water flow and temperature could have an effect on multiple levels of biodiversity (genetic, population/species, community/ecosystem, and landscape). The amount of positive effects would increase as the baseline condition remains altered for any period. The longer discharge effluent produced at the site enters the basin drainage, the higher the probability for effects to species diversity over large portions of drainage. Potential changes in species diversity would be the greatest under Alternative 4 because this alternative would have the most continuous flow of all the Alternatives, therefore, the greatest impact on aquatic ecosystems.

4.8.1.4 Special-status Species

The ESA was enacted in 1973 to address the decline of fish, wildlife, and plant species in the United States and throughout the world. The purpose of the ESA is to conserve “the ecosystems upon which endangered and threatened species depend” and to conserve and recover listed species (ESA [§ 2, 16 U.S.C. 1531]). The law is administered by the FWS. The EIS analysis of threatened and endangered species constitutes a Biological Assessment prepared in accordance with 50 C. *Federal Register* Part 402. BIA and EPA submitted the DEIS to the FWS for review. The FWS reviewed the Biological Assessment (DEIS) and responded in an August 22, 2006 memorandum. The FWS concurred with the "no effect" and "may affect, not likely to adversely effect” determinations in the DEIS.

Under the ESA, species may be listed as either “endangered” or “threatened.” The ESA defines an endangered species generally as any species that is in danger of extinction throughout all or a significant portion of its range (ESA, Section 3(6)). A threatened species is one that is likely to become an endangered species within the foreseeable future throughout all or a significant part of its range (ESA, Section 3(20)). All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened.

The ESA also affords protection to “critical habitat” for threatened and endangered species. The definition of "critical habitat" includes the specific areas within the geographical area occupied by the species at the time it is listed, on which are found physical or biological features essential to the conservation of the species and which may require special management considerations or protection (ESA, Section 3(5)(A and B)). Except when designated by the Secretary of the Interior, critical habitat does not include the entire geographical area that can be occupied by the threatened or endangered species (ESA, Section 3(5)(C)).

Some species may also be proposed and candidates for listing (ESA Section 4(b). The FWS defines proposed species as any species that is proposed in the *Federal Register* to be listed under Section 4 of the ESA; while candidate species are those for which the FWS has sufficient information on their biological status and threats to propose them for listing as endangered or threatened under the ESA, but for which development of a listing regulation is precluded by other higher-priority listing activities. Candidate species receive no statutory protection under the ESA, but by definition, these species may warrant future protection under the ESA. There are no proposed species known to occur in North Dakota.

Bald Eagle

Species Description

Bald eagles occur throughout North Dakota where there is suitable habitat, which usually entails rivers or lakes as well as trees for nesting and roosting. Bald eagles are uncommon breeders in North Dakota; however, in 1997, 8 nests were located in North Dakota along the Missouri River and one nest along Devils Lake. Man-made reservoirs have provided winter habitat. Fish are the primary food source, but bald eagles also prey upon a variety of birds, mammals, and turtles as well as carrion when fish are not readily available.

Analysis of Effects from Proposed Refinery Construction and Operation

The proposed action would place a 468.39-acre tract of land in trust land status and construct a 190-acre refinery. Construction of the refinery would expand human disturbance on the 190-acre tract.

There currently are no known nest sites or winter roost areas in the project area or within the proposed pipeline and transmission line corridor alignments. However, eagles are known to use the Missouri River corridor south of the project area for nesting, roosting, and as a migration corridor. Therefore, bald eagles may occasionally forage in the project area. If eagles occur in proximity to the project area, it is envisioned that they would most likely alter foraging patterns, as they would be expected to avoid active construction and operational areas. However, based on the unique habitat affinity for the Missouri River system, the occurrence of a bald eagle in proximity to the project area would be a rare and random incident.

Use of the roads accessing the refinery site would continue after the refinery is constructed, which may result in vehicular collisions and roadside carcasses for up to 20 to 25 additional years. The presence of roadside carcasses can result in bald eagle foraging along roads, which creates the potential for road kills of foraging bald eagles. In addition, no suitable roosting habitat or concentrated prey or carrion sources for bald eagles are present on the project area. Therefore, it is not anticipated that any bald eagle foraging habitat would be lost during construction or operation of the refinery. Finally, the potential for bald eagles to collide with or be electrocuted by transmission lines would be minimal because of use of low voltage power lines that would be properly designed to avoid electrocution of raptors.

Determination

Construction and operation of the refinery under the proposed action "would have no effect" on the bald eagle. This determination is based on the lack of project actions that would disturb or remove roosting or foraging habitat for bald eagles.

Since the publication of the DEIS, the bald eagle has been removed from the Federal List of Endangered and Threatened Species, effective August 8, 2007. The *National Bald Eagle Management Guidelines* (U.S. Fish and Wildlife Service 2007) were reviewed relative to the project actions. There are no nests, roosts, or foraging habitat within the project area that would be disturbed or removed by the project actions.

Analysis of Effects from Proposed NPDES-Permitted Effluent Discharge and Alternatives

EPA's proposed NPDES permitting action would permit surface water discharges from the refinery to tributaries of the East Fork of Shell Creek. EPA believes that neither the proposed permit issuance nor any of the effluent discharge alternatives would have an effect on the bald eagle or its habitat. There would be no effect to this species or its habitat from the proposed NPDES action or any of the effluent discharge alternatives considered. There is no suitable roosting habitat or concentrated prey or carrion sources and the occurrence of bald eagles in proximity to the project area would be a rare incident. In addition, the proposed NPDES-permitted discharge of effluent from the refinery would meet permit limits and would result in water quality in the tributary and mainstem that would have no effect on any bald eagle that might ingest the water or prey on species residing in the discharged water. The pollutants likely to be discharged by the facility and proposed effluent limits are noted in the draft NPDES permit and Fact Sheet attached to the EIS. In addition, the location of the NPDES discharge is not within the general habitat of the bald eagle.

Determination

EPA's issuance of an NPDES permit or any of the other effluent discharge alternatives would have "no effect" on the bald eagle or its habitat. This determination is based on EPA's finding that eagles are not expected to occur in the project area.

Whooping Crane

Species Description

Whooping cranes require open exposed wetlands, prairie potholes, or freshwater marshes. They seek shallow lakes and lagoons containing small islands of cattails, bulrushes, and sedges. Their diet consists of insects, crustaceans, small mammals, frogs and berries, and is often supplemented with roots and grains.

Analysis of Effects from Proposed Refinery Construction and Operation

Whooping cranes do not breed in North Dakota. However, they are known to migrate through North Dakota during the spring and fall migration periods. According to Austin and Richert (2001), 279 whooping crane observations have occurred in North Dakota between 1943 and 1999. In addition, the migratory path of the whooping crane has been extensively documented. The documented migration path, as outlined by the distribution of whooping crane observations, follows a relatively straight line north-northwest from Aransas National Wildlife Refuge to central North Dakota, then curves northwest along the Missouri Coteau to the North Dakota-Saskatchewan border. The Aransas-Wood Buffalo population, as of January 4, 2006, numbered approximately 217 birds including 189 adults and 28 young. Current and historic records show the proposed construction area to be an important corridor for the migration of the whooping crane. Based on this migration corridor path, the presence of new transmission lines may pose a collision risk to the whooping crane.

Conservation Measures

To minimize the collision and electrocution risk hazard, the transmission lines will be constructed according to APLIC, Edison Electric Institute's Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 and Edison Electric Institute's "Mitigating Bird Collisions with "Power Lines: The State of the Art in 1994."

Determination

Implementation of the proposed refinery construction and operation action "may affect, but is not likely to adversely affect" the whooping crane.

Analysis of Effects from Proposed NPDES-Permitted Effluent Discharge and Alternatives

EPA's proposed NPDES permitting action would permit surface water discharges from the refinery to tributaries of the East Fork of Shell Creek. EPA believes that neither the proposed permit issuance nor any of the effluent discharge alternatives would have an effect on the whooping crane or its habitat. There would be no effect to this species or its habitat from the proposed NPDES action or any of the effluent discharge alternatives considered, because the proposed NPDES-permitted discharge of effluent from the refinery would meet permit limits and would be of such quality that it would have no effect on a whooping crane that might ingest receiving waters for some brief period or prey on species residing in the receiving water. In addition, the location of the NPDES discharge would not be within the general habitat of the whooping crane.

Determination

EPA's issuance of an NPDES permit or any of the other effluent discharge alternatives would have "no effect" on the whooping crane or its habitat.

Interior Least Tern

Species Description

The interior least tern is migratory and its breeding range extends from Texas to Montana and from eastern Colorado and New Mexico to northern Indiana. Of the approximately 2,500 pairs of interior least terns, about 100 pairs are known to occur in North Dakota.

Analysis of Effects from Proposed Refinery Construction and Operation

Interior least terns occurring throughout North America nest in areas with habitat attributes similar to those of the project area. The riverine nesting areas of interior least terns are sparsely vegetated sand and gravel bars within a wide, unobstructed river channel, or salt flats along lake shorelines. Nesting locations are usually at the higher elevations and away from the water's edge because nesting starts when the river flows are high and small amounts of sand are exposed. The size of nesting areas depends on water levels and the extent of associated sand bars.

Under the proposed action, no direct effects to the interior least tern or its habitat are expected to result from any construction activities. There are currently no known nest sites within the project area or within the proposed pipeline and transmission alignments. However, the interior least tern is known to use the Missouri River corridor for nesting and as a migration corridor, and may occasionally use the project area as a transient migratory pathway.

Determination

Implementation of the proposed action "would have no effect" to the interior least tern or its habitat. This determination is based on the lack of project actions that would disturb or remove breeding, roosting, or foraging habitat for the interior least tern.

Analysis of Effects from Proposed NPDES-Permitted Effluent Discharge and Alternatives

EPA's proposed NPDES permitting action would permit surface water discharges from the refinery to tributaries of the East Fork of Shell Creek. EPA believes that neither the proposed permit issuance nor any of the effluent discharge alternatives would have an effect on the interior least tern or its habitat. There would be no effect to this species or its habitat from the proposed NPDES action or any of the effluent discharge alternatives considered because the interior least tern is not expected to utilize the receiving waters. To the extent interior least terns may briefly be present in the tributaries or mainstem, the proposed NPDES-permitted discharge of effluent from the refinery would be of such quality that it would have no effect on an interior least tern that might ingest the receiving water or species residing in the receiving water. In addition, the location of the NPDES discharge would not be within the general habitat of the interior least tern.

Determination
EPA's issuance of an NPDES permit or any of the other effluent discharge alternatives would have "no effect" on the interior least tern or its habitat.

Piping Plover

Species Description
Piping plovers breed in open, sparsely vegetated habitats. The Great Plains population nests along sand and gravel shores of rivers and lakes. They have been observed eating marine worms, fly larvae, beetles, crustaceans, mollusks, and other invertebrates. As of 2001, a piping plover census found 1,112 plovers in North Dakota including 643 along the Missouri River. Critical habitat was designated for the piping plover in the September 11, 2002, *Federal Register*. This included critical habitat in the counties of the proposed action. However, no critical habitat has been designated in the area proposed for the refinery and/or effluent discharge.

Analysis of Effects from Proposed Refinery Construction and Operation
The piping plover is known to breed on a wetland within close proximity to the proposed refinery site. Since piping plovers breed and forage on unvegetated, gravel shorelines of wetlands, it is reasonable to expect that piping plovers would potentially use exposed shorelines of constructed ponds while foraging.

Conservation Measures
To minimize the use of refinery retention ponds, four inch to six inch rock should be used to line exposed in-slopes of all wastewater/storage ponds. In addition, any ponds having the potential to hold contaminated (oily) water should be netted. The larger rock and netting will prevent the creation of an attractive nuisance for piping plovers.

Determination
Implementation of the proposed action "may affect, but is not likely to adversely affect" the piping plover.

Analysis of Effects from Proposed NPDES-Permitted Effluent Discharge and Alternatives
EPA's proposed NPDES permitting action would permit surface water discharges from the refinery to tributaries of the East Fork of Shell Creek. EPA believes that neither the proposed permit issuance nor any of the effluent discharge alternatives would have an effect on the piping plover or its critical habitat. There would be no effect to this species or its critical habitat from the proposed NPDES action or any of the effluent discharge alternatives considered because the piping plover is not expected to utilize the receiving waters. To the extent the piping plover may briefly be present in the tributaries or mainstem, the proposed NPDES-permitted discharge of effluent from the refinery would be of such quality that it would have no effect on a piping plover that might ingest the receiving water or species residing in the receiving water.

Determination
EPA's issuance of an NPDES permit or any of the other effluent discharge alternatives would have "no effect" on the piping plover or its critical habitat.

Gray Wolf

Species Description

The gray wolves have been documented in North Dakota at the rate of about 1 to 2 verified reports per year. These are mostly dispersing males from Canada or Minnesota. They once had a variety of habitats including boreal forest, temperate forests, and temperate grasslands. They now occur primarily in forested areas. Prey species for the gray wolf includes larger prey species such as deer, elk, moose, caribou, bison, musk ox, and mountain sheep. They also take smaller prey consisting of rabbits, hares, beaver, and smaller rodents which are generally taken when larger prey are scarce or an easy kill presents itself.

Analysis of Effects of the Proposed Refinery Construction and Operation and the Proposed NPDES-Permitted Effluent Discharge

There would be no effects to wolves from either the proposed refinery construction and operation or the proposed NPDES-permitted effluent discharge and discharge alternatives. Breeding wolves are not known to occur in or near the project area. Additionally, there is no recent evidence of wolf pairs or packs in the region. Because of the highly mobile nature of this species, it is possible that wolves would periodically travel through the project area. It is anticipated that any use of the project area would be of short duration because of the transitory nature of the species, and would occur at localized habitats within the region. There would always be a low to moderate level of human activity in proximity to the refinery, and wolves are expected to avoid areas with this type of human activity. The proposed action has little potential for affecting local or range-wide prey availability for gray wolves.

Determination

Implementation of the proposed refinery construction and operation action or the NPDES-permitted effluent discharge action would have “no effect” to the gray wolf. This determination is based on the low likelihood for gray wolves to occur within the project area and their tendency to avoid areas of human activity

Pallid Sturgeon

Species Description

The pallid sturgeon is a large fish known to occur only in the Missouri River, the Mississippi River downstream from the Missouri River, and the lower Yellowstone River. Pallid sturgeons require large, turbid, free-flowing riverine habitat with rocky or sandy substrate. The pallid sturgeon feeds on aquatic insects, crustaceans, mollusks, annelids, eggs of other fish and sometimes other fish. In April of 2001, 11 pallid sturgeon were caught in the upper Missouri River and Yellowstone River (not in Lake Sakakawea). No reproduction has been documented in North Dakota in more than a decade.

Analysis of Effects from the Proposed Refinery Construction and Operation

The pallid sturgeon is found only in major rivers such as the Missouri River. Pallid sturgeon habitat is not found in the East Fork of Shell Creek or its tributaries. The proposed refinery and effluent discharges to a tributary of the East Fork of Shell Creek would have no effect on the pallid sturgeon as the refinery is located about 25 miles upstream of Lake Sakakawea (on the Missouri River) and discharge limitations will be protective of aquatic life from the point of discharge.

Determination

Implementation of the proposed action would have “no effect” on the pallid sturgeon.

Analysis of Effects from Proposed NPDES-Permitted Effluent Discharge and Alternatives

EPA's proposed NPDES permitting action would permit surface water discharges from the refinery to tributaries of the East Fork of Shell Creek. EPA believes that neither the proposed permit issuance nor any of the effluent discharge alternatives would have an effect on the pallid sturgeon or its habitat. There would be no effect to this species or its habitat from the proposed NPDES action or any of the effluent discharge alternatives considered because there are no pallid sturgeon in the tributaries of the East Fork of Shell Creek, which is where the permit discharge point would be located; nor are there any pallid sturgeon in the East Fork of Shell Creek itself. By the time the treated discharge reaches Lake Sakakawea, located more than 20 stream miles downstream from the refinery, the discharge would be so diluted and mixed with the receiving waters, that there would be no effect to the lake waters. In addition, the pallid sturgeon is not presently known to occur in Lake Sakakwea. Moreover, even at the point of discharge, effluent from the refinery would meet permit limits and would be of such quality that it would have no effect on the pallid sturgeon. The pollutants likely to be discharged by the facility and the proposed effluent limits for the pollutants are noted in the draft NPDES permit and Fact Sheet attached to the EIS. These limits should ensure no effect on the pallid sturgeon.

Determination

EPA's issuance of an NPDES permit or any of the other effluent discharge alternatives would have "no effect" on the pallid sturgeon or its habitat. This determination is based on EPA's finding that refinery effluent discharged through an NPDES permit would be discharged to a tributary of the East Fork of Shell Creek where there are no pallid sturgeons. Likewise, there are no pallid sturgeons in the East Fork of Shell Creek. By the time the discharge reaches Lake Sakakawea, the discharge will be diluted to the extent that it would have no effect on the species or its habitat. In addition, the NPDES permit would ensure that the discharged water is of such quality that it would have no effect on the pallid sturgeon or its habitat. Stored, land applied, or reinjected water would have no effect on the pallid sturgeon or its habitat.

Dakota Skipper

Species Description

The Dakota skipper butterfly inhabits fragments of high-quality tallgrass and mixed grass prairies. As both a larva and as an adult, it feeds on specific plants found in low and upland prairie habitats.

Analysis of Effects from Proposed Refinery Construction and Operation and the Proposed NPDES-Permitted Effluent Discharge

The Dakota skipper is a candidate species. Historically, the butterflies were found in grasslands in the north-central U.S. and south-central Canada. Currently, the butterflies are found in remnants of high quality native prairie containing a high diversity of wildflowers and grasses. Dakota skipper habitat is very restricted in selection, as feeding of both larval and adult stages is limited to low prairie and upland prairie habitats. The nearest extant metapopulation located on Reservation lands is within McKenzie County, a significant distance west of the project area. Because a significant portion of the project area has been tilled for agricultural uses, only remnant tracts of mixed-grass prairie exist around the edges of wetlands, ditches, and section lines. Because of the small patch sizes of these habitats, it is not believed that any of these existing tracts would be of a size or contain the right diversity of plant species consistent with niche habitat patch requirements. In addition, construction activities associated with linear infrastructure would be constructed within previously disturbed ROWs. Therefore, it is highly unlikely that any extant metapopulations of Dakota skipper would exist in proximity to these disturbed habitats.

Determination

Implementation of the proposed refinery construction and operation action or the NPDES-permitted effluent discharge action would have “no effect” on the Dakota skipper. This determination is based on the lack of project actions that would disturb or remove any required habitat for the Dakota skipper and that it is highly unlikely that any extant metapopulations of Dakota skipper would exist in proximity to the project area.

4.8.1.5 Wildlife, Birds and Aquatic Species Ecological Risk Evaluation

This section evaluates risk to wildlife from air emissions resulting from the proposed alternative and all other construction options during the operation of the refinery through application of a food chain model. For the purpose of this ecological risk evaluation, four areas of interest were examined. See Figure 4-1 for the locations that were analyzed in the food chain model (through air deposition).

- Maximum air concentration was modeled at location R-1 – Located along the process area fenceline to the southeast
- Maximum soil concentration was modeled at location R-2 – Located along the process area fenceline to the northwest
- Farmhouse location – the nearest residence outside the refinery site was modeled to determine soil concentrations from air deposition.
- Forage Location – location within the site boundary where forage for buffalo may be grown in the location of highest expected deposition of chemicals, and where wildlife may be expected to graze.

Receptor locations for areas of possible impact were identified from aerial photos and maps; locations are shown respective to the 16 facility emission sources (units within the refinery) and process boundary on Figure 4-1. Soils concentrations of each HAP were modeled at each of the four locations in the Industrial Risk Assessment Program Human Health (IRAP-h) View model according to methods described in Section 4.16 of the FEIS. Soil concentrations were calculated from the wet and dry deposition rates of chemicals emitted as a vapor and chemicals emitted as particles or bound to particles. Deposition rates were determined in the air dispersion model from the cumulative emissions from the 16 sources. At each of the four receptor locations, the maximum soil concentrations were conservatively assumed to represent the lifetime exposures of each ecological receptor.

To assess the potential for refinery emissions to adversely affect ecological receptors, maximum concentrations of chemicals in soils at each of these areas were compared to applicable ecological screening values (Table 4-12).

Screening values from the following four sources were used in the evaluation:

- Oregon Department of Environmental Quality (ODEQ) Level II Screening Level Values (ODEQ 2001). Where sufficient data are available, ODEQ publishes receptor-specific soil screening level values for plants, invertebrates, birds, and mammals. However, for three of the four TAT refinery HAPs modeled, ODEQ has published mammalian values only. Mammalian values are based on exposure to an unspecified mammal via incidental soil ingestion, assuming a diet of 10% soil.
- EPA Region 5 (EPA 2003b) Ecological Screening Levels. Values are based on exposure to the masked shrew (*Sorex cinerus*).

- EPA Region 4 (EPA 2001b) Ecological Screening Values. Values for the TAT HAPs are based on Beyer (1990) and Dutch Target Values (MHSPE 1994).
- Toxicity Reference Values from EPA's *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (EPA 1999); includes values developed to protect terrestrial plants and soil invertebrates.

Estimated maximum soil concentrations were all well below (i.e., at least four orders of magnitude or 10,000 times) applicable ecological screening values (Table 4-12). While some uncertainty arises from the fact that available screening values are primarily based on exposures to mammals only, effects to other terrestrial receptors such as birds, plants, and invertebrates are unlikely given the magnitude of estimated maximum soil concentrations. These contaminant concentrations would not be detectable using standard analytical methods.

To confirm that the estimated maximum soil concentrations are unlikely to adversely affect terrestrial receptors other than mammals, an analysis of screening values was conducted for chemicals other than the four principal chemicals of concern. EPA has developed Ecological Soil Screening Values (EPA 2007) for 19 chemicals, including 14 metals and five organics. Where data are available, EPA publishes four receptor-specific Ecological Soil Screening Levels (Eco-SSL) per chemical, developed to protect, plants, invertebrates, birds, and mammals. For six of the 19 chemicals for which Eco-SSLs have been published, values are available for all four receptors, and for 18 of the 19 chemicals, values are available for at least two receptors. An analysis of Eco-SSL values indicates that, for any given chemical, Eco-SSLs for all the various terrestrial receptors are typically within two orders of magnitude, and are always within three orders of magnitude, of each other. A similar analysis conducted on ODEQ (2001) values for volatile and semivolatile organics indicates that, with the exception of two phthalate compounds, screening values for different terrestrial receptors are also always within three orders of magnitude of each other. Thus, given that estimated maximum soil concentrations are at least four orders of magnitude less than the available screening values, refinery operations are unlikely to adversely affect terrestrial receptors.

4.8.2 Construction Alternatives

4.8.2.1 Alternative 2 — Transfer to Trust, No Refinery

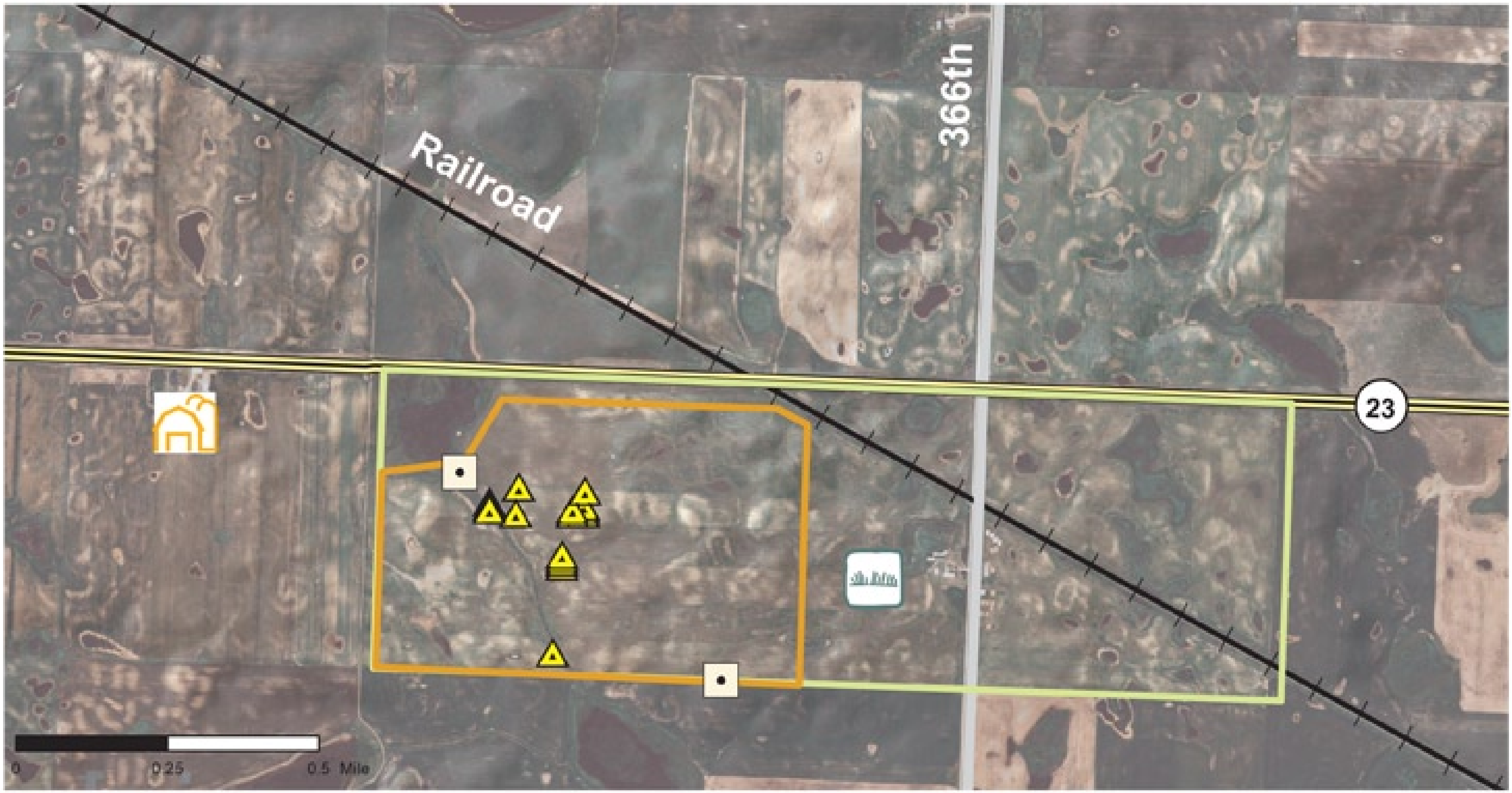
Under this alternative, the entire 468.39-acre site would be accepted into trust status, but construction and operation of the project would not go forward. Therefore, the 468.39-acre project site would most likely continue to be used for agricultural purposes, which have occurred for decades. The MHA Nation could decide to use the entire project site to produce forage for buffalo or the land could be included in a tenant farm-leasing program. Based on the foregoing, impacts to wildlife would be similar to the existing conditions.

4.8.2.2 Alternative 3 – No Transfer to Trust, Refinery Constructed

Under this alternative, the magnitude and type of effects would be similar to those presented under Alternatives 1 and A.

4.8.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in effects similar to those as described in Alternatives 1 and A. The pipelines and power lines would be constructed the same as Alternative 1. The revised site layout avoids disturbing most of the wetland PEMF#2 and replaces wastewater storage ponds with tanks, resulting in some changes in impacts to wildlife. Avoiding the wetland, retains 0.5 acres of wetlands habitat; however the habitat would be located within the refinery site. The replacement of wastewater holding ponds with tanks would reduce the "shore" like and pond areas that may be attractive to waterfowl and plovers. There would still be fire ponds and an evaporation pond under this alternative. In order to minimize impacts to piping plovers and other water birds, these ponds would have to be lined with cobbles not gravel. This alternative would have the most continuous flow which could cause a shift in aquatic organisms to more water dependent species within the wetland system.



Proposed MHA Nation Refinery Site

Legend

- Emissions locations
- Farmer Receptor Location
- Forage Receptor Location
- Modeled Maximum Deposition Locations
- Refinery Process Area
- Entire Parcel Boundary
- Highway
- Streets
- Railroads

2005-07-19, "Airphoto USA",
1:12000, 1.0m resolution

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Sources:
The base map used for this figure is based on the US Census Bureau's 2000 TIGER Data. EPA makes no claims regarding the accuracy, precision, or use of this locational data. Questions concerning the locational data should be referred to the US Census Bureau or other source agencies. The highways and railroads data came from data sets purchased from GDT (Geographic Data Technology). This is proprietary data and cannot be distributed except by GDT. Other data comes from EPA Project personnel and other EPA sources.

Table 4-12 Comparison of Maximum Cumulative Soil Concentrations to Ecological Screening Values

Chemical of Interest	Maximum Cumulative Soil Concentration[A] (mg/kg)	ODEQ Level II Screening Level Value for Plants[B] (mg/kg)	ODEQ Level II Screening Level Value for Mammals[C] (mg/kg)	EPA Region 5 Ecological Screening Level[D] (mg/kg)	EPA Region 4 Ecological Screening Value[E] (mg/kg)	EPA SLERAP TRV for Terrestrial Plants[F] (mg/kg)	EPA SLERAP TRV for Soil Invertebrates[G] (mg/kg)
Farmhouse							
Benzene	1.8740E-009	NA	3.30E+03	2.55E-01	5.00E-02	NA	NA
Benzo(a)pyrene	1.0225E-006	NA	1.25E+02	1.52E+00	1.00E-01	1.20E+00	2.50E+01
Formaldehyde	7.2537E-005	NA	3.90E+03	NA	NA	NA	NA
Toluene	7.8083E-009	2.00E+02	1.44E+03	5.45E+00	5.00E-02	NA	NA
Forage Location							
Benzene	3.4028E-009	NA	3.30E+03	2.55E-01	5.00E-02	NA	NA
Benzo(a)pyrene	1.8313E-006	NA	1.25E+02	1.52E+00	1.00E-01	1.20E+00	2.50E+01
Formaldehyde	1.3176E-004	NA	3.90E+03	NA	NA	NA	NA
Toluene	1.4194E-008	2.00E+02	1.44E+03	5.45E+00	5.00E-02	NA	NA
RI_1							
Benzene	6.8018E-009	NA	3.30E+03	2.55E-01	5.00E-02	NA	NA
Benzo(a)pyrene	4.4999E-006	NA	1.25E+02	1.52E+00	1.00E-01	1.20E+00	2.50E+01
Formaldehyde	2.6312E-004	NA	3.90E+03	NA	NA	NA	NA
Toluene	2.8359E-008	2.00E+02	1.44E+03	5.45E+00	5.00E-02	NA	NA
RI_2							
Benzene	1.5850E-009	NA	3.30E+03	2.55E-01	5.00E-02	NA	NA
Benzo(a)pyrene	1.1287E-005	NA	1.25E+02	1.52E+00	1.00E-01	1.20E+00	2.50E+01
Formaldehyde	6.1392E-005	NA	3.90E+03	NA	NA	NA	NA
Toluene	6.6283E-009	2.00E+02	1.44E+03	5.45E+00	5.00E-02	NA	NA

Notes:

[A] Calculated from the cumulative emissions of 16 sources in the air dispersion modeling; further discussed in Section 4.16 of FEIS

[B] Based on Oak Ridge National Laboratory toxicity value for plants (ODEQ 2001).

[C] Based on exposure via incidental soil ingestion, assuming a diet of 10% soil (ODEQ 2001).

[D] Based on exposure to the masked shrew (*Sorex cinerus*) (EPA 2003b).

[E] Values are as published (EPA 2001b); value for benzene is based on MHSPE (1994), value for benzo(a)pyrene is based on Beyer (1990), and value for toluene is based on both MHSPE (1994) and Beyer (1990).

[F] Value from EPA (1999); based on chronic No Observable Adverse Effect Level (NOAEL) for wheat.

[G] Value from EPA (1999); based on chronic NOAEL for woodlouse (*Porcellio scaber*).

4.8.2.4 Alternative 5 – No Action

Under this alternative, the 468.39-acre site would not be accepted into trust status. Therefore, the 468.39-acre project site would continue to be used for agricultural purposes, which have occurred for decades. The types of direct and indirect effects occurring from agricultural activities to wildlife that have occurred over decades would continue under existing conditions.

4.8.3 Effluent Discharge Alternatives

4.8.3.1 Alternative B —Partial Discharge through an NPDES Permit and Some Storage and Irrigation

Under this alternative, surplus treated wastewater would be disposed of through land application to irrigate trees and crops on the project site, as practicable; otherwise, there would be discharge through NPDES permitted outfalls. Since most of Sections 19 and 20, Township 152 is already used in an agricultural crop rotation, no additional impacts are expected to occur to wildlife species, as long as wastewaters are properly treated prior to land application.

Unlike Alternative 1and A, this alternative would involve irrigating crops potentially consumed directly by humans or crops used as forage for livestock that would be consumed by humans. These same crops may provide forage for wildlife that utilize the irrigated parcel. As a result, there is a potential for exposure to wildlife from contaminants in wastewater via food chain exposure pathways. Potential plant uptake of certain contaminants present in irrigated wastewater may result in accumulation of contaminants in soils or plant tissues at concentrations greater than those present in wastewater. In particular, uptake and storage of metals, such as mercury, chromium, and lead, in plant tissue could potentially pose a risk to wildlife that consumed crops irrigated with wastewater from the refinery.

While it is unclear if these scenarios will occur, they represent an uncertainty that has not been quantitatively evaluated, and must be considered when evaluating each alternative. Until such time as a quantitative analysis of the potential risks posed by discharge of refinery wastewater via irrigation of crops has been performed using actual site-specific data, it cannot be determined that alternative B will be protective of human health and the environment. Therefore, refinery wastewater effluent should not be used to irrigate food chain crops until a quantitative risk assessment is conducted.

The refinery wastewater is considered to be (by definition) a solid waste under RCRA. As such, all wastewater proposed to be used for irrigation should be treated to meet appropriate standards to protect human health and the environment. In addition, unless the wastewater is treated sufficiently, it will continue to be considered a solid waste containing hazardous waste constituents, and RCRA Corrective Action requirements would apply for the irrigated land parcel. This is because the irrigated land parcel would be considered a SWMU. Therefore, a RCRA TSD permit may establish additional treatment levels for irrigation water.

The determinations of effects on Threatened and Endangered species would be the same as described for Alternative 1 and A; “no effect" for: whooping cranes, interior least tern, gray wolf and pallid sturgeon; and "may affect, not likely to adversely effect" for the piping plover. Under Alternative B, piping plovers may use the irrigated parcel for forage. However, that parcel would not be used preferentially over other forage areas.

4.8.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, the MHA Nation would discharge all effluent from the WWTP to a Class I, Non-hazardous UIC well that would be drilled on the project site. Since the well would be finished deep below the ground surface, no additional impacts would occur to wildlife.

For Alternative C, reinjecting wastewater would have no effect on Threatened or Endangered species.

4.8.3.3 Alternative D — No Action

Under this alternative, the proposed refinery would not be constructed. Thus, no discharges of water of any kind would be permitted and no additional impacts would occur to wildlife.

4.8.4 Cumulative Impacts

The primary economy in the region is derived from agriculture. Therefore, agricultural activities are a leading cause of habitat loss within the project area and the region. Much of the rural settlement and development of agriculture took place in this area after the construction of the railroad to Plaza, which was in the early 1900s. The location of the project area near Makoti and Plaza provided access to major agricultural markets by way of the railroad. Therefore, significant conversion of mixed-grass prairie occurred in this region between 80 and 100 years ago.

Livestock grazing typically occurs in the hillier regions. Because of topographical relief, these areas generally preclude the ability to till the lands. These areas are generally west and north of the project area. It is not envisioned that a regional expansion of grazing would occur in the future.

Recreation occurs year-round in the cumulative-effects area. Primary activities are centered on both small and big game hunting. Increased human use of the project area over time can result in wildlife disturbance and, in the extreme, wildlife displacement. Because a significant amount of land is held in private ownership and the balance held in trust by BIA for individual Indians or the MHA Nation, it is not envisioned that construction of the refinery and appurtenant linear facilities would attract additional hunting activities nor would it open up more land to recreation and hunting than is currently allowed by the land owners.

4.9 Cultural Resources

4.9.1 Alternatives 1 and A — Original Proposed Actions

Implementation of Alternatives 1 and A are not expected to substantially affect cultural resources in the project area. The till plain and pothole setting of the project area has soils that are generally good for cultivation, but support a comparatively low diversity of natural resources. These conditions correspond to a low potential for prehistoric or historic cultural resources other than readily visible farm complexes.

The North Dakota SHPO (Swenson 2005) and the Cultural Preservation Office of the Three Affiliated Tribes (Crows Breast 2005) have reviewed the available information for the project area. Both offices have concurred that there is a low potential for significant cultural resources in the project area, and both have recommended a determination of no historic properties affected. The farm complex near the refinery site would not be affected by the proposed action and the farm complexes near the pipeline and power line corridors can be avoided.

The primary affect resulting from implementation of these alternatives would be modification of the old Soo Line Railroad branch line that runs through the property. The line itself would not be moved or removed, but a new siding would be constructed from the line into the refinery. This addition would not adversely impact the historic character of the rail line. The farm house and outbuildings would not be disturbed for construction of the refinery or production of the forage for buffalo.

Under these alternatives, the year-round effluent discharge of 10 gpm would equal 5.25 million gallons or about 16 acre-feet discharged annually into the drainage ditch and ultimately into the wetland PEMF#2 and the tributary to the East Fork of Shell Creek. This discharge of effluent is not expected to affect cultural resources. The locations of the outfalls were disturbed previously. Therefore, construction of the outfalls would not affect cultural resources. The discharges of effluent also would not affect cultural resources.

4.9.2 Construction Alternatives

4.9.2.1 Alternative 2 — Transfer to Trust, No Refinery

Implementation of this alternative would not affect cultural resources. The refinery would not be constructed, so no potential would exist for disturbance to prehistoric or historic cultural resources. Additionally, the production of forage for the MHA Nation's herd of buffalo would not involve a change from current land uses. Thus, the continued agricultural use of the project site would not affect any cultural resources potentially present on the site.

4.9.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Implementation of this alternative would result in the same effects as described for Alternatives 1 and A. The same refinery, pipelines, and power lines would be constructed, so effects attributed to these facilities would be the same. BIA's decision to not accept the project site into trust status would not affect the MHA Nation's proposal for use of the property for refining oil and producing forage for buffalo. Consequently, the effects would be the same as those described for Alternatives 1 and A.

4.9.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in the same effects as described in Alternatives 1 and A. The revised site refinery layout, pipelines and power lines would be constructed, so effects attributed to these facilities would be the same.

4.9.2.4 Alternative 5 — No Action

Implementation of this alternative would result in no effects to cultural resources. The refinery, pipelines, and power lines would not be constructed, so no potential would exist for disturbance to prehistoric or historic cultural resources. Additionally, current uses of the project site would continue into the future, so no changes in effects to cultural resources would occur from continued agricultural use.

4.9.3 Effluent Discharge Alternatives

4.9.3.1 Alternative B — Partial Discharge through an NPDES Permit and Some Storage and Irrigation

With this alternative, the Project would irrigate when possible, but also would be able to discharge when conditions for irrigating are not optimal. For the reasons discussed for Alternatives A, no effects to cultural resources are expected from the implementation of this alternative.

4.9.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, the MHA Nation would discharge all effluent from the WWTP to a Class I, Non-hazardous UIC well that would be drilled on the project site. Because the well would be drilled at a location that already is disturbed, no additional impacts would occur to cultural resources.

4.9.3.3 Alternative D — No Action

Under this alternative, the proposed Refinery would not be constructed. Thus, no discharges of water of any kind would be permitted and no impacts would occur to cultural resources.

4.9.4 Cumulative Impacts

Cumulative effects to cultural resources are expected to be negligible. No other projects or activities have been identified in the project area that could cumulatively contribute to adverse effects to cultural resources.

4.10 Land Use

This section discusses the effects to existing land uses that are anticipated to occur from implementation of the alternatives.

4.10.1 Alternatives 1 and A — Original Proposed Actions

4.10.1.1 Project Site

Under these alternatives, BIA would accept the project site, which the MHA Nation purchased from a private landowner, into trust status. With the project site in trust status, MHA Nation would be able to supplement their existing land base within the Fort Berthold Reservation Boundaries and no longer pay taxes to a non-Indian government. The trust land would be exempt from property taxes paid to the Ward County government, which would lose an estimated $1,960 per year of property taxes. All other lands adjacent to the parcel are privately owned.

There would be no other impacts on existing land ownership or management status from the siting, construction, and operation of the refinery, as it would affect only trust lands owned by the MHA Nation. The croplands surrounding the project site would continue under existing land uses and zoning. Because there are no current plans for other types of development (such as subdivisions) in the immediate vicinity of the project, no long-term impacts to planned land uses on lands surrounding the project site are expected from the construction and operation of the refinery. It is anticipated that the refinery facilities would be constructed on the western portion of the property. Croplands in the eastern portion of the property would be used for the production of forage crops for buffalo.

Short-term disruption during construction from the physical intrusion of the crew and equipment, the generation of dust and noise, and the obstruction of traffic would affect one residence located on the northwest side of the project site. The residence would be affected primarily by noise generated by construction activities, although there would be some air quality impact from dust generated by construction activities and pollutants generated by refinery operations. Other residences along Highway 23 could be affected by construction traffic.

The project site is privately owned and is not used for any recreational activities. In addition, no noteworthy recreational use occurs on or near the project site. Dispersed activities, such as hunting, do occur on lands within the Reservation, however it is primarily on non-crop lands. Recreational activities on the Reservation would not be affected by the construction and operation of the refinery.

Access into the project site from Highway 23 would be provided via a new access road. The proposed access road would be entirely within the project site and used only for access to the project site. There would be no disruption to land uses outside of the project site from construction of the access road. Traffic on Highway 23 would be temporarily disrupted at the junction with the access road by construction activities, and from construction traffic entering and exiting Highway 23.

Access to the power lines and pipeline rights-of-way would be from existing roads, which consist of local and county roads, and the C.P.R. rail line. Because no new access roads would be constructed and the pipelines and power lines would be constructed along existing linear rights-of-way, no existing land uses would be affected.

The effluent discharge outfalls associated with Alternative A would fall within the disturbance footprint of the refinery and would not cause a change in land use.

4.10.1.2 Electric Power Lines

Land ownership along the entire power line ROW is private. If necessary, easements for the power lines on private lands would be negotiated with the landowners. The proposed power lines that would not be in a road ROW would be located along the section lines.

During the construction phase of the project, existing land uses would be temporarily disrupted while the line is constructed. Short-term disruption during construction would consist of the physical intrusion of the crew and equipment, the generation of dust and noise, and the possible short-term obstruction of traffic at road crossings. The small area surrounding each pole structure would be permanently removed from existing uses. There would be no change, and therefore no long-term impact to other existing land uses within or adjacent to the proposed power line ROW.

There would be no impact to recreational opportunities in the project area from the construction and operation of the proposed power lines. The lines would be located within or along existing county road rights-of-way adjacent to privately owned croplands. The affected roads do not provide access to developed recreational areas or opportunities.

4.10.1.3 Pipelines

The natural gas and crude oil pipelines would be constructed along existing rights-of-way for roads and the C.P.R. rail line. Because the pipelines would be buried in existing rights-of-way, they would not affect existing land uses once they are installed. During construction, some minor disruptions of land use may occur within the rights-of-way; however, they would be short-term. Reclamation of the rights-of-way would return them to their previous uses.

There would be no impact to recreational opportunities in the project area from the construction and operation of the proposed pipelines. The pipelines would be located within or along existing county road rights-of-way adjacent to privately-owned croplands. The affected roads do not provide access to developed recreational areas or opportunities.

4.10.1.4 Crude Oil Storage Tanks

Construction of the four storage tanks along Enbridge's existing pipelines would not affect any current land uses. The tanks would be constructed within Enbridge's existing, fenced facilities. Other storage tanks already exist on all four sites.

4.10.2 Construction Alternatives

4.10.2.1 Alternative 2 — Transfer to Trust, No Refinery

Implementation of this alternative would result in minimal effects to land use. Without the refinery, the entire project site would be devoted to agricultural uses, similar to those that have been occurring on the site for decades. Additionally, no changes to land uses along the rights-of-way for the power lines and pipelines discussed under Alternatives 1 and A would occur.

Under this alternative, BIA would accept the project site, which the MHA Nation purchased from a private landowner, into trust. With the project site in trust, MHA Nation would be able to supplement their existing land base within the Fort Berthold Reservation boundaries and no longer pay taxes to a non-Indian government. The trust land would be exempt from property taxes paid to the Ward County government, which would lose an estimated $1,960 per year of property taxes.

4.10.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Implementation of this alternative would result in effects to land use similar to those described for Alternatives 1 and A. Overall, the effects to land use resulting from construction of the refinery would be as described for alternative. The one exception would involve the project site. With the project site not accepted into trust status by BIA, the land would not be exempt from property taxes paid to Ward County. In fact, Ward County would reassess the property and the MHA Nation would pay substantially higher property taxes than the most recent assessment of $1,960.

4.10.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in the same effects as described in Alternatives 1 and A. The revised site refinery layout, pipelines and power lines would be constructed, so effects attributed to these facilities would be the same.

4.10.2.4 Alternative 5 — No Action

Implementation of this alternative would not affect land use. The refinery would not be constructed, and BIA would not accept the project site into trust status. Consequently, land uses on and around the project area would continue as they currently exist, and the MHA Nation would continue to pay taxes to Ward County.

4.10.3 Effluent Discharge Alternatives

Implementation of the effluent discharge alternatives is not expected to result in more than negligible effects to land uses.

4.10.3.1 Alternative B — Partial Discharge through an NPDES Permit and Some Storage and Irrigation

The irrigation associated with this alternative would not change the existing agricultural use of the land, unless the wastewater was not adequately treated or high salinity water was used for irrigation. If inadequately treated wastewater was applied, the irrigation site could become classified as a RCRA hazardous waste LTU. If the irrigated land parcel were to be classified as a LTU, additional land use restrictions would apply.

4.10.3.2 Alternative C — Effluent Discharge to an UIC Well

The UIC well associated with this alternative would fall within the disturbance footprint of the refinery and would not cause a change in land use.

4.10.3.3 Alternative D — No Action

Alternative D would not result in any discharges of effluent or effects to land uses.

4.10.4 Cumulative Impacts

Cumulative effects to land uses from implementing any of the alternatives are expected to be minimal. The project area is rural and agricultural in nature and that situation is not expected to change with the construction and operation of the proposed refinery. Consequently, no projects have been identified where their effects would overlap in time or space with the effects of the alternatives analyzed here. Without projects or activities that have effects that overlap with the effects of the alternatives analyzed in this EIS, no cumulative effects would occur.

4.11 Transportation

4.11.1 Alternatives 1 and A — Original Proposed Actions

Implementation of Alternative 1 would noticeably affect transportation around the project site (segment of Highway 23 between the turnoffs to Parshall and Makoti). The refinery would increase weekly commercial truck traffic by almost 30 percent. Traffic associated with cars would increase by a similar amount. As distance increases east and west from the project site, the effects of the additional traffic would decrease until they would not be detectable.

The addition of the access road to Highway 23 and increase in traffic would inevitably lead to an increase in accidents along Highway 23 where it adjoins the project site. The addition of trucks accelerating, decelerating, and turning along this segment of the highway would increase the potential for additional accidents. The greatest potential for accidents would likely occur during changes of shifts at the refinery. The addition of traffic control lights and nighttime lighting would help minimize the potential for increases in accidents.

Relatively small levels of directs effects to the primary access routes within the Project Area including State and County roads would occur as a result of the project-related vehicular traffic associated with implementation of any of the alternatives. The primary impacts identified are minimal increases in daily traffic and associated slight increases in risk of accidents during construction and operation of the refinery. Secondary impacts may include increased road wear on Highway 23 and additional county feeder routes.

The direct and indirect transportation effects would include an increased risk of traffic accidents in proportion to the amount of increased daily traffic for each of the alternatives for constructing and operating the refinery. The potential for an increase in accidents would be most significant during the construction phase. The rates of traffic accidents would most likely rise due to the increase in the volume of traffic, which is not expected to be significant.

Increased degradation of existing roadways may result from construction and operation of the refinery when the incremental effects of the proposed refinery traffic are added to the daily vehicle trips. Once the refinery is operational, worker and product tanker truck daily trips would account for the majority of refinery vehicle trips. Heavy truck traffic would result in increased costs for road maintenance because heavy trucks result in more damage to road surfaces relative to automobiles and light trucks.

There would be no increase in the miles of road open to the public on Indian, State, or private lands, as all proposed access roads on private lands would be closed under all alternatives. Therefore, implementation of the Project would not result in significant traffic congestion or accident rates in the region.

The effluent discharge outfalls associated with Alternative A would fall within the disturbance footprint of the refinery and thus would not in and of themselves cause a change in transportation around the project site.

4.11.1.1 Transportation Spills

Risk from flammable materials (e.g., gasoline) is driven by frequently occurring accidents that involve low numbers of injuries and fatalities. These types of accidents are called high-probability/low-consequence events. Historical records contain information on many gasoline incidents.

4.11.1.2 Accident Rates

Accident rates are determined by analyzing historical data. To compare the risks that result from transporting various hazardous materials, Brown et al. (2000) conducted a National Transportation Risk Assessment (NTRA) to define the risks associated with rail and highway transportation of hazardous materials in the United States. At the center of their study was a detailed risk assessment for the national transportation of (1) six toxic-by-inhalation (TIH) chemicals, (2) liquefied petroleum (LP) gas, (3) gasoline, and (4) explosives. Results from their study provide a basis for comparison of the transportation risks associated with various hazardous material classes, container types, and transportation modes. The results of their risk assessment study for these chemicals, together with historical data, are provided on Table 4-13.

As summarized on Table 4-13, more than 40,000 Americans die each year and several hundred thousand are injured in transportation-related incidents, mainly from motor vehicle accidents. However, results of their study also show that compared to the other types of transportation risks encountered by the public, the overall risks due to the transportation of hazardous materials is relatively low. Specifically, a small number of the annual traffic fatalities and injuries result from the unintentional release of hazardous materials during transport. As detailed on Table 4-12, during each of the past 15 years, approximately 11 people died as a result of fires that occurred in gasoline-truck accidents, (with truck drivers accounting for approximately 7 of the 10 deaths). Also, the results of their study show that approximately 18 fatalities and 122 injuries would occur on average each year from the combined unintentional releases resulting from highway and rail transportation of all HAZMAT materials including highway transportation of LP gas, gasoline, and explosives.

Table 4-13 Comparisons of Risks Calculated in This Study with Other Transportation-Related Risks in the United States

Risk Type	10-Yr Period Fatalities	10-Yr Period Injuries	Annual Fatalities	Annual Injuries
Risks primarily due to trauma				
Motor vehicles, including large trucks	416,160	22,500,000	41,616	2,250,000
Large trucks	50,877	1,327,000	5,087	132,700
Large trucks carrying HAZMAT	2,500	66,000	250	6,600
Rail accidents (grade crossing)	5,439	16,905	544	1,691
Rail accidents (nongrade crossing)	5,860	163,377	586	16,338
Risks due to hazardous material releases only				
Gasoline transportation	108	205	11	21
Highway LP gas transportation	42	154	4.2	15
Explosives transportation	4.9	14	0.5	1.4
TIH highway accidents	3.8	149	0.4	15
TIH highway en route/non-accidents	0.7	36	0.1	3.6
TIH highway derailments	16	559	1.6	56
TIH rail en route/non-accidents	2	103	0.2	10
Total TIH materials transportation	23	846	2.3	85
Total highway risk for HAZMAT releases	160	558	16	56
Total rail risk for TIH material releases	18	662	1.8	66
Total risk of HAZMAT releases considered in study	178	1,219	18	122

Source: Brown et al. 2000

4.11.1.3 Bulk Liquids

Brown et al. (2000) also estimated release probabilities for bulk liquefied gases using commodity flow and historical release data for gasoline including aviation fuel, distillate fuel oil and sulfuric acid. The results of their analysis for these materials are provided on Table 4-14.

Table 4-14 Release Probability Analysis for Bulk Liquids

Primary Container Type[1]	Commodity	Annual Commodity Flow (MTM)	Average Cargo Capacity (Gal)	Average Shipment Weight (tons)	Annual Truck Miles ($x10^6$)	Accident Rate (per 10^6 Mi)	No. of Accidents	No. of Releases	Release Probability
MC 306	Gasoline/ aviation fuel	17,000	8,500	25	690	2.5	19,000	1,125	0.06
MC 306	Fuel oil	6,600	7,000	21	310	3.0	11,000	720	0.07
MC 312	Sulfuric acid	2,700	4,000	28	96	1.3	1,400	53	0.04

Note:
1. Gasoline and fuel oil were used in estimating release probabilities for MC 306 cargo tanks, whereas sulfuric acid was used in estimating the release probability for MC 312 cargo tanks.

Source: Brown et al. 2000

As summarized on Table 4-14, the release probabilities for transporting gasoline, fuel oil, and sulfuric acid are equal to 0.06, 0.07, and 0.04, respectively. In considering these results, the annual commodity flow when compared to the accident rates for gasoline/aviation fuel is in the middle of the results. The total number of releases and accidents resulting from gasoline/aviation fuel transportation exceeds that of fuel oil and sulfuric acid by a large margin. However, this is a direct result of the high commodity flow for gasoline relative to other materials considered.

In summary, total transportation-related injury risk for gasoline is relatively low. The accident rate for 1 million truck miles is equal to 2.5. Or stated another way, of the 690 million truck miles drive annually, about 19,000 accidents occur with about 1,125 resulting in releases. Based on the foregoing, the transportation of gasoline which results in a spill is a low consequence event. It is important to note the transportation of gasoline materials has the highest total fatality risk in comparison to the other materials. While someone is more likely to be injured as a result of a transportation-related TIH release, that same person is more likely to be killed as a result of a gasoline or LP-gas related incident.

4.11.2 Construction Alternatives

4.11.2.1 Alternative 2 — Transfer to Trust, No Refinery

Implementation of this alternative would not detectably affect transportation resources. Without the construction and operation of the refinery, no real increase in traffic would occur. The project site would experience some additional traffic as the MHA Nation produces forage and transports that forage off the site to its herd of buffalo. However, the increase in traffic would be minor and widely dispersed over time.

4.11.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Implementation of this alternative would result in effects that would be the same as described for Alternatives 1 and A. The same level of traffic would occur with the MHA Nation's construction and operation of the refinery. The same level of traffic associated with the production and transport of forage for the buffalo would also occur.

4.11.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in the same effects as described in Alternatives 1 and A. The revised site refinery layout, pipelines and power lines would be constructed, so effects attributed to these facilities would be the same. Wastewater from employee facilities (e.g. restrooms) may be hauled to Minot or another municipal WWTP. There would be 1 to 2 additional trucks per week to haul sanitary wastewater under this option.

4.11.2.4 Alternative 5 — No Action

Implementation of this alternative would result in no effects to transportation resources. The refinery would not be constructed, so the increase in traffic associated with that facility would not occur. Additionally, agricultural use of the project site would continue. Therefore, no change in traffic would occur.

4.11.3 Effluent Discharge Alternatives

The three effluent discharge alternatives (Alternatives B, C, and D) would have no effects on transportation. All three alternatives involve the discharge of effluent to surface or ground waters. None of these alternatives would involve any of the components of the refinery that would affect transportation. Therefore, none of the additional effluent discharge alternatives would affect transportation.

4.11.4 Cumulative Impacts

The refinery is predicted to increase traffic in the immediate area by approximately 30 percent. Existing usage of the transportation system surrounding the proposed site is generally low. Currently, Highway 23 is used by residents of nearby communities, travelers to New Town and for transporting agricultural goods and equipment. Existing uses of the transportation system are anticipated to continue at the same level. No other projects have been identified in the area which would increase traffic or rail use. The cumulative impacts to the transportation system, combining the proposed refinery with existing usage are not expected to be significant.

4.12 Aesthetics

Impacts to visual resources from the development of the refinery would result from changes to the physical setting and visual content of the landscape, and from effects on the landscape as viewed from sensitive viewpoints, including travel routes, recreation areas, and residences. The proposed facilities and associated access roads would introduce new elements into the landscape, and would alter the existing form, line, color, and texture which characterize the existing landscape.

4.12.1 Alternatives 1 and A — Original Proposed Actions

Project Site

The refinery would be apparent on the existing landscape and would be in the foreground to background distance zones as viewed by people on county roads, Highway 23, rural residences, and Makoti. The refinery buildings in the foreground distance zone of up to 1 mile from the refinery site would be viewed by people on Highway 23, surrounding county roads, and rural residences. The geometric, rectangular block forms of the refinery buildings would dominate the landscape for those viewers nearest to the site, such as the residence on the north side of the site and on county roads near the site. These county roads are used primarily by residents of the area, and there are a small number of residents and travelers on local roads that would view the refinery in the foreground distance zone of the landscape.

There are similarly a very small number of potential viewers in the middleground distance zone between 1 and 3 miles surrounding the refinery site. The refinery buildings would be visible from some residences, although at a 1- to 5-mile distance the refinery buildings would not dominate the landscape viewed by the residents

Beyond a 5-mile radius, the refinery buildings would be in background views, and would be indistinct to viewers in rural residences located throughout the area. The geometric, rectangular block forms of the refinery would be visible in the background zone from the highway, but would be painted to harmonize with landscape colors, which would result in a low contrast with the surrounding landscape because the forms and lines of the buildings would be indistinct at a distance of 3 or more miles. The apparent size of the refinery at this distance relative to the scale of the surrounding landscape is small.

The most visible refinery facility from all viewpoints would be the exhaust stacks. The refinery would have two stacks that would be 180 feet tall and 20 feet in diameter, creating a strong linear, vertical form that would contrast with the surrounding flat, horizontal landscape and be obvious to viewers on the local county roads in the vicinity of the site and visible to nearby rural residences. The remaining six stacks would be 60 feet high and 12 feet wide. The smaller stacks would be similar in height to other refinery buildings, and would not be as obvious to viewers. The refinery would not include cooling towers; therefore there would be no visual impact from a steam plume emanating from the towers.

Refinery facilities would be lit at night to enhance the safety of project personnel and the public. Night-lighting would increase the visibility of project facilities to all viewpoints. The primary impact of night-lighting would be to increase the distance from which the proposed facilities would be visible. The light, glare or backscatter illumination visible to sensitive viewpoints would be minimized by the use of directional shielding of lights. The off-site visibility and potential glare of the lighting would be restricted by the screening structures to be placed around the facility's major equipment, specification of non-glare fixtures, and placement of lights to direct illumination into only those areas where it is needed.

The Federal Aviation Administration (FAA) requires that any permanent object exceeding an overall height of 200 feet above ground level or exceeding any obstruction standard contained in Federal Acquisition Regulations (FAR) Part 77 (Federal Aviation Administration 2000a) be lighted with a flashing lighting system. Because the flare stacks are 180 feet high and more than 3 nautical miles from the nearest airport (as per FAR Part 77), blinking safety lights would not need to be installed (Federal Aviation Administration 2000b).

The year-round effluent discharge, under Alternative A, of 10 gpm would equal 5.25 million gallons or about 16 acre-feet discharged annually into the drainage ditch and ultimately into wetland PEMF#2 and a tributary of the East Fork of Shell Creek. The outfalls would be located within the disturbance footprint of the proposed refinery. Therefore, the outfalls would be indistinguishable from the rest of the refinery. The discharge of effluent would increase flow in the wetland system increasing vegetation and ponded water, thereby changing the aesthetics. If the drainage has more water, it may appear to be greener than other wetlands in the area that periodically dry out.

4.12.1.1 Power Lines

Several effects to visual resources can result from the introduction of power lines into the landscape. The poles introduce straight, vertical lines and color contrasts. There may also be a glare when sunlight is reflected from the conductors.

Long-term impacts to the visual quality of the landscape result primarily from the addition of pole structures into the characteristic landscape. Short-term impacts would result from the construction of the lines. Construction activities, including the transport of materials on local roads, would be obvious to viewers during the construction period. For the duration of construction, the underlying landform colors of light tans and browns would be exposed during the installation of the pole structures. This would not be particularly obvious where the adjacent agricultural land is cultivated.

The power lines would be in the foreground of views seen by travelers on nearby county roads. The power lines would be obvious to viewers on the roads; however, local traffic is relatively sparse. While the power lines would be a new addition to the landscape that would require new ROWs on lands that have not previously been disturbed by any development other than agriculture, it would be viewed by only a small number of residents and travelers. Additionally, the characteristic landscape is common for the area and is not scenic landscape. The power lines would be isolated by distance from any areas that would be sensitive to changes in the landscape.

4.12.1.2 Pipelines

Impacts to visual resources from the construction and operation of the oil and gas pipelines would be primarily short-term and construction-related. Minimal visual impacts would be associated with clearing of vegetation because the existing rights-of-way contain disturbed vegetation from previous road and railroad construction. Once vegetation in the construction ROW is reestablished, the remaining permanent ROW would be similar in appearance to the existing rights-of-way. Once the pipelines are installed, the visual impacts resulting from construction would continue until vegetation has been reestablished on disturbed areas. The pipeline ROW, while visible, would not be a prominent feature in the landscape.

4.12.2 Construction Alternatives

4.12.2.1 Alternative 2 — Transfer to Trust, No Refinery

Implementation of this alternative would not result in any notable effects to aesthetics. The MHA Nation would not construct the refinery; therefore, none of the effects described for Alternatives 1 and A for the refinery, power lines, or pipelines would occur. Use of the project site for the production of forage for the MHA Nation's herd of buffalo would not result in effects to aesthetics. The project site is currently used for agricultural purposes. Thus, the continued use of the site for agricultural purposes would not cause any effects.

4.12.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Implementation of this alternative would result in the same effects to aesthetics as those described for Alternatives 1 and A. The MHA Nation would construct and operate the same refinery and produce forage for its herd of buffalo on the rest of the project site. No effects to aesthetic resources would result from BIA's decision to not accept the project site into trust status.

4.12.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in the same effects as described in Alternatives 1 and A. The revised site refinery layout, pipelines and power lines would be constructed, so effects attributed to these facilities would be the same.

4.12.2.4 Alternative 5 — No Action

Implementation of this alternative would result in no effects to aesthetic resources. The MHA Nation would continue to use the project site for agricultural purposes similar to those that currently occur on the site. Thus, no noticeable change in the aesthetics of the project site would occur.

4.12.3 Effluent Discharge Alternatives

4.12.3.1 Alternative B — Partial Discharge through an NPDES Permit and Some Storage and Irrigation

With this alternative, surplus treated wastewater would be disposed of through land application to irrigate crops or discharged through NPDES permitted outfalls. The effects associated with this alternative would be similar to the effects discussed for Alternative A. Effects due to irrigation would be visible, but those associated with the outfalls would not be detectable to casual observers.

4.12.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, the MHA Nation would discharge all effluent from the WWTP to a Class I, Non-hazardous UIC well that would be drilled on the project site. Because the well would be drilled within the disturbance footprint of the proposed refinery, no additional impacts would occur to aesthetics.

4.12.3.3 Alternative D — No Action

Under this alternative, the proposed Refinery would not be constructed. Thus, no discharges of water of any kind would be permitted and no additional impacts would occur to aesthetics.

4.12.4 Cumulative Impacts

Cumulative impacts to aesthetics would result from other planned or foreseeable development activities that could occur on lands adjacent to or located near to the proposed project in addition to existing developments. No development activities have been identified for the project site's environs. Thus, no changes would occur in the project area whose effects would overlap in time or space with any of the four alternatives. Without any such overlapping effects, no cumulative effects would occur.

4.13 Air Quality

The primary sources of air pollutants for the proposed refinery would be the various heaters and boilers that would serve the refinery's processes and general facility heating requirements. Other emission sources would include tail gas emissions from the sulfur recovery unit and VOC emissions from the storage tanks, product loadout, and piping components. A soybean/oilseed oil extrusion process and a bio-diesel production process would also be included in the proposed project. The Air Quality Technical Report (December 2007) provides a detailed discussion of the sources of air pollutants evaluated in the analysis and the processing and modeling of the air emissions data.

4.13.1 Alternatives 1 and A — Original Proposed Actions

Under these alternatives, the MHA Nation would construct and operate the clean fuels refinery. The effluent discharge outfalls associated with Alternative A would have no effect on air quality. The discharge of effluent to surface or ground waters does not involve any of the components of the refinery that would affect air quality emissions.

4.13.1.1 Clean Air Act Applicable Requirements

Estimated annual air pollutant emissions for the proposed refinery are summarized in Table 4-15. The criteria pollutants include oxides of nitrogen (NOx), CO, VOCs, SO_2, and particulate matter with a nominal aerodynamic diameter of less than 10 micrometers and 2.5 micrometers (PM_{10} and $PM_{2.5}$). The HAPs include benzene, formaldehyde, hexane, toluene, etc.

Table 4-15 Estimated Annual Emissions for the Proposed MHA Nation's Proposed Clean Fuels Refinery

Pollutant	Annual Project Emission Rate (ton/yr)
NO_x	35.7
CO	78.3
SO_2	51.2
VOC	77.0
$PM_{10}/PM_{2.5}$	16.8
Benzene	0.0704
Cyclohexane	0.0493
Ethylbenzene	0.0004
Formaldehyde	0.0883
Hexane (-n)	0.0057
PAH -Polycyclic Aromatic Hydrocarbons	0.0005
Toluene	0.0063
Xylene (Total)	0.0020

In an April 2005 letter to the MHA Nation, EPA made a non-applicability determination for federal air permits for the proposed refinery. Based on the proposed equipment, emissions projections (includes fugitive emissions), and feedstocks (primary feedstock of a low sulfur synthetic crude oil), EPA determined that the proposed refinery was not subject to the permitting requirements of a pre-construction PSD permit or a Title V (40 CFR part 71) operating permit. The "potential to emit" or potential maximum emissions estimated for the refinery were based on the refinery operating 24 hours per day, 365 days a year. Since the estimated "potential to emit" is below 100 tons per year (TPY) of any regulated pollutant and below 10 TPY of any one HAP or 25 TPY of a combination of hazardous pollutants, the proposed refinery would not be considered a major stationary source as defined in the PSD regulations at 40 CFR 52.21(b)(1)(i) and in the Title V operating permit regulations at 40 CFR 71.2. Therefore, the proposed refinery would be classified as a new minor stationary source due to the refinery design and proposed feedstocks. An increase in the proposed refinery's emissions due to any modifications could trigger additional permitting reviews for applicability of the PSD and Title V programs. The applicability of Title V could also be triggered by a new applicable NSPS, as discussed below.

EPA is promulgating new regulations to establish a preconstruction air permitting program for minor stationary sources throughout Indian country. The rule was proposed in the August 21, 2006 *Federal Register.* The effective date for implementing the new regulations is anticipated to be 60 days after the final regulations are published in the *Federal Register*. These regulations may apply to the refinery depending upon when construction on the refinery commences relative to the effective date of these regulations.

The proposed refinery will be subject to several CAA NSPS (40 CFR part 60) and National Emission Standards for HAPs (NESHAP) (40 CFR part 61), which will impose emission limits, fuel gas specifications, or design requirements and require testing, monitoring, recording keeping, and reporting of emissions for many units. However, not all emissions will be required to be monitored under these regulations. Table 4-16 summarizes the applicable NSPS and NESHAP that the refinery will be subject to once constructed, as well as, the testing, monitoring, recordkeeping and reporting requirements. Table A-1 in Appendix A of the Air Quality Technical Report (December 2007) lists the refinery units, their capacity, inherent unit emission controls (if any), and the applicable NSPS and/or NESHAP (if any).

On November 7, 2006, EPA proposed new regulations under NSPS for equipment leaks of VOC in petroleum refineries. These proposed regulations were put out for public comment and the proposal was made final on November 16, 2007. These revised standards are codified at 40 CFR part 60, subpart GGGa, and were effective on November 16, 2007. NSPS subpart GGGa is applicable to the proposed refinery since construction of the affected refinery units will commence after November 7, 2006. [See 72 *Federal Register* 64896, November 16, 2007.] This new regulation will increase the stringency of the leak definition for pumps in light liquid service from 10,000 parts per million (ppm) to 2,000 ppm and for valves in gas/vapor service or light liquid service from 10,000 ppm to 500 ppm. Finalization of NSPS subpart GGGa triggered the requirement for the refinery to apply for a 40 CFR part 71 operating permit within 12 months of commencing operation.

Table 4-16 MHA Nation's Proposed Clean Fuels Refinery, Applicable and Proposed Clean Air Act Requirements Summary[1] New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP)

New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants	Testing and Monitoring Requirements	Recordkeeping and Reporting Requirements
General Provisions 40 CFR Part 60, Subpart A The general provisions apply, except where other subparts are more stringent.	Performance tests must be conducted after achieving maximum production; and in accordance with the EPA test methods referenced in each applicable subpart.	Notify EPA of the date of construction, date of startup, prior to conducting any performance tests, the date the continuous monitoring commences, and of any physical/operational change to the existing refinery which may increase air emissions.
At all times, the owner/operator must maintain and operate any affected facility in a manner consistent with good air pollution control practice to minimize emissions. [40 CFR 60.1- 60.13]		Maintain a file of all measurements, tests, maintenance, reports, and records (including equipment startups, shutdowns, and malfunctions) for at least 2 years.
Flare Standards – General Provisions 40 CFR Part 60, Subpart A The flare must be designed/operated with no visible emissions, be operated with a flame at all times, and meet heat content and tip velocity specifications. [40 CFR 60.18]	The owner/operator must monitor the presence of a flare pilot flame and conduct initial performance tests to determine compliance.	Record all periods of operation during which the flare pilot flame is absent, and report to EPA.
Boiler Standards – Small Units 40 CFR Part 60, Subpart Dc Boilers not subject to SO_2 limits since firing natural gas/refinery fuel gas. [40 CFR 60.40c- 60.48c]	No testing or monitoring requirements, since not subject to SO_2 or PM emission limits.	Record and maintain records of the fuels combusted in the boilers during each calendar month.
Tank Standards for VOCs 40 CFR Part 60, Subpart Kb Fixed roof tanks with an internal floating roof must meet specific requirements for seals, procedures for	The owner/operator must conduct annual visual inspections and repair items within 45 days of	Keep records of tank inspections and other specified tank information; and submit an inspection report to

New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants	Testing and Monitoring Requirements	Recordkeeping and Reporting Requirements
tank filling, bleeder vents, rim space vents, opening covers, etc.	detection.	EPA when tank defects are found.
Tanks with a fixed roof must be equipped with a closed vent system and VOC emissions sent to the processes or flare. [40 CFR 60.110b – 60.116b]	The owner/operator must meet the flare requirements in 40 CFR 60.18 for testing/monitoring and measure for leaks using EPA methods.	Meet the flare requirements in 40 CFR 60.18 for recordkeeping/reporting.
Equipment Leaks of VOCs 40 CFR Part 60, Subpart GGGa The owner/operator must minimize leaks by complying with individual equipment requirements for pumps, compressor seals, pressure relief devices, sampling connection systems, open-ended valves, and valves in vapor/light liquid service. The definition of a leak varies by individual pieces of equipment from 500 ppm to 2,000 ppm. The closed vent system and flare must be operated at all times emissions are vented to them. [40 CFR 60.590a - 60.593a]	Each pump must be equipped with a sensor to detect failure of the seal and monitored monthly. Each pump must be checked by visual inspection, each calendar week, for dripping liquids. Valves in vapor/light liquid service must be monitored monthly using the EPA test method for leaks. A first attempt at pump repair must be made no later than 5 days from detection. All other leaks must be repaired within 15 days from detection. The owner/operator must conduct annual inspections of the closed vent system.	The owner/operator must keep a record of all inspection information (date/time of monitoring, operator identification, instrument reading, etc), the design requirements for the closed vent system, the date and results of weekly visual inspections of pumps for dripping liquids, equipment identification numbers, etc. The owner/operator must submit semiannual reports to EPA that identify monthly the equipment from which leaks were detected and the dates of process unit shutdowns.
VOC Emissions from Wastewater Systems 40CFR Part 60, Subpart QQQ The owner/operator must comply with equipment design and operational requirements for individual drain systems, oil-water separators, the closed vent system, and the flare. [40 CFR 60.690- 60.698]	The owner/operator must inspect wastewater system, such as drain system components and oil-water separators for problems that would produce VOC emissions and must complete all repairs within 15 days of identified problems. The owner/operator must use the EPA test method to measure for VOC leaks from the closed vent system and complete any repairs within 30 days of detection.	The owner/operator must keep a copy of the design specifications for all subject equipment; and a record of information about the operation/ maintenance of the closed vent system and process units that required a shutdown for repair. The owner/operator must record the location, date, and corrective action when VOC emissions are detected during inspections for individual drain systems, oil-

New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants	Testing and Monitoring Requirements	Recordkeeping and Reporting Requirements
		water separators, and the closed vent system and submit an initial report and semiannual reports with this information.
Proposed Fuel Gas Combustion Unit Standards – Effective May 14, 2007, if promulgated as proposed 40 CFR Part 60, Subpart Ja The owner/operator must develop a startup/shutdown/malfunction plan and not routinely release fuel gas to the flare. Sulfur recovery plant (SRP) must meet 99% sulfur removal and H_2S < 10 ppm determined hourly on a 12-hour rolling average. Process heaters/fuel gas combustion devices must meet a 3-hour rolling average SO_2 limit of 20 ppm and a 365 successive day rolling average SO_2 limit of 8 ppm. Process heaters > 20 MMBtu/hr must meet NOx limit of 80 ppm on a 24-hr rolling average. [40 CFR 60.100a – 60.108a]	The owner/operator must conduct performance tests for the SRP, process heaters, and fuel gas combustion devices using EPA test methods. The owner/operator must install and operate O_2 and flow monitors for the SRP and/or process heaters/fuel gas combustion devices, as specified. The owner/operator must install and operate continuous SO_2 and H_2S monitors for the SRP, continuous SO_2 monitors for the process heaters/fuel gas combustion devices, and continuous NOx monitors for the subject process heaters.	Submit results to EPA of all performance tests. Submit semiannual reports to EPA that include revisions made to the startup/shutdown/ malfunction plan and actions taken for startup/ shutdown/malfunction exceedances. Keep records of discharges to the flare gas system. For the SRP, keep records of hourly sulfur production rate and hours of operation. Submit semiannually to EPA a report of excess emissions from the SRP/process heaters/fuel gas combustion devices.
Benzene Emissions from Waste Operations 40 CFR Part 61, Subpart FF If the total annual benzene (TAB) is less than 10 Mg/yr, the owner/operator is exempt from managing and treating the facility waste. If the TAB is greater than or equal to 10 Mg/yr, the owner/operator must be in compliance at initial startup of the facility and must treat and manage the waste streams containing benzene as required by 40 CFR 61.342(c).	The owner/operator must determine the TAB at the point of waste generation using EPA methods detailed in 40 CFR 61.355(c). The amount of the TAB will determine if the TAB must be calculated annually or if the facility must treat, manage, and monitor the waste streams. The TAB must be re-calculated whenever there is a change in the waste generating process.	Records must be kept for 2 years. Records must identify each subject waste stream and identify if it is controlled for benzene emissions. Records also consist of test results, measurements, calculations, etc. Submit to EPA by the initial startup of the facility, a report that summarizes the regulatory status of each waste stream. When the TAB is greater than 1 Mg/yr, a report must

New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants	Testing and Monitoring Requirements	Recordkeeping and Reporting Requirements
[40 CFR 61.340 – 61.357]		be submitted annually with updated information (TAB, etc.) and at all times whenever there is a change in the waste generating process.

Note:
1. Table A-2 in Appendix A of the report details the specific emission limits, design requirements, fuel specifications, testing, monitoring, recordkeeping and reporting requirements that are summarized in Table 4-16 above for the refinery units subject to a NSPS or a NESHAP.

On May 14, 2007, EPA proposed NSPS for new, modified, or reconstructed process units at petroleum refineries. Once finalized these standards will be codified at 40 CFR part 60, subpart Ja. [See 72 *Federal Register* 27177, May 14, 2007.] These proposed standards include emissions limits for several types of affected facilities (see proposed section 60.100a(a)) and the associated testing, monitoring, recordkeeping, and reporting for these facilities. If promulgated as proposed, NSPS subpart Ja will be applicable to the proposed refinery since construction of the affected refinery units will commence after May 14, 2007. Finalization of NSPS subpart Ja will also trigger the requirement for the refinery to apply for a 40 CFR part 71 operating permit within 12 months of commencing operation. Table 4-16 also summarizes the proposed NSPS subpart Ja requirements for the proposed refinery.

The storage tanks with fixed roofs in combination with internal floating roofs will have to meet specific design requirements, such as primary and secondary seals, vents equipped with gaskets, openings equipped with covers, etc. under NSPS, subpart Kb. The storage tanks with fixed roofs will be equipped with a closed vent system for capturing VOCs with no detectable emissions 500 ppm above background. The VOC emissions will be vented back to the processes and sometimes sent to the flare. Tanks will have to be inspected and seals, gaskets, etc. repaired as needed.

To reduce fugitive VOC emissions, leakless valves will be used for valves in gas, light liquid, and heavy liquid service, double seals will be used for the pump seals, open ended valves will be plugged, the compressed seals will be recycled to the process units, and the sample connections will be enclosed. NSPS, subpart GGGa requires a leak detection and repair program for various refinery components, including valves, flanges and pump seals.

NSPS, subpart QQQ also requires that the closed vent system and flare be operated at all times when emissions may be vented to them. The closed vent system is also subject to the leak detection and repair program. A leak is indicated by an instrument reading greater than 500 ppm above background. The flare must be designed and operated with no visible emissions.

The proposed refinery will also be subject to a HAP standard based on the process design information. This standard is the National Emission Standard for Benzene Waste Operations found at 40 CFR part 61, subpart FF. The purpose of this regulation is to monitor and control emissions resulting from the handling, processing, and storage of benzene containing waste streams. While the quantity of these benzene containing waste streams is expected to be minimal, they will be sufficient enough to require the refinery to keep records on the amount of waste created and report these quantities to EPA.

Unit specific emissions in tons per year for both criteria and HAP pollutants are listed in Tables 16, 17, 19, and 21 of the Air Quality Technical Report (December 2007). Data and example calculations can be found in Appendices B and C of the report.

The Air Quality Technical Report (December 2007) details in Table A-2 the new proposed requirements for the process heaters, other fuel gas combustion devices, and the sulfur recovery unit that would be codified at 40 CFR, part 60, subpart Ja and which is summarized in Table 4-16 above. Subpart Ja would require the sulfur recovery unit to be continuously monitored for compliance and to meet a 99% sulfur removal efficiency and a H_2S limit of less than 10 ppm determined on a 12-hour rolling average. Process heaters with a capacity greater than 20,000,000 Btu/hr would have to be continuously monitored for compliance and would be required to meet a NOx limit of 80 ppm on a 24-hour rolling average. All process heaters and fuel gas combustion devices would be required to be monitored continuously and would have to comply with an SO_2

limit of 20 ppm on a 3-hour rolling average and an SO_2 limit of 8 ppm determined daily on a 365 successive day rolling average. The refinery combustion units will all have "Low NOx" burners.

EPA has authority under CAA sections 301(a) and 301(d)(4) to promulgate "Federal Implementation Plans" (FIP) as necessary or appropriate to protect air quality (40 CFR 49.11). EPA may develop a FIP for the refinery which could include additional monitoring, testing, recordkeeping, and reporting for the refinery units as needed to ensure protection of air quality.

4.13.1.2 Air Quality Analysis

An air quality analysis for the proposed refinery project was conducted to model the impact the project would have on the NAAQS, the PSD increments for the Class I and II areas, the Class I AQRV, and the concentrations of HAPs in the project area and surrounding area. The air quality impact analysis for the proposed refinery and surrounding area was conducted using EPA's ISCST3 air model and Chapter 5 of the Air Quality Technical Report (December 2007) provides a detailed discussion of the analysis, including the modeling of inputs and outputs. The results of the modeling analysis are detailed below. Further modeling of air emissions was conducted to evaluate the potential for food chain exposures from HAPs, the results of which are describe in the Human Health and Wildlife sections of this chapter.

4.13.1.3 Class II Area

The refinery project and surrounding area is classified as a Class II area as defined in Chapter 3 of this FEIS.

Ambient air quality monitoring data for the various criteria pollutants was used to establish background concentrations in the refinery project area. This data came from ambient air quality monitors in White Shield, Beulah, and Fargo and reflects the impacts from existing regional sources such as power plants and mobile sources as well as transported pollutants from neighboring states. The modeled incremental impact from the proposed refinery project was added to these monitored values to estimate total cumulative air quality impacts in the project and surrounding area. The total cumulative air quality impacts are shown in Table 4-17 Modeled Maximum Class II Ambient Air Impacts for each applicable criteria pollutant (6^{th} column) and are compared, as a percentage (7^{th} column), to the NAAQS. The NAAQS pollutants are measured based on various time frames in order to address impacts from short-term and long-term exposures (i.e. SO_2 is measured at 3 hours, 24 hours, and annually). The maximum ambient cumulative impacts associated with the proposed refinery are below all NAAQS.

Table 4-17 Modeled Maximum Class II Ambient Air Impacts

Pollutant	Period	NAAQS ($\mu g/m^3$)[1]	Background ($\mu g/m^3$)	Modeled Impact ($\mu g/m^3$)[2]	Modeled Impact with Background ($\mu g/m^3$)	Relative to NAAQS (percent)	PSD Class II Increment	Relative to PSD Class II Increment (percent)
NO_2	Annual	100	7.1	0.79	7.89	8	25	3
CO	1-Hour	40,000	10,832	67.7	10,899.70	27	n/a	–
	8-Hour	10,000	5,474	30.3	5,504.30	55	n/a	–
$PM_{2.5}$	24-Hour	35	16.07	16.44[3]	32.51	93	n/a	–
	Annual	15	5.82	2.94	8.76	58	n/a	–
PM_{10}	24-Hour	150	37	26.31	63.31	42	30	88
SO_2	3-Hour	1,300	106.5	45.50	152.00	12	512	9
	24-Hour	365	31.9	17.49	49.39	14	91	19
	Annual	80	4.3	1.34	5.64	7	20	7

Note:
1. $\mu g/m^3$ = micrograms per cubic meter
2. For 1-, and 8-, and 24-hour standards the modeled impacts are 1st highest short term values, except $PM_{2.5}$.
3. For the 24-hour $PM_{2.5}$ standard the modeled impacts are the 98th percentile value, per the standard requirements.

Use of these monitored data to establish existing baseline conditions in the project area may, in fact, overestimate future concentrations because several of the largest power plants in the region are subject to EPA regulations that will require them to install Best Available Retrofit Technology (BART) over the next five years. These mitigation measures are projected to reduce SO_2 and NO_2 emissions from the affected facilities by up to 95 percent. Cumulative impacts of emissions from power plants will decrease in the area over time.

The analysis of potential air quality impacts was based on conservative estimates (maximum potential) of the proposed refinery's emissions. Emissions are not expected to increase as the project ages. Potential air emissions from future, local developments in the area are expected to be very minor. Estimated increases in vehicle and rail traffic and new commercial/residential air emissions induced by the proposed refinery are predicted to be too minor to cumulatively affect air quality.

The air quality analysis also modeled the proposed refinery's impact on the PSD increments for the area. Table 4-17 also shows that the proposed refinery project will not violate any of the Class II PSD increments for the area. There are no other increment consuming sources nearby the proposed project area that would contribute significantly to the project's maximum increment consumption, so the maximum increment consumption is based on the contribution of the refinery only. The last column in the table shows the relative percent of the various pollutant increments that the proposed refinery would consume.

Near-field acid deposition for the project and surrounding area was estimated using the wet deposition function of ISCST3. A gas-scavenging coefficient of 0.0001 hours per second-millimeter was used for emissions of SO_2 and NO_x. Precipitation data for Bismarck were used because precipitation data were not represented in the Minot surface meteorological data. As a basis for comparison, the results (Table 4-18) for this Class II area are below the natural background total nitrogen (N) and sulfur (S) deposition level for western Class I areas, which is 0.25 kilogram per hectare-year (kg/ha-yr) for each element (National Park Service and U. S. Fish and Wildlife Service 2005).

Table 4-18 Modeled Near-Field Wet Deposition

Year	Total Nitrogen and Sulfur Deposition (kg/ha-yr)	
	N	S
1984	0.08	0.11
1985	0.06	0.08
1987	0.08	0.14
1988	0.04	0.06

4.13.1.4 Class I Areas

The air quality analysis includes an analysis of impacts from the proposed project at the two federally mandated Class I areas closest to the project area: Theodore Roosevelt National Park and Lostwood Wilderness.

The results of the Class I SO_2 increment consumption analysis for the proposed refinery are shown in Table 4-19. Both Class I areas were assessed for each model year, and Table 4-20 lists the Class I area where the maximum impact occurred. The Class I SO_2 increment consumption was evaluated using similar methods (e.g. meteorological data, modeling switches, receptor locations, etc.) as were used in the EPA Region 8 North Dakota increment modeling analysis (U. S. EPA 2003a**).** This modeling included the same sources and receptors as the EPA 2003 analysis with the addition of the proposed refinery. Table 4-19 shows the potential impacts from the proposed refinery project on the SO_2 increment at TRNP are minimal, as demonstrated by the 3-hour project impact of 0.0000 to 0.0060 $\mu g/m^3$; 24-hour impact of 0.0000 to 0.0050 $\mu g/m^3$; and annual impact of 0.0005 to 0.0024 $\mu g/m^3$. Table 4-20 lists the Class I area where the maximum estimated increment consumption for NO_2 and PM_{10} would occur due to the project's emissions. The data in Table 4-20 shows that the project would consume a minimal amount of the NO_2 (0.10% to 0.14%) and PM_{10} 24-Hour (0.21% to 0.47%) increments.

Table 4-19 CALPUFF Class I SO_2 Increment Analysis

Averaging Period/Year	Class I Area	Project Impact (µg/m³)	PSD Class I Increment (µg/m³)
3-Hour			25
1990	TRNP	0.0060	
1991	TRNP	0.0030	
1992	TRNP	0.0000	
1993	TRNP	0.0020	
1994	TRNP	0.0000	
24-Hour			5
1990	TRNP	0.0030	
1991	TRNP	0.0040	
1992	TRNP	0.0050	
1993	TRNP	0.0010	
1994	TRNP	0.0000	
Annual			2
1990	TRNP	0.0005	
1991	TRNP	0.0024	
1992	TRNP	0.0005	
1993	TRNP	0.0005	
1994	TRNP	0.0015	

Table 4-20 Project Increment Consumption at Class I Areas

		Maximum Modeled Impacts (µg/m³)			
		NO_2 Annual		PM_{10} 24-Hour	
Year	Class I Area	Project Impact	Percent Of Increment	Project Impact	Percent of Increment
1990	LW	0.0029	0.12%	0.0082	0.21%
1991	LW	0.0036	0.14%	0.0171	0.43%
1992	LW	0.0034	0.13%	0.0189	0.47%
1993	LW	0.0035	0.14%	0.0174	0.43%
1994	LW	0.0024	0.10%	0.0122	0.31%

The impact of the proposed project emissions on the increment consumption in the TRNP and LW is minimal for two primary reasons. First, the refinery SO_2 and NO_2 emissions are small as compared to existing sources in the Class I airshed. For example, the refinery is projected to emit 51.2 tons per year of sulfur dioxide, as compared to the existing power plant 2004 SO_2 emissions of 148,726 tons per year. The refinery is projected to emit 35.7 tons per year of nitrogen dioxide, as compared to the existing power plant 2004 NO_2 emissions of 77,589 tons per year. Second, because the proposed facility is located 73 miles from the TRNP and 55 miles from LW, the air quality modeling showed the air emissions from the proposed refinery would disperse to minimal amounts by the time they reach the Class I airsheds. Consequently, the relatively low emissions of SO_2, NO_2 and PM_{10} from the proposed project, combined with the dispersion of those emissions, would result in minimal impacts from this project on the Class I airsheds. The proposed project's contribution to cumulative air impacts at the Class I areas would likewise be minimal.

Table 4-21 presents the estimated project impacts on AQRVs (visibility and acid deposition) on the two nearby Class I areas. Both areas were assessed for each model year, and this table lists the Class I area where the maximum impact occurred. The estimated change in Class I visibility from the operation of the refinery was modeled using five years of historical meteorology data. The highest impacts occurred at the Lostwood Wilderness area with visual range reductions of between 1.59 percent and 4.14 percent depending on the weather data used in the modeling. The estimated maximum visual range extinctions resulting from the project emissions are below the 5% threshold or 0.5 deciview that EPA's BART guideline establishes as a threshold for defining a "contribution" to visibility impairment or considered to be perceptible. The impacts are also well below the 10% or 1.0 deciview that is the general level of concern for Federal Land Managers (FLAG 2000). Similar impacts on visibility would be expected over the 20 year lifetime of the facility while operating at its proposed capacity.

The estimated maximum deposition values resulting from the project emissions shown in Table 4-21 are well below the natural background total nitrogen (N) and sulfur (S) deposition level for western Class I areas, which is 0.25 kilogram per hectare-year (kg/ha-yr) for each element (National Park Service and U. S. Fish and Wildlife Service 2005).

Table 4-21 Class I Area AQRV Analyses

	Estimated Maximum Total Wet Deposition				Estimated Maximum Visual Range Extinction	
Year	Nitrogen		Sulfur			
Modeled	kg/ha-yr	Class I Area	kg/ha-yr	Class I Area	Percent	Class I Area
1990	0.010	TRNP	0.013	LW	1.59	LW
1991	0.011	TRNP	0.012	TRNP	3.68	LW
1992	0.010	TRNP	0.014	TRNP	4.14	LW
1993	0.011	TRNP	0.011	TRNP	3.89	LW
1994	0.013	LW	0.018	LW	2.38	LW
Maximum	**0.013**	**LW**	**0.018**	**LW**	**4.14**	**LW**

4.13.1.5 Hazardous Air Pollutants

A modeling analysis was conducted to determine the potential human health impacts resulting from inhalation of emissions of HAPs from the refinery, and Table 4-22 presents the HAP ambient concentrations ($\mu g/m^3$) results. This table describes HAP ambient concentrations in the project area for 1-hour, 24-hour and annual periods. The results of HAP emissions modeling and current health based inhalation benchmarks are shown together in the Human Health section of this Chapter, in Table 4-27. The Human Health section also describes the site-specific hazardous emissions modeling for the proposed refinery to determine the potential for human health impacts from the following HAPs: benzene; cyclohexane; formaldehyde; hexane; polycyclic aromatic hydrocarbons; toluene; and xylene. The HAPs emissions are compared to chronic health effects levels (i.e., long-term exposure). The analysis is related to lifetime exposure to a hazardous emission; thus, assessing a one-year average concentration against the criteria is a conservative estimate of exposure over a lifetime. The Human Health section describes that the estimated ambient HAP concentrations from the proposed refinery are below the federal risk based concentrations for inhalation and that the proposed refinery would not have significant adverse effects on the human health of the local area communities.

Table 4-22 Hazardous Air Pollutants Ambient Concentrations

HAP	Estimated Ambient Concentrations (µg/m³)		
	1-Hour	24-Hour	Annual
Benzene	4.04E-01	8.77E-02	1.32E-02
Cyclohexane	3.05E-01	6.63E-02	9.91E-03
Ethylbenzene	2.38E-03	5.20E-04	8.00E-05
Formaldehyde	4.36E-01	1.34E-02	1.81E-03
Hexane (-n)	3.50E-02	7.60E-03	1.14E-03
PAH	6.22E-02	4.80E-04	5.00E-05
Toluene	1.52E-01	3.37E-03	6.00E-04
Xylene	1.06E-01	1.59E-03	2.70E-04

4.13.1.6 Upset Emissions

Table 4-23 identifies upset emissions (including malfunctions, startups, shutdowns, and maintenance) from several refineries in Texas and Louisiana and lists their production capacities and reported upset emissions over a one year period.

Typical excess emissions can be prevented by better operational and maintenance practices. Leaks from cooling towers have been identified by refineries as the source of some of the largest excess emissions, especially for VOC emissions. Power interruptions are one of the most frequently cited causes for some of the worst upsets. Sometimes outages occur due to a loss of power from a source outside the plant or to other malfunctions of electrical components within the plant. The failure of sulfur recovery units will trigger flaring and the release of excess SO_2 emissions. These excess SO_2 emissions can be avoided by adequately sizing and maintaining a sulfur recovery unit.

As described in Chapter 2, the proposed refinery would have a detailed maintenance plan in place for commencement of operation. The plan would include defining the requirements for equipment inspections and shutdowns and startups. Scheduled turnarounds (shutdowns and startups) for individual process units would occur approximately every three to five years to allow for cleaning out accumulated undesirable residues, replacing catalysts, replacing absorbents, conducting repairs, etc. The plan would include a shutdown of a portion of the plant each year on a rotational basis utilizing tanks to store intermediate products, so there would not be a total outage for any of the individual units every year and flaring of emissions would be minimized. Unscheduled shutdowns result from upset plant conditions usually related to power failure, loss of cooling water, or a fire. To minimize unscheduled shutdowns and startups and associated emissions due to flaring, the refinery design includes two independent sources of power to mitigate the risk of power failure, and an Emergency Generator and a UPS (Uninterruptable Power Supply) for critical equipment. In addition, the proposed refinery does not have a Cooling Tower, which as described above is a source of some of the largest excess VOC emissions. The process units will be liberally spaced for isolation and segregation in the event of fire.

As detailed in Chapter 4 of the Air Quality Technical Report (December 2007), normal operation for the flare was designed for a loading rate of 15 lbs/hour (65.7 tons/year). However, to account for potential process upsets and startup/shutdown activities that could increase emissions releases, a loading rate of 500 lbs/hour (2,190 tons/year) was used to calculate potential air emissions from the flare. The loading rate of 500 lbs/hour is over 30 times the normal operation loading rate of 15 lbs/hour. The potential flare emissions were also calculated based on operating the flare 24 hours a day, 365 days a year [See Flare Example NOx calculation in Appendix C of the Air Quality Technical Report (December 2007)]. Therefore, potential emissions from startups, shutdowns and equipment malfunctions would be greater than air emissions during routine operations. Potential air emissions during upset conditions were conservatively estimated for the proposed refinery.

Table 4-23 Upset Emissions from Large Refineries[1]

Refinery	Production Capacity (bbl per day)	VOC Emissions (lbs/yr)	SO_2 Emissions (lbs/yr)	H_2S Emissions (lbs/yr)	CO Emissions (lbs/yr)	NOx Emissions (lbs/yr)
Atofina (Port Arthur, TX)	175,068	24,600	5,012,808	95,983	43,323	16,808
BP Products North America (Texas City, TX)	437,000	294,206	219,857	6,721	498,955	18,952
Chalmette Refinery (Chalmette, LA)	182,500	294,298	1,050,746	2,632	10,880	8,276
Citgo (Lake Charles, LA)	324,300	72,088	351,406	3,181	380	1,750
Exxon (Baytown, TX)	523,000	188,538	598,756	6,821	591,139	57,613
Exxon Refinery (Beaumont, TX)	348,500	346,541	247,846	3,945	695,345	6,863
Exxon-Mobil (Baton Rouge, LA)	491,500	122,778	1,435,604	3,223	13,381,005	163,054
Flint Hills (East & West) (Corpus Christi, TX)	259,980	3,800 37,156	36,495 84,803	0 2,967	10,780 260,516	6,804 1,717
Motiva (Norco, LA)	219,700	36,286	25,086	194	44,456	153,263
Motiva (Port Arthur, TX)	250,000	390,852	97,871	2,764	10,688	12,735
Murphy Oil USA (Meraux, LA)	95,000	26,082	135,716	28	165,782	23,030
Phillips 66 (Borger, TX)	143,800	80,517	243,756	1,757	252,401	47,524
Premcor (Port Arthur, TX)	255,000	56,706	407,486	4,739	15,088	10,910
Valero (East & West) (Corpus Christi, TX)	134,000	31,524 52,974	455,990 613,268	4,546 6,515	29,246 118,232	3,293 39,154
Western Refinery (El Paso, TX)	90,000	8,518	141,196	1,541	411	487

[1] For Texas refineries, 2003 upset data was gathered and compared to Texas 2002 emissions inventory data.
For Louisiana refineries, 2001 and 2002 upset data was gathered and compared to Louisiana emission inventory data for 2001 and 2002.

4.13.1.7 Global Climate Change

Estimated Greenhouse Gas Emissions from the Proposed Refinery

Construction and operation of the proposed petroleum refinery would generate greenhouse gas emissions. Carbon dioxide (CO_2) is the primary greenhouse gas emitted by refineries with lesser amounts of methane (CH_4) and nitrous oxide (N_20). The main sources of greenhouse gases from refineries are from the combustion of fuels in boilers, burners, heaters and flares. There will also be some fugitive greenhouse gas emissions from equipment leaks, seals, gaskets and valves.

Methods to calculate greenhouse gas emissions from existing petroleum refineries are based on the types of refinery processes and energy use at each facility. These methods use detailed operating and energy use information. In order to fully calculate greenhouse gas emissions from the proposed refinery, detailed refinery-specific information would be needed. That information will not be available until after the refinery has been in operation, generally a year after startup shakedown. Since this type of data is not available for a proposed refinery in preliminary design, another method was developed to estimate greenhouse gas emissions from this proposed refinery by comparing greenhouse gas emissions from existing refineries. Greenhouse gas emission data from existing refineries in Canada was used for this analysis because of the similarities in facilities and because the data are readily available. The emissions are expressed in terms of carbon dioxide (CO_2) equivalent, a unit of measure used to allow the addition of or the comparison between gases that have different global warming potentials. A metric tonne or tonne equals 1,000 kilograms. A comparison of the proposed refinery to similar facilities can provide an approximation of the likely greenhouse gas emissions.

An estimate of greenhouse gas emissions was prepared by comparing the proposed refinery to refineries in Canada of similar size and feedstock. Greenhouse gas emissions were reported for 19 petroleum refineries in Canada in 2005. Greenhouse gas emissions from these 19 facilities ranged from 106,661 to over 3 million tonnes in CO_2 equivalent per year. The average greenhouse gas emissions from Canadian refineries in 2005 were slightly over 1 million tonnes (CO_2 equivalents). The facility found to be most similar to the proposed refinery is the Prince George Husky oil refinery in British Columbia. In 2005, the Husky facility processed 10,000 bbl per day of light crude oil, which is the same capacity as the proposed refinery. The Husky refinery processes light crude oil from British Columbia, whereas the proposed refinery oil will refine synthetic crude which has already been refined once in Alberta. The Husky refinery also has additional greenhouse gas-emitting refinery processes such as a catalytic cracker. The refineries will also have comparable product mixes, primarily gasoline and diesel, although the Husky refinery does produce heavy fuel oil which will not be produced by the proposed MHA Nation Refinery. The Husky refinery has been used to estimate greenhouse gas emissions from the proposed refinery because the facilities have the similar capacity (the Husky facility expanded in 2006), and both facilities use relatively light feedstocks. As described in Table 4-24, the George Husky refinery emitted 106,719 (rounded to 107,000) metric tonnes greenhouse gases in 2005.

Table 4-24 Projected Annual Greenhouse Gas Emissions from the Proposed Refinery Estimated from Prince George Husky Refinery 2005 Data

Gases	Sum in metric tonnes	Metric tonnes in CO_2 equivalent
CO_2	106,000	106,000
CH_4	33	700
N_20	1	300
Totals:		**107,000**

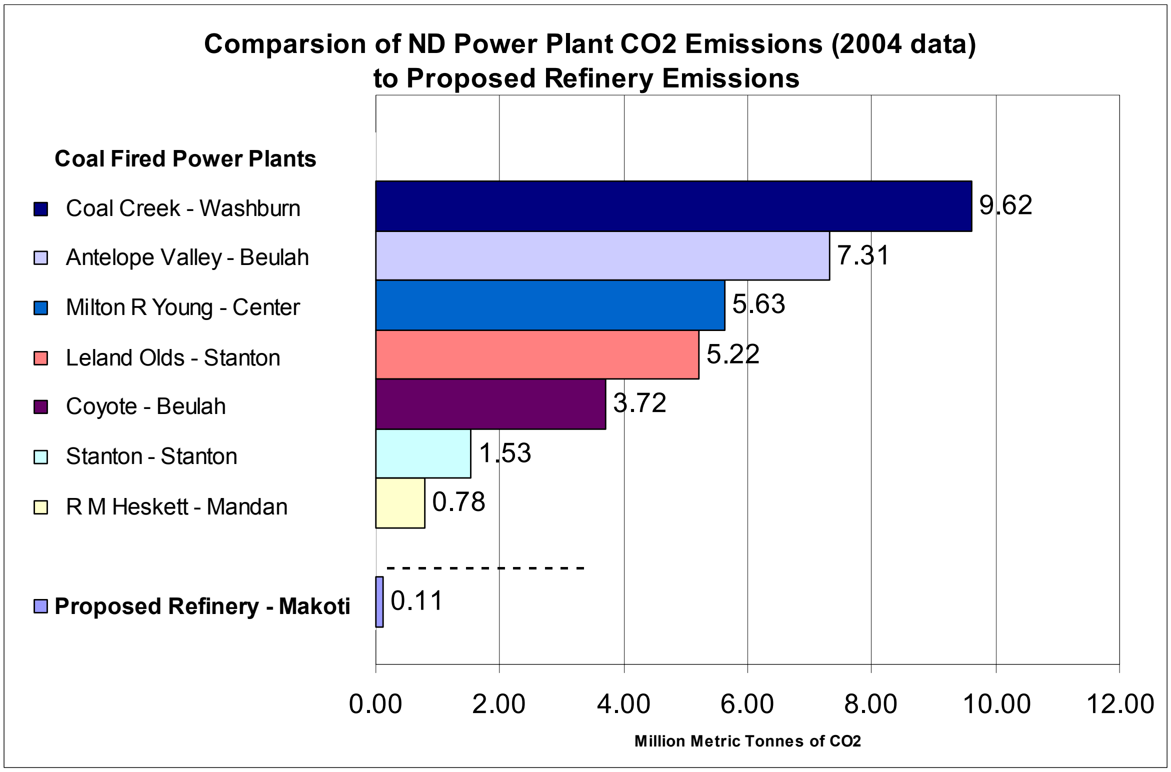
Source: Environment Canada website: 2005 Greenhouse Gas Sources and Sinks

To put the annual estimated 107,000 metric tones of CO_2-equivalent emissions from the proposed refinery into a context that is easy to conceptualize, EPA used a greenhouse gas equivalencies calculator to identify equivalent emissions. (See http://www.epa.gov/cleanenergy/energy-resources/calculator.html. The annual estimated 107,000 metric tones of CO_2-equivalent emissions from the refinery is the equivalent of:

- CO_2 emissions from the energy use of 31,414 homes for one year;
- CO_2 emissions from burning 1,859 railcars worth of coal; and
- CO_2 emissions from 65,187 passenger vehicles for one year.

To put the proposed refinery's estimated emissions of 107,000 tonnes annually in further perspective, individual coal fired power plants in North Dakota emitted between 780,000 and 9,620,000 tonnes per year, based on 2004 data. In North Dakota, electrical power generation emitted 31.7 million tonnes of CO_2 in 2004. CO_2 emissions for the entire state of North Dakota were estimated at 47.6 million tons in 2004. Emissions in North Dakota were determined for five categories in millions of metric tones: 1.0 commercial, 7.7 industrial, 1.3 residential 5.9 transportation and 31.7 electrical power. Figure 4-2 below compares the estimated 107,000 tons of CO_2 emissions from the proposed refinery with North Dakota power plants based on 2004 data.

Figure 4-2 Comparison of Projected CO_2 Emissions from the Proposed Refinery and Existing North Dakota Power Plants



Power Plant emissions from eGRID2006 Version 2.1 Plant File (Year 2004 Data), EPA database

It is also noteworthy that activities associated with the chain of commerce and full life-cycle of the proposed refinery's process inputs and outputs may emit greenhouse gases, e.g., the production of synthetic crude or end-use by consumers. These activities are shown in Table 4-25

Table 4-25 Indirect Greenhouse Gas Emissions from Proposed Refinery

Process Inputs	Source
Electricity	Coal-fired power plant
Synthetic crude	Tar sands mining, initial refining, and pipeline transportation
Field butane, biodiesel, other feedstocks	Production and transportation
Natural gas	Production, processing and compression
Process Outputs	**Source**
Gasoline, diesel fuel, propane	Used as fuel by consumers
Product transportation	Truck and rail transportation

Environmental Effects of Global Climate Change

The estimated 107,000 tonnes (in CO_2-equivalents) emitted from the proposed refinery will have an incremental impact on atmospheric greenhouse gas concentrations and global climate change, when added to the past, present, and reasonably foreseeable future human activities affecting greenhouse gas concentrations and climate. While modeling can predict a slight increase in global temperature associated with the proposed refinery's emissions[6], it is generally not useful to link specific climatological changes or other environmental effects to a single emissions source, as such linkages are difficult to isolate and understand. A more useful approach to understanding the cumulative impact of the proposed refinery's emissions involves consideration of the following factors: 1) the magnitude of the facility's greenhouse gas emissions compared with other emission sources, 2) the refinery's greenhouse gas emissions in the context of total greenhouse gas emissions at the state or regional and national and global scales, and 3) the impacts associated with climate change generally.

The first factor, the comparative magnitude of the refinery's emissions with other emission sources, is discussed above in the section estimating the refinery's emissions. As to the second factor above, the facility's estimated 107,000 tonnes of annual emissions will occur in the context of total State of North Dakota CO_2 emissions which were estimated at 49.9 million tonnes in 2004. See the Energy Information Administration (under the Department of Energy), Emission Detail by State at: http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html. United States emissions for the year 2005 were recently estimated to be 7.2 billion tonnes. See the *Emissions of Greenhouse Gases in the United States 2006*, DOE/EIA-0573 (2006), November 2007, available at: http://ftp.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/ggrpt/057306.pdf. Annual global scale greenhouse gas emissions for the year 2004 were recently estimated to be 26.9 billion tonnes. See the *International Energy Outlook 2007*, DOE/EIA-0484(2007), May 2007, available at: http://www.eia.doe.gov/oiaf/ieo/pdf/0484(2007).pdf. The third factor, the impacts associated with climate change, are generally discussed in detail in Chapter 3.

In addition to the climate change information in Chapter 3, projections of climate change effects in the Great Plains region include increased temperatures and increased precipitation in some areas. (See Ojima DS, Lackett JM. 2002. *Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change -- Central Great Plains*). The modeled minimum temperature increase by the 2090s is over 7 °F (3.9 °C). Modeling shows both increases and decreases in precipitation over the Great Plains region, although there appears to be a slightly wetter trend in the region, especially by 2090. The snow season in the Great Plains is projected to end earlier in the spring, reflecting greater warming in winter and spring. An EPA study drew similar conclusions and further noted, "[g]roundwater levels also could be reduced by lower spring and summer recharge." (EPA, *Climate Change and North Dakota,* Sept. 1998, EPA 236-F-98-007d). Prairie pothole wetlands are very dependent upon the precipitation regime, and therefore climate change forecasts are predicted to result in drier wetland systems, with reduced productivity and habitat degradation. (Johnson, W. Carter, et.al. 2005. *Vulnerability of Northern Prairie Wetlands to Climate Change.* BioScience. October 2005/Vol 55 No. 10.).

These changes may affect, either positively or negatively, many sectors in the Great Plains, including agriculture, ranching and livestock, natural systems, and water. (See Ojima and Lackett 2002). Changes in winter moisture may impact cool season invasive species, the extent of certain

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[6] An increase in global temperature from the proposed refinery's greenhouse gas emissions was modeled using the Model for the Assessment of Greenhouse-gas Induced Climate Change, available at http://www.cgd.ucar.edu/cas/wigley/magicc . For different climate sensitivities, the upper bound prediction for the amount of warming that the TAT refinery would contribute was 0.0000012 degrees C. See Technical Report for further explanation.

vegetation on the range, shallow aquifer recharge, stream flow timing, and forage availability. Winter temperature increases may impact the incidence of pest outbreaks, soil organic matter, plant community composition and invasion of exotics. Increases in summer temperatures and precipitation may impact hail, tree invasives and fire management. Agricultural areas with marginal financial and resource reserves (e.g., the U.S. northern plains) are especially vulnerable to climate change (Antle et al. 2004). Unsustainable land-use practices will tend to increase the vulnerability of agriculture in the Great Plains to climate change (Polsky and Easterling 2001).

A comprehensive summary of the health and environmental effects of climate change is on EPA's Climate Change, Health and Environmental Effects website at http://www.epa.gov/climatechange/effects/index.html. The website also includes links to more detailed information on impacts to specific resource areas such as human health, agriculture and water resources.

Assessment of Mitigation Measures

This section describes potential measures to both reduce and offset greenhouse gas emissions produced by refinery operations. Refinery operations that will result in emissions of carbon dioxide, nitrous oxides and methane include the flaring of waste gases and the operation of process heaters and boilers. Additional refinery processes that may release greenhouse gas emissions include hydrogen production for use in the refinery hydrotreater and fugitive emissions.

Greenhouse gas emissions from refinery operations can be reduced by designing and operating the facility to improve energy efficiency. For example, rather than flaring waste gases emitted from process units, the facility may be designed to capture the hydrocarbon gas streams and reroute the gas back into the refinery fuel gas system. This capture system would likely reduce greenhouse gas emissions by decreasing the facility's demand for external natural gas and by reducing the formation of carbon dioxide from the process of flaring waste gases. In addition, the Energy Star publication *Energy Efficiency Improvement and Cost Saving Opportunities for Petroleum Refineries* describes energy efficiency design technologies and operation processes which could reduce the amount of combustion needed for various processes, thereby reducing the proposed project's greenhouse gas emissions.[7] For example, the facility can be designed to operate with a high efficiency fire box design for process heaters and boilers to ensure that proper combustion gas retention times are achieved; include adequate thermal insulation of all heated lines to minimize heat loss; and refinery operations can include a rigorous leak detection system to provide for repair of leaking pipes, valves flanges and fitting, pumps and compressors.

The facility will need to comply with any CAA requirements applicable at the time the facility is constructed and in operation. Currently, there are no federal regulatory standards directly limiting greenhouse gas emissions.[8] However, there are a number of voluntary measures available to address greenhouse gas emissions, including EPA voluntary programs such as Climate Leaders or Gas STAR. For example, once refinery operations have commenced, the facility could conduct a

[7] (Worrel and Galitsky, 2005, Energy Efficiency Improvement and Cost Saving Opportunities for Petroleum Refineries: An ENERGY STAR Guide for Energy and Plant Managers. Ernesto Orlando Lawrence Berkeley National Lab. University of California. http://www.energystar.gov/ia/business/industry/ES_Petroleum_Energy_Guide.pdf)

[8] Since the issuance of the April 2, 2007 Supreme Court opinion in Massachusetts, et al. v. EPA, 549 U.S. (2007), EPA has been evaluating the potential effects of the Court's decision with respect to addressing emissions of greenhouse gases under the mobile and stationary source provisions of the Clean Air Act. Thus, this EIS for an individual project does not reflect, and should not be construed as reflecting, the type of judgment that might form the basis for a positive or negative finding, permitting decision or regulation under any provision of the Clean Air Act.

greenhouse gas emissions inventory audit to determine where there are opportunities to reduce greenhouse gas emissions under various voluntary programs. In addition, there are several organizations in the United States that develop and implement greenhouse gas offset projects involving agricultural landfill methane, agricultural soil carbon, forestry, renewable energy, coal mine methane, and rangeland soil carbon. Specifically, there are examples of voluntary soil carbon offset projects in the upper mid-west portion of the United States that have involved applying grassland conservation tillage or rangeland soil carbon management methods. In this type of project, soil carbon offsets can be issued on a per-acre, per-year basis. Then, the offset rate depends on the regional soil and crop management improvements. For example, conservation tillage offsets in Illinois have been issued at a rate of 0.6 metric tonnes of CO_2 equivalent per-acre, per-year. At this issuance rate, it would take approximately 180,000 acres of conservation tillage improvements to offset the estimated 107,000 metric tonnes per year of greenhouse gas emissions projected from the refinery. Other rangeland soil carbon management projects in the North Dakota/South Dakota region have included an issuance rate of between 0.12 tonnes of CO_2 equivalent per-acre, per-year on improved lands and 0.52 tonnes of CO_2 equivalent per-acre, per-year on previously degraded lands. Using that range of issuance rates, 200,000 to 900,000 acres of rangeland would need to be under soil carbon management improvements to offset the 107,000 metric tonnes per year of greenhouse gas emissions project from the refinery. Assuming the refinery chose to pursue this type of offset project, the net greenhouse gas emissions once the refinery is operational would affect the amount of acreage required to offset the emissions.

4.13.2 Construction Alternatives

4.13.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the MHA Nation would not construct or operate the clean fuels refinery. Consequently, implementation of this alternative would have no new effects on air quality.

4.13.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Under this alternative, the MHA Nation would construct and operate the clean fuels refinery. The refinery would be the same facility as described for Alternatives 1 and A. Consequently, implementation of this alternative would have the same direct and indirect effects as those described for Alternatives 1 and A.

4.13.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in the same effects as described in Alternatives 1 and A. The revised site refinery layout, pipelines and power lines would be constructed, so effects attributed to these facilities would be the same.

4.13.2.4 Alternative 5 — No Action

Under this alternative, the MHA Nation would not construct or operate the clean fuels refinery. Consequently, implementation of this alternative would have no new effects on air quality.

4.13.3 Effluent Discharge Alternatives

The effluent discharge alternatives would have no additional effect on air quality. These alternatives involve the discharge of effluent to surface or ground waters.

4.13.4 Cumulative Impacts

The power plants located near Beulah, North Dakota, roads and agriculture are the main sources of air quality impacts in the airshed surrounding the proposed refinery. As demonstrated in the modeling analysis and the Class I and II area air quality analysis, the refinery would have minimal impacts on cumulative air quality within the surrounding airshed. No changes are anticipated in the area regarding the air emissions from roads and agricultural practices. Emissions from the power plants around Beulah are anticipated to be reduced over time due to EPA's regulations requiring them to install BART over the next five years to reduce SO_2 and NO_2 emissions. Cumulative impacts from air emissions are expected to decrease in the area over time, even though there are several future energy development projects planned in the surrounding airshed. There is a proposed 500 MW power plant at Gascoyne that is currently in the State permitting process. For more information on the permit, contact the NDDH, Division of Air Quality. There is also a proposed coal gasification plant located in South Heart. Currently, there is no specific information available regarding air emissions from this facility, since the facility has not yet applied for a PSD permit. Recently, there has been a resurgence of oil and gas development in the area, and several exploratory wells are being drilled. Depending on the success of the exploratory wells, additional development may occur. It is anticipated that the Bureau of Land Management (BLM) and BIA will examine air impacts for this new oil and gas development including quantification of the level of potential level of the development. Other new sources of air pollution in the planning stages are ethanol plants, one located in Gascoyne. The cumulative air impact analysis did not specifically include the recently proposed ethanol plants, because emissions from the ethanol plant combined with the refinery and other sources are not expected to be significant in the airshed surrounding the proposed site. VOCs, NO_x and CO are the main air emissions of concern from ethanol plants.

The MHA Nation's Environmental Program plans to install and operate a new "ambient" air quality monitoring station near the proposed refinery site. The ambient monitoring station will not specifically monitor air emissions from the refinery. Instead the monitoring station will collect background air quality data near the site for SO_2, NO_2, $PM_{2.5}$, and meteorological conditions prior to construction and operation of the refinery. Air quality data for the same pollutants will be monitored during operation of the refinery and compared to the background data to verify the modeling results of minimal impacts from the refinery to the NAAQS.

4.14 Socioeconomics

Primary socioeconomic effects of the project (both positive and negative) would occur on the Reservation and in Ward County. Communities that would contribute to the available work force, housing, infrastructure, and goods and services include Minot and New Town, located approximately 30 miles from the site, and the smaller towns of Makoti, Parshall, Plaza, and White Shield.

4.14.1 Alternatives 1 and A – Original Proposed Actions

Implementation of these alternatives would allow the MHA Nation to pursue economic development opportunities in keeping with its tribal sovereignty. In addition, the Project would provide economic benefits to Ward County and communities within the county. The economic benefits from construction activities would occur over the 18 to 24 month construction period. Impacts from the operation of the refinery would occur for the life of the refinery which could be well over 20 years.

4.14.1.1 Population and Housing

A substantial portion of the construction workers are expected to be members of the MHA Nation. The rest of the workforce is expected to live in or around Minot. A labor force availability study (North Dakota Department of Commerce 2002) indicated that workers are willing to commute to a job within a 60-mile radius of their residences. Portions of the Reservation, Minot, and several counties are within the 60-mile radius. Consequently, the construction workers are expected to commute to the refinery site daily to work and it is not anticipated that the Project would require an influx of new employees into the region. Therefore, there would be no substantial local or regional population impacts and little demand for new permanent housing. In the event that some workers do migrate into the area for the construction period, the relatively small number of such workers is unlikely to affect temporary housing stock. A sufficient supply of temporary housing stock including rental, motels, and recreational vehicle (RV) sites is located in Minot, as well as smaller communities near the refinery site.

4.14.1.2 Economy and Employment

The primary economic impact would be the economic benefit to the Reservation from the sales of gasoline, diesel, and propane, which are projected to earn a net profit of an estimated $100 million annually over the estimated 20 or more year life of the Project. In addition, there would be economic benefits to the MHA Nation and Ward County through payroll earnings over the life of the Project, which would be spent on items such as housing, food, goods and services.

During the construction phase of 18 to 24 months, economic benefits would occur from the construction payroll, and construction expenditures on equipment and supplies from local area vendors. The construction and operation of the project is expected to have minimal influence on the Ward County economy. In terms of payroll earnings and construction expenditures, the economic benefit from the Project is small relative to the economy of the county, which is regional center of economic activity.

The MHA Nation has proposed to grow forage for a buffalo herd on approximately 279 acres of the Project site that would not be used for the refinery operations. If implemented, forage obtained from this portion of the parcel would reduce the costs of purchasing forage from other sources.

The construction and operation of the refinery and associated pipelines and electric transmission lines would require a labor pool that would be hired through the MHA Nation and through private contractors. It is anticipated that contractors and the required workforce would be available in the Reservation and nearby Minot. The majority of the construction and operation workforce would be local-hire employees. The completion of the Four Bears Bridge project in the summer of 2005 resulted in a substantial pool of available construction workers in the region.

The number of workers at the peak construction period would be 800 to 1,000 workers, the majority of which are expected to be local hires. The average worker would be paid $55/hour, resulting in an average annual wage of $106,000.

The Fort Berthold Community College currently offers a 2-year program for construction trades. The program would provide instruction to local workers in the skills required for the proposed project.

The permanent workforce for the operation and maintenance of the proposed refinery is summarized in Chapter 2. Operation of the refinery would require about 86 permanent personnel, primarily management staff, supervisory staff, and operators. Maintenance would be performed by contract personnel. The majority (350 workers, or 88 percent) of the contract workers would be turnaround maintenance tradesmen that would work at the plant for one month annually. Other contract workers would consist of daily and shift workers involved in security or maintenance. There would not be any anticipated new employees for the pipelines, other utilities, or railroad.

4.14.1.3 Facilities and Services

Construction and operation of the project have the potential to affect existing community facilities and infrastructure. Temporary activities, such as importation of construction materials and work force would have effects on existing infrastructure and may require installation of new facilities. Operation of the project would have minimal effects on facilities and services. The refinery would provide some of its own infrastructure such as fire protection, emergency health care services, ambulance service, and site security, which would be provided as construction begins and as operations continue. These services would minimize the effects on established services in the local communities.

The project would require highway access to the site and pipeline and rail access for feedstocks and product shipments. Installation of these transportation facilities would reduce impacts. Additional traffic on project area highways would increase the potential for automobile accidents and spill of materials. See section 4.11 a complete discussion of transportation impacts.

Attendance of community schools in the project area could experience a short-term increase during the construction period; however, minimal increases would be observed during project operations.

4.14.2 Construction Alternatives

4.14.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, BIA would accept the 468.39 acres into trust status without construction and operation of the clean fuels refinery. Consequently, the MHA Nation would not earn the $100 million annually over the estimated 20 or more year life of the Project. This would be inconsistent with the Tribes' pursuit of economic opportunities as described by the project purpose and need in Chapter 1. The MHA Nation, however, could decide to use the entire 468.39-acre project site to produce forage for their buffalo herd, or they could have the land included in the Farm Pasture Leasing Program. The production of forage from the parcel would reduce the costs of purchasing forage or grazing leases from other sources.

4.14.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Under this alternative, BIA would not accept the 468.39 acres into trust status. The MHA Nation would still be able to develop a clean fuels refinery on this property without the trust status. The social and economic effects described for Alternatives 1 and A would occur under Alternative 3. However, MHA Nation would pay taxes on the commercial operation to the county. The production of feed from 279 acres of the project site parcel also would occur under this alternative, so there would be the same economic benefit from reduction of forage purchases from other sources.

4.14.2.3 Alternative 4 — Modified Proposed Action

Implementation of this alternative would result in the same effects as described in Alternatives 1 and A. The revised site refinery layout, pipelines and power lines would be constructed, so effects attributed to these facilities would be the same.

4.14.3 Alternative 5 — No Action

Under this alternative, the refinery would not be constructed, the BIA would not accept the 468.39 acres into trust status, and the EPA would issue no environmental permits. The MHA Nation would continue to own the property outside of trust status. The entire 468.39-acre project site would continue to be used for agricultural purposes similar to those that have been occurring on the property for decades. Consequently, the MHA Nation would not earn the $100 million annually over the estimated 20 or more year life of the Project. This would be inconsistent with the Tribes' pursuit of economic opportunities as described by the project purpose and need in Chapter 1.

4.14.3.1 Effluent Discharge Alternatives

The additional effluent discharge alternatives would have no effect on socioeconomics. These alternatives involve the discharge of effluent to surface or ground waters. It is not expected that any of the additional alternatives would involve any of the components of the refinery that would affect socioeconomics noticeably. However, as previously discussed, there would be socioeconomic impacts if the irrigated lands were classified as a RCRA hazardous waste LTU or if a RCRA corrective action was needed.

4.14.4 Cumulative Impacts

Cumulative impacts to social conditions and the economy of the Reservation and Ward County resources would likely result from other planned or foreseeable development activities in addition to the construction and operation of the proposed refinery. There is potential that the increased economic stability of the MHA Nation would stimulate further industrial, residential and commercial development in the Reservation and Ward County. These cumulative and indirect impacts may have positive or negative effects on the economy and social conditions within the Reservation and Ward County.

4.15 Environmental Justice

4.15.1 Alternatives 1 and A — Original Proposed Actions

EPA's evaluation of potential impacts of the project included the potential extent of impacts to air, water and the surrounding community. EPA concluded that the area within a 1-mile radius of the project site may experience some changes in conditions associated with releases and/or potential releases of contaminants to air, surface water, ground water and soils resulting from the proposed project. None of these impacts, however, are expected to be above levels of concern to human health, except for unplanned or extraordinary events. Further, air quality impacts would diminish rapidly with distance from the refinery site, and NPDES discharge limits are required to be protective of aquatic life, drinking water, agriculture and wildlife uses at the point of discharge, which is within the refinery site. Thus, no increased area beyond the 1-mile radius was needed to evaluate these impacts from air emissions and wastewater discharges. In addition, it is expected that many of the impacts will be negligible and/or short term (i.e., potentially higher during the construction phase than during normal refinery operations).

The area within this 1-mile radius includes lands located inside the boundaries of the Fort Berthold Indian Reservation as well as non-Reservation lands. There are a total of six residences located within this same 1-mile radius. The four zip code areas beyond the 1-mile radius of the project site are not expected to experience measurable environmental or human health impacts. For a complete analysis of the potential environmental and human health impacts, please see the other sections in Chapter 4; particularly Ground Water in Section 4.2, Air in Section 4.13, and Health and Safety in Section 4.16.

The two primary exposure pathways from refinery operations are from air emissions and effluent discharges. As stated in the Air Quality Analysis, there are no anticipated significant adverse human health effects from refinery air emissions. This conclusion is based on direct inhalation of predicted refinery emissions rather than ingestion exposures and is therefore less certain with respect to food chain risks. Nonetheless, the potential for bioaccumulative effects of the predicted refinery emissions based on their physical and chemical properties is considered to be low, and no significant adverse human health effects are anticipated from the food chain exposure pathway.

The NPDES permit would require that wastewater discharges from the proposed refinery are protective of multiple uses including: aquatic life, drinking water, agriculture and wildlife uses. The discharge limits take into account indirect pathways of exposure, such as humans eating fish, cattle or bison, and wildlife eating fish or other wildlife. No direct impacts to fish as a result of refinery construction and operations are expected, given that no fisheries are located in proximity to the proposed refinery site.

The area surrounding the site may realize both positive and negative socioeconomic impacts associated with the project. For instance, increased economic activity associated with the project may lead to increased employment and income. Conversely, this area may also experience negative impacts to social cohesiveness resulting from a change in population and demographics, increased traffic, and increased pressure for housing. These negative impacts, however, are expected to be minor and will not disproportionately affect communities with EJ indicators. In addition, the negative impacts are likely to be short-term during the construction phase and subside once full-time operations begin, due to higher employment levels under construction than during the operation phase. For a complete analysis of potential socioeconomic impacts, please refer to Chapter 4, Socioeconomics in Section 4.14. The primary economic impact of the Proposed Action would be the economic benefit to the Reservation from the sales of refinery products, such as gasoline, diesel, and propane. The Tribes have estimated a net profit of $100 million annually over the 20 or more year estimated life of the project. In addition, the refinery would provide economic benefits to several communities, including Parshall and New Town, located on the Reservation approximately 10 and 30 miles, respectively, from the site. Makoti and Plaza, the towns closest to the refinery, are located outside the Reservation boundaries. Local communities would contribute to the available work force, housing, and infrastructure, and provide goods and services for refinery workers. Furthermore, it is expected that a substantial portion of the construction workers would be members of the MHA Nation. For additional social impact analyses, please see the following sections of Chapter 4 of the FEIS: Cultural Resources in Section 4.9, Land Use in Section 4.10, Transportation in Section 4.11, and Aesthetics in Section 4.12.

With respect to impacts throughout the State of North Dakota, it is likely that there will be both short- and long-term positive impacts associated with increased economic activity. These impacts, while significant on a local level, are expected to be small relative to the entire state economy.

Table 4-26 summarizes the type and nature of potential impacts to communities that have been identified as having indicators of an EJ community and to the state of North Dakota. The table shows negative impacts as (-), positive impacts as (+), and combined positive and negative impacts as (±). Negligible impacts are represented as (NG). The table identifies all impacts regardless of significance and does not represent only those impacts that disproportionately affect communities with EJ indicators.

Using EPA's criteria for evaluating EJ claims, it is concluded that there would be no disproportionately high and adverse effects on the communities in the four zip code areas surrounding the proposed refinery including Tribal communities located on Reservation lands within these areas. Ensuring that there would be no disproportionately high and adverse effects on communities surrounding the proposed refinery also ensures that communities located further away from the proposed refinery would not be subjected to any disparate adverse impact from the refinery.

For more information, see EPA's EJ Tier One Analysis for the Mandan, Hidatsa, and Arikara Nation's "Clean Fuels Refinery" Project, December, 2007. See also the responses to comments regarding impacts to wildlife and human health in Appendix E.

Table 4-26 Summary of Impacts to EJ and Reference Communities

	Environ-mental Impacts (Air and Water)	Human Health Impacts	Socioeco-nomic Impacts	Summary of Impacts
Communities Identified with EJ Indicators				
58756 (includes Makoti)	NG	NG	±	Impacts are expected to occur with releases and/or potential releases of contaminants to air, surface water, ground water and soils resulting from the proposed project, though these impacts are expected to be negligible and to occur within either the boundaries of the refinery or a radius of 1 mile; socioeconomic impacts are likely to be both positive and negative in this community
58771 (includes Plaza)	NG	NG	±	Impacts are expected to occur with releases and/or potential releases of contaminants to air, surface water, ground water and soils resulting from the proposed project, though these impacts are expected to be negligible and to occur within either the boundaries of the refinery or a radius of 1 mile; socioeconomic impacts are likely to be both positive and negative in this community
58770 (includes Parshall)	NG	NI	±	Socioeconomic impacts are likely to be both positive and negative in this community
59779 (includes Ryder)	NI	NI	±	Socioeconomic impacts are likely to be both positive and negative in this community
Reference Community: State of North Dakota				
North Dakota	NI	NI	+	Socioeconomic impacts will be positive associated with the increased economic activity, although these are expected to be very small relative to state wide socioeconomic indicators

+: Positive Impact; -: Negative Impact; NI: No Impact; NG: Negligible impacts

4.15.2 Construction Alternatives

4.15.2.1 Alternative 2 — Transfer to Trust, No Refinery

Under this alternative, the MHA Nation would not construct or operate the clean fuels refinery. Although the property would be accepted into trust status, the MHA Nation would continue to use the property for agricultural purposes. Land uses at the refinery site would remain the same as they currently are. Consequently, there would be no local jobs and other economic benefit generated through construction and operation of the refinery. Also the MHA Nation would not earn the $100 million annually over the estimated 20 or more year life of the Project.

4.15.2.2 Alternative 3 — No Transfer to Trust, Refinery Constructed

Implementation of this alternative would result in the same environmental effects as described for Alternatives 1 and A. The effects would be the same because the refinery would be constructed and operated as indicated under Alternatives 1 and A. However, if the refinery site is not accepted into trust by the BIA, the refinery is likely to generate less income for the MHA Nation. One of the main issues would be state fuels taxes. The specific arrangements would be negotiated between the MHA Nation and the State of North Dakota. If the Tribes and the State reach agreement the economic benefits of the refinery would be very similar to those described for Alternatives 1 and A. Consequently, the same disproportionate economic benefits discussed under Alternatives 1 and A would occur with implementation of this alternative.

4.15.2.3 Alternative 4 — Modified Proposed Action

Potential effects to EJ communities for the refinery project under the Modified Proposed Action would be the same as those described under the Alternatives 1 and A.

4.15.2.4 Alternative 5 — No Action

Under this alternative, the MHA Nation would not construct or operate the clean fuels refinery. Land uses at the refinery site would remain the same. Consequently, implementation of this alternative would have no discernable effects to EJ communities in the affected area.

4.15.3 Effluent Discharge Alternatives

4.15.3.1 Alternative B — Partial Discharge through an NPDES Permit and Some Storage and Irrigation

With this alternative, surplus treated wastewater would be disposed of through land application to irrigate crops or discharged through NPDES permitted outfalls. For the same reasons presented for Alternatives 1 and A, implementation of this alternative would not result in adverse effects to the EJ communities in the affected area that would be disproportionate relative to the surrounding area.

4.15.3.2 Alternative C — Effluent Discharge to an UIC Well

Under this alternative, all wastewater would be discharged to an UIC well after treatment in the refinery's water treatment plant. A Class I UIC well permit requires the disposal of water into a deep aquifer that is of too poor quality to be a source of drinking water. Consequently, the water disposed in the well would be isolated from all sources or potential sources of drinking water for the long term. Because the aquifer used for disposal would be completely isolated, implementation of this alternative would not result in adverse effects to the EJ communities in the affected area that would be disproportionate relative to the surrounding area.

4.15.3.3 Alternative D — No Action

Under this alternative, the MHA Nation would not construct or operate the clean fuels refinery. No NPDES discharges would occur and land uses at the refinery site would remain the same. Consequently, implementation of this alternative would have no discernable effects to EJ communities in the affected area.

4.15.4 Cumulative Impacts

No cumulative impacts were identified for EJ. No reasonably foreseeable actions were identified that would have effects in the affected area that would overlap in time or space with the direct and indirect effects discussed above.

4.16 Health and Safety

This section addresses health and safety impacts associated with the proposed MHA Nation Refinery project. The proposed refinery would be located in a rural setting with the closest community of Makoti approximately two miles away. The types of impacts considered in this section are those resulting from exposure to chemicals and from accidents caused by working with equipment related to refinery construction and operation. Other health and safety issues are also examined, including potential impacts to receptors living off-site.

For all alternatives that involve refinery construction, there is potential for impacts to occur to the health and safety of people and to the environment during both construction and operation of the refinery. Impacts associated with construction activities would be comparable to any major industrial construction project. These impacts would be largely confined to the project site, although they would also occur at construction sites for storage tanks, pipelines, and transmission lines and along delivery routes for supplies and equipment. The occurrence of impacts to health and safety during operations would extend throughout the projected 20 years or more of refinery operations and, for some impacts, into the time period assumed necessary to decommission the refinery and reclaim the site.

Health and safety impacts would be largely confined to the project site, but would also occur along supply routes and at locations where support facilities are operating. In addition, during refinery operations and decommissioning, chemicals present in emissions to the air from the project site may migrate downwind, and chemicals in effluents discharged to the environment may move downgradient from the project site. The current area of influence for these chemical effects is estimated to be within the project site fence line, and within the refinery process area in particular, as emissions tend to be less concentrated beyond that point and effluents would be regulated under the conditions of an effluent discharge permit.

The refinery has been designed to avoid many of the types of exposure that could lead to these potential impacts and to minimize other types of exposure. Typical refinery-related impacts to human health may include damage to specific organs or tissues from excessive direct exposure to hydrocarbons, metals, and other site-related chemicals. Increased risk of specific types of cancer from long-term exposure to lower concentrations of these chemicals is another potential impact to human health. Such chronic health impacts are typically caused by repeated and long-term direct contact with such chemicals. Ecological receptors, such as plants and animals, can be similarly impacted, although their impacts are typically evaluated at the population level rather than for individuals (except for threatened, endangered, or other special-status species).

In addition to health impacts, safety concerns are present at the site. Examples of safety issues include: physical injury from the operation of heavy equipment during construction; exposure to hazards associated with cleaning of equipment during operation and turnaround maintenance, such as the steam used for cleaning tanks; and slip/trip/fall hazards around the refinery facility. These safety issues are similar to those commonly found at other large industrial facilities. Such safety concerns, as well as many health concerns, could be minimized, because refinery construction and operation are usually subject to the requirements of OSHA, which establish protocols to ensure occupational safety and health. It is the MHA Nation's intent to apply OSHA regulations during construction and operation of the proposed refinery.

The nature and scale of health and safety impacts associated with the proposed MHA Nation Refinery may be evaluated in a number of ways. EPA typically examines health risk in the context of increases in the incidence of cancer and non-cancer (or systemic) disease. For risk to exist or to be increased due to releases of chemicals, there must be a complete pathway between the source of the contaminant and the human or ecological receptor. Further, once exposed to the chemical, the receptor must exhibit susceptibility to the chemical by demonstrating one or more measurable adverse effects (i.e., disease, reduced growth, mortality). Several points of departure regarding protection of human receptors are described later in this section. Additionally, impacts to the environment and ecological receptors have generally been discussed in other sections of this document, but the impacts of chemicals on plants and animals, some of which may be harvested and eaten by people directly or that may be fed to livestock and subsequently consumed by people, are considered here. Such impacts would be considered significant if they provide an important exposure route to humans or cause plant or animal populations to decline.

Under the refinery construction alternatives (Alternatives 1, 3, and 4), part of the land would be used for cultivation of forage to be fed to the MHA Nation buffalo herd. Under Alternatives 2, the entire parcel would be used for forage production, and the refinery would not be built. Under Alternatives 5, there would be no change from current use of the land. Under Alternatives 2 and 5, there would be no impacts from new chemicals brought to the site for the refinery; the ongoing potential for accidents during use of agricultural equipment would be the only health and safety concern.

A more detailed discussion of potential health and safety concerns is provided in the sections that follow.

4.16.1 Alternatives 1 and A—Original Proposed Actions

4.16.1.1 Refinery Emissions and Effluents

During construction, the primary chemicals present on-site would be fuels for construction vehicles and possibly substances used to minimize airborne particulates. During refinery operation, the diversity and volume of chemicals that are present on the site would be considerably greater. Specifically, the refinery chemicals will include large volumes of diverse hydrocarbons (e.g., benzene, butane, crude oil, ethane, gasoline, light and heavy diesel fuel, gasoline, isobutene, isobutylene, iso-octane, kerosene, methane, naphtha, and propane), small amounts of metals (e.g., selenium, chromium), and other chemicals (e.g., alcohols, ammonia, CO, hydrogen sulfide, nitrogen oxides, sodium hydroxide, and sulfur dioxide), all of which are potentially harmful to human health and the environment at certain concentrations.

Refinery Air Emissions and Sources

The MHA Nation proposes to construct and operate a 13,000 BPSD of synthetic crude oil clean fuels refinery. Additional feedstock for the refinery would include 3,000 BPSD of field butane, 6 MMSCFD of natural gas, and 300 bbl of bio-diesel or 8,500 bushels per day of soybeans. From the feedstock, the refinery would produce about 5,750 BPSD of diesel fuel, 6,770 BPSD of gasoline, and 300 BPSD of propane.

Table 4-15 provides a summary of the estimated annual criteria pollutant emissions for the refinery. Total estimated emissions are approximately 207 tons per year, with the largest estimated quantities consisting of the following: NOx, CO, non-methane-ethane VOCs, SO_2, and PM_{10} and $PM_{2.5}$. HAPs estimated to be released include benzene, cyclohexane, ethylbenzene, formaldehyde, n-hexane, Polycyclic Aromatic Hydrocarbons (PAH), toluene, and total xylenes.

According to the air quality technical report (December 2007), all production emission sources at the proposed refinery are assumed to operate continuously (24 hours/day, 7 days/week and 52 weeks/year). The primary sources of air pollutants include the hydrocracking unit and various heaters and boilers that serve the refinery's processes and general facility heating requirements. Other emissions would result from a soybean/oilseed oil extrusion process and a bio-diesel production process, also included in the proposed project. In addition, an emergency generator and fire pump would operate periodically for testing and maintenance. Fugitive emissions at the refinery would include VOC emissions from processes and material handling (e.g., tank farm, rail loading, truck loading), and fugitive dust (PM_{10}) from vehicle traffic during the construction and operation phases of the facility.

Refinery Water Effluent and Sources

The refinery would generate three types of wastewater: (1) sanitary wastewater, (2) uncontaminated (non-oily) wastewater, and (3) process wastewater and potentially contaminated (oily) stormwater. Under Alternatives 1 and A, each of these streams of wastewater would be handled separately and receive different levels of treatment.

EPA has developed draft NPDES effluent limits for wastewater discharges anticipated at the refinery. These limits have been developed based on criteria to protect aquatic life, drinking water quality, and wildlife. Table 4-2 in this chapter lists the EPA draft effluent limitations for refinery process wastewater and contaminated (oily) stormwater for the following effluent characteristics: flow, Biochemical Oxygen Demand (BOD), total suspended solids, chemical oxygen demand, oil and grease, phenolic compounds, several metals, and VOCs. Uncontaminated (non-oily) stormwater discharges would also be covered under the permitted NPDES outfall.

Other Contaminants Present at the Facility

In addition to those contaminants emitted from the construction and operation of the facility, the current status and quality of the various environmental media (e.g., surface water, air, and ground water) are presented in Chapter 3, Affected Environment. Some media at the refinery site are already impacted by certain contaminants, thereby presenting the potential for additional human health exposures. Specifically, surface water concentrations of arsenic exceed both the aquatic and human health criteria in the East Fork of Shell Creek. In addition, other constituents in the East Fork of Shell Creek are at levels above concentrations typically found in undeveloped areas. Existing ambient air quality has been monitored for SO_2 and PM_{10} in an area 25 miles (40 kilometers) south of the project site in White Shield, North Dakota, which is close to most of the existing emission sources. NO_2 has been monitored in Beulah, North Dakota, which is 47 miles (76 kilometers) south of the project site. While maximum annual average concentrations of SO_2 (4.8 $\mu g/m^3$), PM_{10} (11.6 $\mu g/m^3$), and NO_2 (7.1 $\mu g/m^3$) show these pollutants have been detected, none exceed NAAQS or North Dakota Ambient Air Quality Standards. Ambient background concentrations of SO_2, PM_{10}, NO_2 and CO were all considered in the NAAQS impact analysis (Table 25, Greystone 2004). For ground water, ten ground water monitoring wells on the project site were sampled, and quarterly sampling events indicated that all PCBs and pesticides were at non-detectable levels, RCRA metal concentrations were below MCLs in all samples, and very low concentrations of some VOCs were detected in some samples, but were non-detectable in duplicate samples.

4.16.1.2 Fate and Transport of Emissions and Effluents

Air emissions and water discharges from the facility construction and operations would result in the release of contaminants via air dispersion and deposition and water discharges to the surrounding environmental media. The fate and transport of each contaminant would likely differ depending on the specific chemical properties and where the dispersion, deposition, and discharges occur. This section discusses the air emissions and effluent discharges under both the construction and operational phases of the facility, and the potential fate and transport in the various environmental media, including air, water, and soil. Chemical transport properties such as volatility, solubility and sorption potential are important factors to consider for the fate and transport into the various media. There would be minimal exposure to chemical hazards other than dust and heavy equipment emissions during construction. During refinery operation, however, air and water exposure pathways would be used by a much greater number of chemicals, as discussed below. Exposure to the chemicals present during operational phases of the project could be through direct contact, or these chemicals could be dispersed to air, water, and soil resulting in indirect exposures to receptors through the food chain pathway.

Air Pathway

Under the construction phase, the primary emissions would be from mobile sources (vehicles) and dust generation. Specific contaminants would include CO, NOx and PM_{10}. This would result in emissions to the air and likely local dispersion and deposition to the surrounding soil and surface water. Humans are likely to be exposed via inhalation or incidental ingestion of soil and/or surface water.

During operations, NOx, CO, SO_2, and PM_{10}/$PM_{2.5}$, as well as multiple HAPs (i.e., benzene, cyclohexane, ethylbenzene, formaldehyde, n-hexane, PAHs, toluene, and total xylenes) are expected to be emitted from the facility. These contaminants are a result of either the combustion process or products of incomplete combustion and would transport via advection [air movement, wind] and disperse into the atmosphere. An ambient air quality analysis was conducted using the ISCST3 model. The results of this analysis indicate that some deposition would occur to the surrounding soil and surface water, and humans and environmental receptors may be exposed to low levels of contaminants via the inhalation pathway or incidental ingestion of soil and/or surface water.

Water Pathway

Construction activities would disturb soils and potentially result in transport of sediment during precipitation events. This transport could enter nearby drainages or wetlands and cause adverse effects on surface water quality. Humans can be exposed via incidental contact with surface water. Construction activities are not expected to impact ground water quality. While there are potential impacts to soil from inadvertent spills of hazardous materials, protective measures such as BMPs, required by the Stormwater Construction General NPDES permit, the SWPPP, and the SPCC plan, would minimize contamination into soils and consequently shallow ground water at the site. No impacts to water quality in deeper aquifers are anticipated during construction activities.

During facility operations, all water effluent discharged from the outfalls would meet the refinery's NPDES permit effluent criteria. Any potential impacts would be a result of water discharge and oil spills and leaks. Contamination to ground water could result from the dissolution and mobilization of exposed oil and refined products by precipitation and subsequent downward migration into the underlying soils. However, design engineering and operating practices (e.g., spill response plans) would minimize impacts to surface and ground water quality.

Contaminants distributed via air emissions would undergo dispersion and deposition onto local surface water bodies including Shell Creek and East Fork Shell Creek drainages. If those surface water bodies are used as sources for drinking water, humans could be exposed via ingestion of potable water. If there are aquatic species residing in the surface water bodies, then humans could be exposed via ingestion of contaminated fish. If treated wastewater is used as a source of irrigation water, it is possible that the irrigated soil, ground water, vegetation, and animals could subsequently become contaminated. Thus, humans could be exposed via the food chain pathway.

Soil Pathway

Under the construction phase, the primary emissions would be from mobile sources (vehicles) and dust generation. This would result in emissions to the air and likely local dispersion and deposition to the surrounding soil. Humans are likely to be exposed via incidental ingestion of soil.

Once emitted during facility operations, contaminants would undergo dispersion and deposition onto the soil of the facility and surrounding area. Spills and accidents impacting soil may include: synthetic crude oil, refined petroleum products (e.g., gasoline, diesel), lubricating oils, hydraulic oils, or sludge contained in storage tanks or equipment. If crops are grown on this soil, it is possible that both the vegetation and the livestock that feed on this vegetation could uptake the contaminants. In addition, it is possible that contaminants could infiltrate into the underlying ground water. Humans could be exposed via incidental soil ingestion, ingestion of the various food crops or livestock, or ingestion of the ground water.

Food Chain Pathway

As discussed above, there would be some minor releases of chemicals to the environment via air, water, and soil pathways that would become available for uptake by receptors through the food chain. EPA completed a quantitative analysis of food chain risks posed by refinery emissions to determine the potential for adverse effects from these exposures. See the Qualitative and Quantitative Human Health Risk Assessment Technical Report for more information. The results of this analysis indicate that the releases would be greatest within the refinery process area and the area immediately surrounding the site. Chemicals that are airborne as individual molecules, adsorbed onto particulates, or absorbed by them can be inhaled by animals in the area influenced by the site. In addition, these airborne particles can be deposited to soil and surface water both within and beyond the site boundary. Chemicals that are suspended or dissolved in the water can be contacted directly by aquatic plants and animals, or ingested as drinking water by terrestrial animals either on the site or downstream from their point of origin. Such chemicals can also be deposited in the soil if they drop out of suspension as surface water flow decreases. Once in the soil, these chemicals can be taken up by plant roots, ingested incidentally by animals as they dig burrows, take dust baths, or feed on organisms in or covered with soil. Even if the chemicals are not ingested, they may pass through the moist skin or mucosa of some species, such as amphibians.

Once within a plant or animal, a chemical may be broken down to harmless components, excreted, or may remain intact and be stored in tissues such as hair, fat, fingernails, or bone. Chemicals that are stored in forage plants or prey animals are consumed when the plant or animal is eaten. Because a given predator typically eats numerous individual prey items, it could receive multiple doses of stored chemicals. This predator might in turn be eaten by another predator or by a person. The further up this "eat and be eaten" food chain chemicals move, the more concentrated they may become. Even at high concentrations, the chemicals may not affect their host organisms, as long as they are stored in tissue and physiologically unavailable. Alternatively, impacts to ecological receptors from stored chemicals may occur when the organism goes through a period of stress and uses up its body fat, releasing its store of chemicals. This may happen as birds near the end of a long migration, or big game reach the end of a long hard winter.

The risk characterization resulting from the quantitative evaluation of food chain risks (see Qualitative and Quantitative Human Health Risk Assessment Technical Report) indicates that both cancer and non-cancer risks are many times less than the lower end of EPA’s target risk cancer range and target non-cancer hazard index, respectively.

4.16.1.3 Impacts to Human Health and the Environment

Human Receptors

Impacts to human health and the environment posed by Alternatives 1 and A are assumed to occur during two distinct components of the project: 1) construction, and 2) operation and maintenance of the clean fuels refinery.

The MHA Nation intends that all phases of the construction and operation and maintenance of the clean fuels refinery would be subject to safety and health regulations outlined by the U.S. Department of Labor, OSHA. OSHA assures the safety and health of workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. As such, it is anticipated that workers involved in refinery construction and operation and maintenance would be protected by health and safety standards and work practices afforded through OSHA compliance.

Construction Impacts

Construction of the proposed project is expected to result in only temporary impacts to human health and the environment. As previously mentioned, construction activities may result in risks to worker health and safety. Compliance with OSHA standards and regulations, however, would minimize potential impacts to worker health and safety.

Nearby residents would be the most likely human receptors impacted by construction activities. Construction would begin with the stripping of topsoil, the grading of the refinery site, and the excavating of foundations and spaces for underground work. The most likely exposure pathway for off-site residential exposure associated with construction of the proposed project would include increased exposure to dust, emissions from construction equipment, and any entrained chemicals associated with windborne dust or surface erosion. Soil erosion from all construction activities is expected to be minimal, because the proposed project would be constructed following standard practices and permit conditions to control wind erosion by limiting the removal of vegetation, avoiding construction on steep and erosive slopes, revegetating or covering any topsoil that was removed and stockpiled, surfacing roads, and reclaiming areas in a timely manner. In addition, active construction sites would be watered, as necessary (except during periods of rain), to minimize the potential for wind erosion.

Increased vehicular traffic associated with construction of the clean fuels refinery under Alternative 1 is also a potential factor that could impact human health. The primary impacts to human health are a minimal increase in daily traffic, specifically heavy equipment and truck traffic, and an associated increase in risk of accidents during construction of the refinery. The addition of traffic control lights and nighttime lighting would help minimize the potential for increases in accidents.

Operation and Maintenance Impacts

During the operation and maintenance phase of the proposed clean fuels refinery, releases of various chemicals and hazardous materials during refinery operations are the most significant concern for impacts to human health. The proposed refinery would use a number of hazardous materials at the site to manufacture clean fuels. Transporting, handling, storing, and disposing of chemicals and hazardous materials inherently pose a risk of a release to soil, ground water, air, surface water, and sediment. In addition, air emissions generated during refinery operations associated with making clean fuels are a source of potential adverse impacts to human health. Finally, secondary release mechanisms (e.g., plant uptake of contaminants from soil impacted by air deposition) are also of concern, which also may be irrigated using water from refinery operations under Effluent Discharge Alternative B.

The following sections discuss potential impacts to human health due to potential releases from the refinery of hazardous constituents by various mechanisms. Because limited data are available, quantitative evaluations of the risks posed to human health by release of hazardous constituents are only addressed for direct or indirect exposure to air emissions from refinery operations. A qualitative discussion is provided for other release mechanisms.

Transportation

Increased vehicular traffic associated with operation of the clean fuels refinery under Alternative 1 would be a potential factor that could impact human health. The primary impacts to human health relate to increases in daily traffic, specifically heavy equipment and truck traffic, and an associated increase in risk of accidents. These and related issues have been discussed earlier in this chapter.

On Site Releases

Various chemicals, synthetic crude oil, and refined products would be stored at the refinery facility in aboveground storage tanks, containers, or drums. The movement and storage of synthetic crude oil and processed product within the tank farm, processing area, and product loading area is part of the complex bulk product distribution, refining, and storage system on the refinery. The complexity of the refining process and amount of stored oil, product, and chemicals moving through the system provides opportunities for accidents, spills, leaks, and losses from simple volatilization.

Petroleum products may be released to the environment as managed releases, or as unintended by-products of industrial, commercial, or private actions or accidents. Spills could also occur from corrosion of containers, piping, and process equipment; and leaks from seals or gaskets at pumps and flanges. The overall spill hazards associated with the handling and transport of processed fuel oils at the MHA Nation Refinery are expected to occur less than at refineries using older technologies. It is anticipated that if a spill occurred, it would be either a human or a mechanical error.

Most spills would likely involve either crude or bulk fuels (e.g., distillates), such as fuel oils. Consistent national statistics regarding type and magnitude of release are lacking for many stages in the overall oil refining and distribution system. The main exceptions involve larger leaks and spills, especially those in coastal areas or on larger rivers and streams.

Soil contamination could occur during the construction and operation of the refinery. Contaminated soils would typically include natural materials such as soils, subsoils, overburden, or gravel that have been contaminated with synthetic crude oil; refined petroleum products, such as gasoline and diesel fuels; lubricating oils; and hydraulic oils or sludge contained in storage tanks or equipment. The immediate potential effect would be direct contamination of the soil, which could result from the release of fuels and oil at the refinery site and along the pipeline corridor, or from accidents during delivery of product. The anticipated causes of spills on land could include traffic accidents, operational errors, corrosion, mechanical failures, and vandalism.

In general, oil or petroleum product dumped or spilled onto soils can saturate the soil matrix. This type of concentrated contamination can be problematic to remediate. If oil or petroleum product is introduced at any depth within the soil matrix, natural weather and biodegradation processes can be rendered less effective and the chances may increase that some of the oil or petroleum product may contaminate ground water, if present. Because many oil or petroleum product components have densities lower than or close to that of water, the lighter non-aqueous phase liquids (LNAPLs) generally pose less potential for ground water pollution than most chlorinated solvents (e.g., PCBs or TCE), which are denser than water (denser non-aqueous phase liquids [DNAPLs]) and are found at numerous industrial sites.

Ground water resources in proximity to the refinery could be affected by leaks and spills, particularly if a spill occurred directly above or close to shallow underlying ground water. Adverse impacts to drinking water quality of individual well users and public supply systems are not anticipated under this alternative and are discussed further in the Ground Water section of this chapter.

The Town of Plaza uses a well completed in the Fox Hills-Hell Creek aquifer located approximately four miles from the refinery site. Impacts to the Fox Hills-Hell Creek aquifer in terms of water quality would be insignificant due to its great depth and hydraulic isolation from the shallow aquifers. Residents of Plaza use two additional ground water wells to meet the demand during high usage periods. These wells are completed at depths of 88 and 91 feet in Coleharbor Formation and are located approximately five miles northwest of the refinery. Impacts to water quality are expected to be negligible due to the low hydraulic conductivity of overlying soils and distance from the refinery property.

Residents of Makoti obtain water from two ground water wells completed in the Vang aquifer (buried valley aquifer) at depths of 22 and 41 feet. These wells are located approximately five miles northeast of the project site. Impacts to water quality are expected to be negligible due to the distance of these wells from the refinery site, the limited local extent of these aquifers, the low hydraulic conductivity of the overlying soils, and the existing degraded water quality in this formation.

The majority of the domestic wells used by individuals in the vicinity of the refinery are completed in surficial deposits, primarily the till. Six residences are located within one mile of the project area. Wells for two of these residences include the O__ well just north of Highway 23 and the S__ well located south of the proposed refinery property. Wells are completed at depths of 103 and 189 feet and the water has a brownish-red appearance with high TDS values. These residences haul in water for drinking and use the well water solely for cattle and horses. There are two water wells located at the east side of the property at the farm house. Neither of these wells is currently used, nor are they anticipated to be used in the future. Impacts to water well quality in the shallow till and buried valley aquifers from project discharges are not anticipated, primarily because all the discharged water would be of better quality (i.e., meeting the NPDES requirements) than the formation water in the shallow aquifers. Additionally, low volume of discharges and low hydraulic conductivity of the overlying till material would minimize the infiltration rates and volumes. As described earlier, potential impacts to shallow ground water might occur as a result of inadvertent spills or leaks, although protective measures, as provided in the SPCC plan, the SWPPP, and application of BMPs, would minimize introduction of undesired substances into soils and consequently into shallow ground water.

Treated Wastewater and Stormwater Discharges

The stream of wastewater containing hazardous constituents would consist of process wastewater that is collected from process units directly and potentially contaminated (oily) stormwater collected from the process area, product loading area, and tank farm. All process wastewater would be routed to the WWTU for treatment. There would be no direct discharge of untreated process wastewater to surface waters. Because all contaminated wastewater and stormwater would be treated prior to discharge under the NPDES Permit, the effects on surface water quality would be minimal. As a result, the impacts on human health of discharged treated wastewater and stormwater from the proposed refinery are expected to be negligible.

Air Emissions

Impacts to ambient air quality were evaluated using existing monitoring data available for the Reservation and surrounding areas, projections of criteria and HAP emissions from the refinery, and air quality modeling. Existing air quality data are summarized in the Air Quality Section of this chapter. The air quality modeling overlaid projected emissions on existing conditions and quantitatively estimated the potential near-field and far-field effects. Near-field effects are those that occur within a 10-km radius of the project, and far-field effects are those that occur at the Class I areas described in Chapter 3. The modeling was built on recent modeling done by EPA for PSD purposes in North Dakota. It included analyses that compared concentrations of criteria air pollutants with the NAAQS, the Class I or Class II increments, and AQRV. The modeling also included an analysis that compared concentrations of HAPs with risk based concentrations for the inhalation pathway.

Refinery Air Emissions

The primary sources of air pollutants (criteria and hazardous) would be the various heaters and boilers that serve the refinery's processes and general facility heating requirements. A soybean/oilseed oil extrusion process and a bio-diesel production process would also be included. The air quality technical report (December 2007) provides a detailed discussion of the sources of air pollutants evaluated in the air quality analysis and the processing and modeling of the emissions data.

The cumulative effects analysis contained in the air quality technical report (December 2007) evaluated the potential effects of the refinery on regional air quality. Criteria pollutant background concentration data were also used to assess these impacts. The cumulative effects modeling analyses demonstrated that the refinery would have negligible impacts on the quality of air. The air quality technical report (December 2007) provides a detailed discussion of the cumulative effects analysis, including the inputs for the modeling and resulting outputs.

Under the proposed alternatives, the MHA Nation would construct and operate the clean fuels refinery. Table 4-15 provides a summary of the estimated annual criteria pollutant emissions for the refinery. These criteria pollutants include NOx, CO, VOCs, SO_2, PM_{10} and $PM_{2.5}$.

EPA has established NAAQS for ozone, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and airborne lead. These standards were developed to protect public health and welfare with an adequate margin of safety. The NAAQS and State of North Dakota's ambient air quality standards are presented in Chapter 3 in Table 3-15. These are the regulatory limits that concentrations of pollutants must not exceed during the specific averaging period for an area to be considered in attainment for air quality. The modeled results showed the potential emissions of criteria pollutants from the refinery are below all NAAQS.

EPA has also established increment standards for both Class I and Class II areas. These increment standards were developed to restrict deterioration of air quality for SO_2, NO_2, and PM_{10} and are presented in Chapter 3 in Table 3-16. The maximum modeled emissions did not exceed the increment standards for either the Class I (Table 4-20 and Table 4-21) or Class II areas (Table 4-17).

Based on air emission modeling for the proposed refinery, Table 4-22, presented earlier in this chapter, summarizes the estimated maximum HAP ambient concentrations in micrograms per cubic meter ($\mu g/m^3$) of air. The results of HAP ambient impact modeling and current health-based inhalation risk estimates are shown in the Clean Fuels Refinery Site-Specific Air Emissions Modeling section of this chapter.

The treated wastewater discharges associated with Alternative A would have no effect on air quality. The discharge of effluent to surface water or ground water does not involve any of the components of the refinery that would affect air quality emissions.

Regional Air Emissions

The power plants located near Beulah, North Dakota, roads, and agriculture are the main sources of air quality impacts in the airshed surrounding the proposed petroleum refinery. As demonstrated in the modeling analysis and the Class 1 and II area air quality analysis, the refinery would have negligible impacts on cumulative air quality within the surrounding airshed. No significant changes are anticipated in the area regarding the air emissions from roads and agricultural practices. Emissions from the power plants around Beulah are anticipated to be reduced over time as one power plant has announced plans to modernize pollution equipment. However, there are several new sources of air pollution in the airshed surrounding the proposed petroleum refinery that are in the planning stages including a new power plant and an ethanol plant.

Livestock Grazing and Forage Production

The area surrounding the site is used extensively for agriculture purposes, and approximately 279 acres of the site would be used to produce buffalo forage. Air modeling results indicate that the area of maximum emissions deposition would be at or near the proposed project fence line and within the refinery process area in particular. These results suggest that small amounts of the emissions may be deposited on the forage crops and fields in the immediate vicinity of the refinery. In addition, the crops on the trust land may be irrigated with wastewater from the proposed refinery under Effluent Alternative B. As a result of direct contact or plant uptake, forage crops may be an indirect mechanism for exposing human receptors to chemical and hazardous constituents emitted from the refinery.

Qualitative and Quantitative Evaluation of Human Health Risks Posed By Air Emissions

Petroleum refineries produce a variety of air emissions, with the types and amounts varying due to the process operations, controls and feedstock. Common air emissions from a petroleum refinery include hazardous emissions, such as benzene, toluene, ethylbenzene, xylene, VOCs; and criteria emissions such as NOx, SO_2, CO, and PM. There can be adverse health effects associated with excessive exposure to hazardous and criteria pollutants, such as cancer, respiratory irritation, and damage to the nervous system. These potential hazards associated with refineries have resulted in increased concerns for residents of communities located in close proximity of refineries. The following sections further discuss potential adverse health effects associated with petroleum refineries. Additional information is contained in the Qualitative and Quantitative Human Health Risk Assessment Technical Report on the CD-ROM enclosed with this FEIS.

4.16.1.4 History of Health Risks Posed By Refineries

History of Risks Posed By Refinery Air Emissions

The last major refinery built in the U.S. was in 1976. All existing refineries have had to modify existing facilities to meet new environmental regulations specific for refining commencing in the early 1980s. Process equipment to be used by the proposed refinery has been designed in order to meet specific regulatory requirements, and control equipment has been improved to substantially remove more emissions than was previously possible with older technology. The proposed MHA Nation Refinery would have the advantage of being able to utilize these modern processing and controls in meeting regulatory requirements and minimizing effects to nearby communities and the environment. The facility would also be refining synthetic crude that has already been partially refined in Canada.

Petroleum refineries in the U. S. have reduced criteria emissions by 77 percent between 1970 and 1997 (American Petroleum Institute 2005). Since 1970, CO and SO_2 emissions from petroleum refineries and related facilities have declined by 85 percent and more than 63 percent, respectively, since 1970. During this same period, NOx and VOCs declined by more than 50 percent. Hazardous emissions from petroleum refineries have declined by similar amounts. Releases dropped by 34 percent between 1988 and 1997, with benzene levels dropping by 51 percent (American Petroleum Institute 2005). According to EPA's Toxic Releases Inventory Program, petroleum refineries account for approximately 3 percent of all of the nation's toxics releases (American Petroleum Institute 2005). These reductions are associated with the use of innovative technologies and a continual movement toward further reductions. The use of state-of-the-art control technologies by new refineries would allow these facilities to operate with significantly reduced emissions as compared to older refineries.

The ATSDR has performed several public health assessment studies addressing impacts to human health and the environment related to oil refineries. Most of these studies involved closed facilities with limited historical air emissions data available, although the ATSDR has completed some focused studies on operating refineries for specific types of releases. Most of the studies on closed facilities indicated inconclusive results regarding historical health impacts, and various interest groups have highlighted the lack of information regarding the combined human health effects of the mixtures of chemicals released from refineries.

In the 1990 CAA Amendments, Congress mandated that the EPA carry out a human health risk and adverse environmental effects-based "needs test." This is referred to as the residual risk standard setting, a phase in which the EPA would consider the need for additional standards following regulation under section 112(d) of the CAA to protect public health and the environment. The EPA assesses the risks from stationary sources that emit air toxics after technology-based (maximum available control technology [MACT]) standards are in place. For the refinery industry, EPA has initiated a study of human health risk; however, the residual risk review has not been completed.

The EPA studied 155 U.S. refineries to assess potential cancer risks from air releases based on available information (Shaver 2003). The majority of the 155 refineries fell between the one in one-million (1x10-6) and one in ten-thousand (1x10-4) excess lifetime cancer risk range. As discussed in the National Contingency Plan (NCP) (55 *Federal Register* 8666, March 8, 1990), EPA's human health risk reduction goal and target risk range is to:

> "reduce the threat from carcinogenic contaminants such, that for any medium, the excess risk of cancer to an individual exposed over a lifetime generally falls within a range 10-6, in other words, an exposed individual would have an estimated upper bound excess probability of developing cancer from one in one-million, to 10-4, or an exposed individual would have an estimated upper bound excess probability of developing cancer from one in ten-thousand."

Approximately 10 of the 155 refineries exceeded 1x10-4, meaning there is one chance in ten-thousand of an additional cancer event occurring. Between 6 and 12 refineries of the 155 refineries were below 1x10-6, meaning there is one chance in one-million of an excess cancer event occurring (Walker 2002).

Based on EPA's target risk range information, most refineries appear to fall into a risk level between one in one-million (1x10-6) and one in one-hundred-thousand (1x10-5) for cancer risk. The majority of the cancer risks are attributable to very few compounds, with benzene being the main risk "driver," the inhalation pathway being the main means of exposure, and fugitive emissions (as opposed to stack emissions) being the dominant source of exposure (Walker 2002). There appears to be little correlation between process unit and risk. The main risk factor was found to be the proximity of a person to the emission source(s) (Walker 2002). It should be noted that the results shown above are preliminary, and additional data are needed for better assessments. A determination as to the need for any additional public health-based amendments for petroleum refining would be made once the EPA completes the residual risk review for petroleum refineries. The proposed MHA Nation refinery would be designed to comply with applicable MACT and associated health-based amendments.

Ponca City, Oklahoma Air Toxics Assessment

The Air Quality Division of the Oklahoma Department of Environmental Quality (ODEQ) conducted an assessment of the air toxic risk in Ponca City, Kay County, Oklahoma, in 2002 (Oklahoma Department of Environmental Quality 2004). The purpose of the study was to examine the accuracy of the National Air Toxics Assessment, which had indicated unusually high risk in Kay County. Ponca City has an existing oil refinery (about 10 times larger than the proposed refinery). A 20-kilometer square area was selected for analysis, which included all the major sources of air pollution in the immediate area.

The risk assessment was based on the following:

- 20 km squared study area
- Focus on VOCs and not semi-volatiles, particulates or metals
- Model inhalation risk only
- Exclusion of mobile and area sources

Most of the total volatile organic emissions were attributed to three industrial facilities in the assessment area:

- Petroleum refinery (187,000 bbl per day, 54 sources representing 1,535 tons/year)
- Petroleum tank farm (159 sources, 492 tons/year)
- Carbon black plant (15 sources, 200 tons/year)

Modeling was conducted as per the Regional Air Impact Modeling Initiative. The conclusion of the risk modeling was that there was no significant increased lifetime cancer risk from the volatile organic air toxics in the Ponca City area. The model predicted increased lifetime cancer risks in the range of one in one-hundred-thousand (1x10-5) to one in one-million (1x10-6) immediately next to the refinery.

Estimated volatile organic emissions from the MHA Nation Refinery would be about 40 tons per year, which is significantly less than the total volatile organic emissions from the three industrial sources in the Ponca City study (2,042 tons/year). In a general comparison, similar modeling of the MHA Nation Refinery would be expected to demonstrate similar results — no significant increased lifetime cancer risk from volatile air emissions. The terrain in the area of the Ponca City Refinery is similar (gently rolling prairie) to that of the MHA Nation Refinery, but with a higher number of adjacent and area human inhabitants.

ATSDR Review of the Literature on Adverse Health Effects Observed in Communities Living Near an Oil Refinery

ATSDR conducted a literature review in response to a request by EPA to assist in the evaluation of potential health effects to the local community from the presence of the proposed MHA Clean Fuels Refinery. The literature review targeted information pertaining to health of residents living near an existing oil refinery. The goal of the review was to identify references and information not already cited in the DEIS; detailed review and analysis of each reference was not provided. The search for additional literature was assisted by the Center for Disease Control and Prevention (CDC) Library Resources. Searches were performed of the National Library of Medicine's PubMed database, and experts in air quality were contacted as additional sources.

The review of newly acquired scientific articles on health studies of communities near oil refineries revealed that the oil refineries under study were operating with old technology that was not comparable to the newer technology of clean refineries. None of the existing oil refineries for which health studies had been performed were using the new clean technology. Because the newer clean refinery technology is designed to greatly reduce emissions of chemicals to the local environment compared to the existing old technology, exposures related to the old technologies do not adequately represent the potential exposures the might result from the newer clean technologies. For this reason, ATSDR concluded that the outcomes of the existing health studies were not applicable to technological processes at the proposed MHA Clean Fuels Refinery. Because of the lack of applicability, detailed review and analysis of the results of the existing health studies were not presented.

Researchers and experts in air quality and adverse health effects associated with refineries were also contacted to solicit information on chemicals the might be emitted by oil refineries. These contacts shared industry-specific reports for projects in western Canada during the years 2001-2006 and identified chemicals and compounds present in the oil industry that might be related to cancer risk. The chemicals selected were detected at multiple Canadian oil refineries that had recently evaluated the environmental and human health impacts of expansion and technical upgrades. The list of chemicals is included in the "ATSDR Literature Review and Summary of Potential Adverse Health Effects Associated with Living near and/or Working at an Oil Refinery", which is appended to this EIS in Appendix D. Chemicals are identified by class, including criteria air contaminants, such as CO, nitrogen oxides, and sulfur dioxide; VOCs, such as the compounds found in gasoline; and polycyclic aromatic hydrocarbons. Reviews of each of the major chemicals within these groups are included, covering their toxicity and potential adverse health effects to humans.

ATSDR Baseline Health Assessment of Asthma and Cancer for the Fort Berthold Indian Reservation

ATSDR compiled statistics on the present incidence of select cancers at the Fort Berthold Indian Reservation that will serve as baseline statistics for the population. Any future data collected after oil refinery operations can be compared with this baseline data. The North Dakota Health Department was contacted to acquire statistics on the current incidence of cancer for McLean, Mountrail, and Ward counties. Because the scientific literature on occupational studies of workers who have been exposed to high levels of oil or gasoline has indicated an increased incidence of cancers of the kidney and non-Hodgkin's lymphoma, these cancers served as the focus of the review. The reported age-adjusted average annual cancer incidence (per 100,000 population) for kidney cancer and non-Hodgkin's lymphoma in McLean, Mountrail, and Ward counties, North Dakota, between the years 1997-2004 were compiled. The reported incidence of these cancers among persons living in these three counties was found to be similar to the rates for all persons living in North Dakota. ATSDR concluded that because of the small population size in each of these three counties, the ability to statistically detect changes in cancer rates over time would be difficult.

The local IHS that provides healthcare to American Indians living on the Fort Berthold Indian Reservation was contacted for information on asthma prevalence. Only American Indians were included in the statistics; non-American Indians in outlying communities who could be exposed to chemicals released into the air but who would report to a different health care facility were not included in these statistics. Baseline incidence data on asthma for the population served by the IHS was compiled.

The North Dakota Health Department was also contacted to acquire baseline data on the prevalence of asthma among adults and children in North Dakota; data were not available on a county-wide basis. Data on the prevalence of asthma was based on self-reporting. Between 2001 and 2005, the prevalence rate of lifetime asthma among North Dakota adults was found to range between 9.1 percent and 11.1 percent. In 2005, the lifetime asthma prevalence rate among children in North Dakota ranged between 7.8 percent and 11.6 percent. The prevalence rates for adults in North Dakota were similar to the US and American Indian prevalence rates during the same period. ATSDR concluded that assessing asthma prevalence rates on a state-wide basis would hinder the statistical detection of changes in asthma incidence at the county-level. This conclusion suggests that subtle changes in asthma incidence in the study counties over time might not be detectable. The complete results of the Baseline Health Assessment are in the ATSDR Technical Report on the enclosed CD-ROM.

Refinery Employees Health Risk

Employees of the refinery would be exposed to more air emissions and hazardous chemicals than the general public, because of their proximity to chemicals and potential exposures during refinery operations. Six toxicological studies are discussed below regarding refinery worker health. There are limitations of these studies for use as a direct comparison because of numerous factors including: age of technology employed at studied facilities and use of clean fuels refinery tending to emit fewer contaminants.

A study of mortality among oil refinery and petrochemical employees was conducted for a group of 3,803 persons employed at the Norco Manufacturing Complex, a refinery/petrochemical manufacturing complex near New Orleans, Louisiana, for at least six months between January 1, 1973 and January 1, 1994, and retirees who were actively employed at the facility on January 1, 1973. Mortality from all causes including all cancers, heart disease, nonmalignant respiratory diseases, and liver cirrhosis was significantly decreased in the group regardless of the reference population used. The authors concluded that the decreased mortality rates found in the group probably reflects the healthy worker effect, relatively low workplace related risks, and the many benefits associated with continuing employment including greater access to health care (Tsai et al. 1997).

A long-term study investigated the possibility of increased death (mortality) among a group of 12,526 white male oil refinery workers over a 41-year period. The mean ages at time of death for this group were 53, 57, and 74 years of age, respectively, for active, terminated, and retired workers. This seems to indicate active workers are dying at an earlier age. However, the number of deaths within each group was not statistically increased. The Standardized Mortality Ratio (SMR) is a value that is used as an indicator that the number of deaths within a population of workers is normal or unusually high (due to work-related accidents, health problems, etc.). Simply put, the SMR compares the number of deaths that have occurred in a worker population (study group) to the number of expected deaths based on the general population (control group). Because each age group in a large population has a different rate of death, SMRs are usually reported as age adjusted. An SMR of 1.0 indicates there is no increase in mortality (number of deaths in the worker population is exactly the expected number). Likewise, an SMR greater than 1.0 indicates the number of deaths was higher than expected and an SMR lower than 1.0 indicates that the number of deaths was fewer than expected. In the group of oil refinery workers, the SMRs for all causes of death were 0.68, 1.04, and 0.89 for the three age groups noted above. The SMRs due to deaths from all types of cancer for this same group of workers was 0.85, 0.98, and 1.05. These SMRs indicate the death rate was not increased for either all causes of death or for deaths specifically due to cancer for any of the three age groups. It was noted that the SMR was actually decreased for active and terminated workers. However, this may simply reflect that the control group does not accurately represent or match the worker group (since the number of observed deaths should not be significantly lower than the number of expected deaths). Nevertheless, deaths from specific medical causes such as cerebrovascular, arteriosclerotic, and nonmalignant respiratory causes were lower in the worker group. Early retirees also showed excess deaths from nervous and sense organ diseases. Terminated workers showed varying degrees of higher SMRs than the active workers did for all categories except stomach cancer and cerebrovascular and arteriosclerotic heart disease (Wen et al. 1984).

The third study was an epidemiological study, which was conducted on workers in three major U.S. oil refineries and chemical facilities. The group consisted of 21,698 workers. No geographic site group showed consistently different rates for all major causes of death. Kidney cancer was the only cause of death whose rate was higher among workers than for the U.S. population. Mortality rates for potentially exposed workers were slightly higher than those for unexposed workers (Hanis et al. 1985).

In the fourth study, the brain cancer mortality rate in refinery and petrochemical workers was investigated. The study population consisted of 8,666 persons employed at a facility located in Baton Rouge, Louisiana, for at least one month between January 1, 1970 and December 31, 1977, and retirees who were alive on January 1, 1970. The authors noted that because of the small number of cases and the multiplicity of exposures experienced at the facility, a relationship between worksite exposures and brain cancer could not be established. The only conclusion that can be drawn from the study was that an excess mortality from brain cancer has not occurred when compared with the general U.S. population (Hanis et al. 1982).

To determine the risk of non-Hodgkin’s lymphoma in petroleum workers, groups of petroleum workers in the United States, the United Kingdom, Canada, Australia, Italy, and Finland were identified. The combined multinational group consisted of more than 308,000 workers, and the observation period covered an interval of 60 years from 1937 to 1996. Results from individual studies, as well as from the pooled analysis, indicated that petroleum workers were not at an increased risk because of their exposure to benzene or benzene-containing petroleum products in their work environment (Wong and Raabe 2000).

The sixth report evaluated worker health data for exposure to gasoline in a variety of occupations. A discussion was presented of animal and human studies implicating gasoline as a carcinogen. Gasoline contained 30 to 40 percent aromatic carcinogens, primarily benzene, toluene, ethylbenzene, and xylene. Human exposures occurred in gasoline production, transport and dispensing. Skin contact, accidental ingestion and vapor inhalation were primary exposure routes. Vapor intoxication produced neurological effects and liver and kidney damage. Mortality studies of members of the Oil, Chemical and Atomic Workers International Union in Texas and of its members in Texas refineries showed increased rates of cancers of the digestive organs and peritoneum, respiratory systems, skin, stomach, pancreas, prostate, brain, and hematopoietic and lymphatic systems. The International Agency for Research on Cancer classified gasoline as a possible human carcinogen, and the EPA classified it as a probable human carcinogen. The author suggests that gasoline be considered a Class 1A carcinogen, that benzene limits in gasoline be reduced from current levels (2.5 to 5 percent) to ½ percent and that stage-II controls for gasoline vapor recovery in public gasoline pumps be implemented in all states (Mehlman 1990).

The numerous studies performed on workers in the petrochemical industry because of the potential for adverse impacts results, when taken as a whole, do not suggest clearly identifiable impacts to workers.

4.16.1.5 Clean Fuels Refinery Site- Specific Air Emissions Modeling

A hazardous and criteria ambient air impact analysis was performed for the proposed refinery. Modeling methodology and results are described in detail in the air quality technical report (December 2007) and briefly summarized below.

Criteria Pollutants Emission Modeling

Criteria emission prediction modeling was conducted for NO_2, CO, SO_2, ozone, $PM_{2.5}$, and PM_{10}. Modeled maximum ambient air impacts were compared with EPA established NAAQS for these parameters. Background concentration data were also used to assess these impacts. Table 4-15 summarizes the modeling results. In general, modeled impacts together with background concentrations represented about 5 to 39 percent of NAAQS. No direct correlation to human health impacts was assessed.

Hazardous Pollutants Emission Modeling

Hazardous emission modeling was conducted to determine human health impacts resulting from inhalation and was conducted for the following parameters:

- Benzene
- Cyclohexane
- Ethylbenzene
- Formaldehyde
- Hexane (-n)
- Polycyclic Aromatic Hydrocarbons
- Toluene
- Xylene

These are common parameters that are typically found in air emissions from petroleum refineries. Table 4-27 presents the results of the HAP ambient impact modeling and current health-based inhalation risk estimates. Modeling was conducted to assess non-carcinogenic health effects of substances (chronic reference concentration [RfC]) and cancer unit risk. The first three columns of this table show the estimated impacts from dispersion modeling. The fourth and sixth columns present the federal risk estimates that are used to determine the significance of the impacts. The fifth column presents the Unit Risk value. This value shows the estimated probability of cancer risk, from inhalation, for an ambient concentration of 1.0 microgram per cubic meter ($\mu g/m^3$) of the corresponding HAP. The value in the sixth column is a conversion of the Unit Risk value that represents the ambient concentration that would result in an estimated probability of cancer incidence, from inhalation, of one in one-million (1x10-6).

Because the hazardous emissions are correlated to chronic health effects (i.e., long-term exposure), only the estimated annual concentrations need to be assessed. Both the RfC and Unit Risk are related to lifetime exposure to a hazardous emission; therefore, assessing a one-year average concentration against these criteria is a conservative estimate of exposure over a lifetime. As Table 4-27 shows, the estimated ambient impacts are below the federal risk based concentrations.

__Chronic Reference Concentration__

In general, the RfC is an estimate of a continuous inhalation exposure for a chronic duration (up to a lifetime) to the human population (including susceptible subgroups) that is likely to be without an appreciable risk of adverse health effects. The inhalation RfC considers toxic effects for both the respiratory system and peripheral to the respiratory system. The RfC values are chemical-specific, with a lower RfC value implying a greater toxicity of the substance. As an example, benzene with a RfC concentration of 30 μg/m^3 would have a higher toxicity than cyclohexane with a RfC value of 6,000 μg/m^3.

Table 4-27 Hazardous Air Pollutant Ambient Impact Analysis Results

HAP	Estimated Ambient Concentrations (μg/m³) 1-Hour	24-Hour	Annual	RfC[1] (non-cancer risk) (μg/m³)	Unit Risk[2] (excess cancer risk per 1.0 μg/m³) (μg/m³)$^{-1}$	1:1E+6 Risk Conc.[3] (cancer risk) (μg/m³)	Risk Estimate Source[5]
Benzene	4.04E-01	8.77E-02	1.32E-02	30	2.20E-06	4.55E-01	1
Cyclohexane	3.05E-01	6.63E-02	9.91E-03	6,000	-	-	1
Ethylbenzene	2.38E-03	5.20E-04	8.00E-05	1.000	-	-	1
Formaldehyde	4.36E-01	1.34E-02	1.81E-03	-	1.30E-05	7.69E-02	1
Hexane (-n)	3.50E-02	7.60E-03	1.14E-03	700	-	-	1
PAH[4]	6.22E-02	4.80E-04	5.00E-05	-	1.10E-03	9.09E-04	2
Toluene	1.52E-01	3.37E-03	6.00E-04	5,000	-	-	1
Xylene	1.06E-01	1.59E-03	2.70E-04	100	-	-	1

Notes:

1. Chronic Reference Concentration (RfC): An estimate of a continuous inhalation exposure for a chronic duration (up to a lifetime) to the human population (including susceptible subgroups) that is likely to be without an appreciable risk of adverse health effects over a lifetime.
2. Unit Risk: The upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 μg/m^3.
3. Unit risk value converted to a concentration that may cause 1 incident per 1,000,000 people exposed.
4. Polycyclic Aromatic Hydrocarbons
5. Risk Estimate Sources:
   1. USEPA Integrated Risk Information System (http://www.epa.gov/iris/ ; and
   2. California OEHHA/ARB Approved Risk Assessment Health Values (http://www.arb.ca.gov/toxics/healthval/healthval.htm)

The RfC concentration values for specific chemical parameters established by EPA and the California EPA's Office of Environmental Health Hazards Assessment (OEHHA)/Air Resources Board (ARB) (Table 4-22) are compared directly to the estimated annual concentrations resulting from the proposed refinery's hazardous emission modeling. The predicted annual ambient concentrations in μg/m^3 are significantly (3 to 8 orders of magnitude) lower than the RfC values for the listed parameters.

Unit Risk

Unit risk is defined as the lifetime cancer risk estimated to result from continuous exposure to a cancer-causing agent at a concentration of 1 μg/m^3. The Unit risk is converted to a comparable concentration that may result in 1 incident of cancer for every 1,000,000 people exposed. The calculation is as follows:

$$(1/\text{Unit Risk } (\mu g/m^3)\text{-}1)/1{,}000{,}000 = 1{:}1{,}000{,}000 \text{ Risk Concentration } (\mu g/m^3)$$

Comparing the estimated annual concentrations to the 1:1,000,000 risk concentrations shows that the estimated annual concentrations are below the 1:1,000,000 risk concentrations for cancer (Table 4-22). A 1:1,000,000 risk concentration means that there is one chance in 1,000,000 of an additional person developing cancer due to exposure to the parameter(s) being assessed.

Human Health — Air Impact Analysis Conclusions

Rationale for the position that the proposed refinery would not have significant adverse effects on the human health of the local and area communities include the following:

- The production volume (13,000 BPSD) of the proposed refinery is considered small in comparison to most other refineries in the U. S. The amount of emissions generated and discharged would be correspondingly less than what is typically produced from larger refineries.
- The refinery's primary feedstock would be synthetic crude, which has been upgraded (i.e., hydrotreated) prior to delivery to the refinery. This advanced treatment would remove contaminants from the crude that would reduce the potential for emissions further downstream in the refinery process. Contaminants that would be removed include sulfur, nitrogen, most metals, and various hazardous organic compounds.
- The refinery process would **not** include a fluidized catalytic cracking unit, which is the largest air-emitting unit in most refineries.
- The refinery process would not use an alkylation unit that utilizes either hydrofluoric acid or sulfuric acid. Such units are potential sources of hazardous chemical releases.
- Elevated flares would only be used for disposal of gases released during emergencies.
- Natural gas and fuel gases would be used for the refinery's boilers and heaters, with no use of fuel oils. Combustion of natural gases and fuel gases would result in lower emissions than that of fuel oil combustion.
- The refinery would use a highly efficient sulfur removal unit to remove sulfur from fuel gas burned in the refinery's process heaters.
- Ultra-low NOx burners would be used for control of NOx emissions from the refinery's boilers and heaters.
- Selective catalytic reduction (SCR) would also be used for control of NOx emissions in the refinery.
- Ammonia emissions from the SCR-equipped process heaters would be minimized.
- Floating roofs would be used on selected hydrocarbon liquid storage tanks (e.g., gasoline) for the control of VOCs.
- The refinery would utilize a stringent program for preventing VOC emissions by monitoring, detecting and repairing leaks in equipment such as valves and pumps.
- A vapor recovery system would be used to minimize the loss of VOCs from the tank farm, rail and truck loading docks, and the WWTP. This system would consist of floating roof(s), spherical and bullet storage tanks in the tank farm, and a separate pipe loop that would collect vapors at each tank, loading spot and the WWTP. Vapors collected by the system would be compressed, air cooled and returned to the process for recovery. This vapor recovery system would minimize fugitive emissions of VOCs from the refinery.
- Standard operating procedures would be developed and utilized in order to ensure consistent and effective operation of refining process equipment and control equipment. This would help to ensure emissions are controlled to the maximum degree possible, as dictated by the equipment design.
- The Ponca City assessment of air emissions risk conducted by ODEQ concluded that there was no significant increased lifetime cancer risk from volatile organic emissions.

Estimated volatile organic emissions from the proposed MHA Nation Refinery would be significantly lower than the emissions from the industrial sources in the Ponca City study. In a general comparison, the proposed MHA Nation Refinery would be expected to demonstrate similar results - no significant increased lifetime cancer risk from volatile air emissions.

- The qualitative analysis of acute and chronic human health risk at three Canadian refineries indicated negligible to low risk from direct and indirect exposures to refinery emissions. Because these refineries were determined to have negligible to low risk and they are significantly larger than the proposed MHA Nation Refinery, it is reasonable to conclude that human health risks from the proposed MHA Nation Refinery will, at most, be negligible to low.
- The site-specific quantitative risk analyses of criteria and HAPs performed for the proposed MHA Nation Refinery indicate that the magnitude of modeled air emissions and subsequent exposures were low enough that, when compared to risk based concentrations and previous health effects research for refineries, no correlation to adverse human health effects could be established.

Ecological Receptors

Chemicals taken up by ecological receptors may find their way into human receptors where they contribute to the impacts previously discussed, or they may affect the ecological receptor itself. The potential impacts of refinery chemicals on aquatic life are discussed above in the sections on water quality, wetlands, and aquatic life. In general, these impacts could result in decreased community diversity and biological resilience, as well as an increase in the populations of species that are highly tolerant of contaminants. During this process, individual organisms may experience toxic effects, such as deformities from abnormal development or tumors, decreased reproduction, or increased mortality. Eventually, impacts to ecological receptors may move from effects on individuals, to effects on populations, to changes in community composition and diversity, to reductions in ecosystem functions.

In terrestrial environments, contaminants may also bioaccumulate and increasingly impact species that are higher in the food chain. In this environment, although exposure to contaminants is primarily via ingestion of food and water, the impacts are similar to those in an aquatic setting in that individual animals may be affected, followed by impacts to the population, and then impacts to community structure and function, and ultimately to the ecosystem itself.

Because plants are at the bottom of food chains, they generally are not subject to impacts from high doses of chemicals that result from bioaccumulation. Rather, in both aquatic and terrestrial environments, particular plant species would tend to grow, grow poorly, or not grow at all as a result of exposure to chemicals in the soil, water, or air that surrounds them. Ultimately, this affects the composition and diversity of a plant community and the wildlife habitat it provides.

Ecological Receptors — Air Impact Analysis Conclusions

The rationale for the position that the proposed refinery would not have significant adverse effects on the ecological receptors of the immediate and surrounding area includes those factors given for impacts to Human Health, particularly the refinery process-related factors, plus the following:

- Impacts to ecological receptors were evaluated by combining the results of site-specific quantitative emissions modeling of criteria and HAPs for the proposed refinery with a food chain model that examined potential exposures at four locations in the immediate vicinity of the process area. To assess the potential for refinery emissions to adversely affect ecological receptors, maximum concentrations of chemicals in soils at each of these areas were compared to applicable ecological screening values (Table 4-12). Estimated maximum soil concentrations were all well below (i.e., at least four orders of magnitude) applicable ecological screening values.

- While some uncertainty arises from the fact that available screening values are primarily based on exposures to mammals only, effects to other terrestrial receptors such as birds, plants, and invertebrates are unlikely given the relatively low estimated maximum soil concentrations. These contaminant concentrations would not be detectable using standard analytical methods.
- Based on the relatively low estimated maximum soil concentrations, the refinery emissions would result in no significant loss or degradation of habitats in the immediate vicinity nor would they result in displacement, habitat fragmentation, or reduced availability of prey, which might affect larger terrestrial receptors.
- The impacts to aquatic receptors are primarily associated with potential exposures through wastewater discharges rather than air emissions.

4.16.2 Construction Alternatives

4.16.2.1 Alternative 2—Transfer to Trust, No Refinery

In the absence of refinery construction and operation, only chemicals and safety hazards associated with agriculture would be present at the site. Impacts from these would be the same as current impacts and not a result of this project. Thus, there would be no refinery chemicals, emissions, and effluents; no chemicals subject to uptake by receptors; no impacts on human health and the environment.

4.16.2.2 Alternative 3—No Transfer to Trust, Refinery Constructed

Alternative 3 differs from Alternatives 1 and A only in the trust status of the property. The difference in trust status would not alter any of the following: refinery chemicals, emissions and effluents or their fate and transport; receptors of chemicals directly or in emissions and effluents; impacts to human health and the environment. Therefore, the impacts from Alternative 3 would be the same as the impacts from Alternatives 1 and A with regard to health and safety.

4.16.2.3 Alternative 4—Modified Proposed Action

Alternative 4 differs from Alternatives 1 and A only in that the refinery facilities would be reconfigured on the site to minimize impacts on a wetland and swale and the wastewater holding ponds would be replaced with a tank. The difference in facility configuration would not alter any of the following: refinery chemicals, emissions and effluents, or their fate and transport; receptors of chemicals directly or in emissions and effluents; impacts to human health and the environment; or the mitigation measures needed. Therefore, the impacts from Alternative 4 would be the same as the impacts from Alternatives 1 and A with regard to health and safety.

4.16.2.4 Alternative 5—No Action

Similar to Alternative 2, only chemicals and safety hazards associated with agriculture would be present at the site in the absence of refinery construction and operation. Impacts from these would be the same as current impacts and not a result of this project. Thus, there would be no refinery chemicals, emissions, and effluents; no chemicals subject to uptake by receptors; no impacts on human health and the environment; and no need for mitigation as a result of this project.

4.16.3 Effluent Alternatives

4.16.3.1 Alternative B— Partial Discharge Through NPDES Permit and Some Storage/Irrigation

Under this alternative, surplus treated wastewater would be disposed of through land application to irrigate trees and crops on the project site, as practicable; otherwise, there would be discharge through NPDES permitted outfalls. Impacts to human health from discharging treated wastewater would be essentially the same as those discussed above under alternative A, although there would be less water discharged to surface water under alternative B.

Unlike the Alternatives 1 and, this alternative would involve irrigating crops potentially consumed directly by humans or crops used as forage for livestock that would be consumed by humans. As a result, there is a potential for exposure to contaminants in wastewater via food chain exposure pathways. Potential plant uptake of certain contaminants present in irrigated wastewater may result in accumulation of contaminants in soils or plant tissues at concentrations greater than those present in wastewater. In particular, uptake and storage of metals, such as mercury, chromium, and lead, in plant tissue could pose a risk to humans who consumed crops irrigated with wastewater from the refinery or who consumed livestock fed forage irrigated with wastewater from the refinery.

While it is unclear if these scenarios will occur, they represent an uncertainty that has not been quantitatively evaluated and must be considered when evaluating each alternative. Until such time as a quantitative analysis of the potential risks posed by discharge of refinery wastewater via irrigation of crops has been performed using actual site-specific data, it cannot be determined that alternative B will be protective of human health and the environment. Therefore, refinery wastewater effluent should not be used to irrigate food chain crops until a quantitative risk assessment is conducted.

The refinery wastewater is considered to be (by definition) a solid waste under RCRA. As such, all wastewater proposed to be used for irrigation should be treated to meet appropriate standards to protect human health and the environment. In addition, unless the wastewater is treated sufficiently, it will continue to be considered a solid waste containing hazardous waste constituents, and RCRA Corrective Action requirements would apply for the irrigated land parcel. This is because the irrigated land parcel would be considered a SWMU. Therefore, a RCRA TSD permit may establish additional treatment levels for irrigation water.

4.16.3.2 Alternative C—Effluent Discharge to an UIC Well

The injection of treated effluent into an UIC well would not change the quantities or types of pollutants emitted/discharged from the refinery site. However, injection could alter the fate and transport of chemicals in air, water, and soil pathways, thereby changing exposures to human and ecological receptors. Since the wastewater would first be treated in the WWTU and then injected into the well, it would be unavailable as a pathway for residual chemicals to reach receptors that are contemporary with the refinery. The injected wastewater would have to meet applicable RCRA UIC permit requirements.

4.16.3.3 Alternative D—No Action

Under this alternative, the proposed Refinery would not be constructed. Thus, there would be no refinery chemicals, emissions, and effluents; no chemicals subject to uptake by receptors; no impacts on human health and the environment; and no need for mitigation as a result of this project.

4.16.4 Cumulative Impacts

No cumulative impacts were identified for health and safety. No reasonably foreseeable actions were identified that would have effects in the affected area that would overlap in time or space with the direct and indirect effects discussed above.

4.17 Mitigation Measures, Controls and Selected Plans

The following section lists the mitigation measures developed to avoid or reduce the impacts of the proposed project and alternatives. The mitigation measures are listed by the types of impacts being mitigated and the phase of the project. Mitigation measures will need to be implemented throughout the construction, operation and closure of the proposed facility. There are three main types of mitigation measures: (1) mitigation/control measures that are incorporated into the design of the refinery, (2) practices or procedures implemented during construction and/or operation to control/limit impacts and (3) monitoring and inspection programs to ensure that the controls and mitigation measures are performing and assure a rapid response if problems develop. The discharge and/or emission limitations from environmental permits are not considered mitigation measures and, therefore, are not included in this section. For more information on these environmental permits please see the water and air resource sections in this Chapter.

Some of the mitigation and control measures are required by a federal environmental statute or permit, while others are recommended. For mitigation measures and plans that are recommendations, the refinery operator may or may not implement those measures.

Table 4-28 summarizes the permits, plans and mitigation measures for the proposed alternatives, and describes whether or not the measures are required. Table 4-29 summarizes the monitoring, inspecting, and reporting activities for the refinery construction alternatives, including information on whether or not the activity is required, reporting requirements, if any, and potential follow-up actions.

4.17.1 Design and Operating Measures to Prevent and Contain Spills and Leaks

The following measures will prevent, limit or control contamination of surface water, soil and ground water from leaks and spills from the refinery.

- Design and operate the refinery to prevent or reduce the likelihood of spills, leaks, and other releases. [Included as part of the proponent's proposal (Alternative 1 and A and all other construction alternatives. Would be a condition for the acceptance of the land into Trust for the purpose of constructing the clean fuels refinery]
- Design and construct curbing, secondary containment, and paving of vulnerable areas. [Included as part of the proponent's proposal (Alternative 1 and A) and all other construction alternatives.]
- Separate oily and non-oily stormwater management systems. Stormwater from areas with potentially oily stormwater, such as the process and loading areas, would be contained through curbing and gutters and conveyed to the wastewater treatment system. [Included as part of the proponent's proposal (Alternative 1 and A) and all other construction alternatives.]
- Double wall tanks or double-lined ponds would be installed for any units that contain contaminated (oily) or potentially contaminated (oily) wastewater. [Mix of required and recommended actions. Requirements under RCRA TSD permit for ponds and some tanks, for all construction alternatives except 4 and A. Recommended for Alternative 4

and A, and in general for all tanks storing oily or hazardous materials. Double-bottomed tanks are recommended, but not required for any construction alternatives.]

- Develop and implement, SPCC and FRPs and other emergency response plans to prevent, contain, and remediate spills. Workers would also be well trained for implementation of these plans. [Required]
- Leak detectors to prevent infiltration from the evaporation and holding ponds. [Required by RCRA TSD permit for Alternatives: 1 and A, 1 and B, 1 &C, 3 and A, 3 and B and 3 and C. Recommended for Alternatives 4 and A, B, and C as tanks are used instead of surface impoundments.]
- Conduct routine inspections of facilities to evaluate whether there are spills or leaks and take corrective actions, as appropriate. [Required for tanks, pipes and containment regulated by the SPCC and FRPs and under the stormwater permit. Additional equipment and facilities inspections would also be required for all construction alternatives except 4 and A under the RCRA TSD permit.]
- All HWMUs are required by RCRA to be adequately protected from 100-year flood events.

4.17.2 Measures During Construction to Protect Surface Water and Reduce Soil Erosion

- Develop a SWPPP in accordance with the NPDES construction stormwater permit. The SWPPP would identify areas that have potential for pollutants entering into the stormwater systems at the facility and BMPs to minimize pollutant introductions from those identified sources. [Required by the NPDES stormwater construction permit]

4.17.2.1 General Erosion and Sediment Control During Construction

The following are standard mitigation measures to reduce impacts to surface water and reduce prevent soil erosion during construction. These measures are mix of required and recommended actions, depending on the specific permit condition in the NPDES stormwater construction permit and SWPPP.

- A sedimentation and erosion control plan would be used throughout construction to minimize land disturbing activities. Any runoff from the construction areas would flow through sedimentation and erosion control devices before entering any surface water body.
- Keep the area of disturbance to a minimum at any given time through avoidance of disturbance and concurrent reclamation.
- Divert surface runoff from undisturbed area around the disturbed area.
- Retain sediment within the disturbed area.
- Route runoff through the disturbed area using protected engineered channels and culverts so as not to increase sediment load.
- Use adequate sediment ponds, with or without chemical treatment.
- Use riprap, straw dikes, check dams, mulches, temporary vegetation, or other measures to reduce overland flow velocities, reduce runoff volume, and retain sediment.
- Retain stabilizing vegetation on unstable soils to the extent possible.

- Avoid continuous disturbance that provides continuous conduit for routing sediment to streams.
- Inspect all erosion control structures at least every 14 days and after any precipitation or snowmelt event that has the potential to cause surface erosion.
- Repair erosion, clogged culverts and other hydrological controls in a timely manner.
- If BMPs do not result in compliance with applicable standards modify or improve such BMPs to meet the controlling standard of surface water quality.

4.17.2.2 Roads, Sediment Control during both construction and operation

The following are standard mitigation measures to reduce impacts to surface water and reduce prevent soil erosion from roads. All of measures in a section are part of the proponent's proposal. The last five measures are also typical BMPs that could be required under the SWPPP required by both the stormwater construction permit and the NPDES permit during operations.

- Restricting the length and grade of roadbeds;
- Surfacing roads with durable material;
- Creating cut and fill slopes that are stable.
- Revegetating the entire road prism including cut and fill slopes.
- Providing adequate road cross drainage to reduce erosion.
- Installing properly designed ditches, water-bars, cross drains, culverts, and sediment traps to pass peak flows from pre-defined precipitation storm events.
- Creating and maintaining vegetative buffer strips, and constructing sediment barriers (e.g. straw bales, wire-backed silt fences, check dams) during the useful life of roads.
- Periodically maintaining erosion control structures to prevent blockage or impedance of drainage or significant alteration of the intended purpose of the structure.

4.17.3 Protect and/or Reduce Impacts to Waters of the US, Wetlands and Riparian Habitat

4.17.3.1 Streams, Ponds, Riparian Habitat

These measures are mix of required and recommended actions, depending on the specific permit conditions in the NPDES stormwater construction permit, NPDES refinery permit, and the CWA 404 permit(s) (nationwide or individual permit).

- To the extent possible maintain vegetation within 50 feet adjacent to streams, creeks and ponds.
- Install stream crossings to maintain bankfull dimensions of width, depth, and slope.
- Where pipelines cross streams, creeks and ponds, install and maintain automatic shutoff valves.
- All reasonable precautions shall be taken to ensure that turbidity is kept to a minimum, and violations of surface water standards are prevented.
- Re-established riparian vegetation as soon as practical following operation or building activities.

- Conduct ambient stream monitoring during operation for erosion and channel down cutting.

4.17.3.2 Wetland Construction Mitigation

Wetland construction methods would be in accordance with applicable permit conditions. To avoid or minimize impacts on wetlands, the construction contractor would implement measures during the construction and operation of the proposed petroleum refinery and pipeline facilities. The measures may include, but are not limited to, the following requirements. There may be additional requirements in the stormwater construction permit and the CWA 404 permit(s) (nationwide or individual permit).

- Construction equipment operating within the ROW should be limited to that equipment necessary for clearing, excavation, pipe installation, backfilling, and restoration activities. All equipment should use upland access roads to the maximum extent practicable.
- Equipment operating within saturated wetlands would be low-ground-weight equipment.
- Temporary erosion and sedimentation control measures would be installed immediately after the initial disturbance of wetland soils and would be inspected and maintained regularly until final stabilization.
- Sedimentation controls would be installed across the construction ROW, as needed, within wetlands to contain trench spoil.
- Grading of riparian vegetation and pulling of tree stumps would be limited to the area directly over the trench line unless additional grading or stump removal is required for worker safety.
- In unsaturated wetlands, the uppermost 12 inches of topsoil along the pipeline trench should be segregated from the underlying subsoil.
- A site-specific wetlands mitigation plan would need to be developed and approved by the USACE for any wetlands that are impacted through a CWA Section 404 permit. The mitigation plan would include the specific location, acres of wetlands and uplands that would mitigate wetland impacts. The plan would also identify the wetland plant communities that would be created or restored, site hydrology, and maintenance of the mitigation site.

4.17.4 Measures to Protect Surface and Ground Water During Refinery Operations

- Conduct routine water quality monitoring of the effluent at all outfalls. [Required for all discharges under NPDES and UIC permits (Alternatives A and C). For Alternative B, the portion of effluent discharged through the NPDES permit would be required to be monitored. Monitoring of the wastewater land applied would be a mix of recommended actions and requirements under RCRA TSD permit. The TSD permit could include some monitoring and reporting requirements.]
- Design, install and implement a ground water quality monitoring program for the Project Area to provide an early warning of potential contamination. A Ground Water Protection Program as discussed with the MHA Nation could include monitoring and reporting. [Required by the RCRA TSD permit for all construction alternatives except 4 and A, recommended for Alternative 4 and A.]

- If erosion occurs at the outfall locations, an energy dissipater would be installed at the end of the outfall pipe to reduce potential erosion impacts from high volume discharge periods. [Recommended]

4.17.4.1 Design and Operating Measures for Alternative B – Land Application

The following mitigation measures are in addition to the other mitigation measures and controls. These measures are only applicable to refinery construction alternatives combined with effluent discharge Alternatives B (partial discharge under the NPDES permit and land application).

- Development and implementation of an effective irrigation farm management plan for irrigation alternatives. The plan would include procedures for determining agronomic and loading rates for the crops being grown. The plan should also be protective of human health and the environment. [Mix of recommended and required measures for these alternatives. Some requirements under the solid waste disposal regulations.]
- Upon operation of the refinery, test effluent quality to determine the concentrations of any hazardous constituents, if any, in the treated wastewater. No hazardous waste would be permitted to be land applied.
- Upon operation of the refinery, test effluent quality for sodium, calcium, and magnesium concentrations to determine appropriate salinity limitations for irrigation. [Recommended as good agronomic practice and to minimize impacts to soil from irrigation.]
- Implement a ground water monitoring program to assess potential and actual impacts to soils and ground water from land application operations. The results of the monitoring would be used to modify the irrigation farming operations and treatment if necessary. [Mix of required and recommended monitoring. Some monitoring would be required by the land disposal regulations for RCRA solid waste.]
- Conduct annual soil testing to determine salinity and key nutrient levels in the soil. If testing shows high levels of salinity or deficient key nutrients, implement one or more of the standard soil treatment methods to counter sodium buildup from the use of saline irrigation water. [Recommended as good agronomic practice and to protect long-term soil productivity.]

4.17.5 Facility Design Considerations to Protect Birds

- Electrical transmission lines would be constructed to minimize collision and electrocution risks to birds, according to APLIC, Edison Electric Institute's Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 and Edison Electric Institute's "Mitigating Bird Collisions with "Power Lines: The State of the Art in 1994."
- Cobbles would be placed on the side slopes of all wastewater/storage ponds to discourage plovers from nesting. [This is a recommendation that the Tribe has committed to in writing, although there would be no regulatory requirement to implement this measure. However, if a species on the Federal List of Endangered and Threatened Species or a species protected under the Migratory Bird Treaty Act were to become oiled there could be enforcement actions under the ESA, the Migratory Bird Treaty Act by the FWS, or other applicable laws.]
- Any ponds/tanks with potentially contaminated (oily) water would be netted. [This is a recommendation that the Tribe has committed to in writing, although there would be no

regulatory requirement to implement this measure. However, if a species on the Federal List of Endangered and Threatened Species or a species protected under the Migratory Bird Treaty Act or other applicable laws were to become oiled there could be enforcement actions by the FWS.]

4.17.6 Cleanup of Contamination, Closure of the Refinery

- Obtain financial assurance or bonding for cleanup and closure of the facility. [Financial assurance would be required for all HWMUs and for releases from SWMUs if the facility is regulated as a TSD facility for all construction alternatives except 4 and A where the facility would be a generator only. RCRA financial assurance requirements do not extend to closure and dismantling of process or product units. Financial assurance or bonding is recommended for all alternatives. The money would pay for corrective action and other cleanup activities.]
- Work with tribal authorities on establishing requirements for solid waste land application units (Alternative B only, concerning irrigation of wastewater). [The requirements for solid waste land application units on tribal lands are self-implementing. However, in order to ensure full implementation, the MHA Nation would need to establish an effective program that is protective of human health and the environment.]

4.17.7 Human Health Risks and Safety Mitigations

Mitigation of Emission/Effluent Fate and Transport

Adhering to OSHA standards during construction and following typical BMPs would minimize exposure to chemicals on the site and the distribution of chemicals and particulates via air, water, or soil. Examples of typical BMPs include use of silt fences and straw bales to minimize erosion, watering or chemical compounds to minimize dust, and storage of fuels in lined and bermed areas. The measures mentioned above as mitigation to protect water resources and soil are applicable and would serve to minimize the human exposure of chemicals that are on site and the potential for these chemicals to move off site during construction.

During refinery operation, the diverse chemicals that are used on the site would be contained in tanks or other storage vessels and handled according to OSHA standards. As noted above in the discussion of mitigation measures to prevent contamination of water resources and soil, double liners and berms would be used to contain any inadvertent spills, and shut-off valves would be installed at strategic locations in pipelines to minimize the volume of any spill. Careful monitoring of pipeline flows would enable early detection of spills. During fluid transfers, particular care would be taken to avoid spills by ensuring use of proper techniques through training and careful oversight. During turnarounds when tanks are cleaned and catalysts are replaced, proper protective equipment for workers and cautious procedures would minimize exposure to chemicals and the release of these chemicals into the air, water, or soil. Use of netting on the two effluent holding ponds, as well as on the evaporation pond if it has poor water quality, would prevent contaminants in these waters from entering the food chain via water birds that might be attracted to these ponds. In addition to mitigating the exposure of people to chemicals and the transport of chemicals to the environment via air, water, or soil, care must also be taken to mitigate impacts from accidents associated with equipment operation and the use of steam to clean the tanks. The establishment of proper procedures that are compliant with OSHA standards, training workers to follow these procedures, and provision of strict oversight to ensure compliance with procedures would largely prevent adverse impacts. Mitigation of impacts from refinery decommissioning and reclamation would be similar to measures taken during turnarounds for equipment, and during construction for removal of equipment and reclaiming the site.

Mitigation of Impacts to Receptors

Even though exposure to chemicals at the refinery and in the air and water that leave the refinery would be minimized, people working to construct or operate the refinery and plants and animals in habitats on or near the refinery would still be exposed to chemicals and physical safety hazards that might harm them. Although some adverse effects are expected to occur, no significant adverse impacts are projected. In addition, data on a number of older refineries have indicated that their workers suffered no significant adverse health effects, and adverse health effects at this new refinery, the first major refinery to be constructed since 1976, should be even less likely. Nonetheless, until the MHA Nation Refinery is operating and sufficient data on people's individual health and plant/animal populations have been collected, the impacts to human health and the environment discussed above would continue to be only projections and would contain significant uncertainty.

The following are recommended actions for minimizing human exposure near the refinery.

- The existing farm house should no longer be used as a residence.
- The farm house well should not be used for drinking water purposes after refinery operations commence. The well needs to be properly capped for the land to be accepted into trust status. Since the DEIS was published, this well has been decommissioned.
- Implement OSHA requirements to ensure occupational safety and health.

4.17.8 Acceptance of Land into Trust Status

Under Alternatives 1 and 4, BIA would accept 468.39 acres of fee land into trust for the purposes of constructing and operating a clean fuels petroleum refinery and producing buffalo forage on the Fort Berthold Indian Reservation. Under Alternative 2, BIA would accept 468.39 acres of fee land into trust for the same agricultural purposes used to date but not to construct and operate a clean fuels petroleum refinery on the Fort Berthold Indian Reservation. Under Alternative 3, BIA would not accept 468.39 acres of fee land into trust; however, the Tribe could still construct and operate a clean fuels petroleum refinery. Under Alternative 5, no action would be taken to accept the land into trust and the Tribes would not construct and operate a clean fuels refinery.

The following would be conditions of the BIA accepting the 468.39 acres of fee land into trust for the purposes of constructing and operating a clean fuels petroleum refinery and producing buffalo forage (Alternatives 1 and 4).

- The well on the property near the residence is properly removed/sealed by a contractor certified by the North Dakota State Water Well Association. This will be verified with by the Regional Environmental Engineer.
- Any title objections raised by the Field Solicitor in an Interim Title Opinion that would interfere with contemplated use of the land will need to be cleared by the Tribes. This may include items such as unpaid taxes.
- Financial assurance arrangements are in place and are sufficient to adequately remediate any contamination due to operation or closure of the refinery.
- There is appropriate monitoring of soils, ground water, surface water, and air for contaminant releases.
- It is possible that the Department may also request an indemnification agreement with the MHA Nation holding the United States harmless from refinery operations and potential contamination from operation of the refinery.

The following would be conditions of the BIA accepting the 468.39 acres of fee land into trust for continued agricultural use (Alternative 2).

- The well on the property near the residence is properly removed/sealed by a contractor certified by the North Dakota State Water Well Association. This will be verified with by the Regional Environmental Engineer.
- Any title objections raised by the Field Solicitor in an Interim Title Opinion that would interfere with contemplated use of the land will need to be cleared by the Tribes. This may include items such as unpaid taxes.

4.18 Irreversible and Irretrievable Commitment of Resources

An irreversible or irretrievable commitment of resources would occur when resources would be consumed, committed, or lost as a result of the project. The commitment of resources would be irreversible if the project started a process (chemical, biological, or physical) that could not be stopped. As a result, the resource or its productivity or its utility would be consumed, committed, or lost forever. Commitment of a resource would be considered irretrievable when the project would direct eliminate the resource, its productivity, or its utility for the life of the project and possibly beyond.

4.18.1 Irreversible Commitment of Resources

- Removal of ground water for all construction alternatives.

4.18.2 Irretrievable Commitment of Resources

- Loss of vegetative cover until the refinery is decommissioned and reclaimed.
- Loss of wildlife habitats for the life of the refinery.
- Loss of crop or forage productivity until the refinery is decommissioned and reclaimed.
- The addition of an industrial facility to the rural landscape.

4.19 Unavoidable Adverse Effects

Several of the effects described in the resource sections above would be unavoidable. In particular, there will be unavoidable adverse effects from spills and leaks to soil and ground water underneath the refinery. There will also be impacts to wetlands either directly as a result of the construction or through changes in hydrology and water quality. Proposed mitigation measures and permits would reduce these adverse impacts.

Table 4-28 Selected Environmental Permits, Plans and Mitigation Measures

Environmental Permit, Plan or Mitigation Measure	Requirement or Recommendation by Alternative: Alts 1&A, 3 Initial Design	Alt 4&A Modified Design	Alt B ½ Land application, ½ Effluent discharge	Alt C UIC injection well	Alts 2, 5 & D No refinery
NPDES Permits					
NPDES permit, refinery operation					
Discharge effluent limits	Permit requirement	Same as 1&A	Required for discharges, recommended for land	None for process water	N/A
Monitoring of effluent quality, may also include downstream water quality monitoring	Permit requirement	Same as 1&A	Required for discharges, recommended for land application	None for process water	N/A
BMPs, separation of contaminated and uncontaminated storm water	Permit requirement	Same as 1&A	Required for discharges, recommended for land application	Potentially required, depends on design of storm water system	N/A
Develop a SWPPP (Storm Water Pollution Prevention Plan)	Permit requirement	Same as 1&A	Required for discharges, recommended for land	Potentially required, depends on design of storm water system	N/A
NPDES general storm water construction permit					
Develop a SWPPP (Storm Water Pollution Prevention Plan) Typical measures include: silt fences, erosion protection	Permit requirement	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Closure					
General refinery closure & reclamation plan Plan to decommission the refinery	Recommended	Same as 1&A	Same as 1&A	Same as 1&A	N/A
RCRA closure plan Specific hazardous waste management units (HWMU) closure requirements including monitoring and financial assurance	TSD Permit requirement	Recommended	Same as 1&A	Same as 1&A	N/A
Bonding/ Financial Assurance Financial assurance for cleanup and closure	TSD Permit requirement	Recommended	Same as 1&A	Same as 1&A	N/A
Take corrective actions Quickly clean up spills and leaks	Partially required under RCRA TSD permit	Recommended, some requirements as RCRA generator	Same as 1&A	Same as 1&A	N/A

Environmental Permit, Plan or Mitigation Measure	Requirement or Recommendation by Alternative: Alts 1&A, 3 Initial Design	Alt 4&A Modified Design	Alt B ½ Land application, ½ Effluent discharge	Alt C UIC injection well	Alts 2, 5 & D No refinery
Air Quality Protection Requirements					
Minor source preconstruction permit required if construction begins after the deadline in the proposed rule for minor sources in Indian country	Potential future permit, depending on final regulations	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Existing new source performance standards (NSPS) for petroleum refineries. EPA may develop an air FIP.	NSPS Apply; FIP may be developed	Same as 1&A	Same as 1&A	Same as 1&A	N/A
When finalized, revisions to petroleum refinery NSPS will apply and may also require an operating permit (Part 71) for the facility.	Potential new NSPS and operating permit, if NSPS finalized	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Unit emissions monitoring to be required through mix of NSPS, future minor source permit or FIP.	Specifics to be developed after new regulations final	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Tribal air quality monitoring near proposed site	Recommended	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Mitigation Plans					
Wetlands mitigation plan Plan to replace or mitigate any wetlands filled by project (fill and other impacts)	Required by COE 404 individual permit and recommended by Executive Order	Recommended by Executive Order	Same as 1&A	Same as 1&A	N/A
Wildlife mitigation measures Cobbles to discourage plovers, netting of ponds with oily water, bird friendly power line construction specifications, as necessary	Recommended by FWS	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Ground water					
Project ground water quality monitoring program	TSD Permit	Recommended	SA-1	SA-1	N/A
Tribal ground water protection program	Recommended	SA-1	SA-1	SA-1	SA-1
Irrigation					
Irrigation farm management plan -- Agronomic irrigation rates for the crops being grown, hydraulic loading considerations to ensure no runoff and crop	N/A	N/A	Recommended	N/A	N/A

Environmental Permit, Plan or Mitigation Measure	Requirement or Recommendation by Alternative: Alts 1&A, 3 Initial Design	Alt 4&A Modified Design	Alt B ½ Land application, ½ Effluent discharge	Alt C UIC injection well	Alts 2, 5 & D No refinery
Irrigation water and soils monitoring plan -- Monitoring wastewater and soils for environmental and agronomic purposes, monitoring for runoff.	N/A	N/A	Partially Required by solid waste regulations & TSD permit	N/A	N/A
Refinery operations plans					
Refining of synthetic crude only	Included as part of Refinery proposal	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Recycling of wastewater, operation of wastewater treatment plants for all alternatives	Included as part of Refinery proposal	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Inspections for spills or leaks from process units & tanks	Partially required under RCRA TSD Permit and by RCRA container regulations	Partially required by RCRA container regulations	Same as 1&A	Same as 1&A	N/A
Refinery design and construction plans					
Double-liners and leak detectors, evaporation and holding ponds.	TSD Permit requirement	No ponds	TSD Permit	TSD Permit	N/A
Double-walled tanks	TSD Permit requirement	Required, Generator regs.	Required, TSD	Required, TSD	N/A
Separate oil and non oily stormwater handling systems	Partially required by NPDES permit	Same as 1&A	Same as 1&A	Recommended	N/A
Controls to prevent mixing of uncontaminated stormwater with potentially contaminated stormwater	Partially required by NPDES permit	Same as 1&A	Same as 1&A	Partially required by NPDES stormwater permit	N/A
Emergency and spill response plans					
Spill Prevention, Control, and Countermeasure, Plans (SPCC) -- Oil Pollution Act	Required	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Facility Response Plan (FRP) – Oil Pollution Act	Required	Same as 1&A	Same as 1&A	Same as 1&A	N/A
CAA Risk Management Plan Hazardous Materials	Required – CAA	Same as 1&A	Same as 1&A	Same as 1&A	N/A
Superfund Emergency Plan	Required – CERCLA	Same as 1&A	Same as 1&A	Same as 1&A	N/A

Environmental Permit, Plan or Mitigation Measure	Requirement or Recommendation by Alternative				
	Alts 1&A, 3 Initial Design	**Alt 4&A Modified Design**	**Alt B ½ Land application, ½ Effluent discharge**	**Alt C UIC injection well**	**Alts 2, 5 & D No refinery**
Hazardous Waste Contingency Plan (HWCP)	TSD Permit requirement	RCRA generator requirement	Same as 1&A	Same as 1&A	N/A
Transportation Act (HMTA) Response Plan	Required – HMTA	Same as 1&A	Same as 1&A	Same as 1&A	N/A
RCRA TSD Permit					
Waste Management Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
Waste Analysis Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
Inspection Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
Training Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
Health and Safety Plans	Required TSD Permit	OSHA portion required	Same as 1&A	Same as 1&A	N/A
Surface Impoundment Design, Construction, and Operation Plans	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
RCRA Post-Closure Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
Air Monitoring Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
Quality Assurance / Quality Control Plans	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
RCRA Tank Design, Construction, Operation and Closure Plans	Required TSD Permit	Partially required as RCRA Generator	Same as 1&A	Same as 1&A	N/A
Containers Management Plan	Required TSD Permit	Partially required as RCRA Generator	Same as 1&A	Same as 1&A	N/A
Waste Minimization / Pollution Prevention Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A
RCRA Corrective Action Plan	Required TSD Permit	Recommended	Same as 1&A	Same as 1&A	N/A

Table 4-29 Monitoring, Inspecting, Reporting and Follow-up

Monitoring, Inspecting, Reporting and Follow-up							
Description	**Alternatives[9]**	**Required?**	**Who Monitors?**	**Monitoring Frequency**	**Reason for Monitoring**	**Report Monitoring to**	**Enforced by?**
NPDES permits							
NPDES permit during refinery operations Monitoring of effluent quality, may also include downstream water quality monitoring	Alts 1, 3, 4 with A Alts 1, 3, 4 with B Alts 1, 3, 4 with C	Yes Yes N/A	Refinery	Generally monthly, varies by parameter, as specified in permit	Protect water quality. Determine if effluent water quality is in compliance with permit	EPA and TAT Environmental Division	EPA
Facility inspections – Implementation of BMPs, and SWPPP (Storm Water Pollution Prevention Plan	Alts 1, 3, 4 with A Alts 1, 3, 4 with B Alts 1, 3, 4 with C	Yes Yes Yes[2]	Refinery	As specified in plans	Prevent/reduce contamination of water. Evaluate implementation of BMPs and SWPPP	Maintain records on site	EPA
NPDES general storm water construction permit – Inspect/monitor implementation of SWPPP (Storm Water Pollution Prevention Plan) Typical measures include: silt fences, erosion protection	All refinery construction alternatives	Yes	Refinery	As specified in plan	Determine if SWPPP is being properly implemented and if the plan is sufficient to protect water quality.	Maintain records on site	EPA
Closure							
General refinery closure & reclamation plan – Monitoring of soil and ground water Inspection of the site during closure	All refinery construction alternatives	Recommended	Refinery	As specified in plan	To determine if the site is sufficiently cleaned up and reclaimed to return to agricultural use.	N/A	N/A
RCRA closure plan – Specific hazardous waste management units (HWMU) closure requirements including monitoring and financial assurance	Alts 1, 3, with A Alt 4 with A Alts 1, 3, 4 with B Alts 1, 3, 4 with C	Yes Recommended Yes Yes	Refinery	As specified in plan Recommended As specified in plan As specified in plan	Determine if hazardous waste units have been successfully closed and if cleanup has been sufficient (as needed)	EPA Recommended EPA EPA	EPA N/A EPA EPA

[9] Alternatives 1 and 3 = Initial refinery site layout, Alt 4 = Modified Design layout. Alts 2, 5 = No refinery constructed
Alternative A = NPDES permit for wastewater discharge, Alt B = wastewater discharge ½ Land application + ½ Effluent discharge, Alt C = UIC injection well
[2] Required by regulation for Alternatives 1, 3 and 4 with discharge Alt C (injection of wastewater)

Monitoring, Inspecting, Reporting and Follow-up

Description	Alternatives[9]	Required?	Who Monitors?	Monitoring Frequency	Reason for Monitoring	Report Monitoring to	Enforced by?
RCRA – Hazardous Waste							
RCRA Large Quantity Generator – Inspection of hazardous wastes accumulation areas	All refinery construction alternatives	Yes	Refinery	Weekly	Determine if wastes properly stored and contained	Maintain records on site	EPA
RCRA Large Quantity Generator Inspection of hazardous waste tanks under RCRA	All refinery construction alternatives	Yes	Refinery	Daily	Determine if hazardous wastes are properly contained; e.g., no spills or leaks, covers and valves properly operating.	Maintain records on site	EPA
RCRA Large Quantity Generator Closure monitoring of hazardous waste storage areas	All refinery construction alternatives	Yes	Refinery	Required during closure of facility	Determine if the area(s) used to temporarily store hazardous wastes have become contaminated	EPA	EPA
Air Quality							
Air Title V CAA permit, NSPS subpart Ja	All refinery construction alternatives	Likely, when regulations final	Refinery	As specified in permit	Unit emissions monitoring	EPA	EPA
New Source Performance Standards (NSPS)	All refinery construction alternatives	Yes	Refinery	As specified in standards	Unit emissions monitoring to be required through mix of NSPS, future minor source permit and/or FIP	EPA	EPA
Tribal air quality monitoring near proposed site	All refinery construction alternatives	Recommended	TAT Environmental Division	As described in TAT air 105 grant work plan	Determine air quality in the vicinity of the refinery	EPA	N/A
Misc. Monitoring							
Ground water quality monitoring program for refinery	All refinery construction alternatives	Recommended	Refinery	Quarterly recommended	Determine if ground water has become contaminated and the extent of contamination and help evaluate remedial options	Recommended to TAT Environ. Division & EPA	N/A

Monitoring, Inspecting, Reporting and Follow-up

Description	Alternatives[9]	Required?	Who Monitors?	Monitoring Frequency	Reason for Monitoring	Report Monitoring to	Enforced by?
UIC -- Underground Injection Control Permit – monitoring of pressure, flow rate, volume, fluid chemistry	Alts 1, 3, 4 with A	N/A	Refinery	Quarterly	Determine compliance with UIC permit and assess performance of measures to protect ground water	EPA	EPA
	Alts 1, 3, 4 with B	N/A					
	Alts 1, 3, 4 with C	Yes					
Irrigation water and soils monitoring plan Monitoring of wastewater, soils and ground water for environmental and agronomic purposes, monitoring for runoff.	Alts 1, 3, 4 with A	N/A			-	-	N/A
	Alts 1, 3, 4 with B	Partially required by TSD Permit	Refinery	As specified in plan	Determined if soil and ground water will be contaminated by irrigation -	Maintain records on site	N/A
	Alts 1, 3, 4 with C	N/A				-	N/A
Misc. Inspections							
Inspections for spills or leaks from process units & tanks	All refinery construction alternatives	Generally required[11]	Refinery	As specified in plans and permits	Determine presence of spills and leaks. Check the integrity of tanks and containment.	EPA and maintain records on site	EPA

[11] Inspection requirements for spills and leaks required by the NPDES permit, the SPCC plan and facility response plans. Inspections are also required under RCRA for tanks associated with hazardous waste generation

Chapter 5 — Consultation with Others

Agencies, companies, and organizations consulted by BIA, EPA, and USACE include the following:

- Bearpaw, Inc.
- City of Makoti
- City of Plaza
- Enbridge Pipelines (North Dakota) LLC
- GeoTrans, Inc.
- Indian Health Services
- North Dakota Department of Health
- North Dakota Department of Transportation
- North Dakota Parks and Recreation Department,
- North Dakota Heritage Inventory
- State Historical Society of North Dakota
- Triad Project Corporation
- United States Fish and Wildlife Service
- Water Supply, Inc.
- Agency for Toxic Substances and Disease Registry (ATSDR)

For additional information regarding BIA, EPA, cooperating agencies and the MHA Nation, please see Section 1.2, NEPA Process and Decision Making, of this document. Information on public participation can be found in Section 2.1, Public Participation, and in Chapter 7 regarding distribution of the DEIS.

Chapter 6 — Preparers and Contributors

BIA and EPA are Co-Lead agencies with decision-making authority over the EIS documents, including the EIS. This document was prepared by BIA, EPA and Greystone Environmental Consultants, Inc., (DEIS contractor), and Booz Allen Hamilton (contractor). Representatives from the cooperating agencies contributed sections of the EIS and participated in the NEPA process. Table 6-1 through 6-6 present the names of individuals and their area or areas of responsibility from BIA, EPA, USACE, the MHA Nation and Greystone and Booz Allen Hamilton.

Table 6-1 U.S. Department of Interior, Bureau of Indian Affairs

Name	Project Responsibility
Great Plains Regional Office	
Diane Mann-Klager	Project Team Leader: NEPA and Fish and Wildlife
Roy Pulfrey	Irrigation Engineer, NEPA
Darin Larson	Hydrologist, engineer
Paul Hofmann	Hydrologist
Carla Clark	Realty Specialist
Fort Berthold Agency	
Howard Beamer	Superintendent
Mary Fredericks	Natural Resources

Table 6-2 U.S. Environmental Protection Agency, Region 8

Name	Project Responsibility
Monica Morales	Project Team Leader DEIS and Air Quality
Steve Wharton	Project Team Leader FEIS and Toxicology
Dana Allen	NEPA – EIS
Bob Brobst	NPDES
Bruce Kent	NPDES
Mike Wireman	Ground water
Tom Aalto	RCRA
Felix Flechas	RCRA
Jean Belille	Environmental Justice
Dave Ruiter	Wetlands
D.J.Law	Air
Kevin Golden	Air Modeling

Table 6-3 U.S. Army Corps of Engineers

Name	Project Responsibility
Daniel Cimarosti	Project Manager
Toni Erhardt	CWA Section 404

Table 6-4 MHA Nation

Name	Project Responsibility
Horace Pipe	Project Manager
Patty Jo Thomas Burton Bell Jared Wurtz Harlan Dean Elton Spotted Horse	Environmental Division
Todd Hall Fred Poitra	Fish and Game Division
Elgin Crows Breast Calvin Grinnell	Cultural Division
Damon Williams Jenny Fyton	Legal Department

Table 6-5 Greystone — Third-party Contractors

Name	Project Responsibility	Education
Jerry Koblitz	Principal-in-charge, Water Resources	B.S. Wildlife Management 32 years of experience
David Cameron	Project Manager	B.A. Biology M.S. Terrestrial Ecology 26 years of experience
Jack Cearley	Hazardous and Non-hazardous Wastes	Ph.D. Environmental Health, Aquatic Ecology/Toxicity M.S. Environmental Health B.S. Biology and Geology 34 years of experience
Gordon Frisbie	Air Quality	M.S. Environmental Engineering B.S. Wildlife and Fisheries Biology 17 years of experience
Ryan Henning	Vegetation, Wildlife, Special-status species, Soils, Water Resources	B.S. Biology 11 years of experience
Mike Holle	Geographic Information Systems (GIS)	B.S. Natural Resource Science Minor in Spatial Database Management Systems 9 years of experience
Selina Koler	Soils	M.S. Restoration Ecology B.S. Natural Resource Management 4 years of experience
Carl Späth	Cultural Resources	Ph.D. Anthropology M.A. Anthropology B.A. Anthropology 32 years of experience

Name	Project Responsibility	Education
Lisa Welch	Socioeconomics, Aesthetics, Land Use, Recreation, Transportation	B.S. Earth Science 12 years of experience

Table 6-6 Booze Allen Hamilton — FEIS Contractors

Name	Project Responsibility	Education
Mary LeMier	Project Manager	B.A. Environmental Studies 8 years experience
Jennifer Nystrom	Deputy Project Manager, Ecological Risk Assessor	M.S. Ecology and Evolutionary Biology B.A. Evolutionary and Environmental Biology 10 years experience
Lisa McDonald	Environmental Justice, Socio-economic Specialist	Ph.D. Mineral Economics 14 years experience
John Belin	Human Health Risk Assessor	M.S. Environmental Health Science B.S. Biology 10 years experience
Gary Pascoe	Human Health Risk Assessor	Ph.D., Toxicology B.A., Biology 25 years experience
Kathy Rogovin	Human Health Risk Assessor	M.S. Toxicology, B.S. Zoology 13 years experience
Jean Tate	NEPA Specialist	Ph.D. Ecology, M.S. Zoology B.S. Biology 30 years experience
Eric Hurley	Environmental Justice, Socio-economic Specialist	M.S and B.A. Economics 4 years experience
Holly Bender	Environmental Justice, Socio-economic Specialist	M.S. and PhD in Mineral Economics B.A. Economics and Political Science 13 years experience

Table 6-6 GeoTrans — Ground Water Contractors

Name	Project Responsibility
Kevin Lincicum, PG –	Senior Project Hydrologist
Mike Noel PG-	Principal Hydrologist

Chapter 7 — Distribution of the Draft EIS

The following list identifies the officials, agencies, and organizations to whom the Draft EIS was sent. Approximately 50 copies of the DEIS were mailed out to individuals. The DEIS was published in both hard copy and on CD-ROM. The DEIS and technical reports were also published on EPA Region's website and linked to the Three Affiliated Tribes website.

Copies of the DEIS were available for public review at each of the Three Affiliated Tribes Segment Offices, in Makoti, at BIA's Offices in New Town, ND and Aberdeen, SD and at EPA's library in Denver, CO.

Publicly Available DEIS

Twin Butte Segment Office	Halliday, ND
White Shield Segment Office	Roseglen, ND
Parshall Segment Office	Parshall, ND
Mandaree Segment Office	Mandaree, ND
Four Bears Segment Office	New Town, ND
North Segment Office	New Town, ND
Three Affiliated Tribes, Legal Department and Office of the Secretary	New Town, ND
Rensch Garage	Makoti, ND
BIA, Fort Berthold Agency	New Town, ND
BIA Regional Office	Aberdeen, SD
EPA Region 8 Library	Denver, CO

Federal, Tribal, and State Officials

Tex Hall, Three Affiliated Tribes Chairman at time of DEIS distribution

John Hoeven, North Dakota Governor

Federal Agencies

Department of the Interior

Bureau of Indian Affairs – Central Office, Great Plains Regional Office, and Fort Berthold Agency

Indian Health Service – Aberdeen Area and Fort Berthold

Environmental Protection Agency, Region 8 and Headquarters

U.S. Army Corps of Engineers, North Dakota Regulatory Office

U.S. Fish and Wildlife Service, North Dakota Ecological Services

Natural Resources Conservation Service

Farm Service Agency

Indian Health Service

Economic Development Administration

Agency for Toxic Substances and Disease Registry (ATSDR)

Tribal Agencies

Three Affiliated Tribes, Business Council:

Three Affiliated Tribes, Natural Resources Department

Three Affiliated Tribes, Environmental Department

Three Affiliated Tribes, Game and Fish Department

Three Affiliated Tribes, Legal Department

State Agencies

North Dakota, State Water Commission

North Dakota Department of Health

North Dakota Department of Environmental Quality

North Dakota, Department of Transportation

Local Agencies

Ward County, Executive Director and Roger Kluck

Makoti Development Board

Ward County, Farm Service Agency

Mountrail County, Farm Service Agency

Organizations/Companies

Indigenous Environmental Network

Honor the Earth

The Environmental Awareness Committee

Triad

Natural Resources Defense Council

North West Venture Communities

Verendrye Electric Cooperative

High Plains Consortium, Inc.

Chapter 8 — Glossary

Alkylation – A process using sulfuric or hydrofluoric acid as a catalyst to combine olefins (usually butylene) and isobutane to produce a high-octane product known as alkylate.

Aromatics – The group of hydrocarbon products that has a sweet smell, including benzene and toluene. They provide feedstock for many of the main petrochemical processes and improve the octane rating of gasoline.

Benzene – An unsaturated, six-carbon ring, basic aromatic compound. It is a colorless liquid hydrocarbon.

Barrel of oil – Measurements that equal a barrel of oil include 42 U.S. gallons, 35 Imperial gallons, and 159 liters.

Bottoms – Tower bottoms are residue remaining in a distillation unit after the highest boiling-point material to be distilled has been removed. Tank bottoms are the heavy materials that accumulate in the bottom of storage tanks, usually comprised of oil, water, and foreign matter.

Catalyst – A material that aids or promotes a chemical reaction between other substances but does not react itself. Catalysts increase the speeds of reactions and can provide control by increasing desirable reactions and decreasing undesirable reactions.

Catalytic hydrocracking – A high-pressure petroleum refining process in which molecules too large and complex for use in gasoline have hydrogen added to them before being cracked into smaller, more suitable molecules.

Cetane number – A measure of a fuel's ignition delay. This is the time between the start of injection and start of combustion (ignition) of the fuel. In a particular diesel engine, higher cetane fuels will have shorter ignition delay periods than lower cetane fuels. Diesel fuels with a cetane number lower than minimum requirements for an engine can cause the engine to operate roughly make it more difficult to start, especially in cold weather or at high altitudes.

Cracking – The breaking of large (higher boiling point) hydrocarbon molecules into smaller (lower boiling point) ones.

Debutanizer – A fractionating column used to remove butane and lighter components from liquid streams.

Dehydrogenation – A reaction in which hydrogen atoms are eliminated from a molecule. Dehydrogenation is used to convert ethane, propane, and butane into olefins (ethylene, propylene, and butenes).

Distillate fuel oil – Products of refinery distillation sometimes referred to as middle distillates — includes kerosene, diesel fuel, and home heating oil.

Distillation – The separation of different petroleum components by selectively heating, vaporizing, and condensing compounds based on their different vapor pressures.

Dry gas – Gas containing no water vapor.

Feedstock – Stock from which material is taken to be fed (charged) into a processing unit.

Flaring – The controlled and safe burning of gas that cannot be used for commercial or technical reasons.

Fractionation – The process whereby saturated hydrocarbons from are separated into distinct parts or “factions”, such as propane, butane, and ethane.

Fuel gas – Refinery gas used for heating.

Gasoline – A blend of naphthas and other refinery products with sufficiently high octane and other desirable characteristics to be suitable for use as fuel in internal combustion engines.

Grass roots refinery – A refinery built at a new location all at once from the ground up. This does not include additions or refurbishments made at an existing refinery.

Grub – To clear by digging up roots and stumps

Heat exchanger – Equipment to transfer heat between two flowing streams of different temperatures. Heat is transferred between liquids or liquids and gases through a tubular wall.

Hydrocarbons – Organic compounds consist of only hydrogen and carbon atoms. In general, the densities, boiling points, and freezing points of these compounds increase as their molecular weights increase. The smallest molecules of hydrocarbons are gaseous. The largest are solids.

Hydrodesulfurization – A catalytic process in which the principal purpose is to remove sulfur from petroleum fractions in the presence of hydrogen.

Hydrogenation – The chemical addition of hydrogen to a material in the presence of a catalyst.

Isomerization – A reaction that catalytically converts straight-chain hydrocarbon molecules into branched-chain molecules of substantially higher octane number. The reaction rearranges the carbon skeleton of a molecule without adding or removing anything from the original material.

Iso-octane – A hydrocarbon molecule (2,2,4-trimethylpentane) with excellent antiknock characteristics on which the octane number of 100 is based.

Mercaptans – Strong-smelling compounds of carbon, hydrogen, and sulfur found in gas and oil. They are sometimes added to natural gas for safety reasons.

Naphtha – A general term used for low boiling hydrocarbon fractions that are a major component of gasoline. Aliphatic naphtha refers to those naphthas containing less than 0.1 percent benzene and with carbon numbers from C3 through C16. Aromatic naphthas have carbon numbers from C6 through C16 and contain significant quantities of aromatic hydrocarbons such as benzene (>0.1 percent), toluene, and xylene.

Octane rating – A classification of gasoline according to its anti-knock properties. “Knocking” or “pinking” is a tendency for gasoline to detonate under compression in an engine instead of burning evenly. The higher the octane number, the less prone the fuel is to knocking.

Olefins – The group of hydrocarbons known as alkenes. In a refinery, olefin units produce ethylene and propylene to make polyethylene and polypropylene used by the petrochemical industry to make plastics, synthetic fibers, and adhesives.

Paraffins – Alkane hydrocarbons, such as methane, ethane, propane, butane, and pentane.

Polymerisation – The bonding of two or more simple molecules under heat and pressure to form larger molecules. In petrochemical production, polymer hydrocarbons are used to make plastics.

Reformate – An upgraded naphtha resulting from catalytic or thermal reforming.

Reforming – The thermal or catalytic conversion of petroleum naphtha into more volatile products of higher octane number. It represents the total effect of numerous simultaneous reactions, such as cracking, polymerization, dehydrogenation, and isomerization.

Saturated hydrocarbon – A hydrocarbon that has used all of its bonding electrons to make single bonds to other atoms. It can not make additional bonds without cutting off part of the existing molecule.

Sour crude – Crude oil with a comparatively high sulfur content, 0.5 percent by weight and higher.

Sour gas – Natural gas that contains corrosive, sulfur-bearing compounds, such as hydrogen sulfide and mercaptans.

Sweet crude – Crude oil with a comparatively low sulfur content, less than 0.5 percent.

Unsaturated hydrocarbon – A hydrocarbon that contains double or triple bonds between certain atoms. These bonds may be broken and new atoms attached without disrupting the existing skeleton of the hydrocarbon.

Wet gas – Natural gas containing condensable hydrocarbons.

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Appendix A — Overview of Petroleum Refining

Refining petroleum is the process of separating crude oil into useful hydrocarbon-based substances. These substances include fuels (gasoline, jet fuel, diesel, kerosene, and fuel oils), petrochemical feedstock (naphtha, ethylene, benzene, and xylene), and other products (lubricating oils, greases, waxes, bitumen, white oils, and petroleum coke).

The first refinery opened in 1861 and produced mostly kerosene, tar, and naphtha (gasoline). The last major refinery built in the U.S. was completed in 1976. The number of refineries in the U.S. hit a high point in 1981, when 315 were operating. Many closed during that decade because they were small and inefficient or because prices for petroleum products were historically low for the latter 1980s and much of the 1990s. Since then, the number of operating refineries in the U.S. has continued to shrink. Even in the 1990s, as the industry faced growing requirements for cleaner fuels and improved environmental performance along with rising demand for gasoline, the number of refineries continued to drop, from 194 in 1990 to 155 at the end of the decade. Currently, the capacity of domestic refineries is considered inadequate to meet the demand for products.

How Refineries Work

A refinery carries out a number of processes to produce products from the "crude" or unprocessed oil that comes out of the ground. These processes are organized into several categories: physical separation, chemical conversion, purification or treatment, and blending. These processes combine to create a variety of products that are more than the sum of their parts: the output from a refinery actually exceeds the input. This appendix discusses the steps that are involved in refining crude oil, as well as potential impacts to the surrounding community.

Crude Beginnings

Crude oil often is delivered to the refinery by barge and, as a result, refineries are concentrated in coastal states. It also can be delivered by pipeline, and so refineries are located near current or historical sources of crude oil and near heavily industrialized regions. Crude oil would be delivered from Canada to the MHA Nation Clean Fuels Refinery by pipeline.

Crude oils are used to create a wide variety of substances because they contain "hydrocarbons," a mix of hydrogen and carbon in various chemical structures. The crude can range in color from clear to black and in texture from like water to nearly solid. Crude oil is a fossil fuel, meaning that it was created from the natural decay of plants and animals that lived in ancient seas: anywhere crude oil is found was once a sea bed.

The atoms in hydrocarbon molecules are arranged in a variety of ways, from straight chains to rings, and contain a varying number of carbon atoms. A hydrocarbon with one (methane, a gas that is lighter than air) or only a few carbon atoms will be a gas; slightly longer "chains" of carbon molecules will create a liquid, and a long chain will be a solid, such as wax or tar. When they are refined, these chains are combined in a number of ways to produce anything from gasoline and jet fuel to plastic and nylon. These chains also control how quickly the substance will evaporate and so how it will be processed when it is refined. Throughout the process, intermediate steps continuously remove unwanted components, such as sulfur and excess gas, which often can be used in other portions of the refining process.

Crude oil contains hundreds of different types of hydrocarbons mixed together that must be separated to be useful. The various types are separated in an oil refinery: the various hydrocarbon "chains" boil at different temperatures — from barely above room temperature to more than 1,112 ºFahrenheit — and so can all be separated by distillation.

Basic Processes

The most common method used to separate the crude oil into the various components is to heat the oil, allow it to boil and vaporize, and then condense the various vapors into a variety of products. Atmospheric distillation was the first refining process developed (in 1862) and produces mainly kerosene and some diesel fuel that can be further refined. After the initial atmospheric distillation step at MHA, the refinery will use hydrotreating, hydrocracking, and alkylation to process the crude oil.

The major classes of hydrocarbons in fuel oil include the paraffins and, unlike a paraffin candle, are usually gas or liquid; the aromatics, which refers to the chemical "rings" that make them up and not to the smell; naphthenes or cycloalkanes, which are usually liquid; and other categories that can be liquid or gas and that include alkenes, dienes, and alkynes.

Desalting

Before certain varieties of crude oil can be processed at all, they must go through a process called "desalting." This process removes water, salts, and other solid materials that otherwise could damage the equipment at a refinery. Desalting essentially means that the crude oil is dehydrated (water is removed) so that the impurities settle out.

Synthetic crude is crude that was processed at the source. It does not require desalting at the refinery. Thus, the waste water and contaminants that are a byproduct of desalting are not an issue for refineries that use synthetic crude oil.

Distillation

The first and most important step in the process is called fractional distillation. The various components of crude oil boil at different temperatures and so can be separated in the process. First, the crude oil is heated, usually with steam, to a temperature of 700º to as high as 1,200º Fahrenheit. All but the heaviest components “flash” into gas (“vapor”) that cools as it rises. The vapor enters the “fractionating tower, a steel tube about 120 feet high, that contains trays at various heights. As the vapor rises in the column, it cools, condenses back to a liquid, and collects on the trays. Each tray contains holes that allow the vapor to flow up through the tray; some liquids collect and are returned to a lower level where they evaporate again. This recycling action makes the product more pure. Because the various components of crude oil boil at different temperatures, they condense at different temperatures and heights in the column. The column is coolest at the top and hottest at the bottom, so the components with lower boiling points condense back to liquid farther up the column. At successively higher points, the products include lubricating oil, heating oil, kerosene, gasoline, and gases. The liquids — called “fractions” — that are collected are either sent to condensers to cool them more, or move on to other areas of the refinery for more processing.

					Product	Carbons
Crude Oil	20º C				Gas	4
	40º C			Reformer	Naphtha	8
	70º C				Gasoline	8
	200º C				Kerosene	12
				Alkylation Unit	Gas Oil or Diesel	16
	300º C			Cracking Unit	Lubricating Oil	36
					Heavy Gas Oil	44
Boiler	600º C	Distillation Column			Residual	80

Two types of crude oil distillation are in use at refineries. “Atmospheric” distillation operates under pressure that is ambient (in other words, at normal air pressure) or slightly above. Some refineries also follow this step with distillation under vacuum. These vacuum towers tend to be wider than the atmospheric columns, but operate under generally the same principle; they often produce usable products from the thick residual that remains from atmospheric distillation.

Almost none of the products that come out of the fractional distillation column is ready for market. Instead, they must be processed further, usually by:

- Solvent extraction or dewaxing
- Cracking: breaking large hydrocarbons into smaller ones
- Unification: combining smaller pieces
- Alteration: rearranging the various pieces.

Solvent Treating

Solvent treating involves methods to remove the impurities that remain after the initial distillation step. These methods usually are used both at intermediate stages in the process and just before the product is sent to storage. Essentially, these processes remove the impurities by adding solvents (a liquid that can dissolve another substance). Depending on the specific processes, the impurities either clump up and fall to the bottom by chemical reaction (known as precipitating), are evaporated away along with the solvent, or the product is chilled so that the impurities precipitate.

Cracking

Cracking may be "thermal," which uses heat to break apart large hydrocarbon molecules into smaller compounds, or "catalytic," which uses a catalyst to cause a reaction in and change the hydrocarbons.

Developed in 1913 — when it was known as the Burton Process — in response to the increase in demand for gasoline, the thermal cracking technology uses a combination of pressure and intense heat to physically break large molecules into smaller ones to produce additional gasoline and other fuels. The initial process, however, produced unwanted byproducts and eventually evolved into methods that produce materials that are more desirable. Thermal cracking also may use high-temperature steam to break hydrocarbons into raw materials that are used to manufacture chemicals.

Visbreaking

Two other techniques are used to treat the residuals that remain in the distillation tower. The first is "visbreaking," considered a "mild" form of thermal cracking. In this process, residuals from the atmospheric distillation tower are heated, and then the resulting product is cooled with gas oil and rapidly burned or "flashed" to make heavy oils flow more easily. The process, originally developed in the 1930s, also produces tar.

Coking

In the second technique, "coking," the residual that is left behind in the distillation tower is heated until is breaks down into oil, gasoline, and naphtha (which is further processed to make gasoline); the process leaves behind an almost pure residue of carbon called "coke," which is sold. It is not the same as the coke produced in steel making.

Hydrocracking

In general, catalytic cracking has replaced most uses of thermal cracking. All forms of catalytic cracking break down complex compounds into simpler structures to increase the quality and quantity of the desirable products and decrease the amount of residuals. A similar process that is not as common as "catalytic cracking," is called "hydrocracking." It is a two-step process that uses a different catalyst — a substance that helps cause a reaction but that does not take part in it — than catalytic cracking, as well as lower temperatures; it also involves high pressure and introduction of hydrogen ("hydrogenation"). It breaks down heavy oil into gasoline and jet fuel or kerosene. Hydrocracking was developed in the 1960s to increase production of gasoline and forms the basis for the modern petrochemical industry. It is used for feedstock that is difficult to process by either catalytic cracking or reforming because they contain substances that are considered "poisons" for the catalyst.

Hydrotreating

"Hydrotreating," is a process that removes certain constituents — nitrogen, sulfur, oxygen, and metals — that are considered "contaminants" in the liquid petroleum. These materials can damage the refinery equipment and impair the quality of the finished product. It also is used in advance of catalytic cracking to improve yields and to upgrade the quality of the product. Essentially, the process works by mixing the feedstock with hydrogen, heating it, and then passing it through a catalytic reactor. The reactor converts the contaminants to other forms that can be separated; the result is a gas stream that, after treatment, can be used to fire the furnaces at the refinery, and a liquid stream that can be blended or used as feedstock.

Practically all the naphtha that is fed to catalytic reforming units is hydrotreated to remove arsenic, sulfur, and nitrogen that would damage the catalyst. The resulting product, called reformate, is fed to the gasoline blending pool. Byproducts of this process include hydrogen, which is recycled within the refinery and used in hydrotreating or hydrocracking.

Unification

Unlike cracking, which separates the large hydrocarbons into smaller ones, "unification" does the reverse. The process creates compounds that are used in making chemicals and in blending gasoline, and generates hydrogen, which may be used in hydrocracking or may be sold.

Reforming

The major process is "catalytic reforming," which converts low-octane products into components that can be blended into high-octane gasoline. It also produces hydrogen that can be recycled and used in other processes. Reforming is the result of a number of reactions that occur simultaneously. The reformer includes a reactor (which may consist of alternating furnaces and fixed-bed reactors) and a section for product recovery. Most processes use platinum as the catalyst, although it may be combined with a second substance.

Alkylation

Finally, the structure of the hydrocarbon may be rearranged, rather than broken or combined, to produce a product. At MHA, the alteration process is known as "alkylation." In alkylation, certain gases (known as "low molecular weight") are mixed with a catalyst. This catalytic process was developed in the 1940s to produce high-octane aviation gasoline, clean-burning fuels, and materials to produce explosives and synthetic rubber.

Treating and Sweetening

Some intermediate and finished products may be treated and sweetened, in most cases to remove unwanted sulfur. Treating is a means to remove certain substances that are considered "contaminants" in the finished product. These contaminants can include sulfur, nitrogen, oxygen, certain metals, and salts. Sweetening is a major refinery treatment for gasoline and improves color, odor, and stability; it also reduces the concentration of carbon dioxide. These processes can be accomplished by addition of acid or other compounds, by heating the product, or through use of catalysts.

Saturate Gas

A saturate gas plant separates components of the refinery gas, including butanes that will be used in the alkylation process; pentanes that will be used to blend gasoline; and ethanes that will be used to produce petrochemicals.

Asphalt Production

The residual materials from the refining process can be used to produce asphalt. Asphalt for roads is processed in vacuum distillation, where it is heated and sent to a column under vacuum to prevent it from cracking (further separating into other materials). When the asphalt will be used for shingles or other roofing materials, it is produced by air blowing. It is heated almost to the point where it will evaporate and then sent to a tower, where hot air is injected. A third process is solvent deasphalting. This process uses propane or hexane as a solvent; it produces lubricating oil, materials that can be recycled in other parts of the refining operation, and asphalt. The process feeds the material and propane into a tower at closely controlled mixtures, temperatures, and pressures, and separates the material on a rotating disc. The products are evaporated and exposed to steam to recover the propane, which is recycled in the operation.

Blending

Blending is the physical mixing of a number of different hydrocarbons to produce a product. Products can be blended through manifolds or in tanks and other vessels. The products can be blended by injecting the correct amounts of each component; additives to improve performance can be added both during and after blending to provide specific characteristics that would not otherwise be present.

Other Products

Lubricants, waxes, and grease also are refined from the residuals that remain after atmospheric and vacuum distillation. The primary objective of this process is to remove the asphalts, certain other compounds, and waxes. In creating this process, the asphalt is first removed from the reduced crude, which is combined with lubricating oil and treated to produce a compound called a “raffinate.” This raffinate contains wax that is continuously removed by mixing the material with a solvent; the mixture is cooled, the wax is removed, filtered, and washed to remove oil. This wax can be used to make paraffin candles, in cosmetics, and in petroleum jelly.

The dewaxed raffinate is blended with other materials in extraction processes that use solvents to create lubricating oil. Additives help the finished product meet the characteristics that are needed for motor oils, industrial processes, and oils for metal working.

Finally, grease is produced by blending what are known as “metallic soaps” (they contain calcium, sodium, aluminum, lithium, or other metals, depending on the intended use for the grease) and other additives into lubricating oil at a temperature of 400º to 600º Fahrenheit.

Other Operations

Most processes at a refinery require tremendous amounts of energy to create the steam, power, water, hydrogen, and heat required for the various processes. Thus, most include methods for heat integration, recycling of some constituents, heat regeneration, and energy savings. Some of the major processes are discussed in this section.

Heating

Process heaters and heat exchangers preheat the product in various processes so that it reaches reaction temperatures. Heat exchangers use either steam or hot hydrocarbons that have been transferred from some other section of the process. The heaters are usually designed for specific operations. They may be fired by refinery or natural gas, distillate, and residual oils.

Cooling

Heat may be removed from some processes by air and water exchangers, fans, gas and liquid coolers, and overhead condensers, or by transferring heat to other systems. Mechanical refrigeration units may use water, mixtures of alcohol and water, or various glycols (antifreeze) as coolants.

Steam

Heat from flue gas or other sources generate steam at various points in the process. These systems include the furnace and an enclosure where heat is transferred and that seals the system to prevent flue gas from escaping. Other parts of the system supply fuel — refinery gas, natural gas, fuel oil, or powdered coal — distribute the heat, and supply water to create the steam. The water is treated to remove sediment and contaminants that could damage the system.

Pressure Relief

Refineries include a variety of processes that will release pressure when necessary. Pressure relief is automatic and occurs when operating pressure reaches a preset level. The term “blowdown” is used to describe an intentional, and not automatic, release of pressure, such as during startup, shutdown, or in emergencies. All systems incorporate safety relief valves, used for air, steam, and gas, to release any excess pressure in a system.

Flaring

Flaring is the controlled and safe burning of gas that cannot be used for commercial or technical reasons. The tall flame can be highly visible, especially at night, but emissions from the flare are closely controlled under the terms of federal and state air quality permits that govern the refinery.

Waste Water Treatment

Waste water treatment is used for process, runoff (usually rain), and sewage water before it is discharged or recycled. Wastewater usually contains hydrocarbons, dissolved and suspended materials, and other compounds that can be both alkaline and acidic.

The waste water is first pretreated by separated hydrocarbons and solids from the water, usually by gravity separation, skimming, and filtration. In some cases, heat is needed to separate the oil and water. The water is also neutralized so that it is neither acidic nor alkaline.

After the pretreatment step, suspended solids are removed by sedimentation or air flotation. (Many refineries use a technique called dissolved air flotation, known as “DAF.”) Like a municipal treatment plant, this step involves screening or filtering water and then using processes that biologically degrade organic matter and remove oils and chemicals. In addition, advanced techniques such as chlorination, ozonation, ion exchange, reverse osmosis, and activated carbon may be used to remove specific contaminants and meet the limits set under the refinery’s water permit.

Cooling Towers

Cooling towers at a refinery remove heat from process water, either by allowing air to pass perpendicular to the flow of water, or by allowing the water to cascade down through a tower. In either case, the water must be treated before it can be re-used.

Electric Power

Refineries may receive power from the local grid or may generate it on the site with steam turbines or gas engines. Substations that receive power and route it to distribution stations within the refinery are located away from sources of explosive vapors, as are most transformers, circuit breakers, and switches.

Compressors

Systems that include air and gas compressors, coolers, receivers and dryers, controls, distribution piping, and blowers provide air to operate air-powered tools, to regenerate catalyst, and to supply heaters and other operations. Air also must be provided for certain instruments and controls, some motors, and some connections.

Loading

The refinery must be equipped with facilities for loading the product into tank cars, trucks and, where possible, ships and barges.

Tanks

Tanks are located throughout the refinery and may be at normal atmospheric pressure or can be pressurized. They store the crude oil, intermediate components, and the finished product, as well as water, additives, and other chemicals.

What are the Major Products of a Refinery?

Refineries produce a number of products. Figure A–1 below shows the proportions of the various products; each is explained briefly below.

Gasoline: Currently the most important product of refineries, gasoline may contain additives to enhance performance and protect against rust.

Kerosene: The first major product of a refinery, kerosene is used in jet fuel and for cooking and space heating.

Liquefied Petroleum Gas: Known as “LPG,” this product is produced for use as fuel (usually as “bottled gas”) and as a material to manufacture other chemicals.

Distillate Fuels: These products consist primarily of diesel, used to power vehicles and generators, and domestic heating oils.

Residual Fuels: These “leftover” fuels are used in ships, power plants, and commercial and industrial facilities.

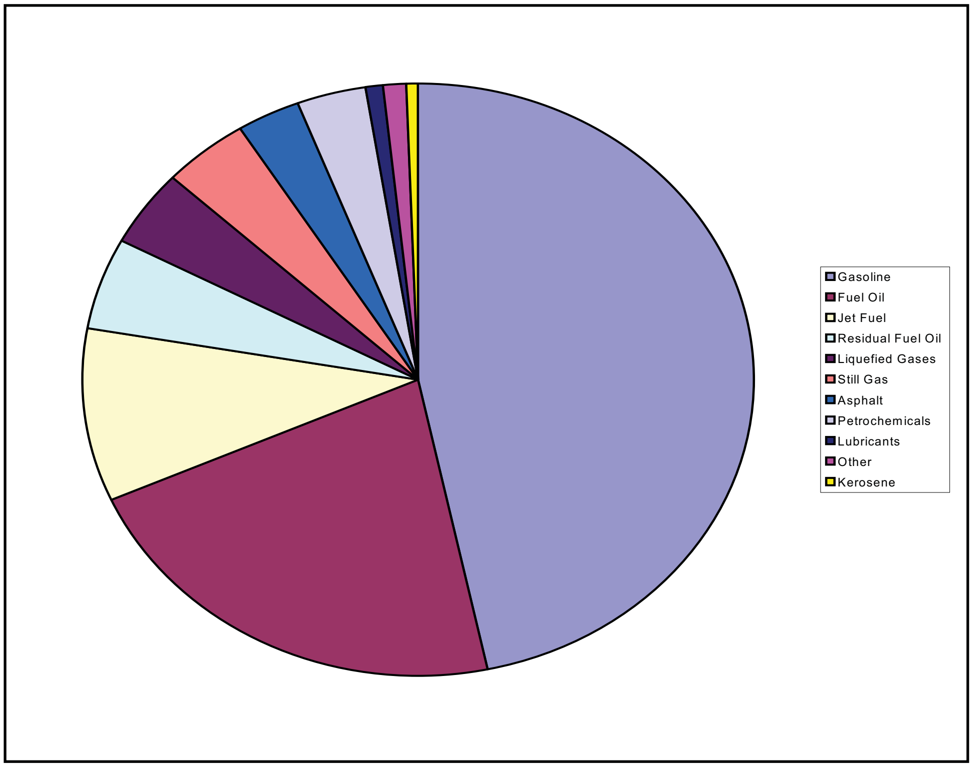

Figure A–1 Distribution of Petroleum-based Products from Refining

Coke and Asphalt: Coke is almost pure carbon and may be used in anything from electrodes to charcoal for home grilling. Asphalt is used in roads and roofing.

Solvent: The term encompasses of variety of products used for purposes such as cleaning and degreasing.

Petrochemicals: These products are primarily intended to produce plastics and synthetic fibers and rubbers.

Lubricants: These products are the result of special refining processes. They are used in motors and as industrial greases and cutting oils.

Regulations and Health and Safety

Petroleum refining has been called one of the most heavily regulated industries in the United States. In addition to the environmental impacts of operations, refineries must deal with the complex regulations that involve their products. For example, gasoline must be formulated different depending not only on season but on geographic location: the industry now produces more than 20 variations of reformulated gasoline to meet the requirements set for specific climatic and geographic areas.

There are emissions from refineries — that's the nature of refining. But from 1992 to 2001, the industry spent about $98 billion on various measures to protect the environment. (These expenditures include capital expenses for pollution controls, research and development, operations, maintenance, and administration, and a small portion for cleanups and spills.) Overall, more than 99.7 percent by weight of crude oil that arrives at a refinery is converted to product or fuel for the refinery.

Almost all components of a refinery are considered “closed” systems, meaning that all of the product that is being refined is enclosed within some kind of container. These closed systems are designed both to limit waste and to prevent emissions. As a result, the potential for exposure by humans is limited and would occur mostly on the site, where safe work practices and personal protective equipment protect the health and safety of workers.

The most visible emissions from a refinery occur when gas is “flared” (burned), usually to release pressure in one part of the system or to burn waste gases. Although the flame can be seen for a considerable distance, flaring occurs only under a permit issued by a state or federal agency that strictly limits the compounds that can be released from the refinery. Most of the emissions consist of sulfur dioxide.

Of the emissions that refineries must report under the Toxic Release Inventory, about three-quarters are to air and the rest to wastewater. The major sources of environmental risk include:

- Air: Refinery emissions contain several precursors to ozone. The impacts are most significant near and downwind of a facility.
- Water and soil: Refineries pose a potential for contamination from leaks and spills. Refineries are, however, required to have in place a Spill Prevention Control and Countermeasures Plan that describes in detail how to contain a spill; in addition, refineries are designed with containment structures that would enclose a leak or spill.
- Health: Air emissions from refineries can contain benzene.
- Global warming: The products from refineries — although not the refineries themselves — may contribute to global warming. The overall risk associated with global warming is still being studied, however.

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Introduction

The Clean Water Act Section 404(b)(1) Guidelines (40 CFR 230 Subpart B) state that no discharge of fill material shall be permitted if there is a practicable alternative to the proposed discharge. A practicable alternative is an alternative that is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. The practicable alternative that would have less adverse impact on the aquatic ecosystem may be rejected if it would have other significant adverse environmental consequences (40 CFR 230.10(a)). The guidelines should be applied in reasonable, common sense manner based on the nature of the aquatic resource and the potential impacts of the activity in determining compliance with the alternative analysis.

The purpose of the proposed action is to accept 469 acres into trust in support of Mandan, Hidatsa and Arikara Nation's (MHA Nation) proposal to construct a clean fuels refinery within the Fort Berthold Reservation. The need is to facilitate tribal self determination and economic development. This site, identified as Site 8 in a Feasibility Study conducted by Triad Project Corporation in 2002 (finalized in January 2003), was selected to be purchased by the Tribe (Resolution 03-085 dated February 5, 2003). Following purchase the MHA Nation requested the Bureau of Indian Affairs to acquire the lands into trust for the benefit of the MHA Nation (Resolution 03-020 dated March 17, 2003). The MHA Nation had already contracted with Triad to design a refinery. Triad did a preliminary refinery design using for the site using the site to its maximum capabilities by minimizing the overall facility footprint; exploiting the natural topography to capture surface water runoff efficiently; and minimizing potential liabilities by providing adequate spacing between refinery units, moving the drainage, having a setback from edge of property, minimizing traffic in facility for loading/unloading, maintaining safety lines of sight for train traffic, and having no road/rail crossings. The engineers experience in refinery design was used to minimize liabilities that would translate into insurance cost savings for the MHA Nation.

Prior to submitting the request for acquisition of the land into trust to the United States (US), the MHA Nation searched for a potentially suitable site for constructing, operating, and maintaining a clean fuels refinery (Triad 2003). This search began with an evaluation of sites relative to the physical aspects required. One of the criteria for this evaluation was potential impact to surface water, as well as the following criteria:

- Ownership of the property (Tribal land versus privately owned land) with tribal land and land within the reservation being preferred,

- Suitable topography (topography contributes to the safety and economics of the refinery's operation and was one of the major factors in determining a site's suitability) with a relatively flat site preferred,

- Potential for effects to surface water, watershed, and wetlands with no impacts preferred.

- Potential for effects to communities (an adequate population base must be nearby to supply the work force, however, the refinery should not be located too close to communities) with no impacts preferred,

- Proximity to the existing pipeline was considered with points attributed for distance from the line,

- Proximity to an existing highway was considered with points attributed for distance from the highway,

- Proximity to an existing railroad was considered with points attributed for distance from railroad and switch yard;

- Proximity to oil industry facilities was considered with points attributed for distance from existing facilities,

- Value of the site as farmland or wetlands was considered with points attributed for soil type and existence of wetlands, and

- Visibility of the refinery from recreational areas, namely Lake Sakakawea, was considered with points attributed for visibility.

- The final evaluation of the three sites with the highest scores involved a cost and safety analysis that included the following criteria:

- Seller willing to sell at a reasonable price within the budget,

- Cost of infrastructure in relation to each site (cost for constructing rail service, roads, surface drainage, utilities and overall facility),

- Safety factors relative to highway and railway traffic and any ongoing liability, which can be reduced or eliminated by site selection, and

- Ability to have the land acquired into trust status.

There were two sites that were within the reservation boundaries. The Tribe chose to only consider those areas within the reservation boundary as there is less review for acquisition of land into trust status by the US for properties within the reservation boundaries than outside the boundaries. Properties outside established or former reservation boundaries are more likely to be challenged by local and state governments. In addition properties that are outside the boundaries of the reservation require review of the business plan and an analysis of distance outside the reservation boundary (25 CFR Part 151.11).

Of the two sites within the reservation boundaries, Site 6 and Site 8, there were differences in the availability of purchase (not available versus available), proximity to missile site (1800 feet versus 6900 feet), proximity to highway (adjacent versus ½ mile off the highway), safety aspects for road/railway crossings (none versus at least one) and cost of construction. Personnel at the Minot Air Force base indicated that structures could not be constructed within 1500 feet from missile structures. There is also concern for cabling near these missile sites. Site 6 would be only 1800 feet from a missile site, it would also require ½ mile of road construction which can cost approximately $250,000 to complete according to BIA roads engineers. The additional cost to construct and maintain a roadway increased overall cost of construction on Site 6 as well as concerns for railway safety.

The safety aspect for railway construction pertains to the movement of cars on relatively flat grade and ability to maintain a clear line of sight. Site 6 would require a cut of 15 to 20 feet in a relatively short distance. Site 8 would only require fill. A railway on a fill is safer than one on a cut as it gives the road and rail traffic a clear view of the train traffic which helps prevent accidents. It is also imperative to have the train movements as visible as possible to workers on the refinery site to promote a safe work environment. The positioning of the railway is important to the overall site design because of the need maintain appropriate clearances, restricted use areas. This analysis was conducted by the engineers at Triad who have more than 30 years experience in railway and refinery design.

Of most importance in the selection of a site to meet the Tribes needs is that Site 8 was available for purchase while Site 6 was not. The Tribes instructed their consultants to select and purchase a site for the purposes of constructing and operating a clean fuels refinery.

Both Site 6 and Site 8 had wetlands identified on the National Wetland Inventory (NWI) Maps that are impacted by agricultural practices (Figure 1). There would be approximately 2.36 acres potentially impacted on Site 6 and 5.04 acres on Site 8 according to the NWI maps. Some of these wetlands may be isolated wetlands not considered jurisdictional by the Corps of Engineers for application of CWA 404 regulations. A ground determination of wetlands was not conducted on Site 6 as this site was not pursued by the Tribe for consideration. The wetlands delineated on Site 8 are not similar to those indicated on the NWI maps as the wetlands indicated on the NWI are remotely estimated and require ground verification. There are two wetlands within Site 8 that may be impacted by construction of the refinery (PEMF#2 and PEM/ABF#3). The remaining wetlands on Section 19 and those on Section 20 would continue to be impacted by agricultural activities.

Basic considerations in Refinery Design

There are a number of safety considerations in the design of this type of facility. These considerations are for clearance around components of the refinery that have been developed using insurance company assessments and refinery technology over time (Figure 2). These include maintaining a safety buffer of 300 feet between the tank farm and processing area, the main components of the facility being at least 300 feet from the edge of property, the main components of the facility and railcars being at least 300 feet from existing railroad, and minimization of vehicle traffic within the facility. Compromise of these safety considerations translates into greater liabilities which would translate into higher insurance costs. Compromise of these safety buffers could increase the potential for accidents that could pose significant environmental consequences (i.e. unplanned air release or unprotected release to soils).

It is also good engineering practices to construct a refinery on virgin material instead of fill. Settling of process units could cause disruptions or integrity failures which could have considerable safety ramifications. The weight and height of the columns in a refinery require a stable foundation and virgin material is typically more stable than standard compacted fill. Structure of this type may require additional fortification of fill such as steel pilings which equate to additional construction costs.

When designing a facility it is always good engineering practice to plan for expansion. Technological and/or regulatory changes may require additional process units or other modifications in the future.

Design "J"

Design "J" proposes impacts to the drainage swale into PEMF#2 to maintain the integrity of surface water capture within the facility and to PEM/ABF#3 for construction of the railway spur (Figure 3). The surface water is designed to be captured for testing prior to use by the facility or release in compliance with applicable permits by relying on gravity.

Design "J" would impact the existing drainage swale by the placement of fill of the existing swale (0.5 acres) and construction of a new drainage. There would be short-term impacts to the receiving wetland while the new drainage's vegetation is established. This would reestablish the water flow and, based upon design, may increase water quality to the receiving wetland, PEMF#2, as revegetation would be able to occur without continued impact from agricultural activities. There would also be a fill of approximately 0.3 acres of a non-jurisdictional wetland, PEM/ABF#3.

This design was proposed to have cost about $150 million to construct in 2003. The wastewater management portion of this design would cost about $750,000 for excavation of less than 200,000 cubic yards. Due to the increases in steel and concrete in the last few years, the present cost is estimated at more than $200 million; however, the excavation costs have not changed significantly.

Alternatives to Design "J"

In order to avoid impacts to isolated wetlands that are not regulated under Section 404 and to avoid road and railroad crossings, any reconfiguration of the facility to avoid filling the drainage swale would need to be confined to the property in Section 19.

A final detailed design has not been developed for the project or these alternatives. Therefore, only estimates for construction costs are presented with a number of unknowns such as actual construction needs based upon detailed analysis of soils.

Alternative to completely avoid drainage swale with pumping

This alternative would shift of the facility to the east and slightly south using Alternative A design (Figure 4). There would be no fill of the drainage swale into PEMF#2 and 0.3 acres of fill for PEM/ABF#3. This alternative would encroach upon the safety zones for the edge of property, railroad, and existing homestead. It would require additional excavation to achieve acceptable surface water drainage and capture. To minimize excavation and disposal costs, the drainage would not be all in one direction so a pumping system would need to be installed to move captured water to the treatment facility from at least two areas. At least four pumps would be required for the two different drainages and two independent surface water collections (areas with potentially oily water and outside areas).

The rough estimate for the facility construction would increase by approximately $2,000,000 as there would be additional infrastructure required (about $1,180,000 - four pumps for two drainage areas), more excavation to achieve an acceptable surface water drainage (about 200,000 cubic yards for $800,000), and captured surface water pumping to the water treatment unit. There would also be increased operational costs for the facility from the pump maintenance.

Alternative to completely avoid drainage swale without pumping

This alternative would shift of the facility to the east and slightly south. There would be no fill of the drainage swale into PEMF#2 and 0.3 acres of fill for PEM/ABF#3. As with the previous alterative, it would encroach upon the safety zones for the edge of property, railroad, and existing homestead. In order to have gravity capture of the surface water without the need for pumping, there would be a need to excavate more than 30 feet on the south side of the property to drop the elevation from 2095 to 2065 at a minimum plus grading throughout the process area. This translates into more than 2,000,000 cubic yards of material would need to be excavated at a cost of $4 a cubic yard for $8,000,000. This cost does not include any retaining walls to protect slopes from erosion which would need to be addressed in the final detailed design. It also does not address the cost for removing excess fill material. Placing the fill material on other portions of the site would impact non-jurisdictional wetlands and would not be in keeping with the other purpose to provide hay for tribal use.

Alternative to minimize impact to drainage swale with ponds on the east

This alternative would reduce the fill of the drainage swale by 100 feet by moving the water treatment unit and ponds to the east of the drainage swale. There would be 0.4 acres of fill in the drainage swale into PEMF#2 and 0.3 acres of fill for PEM/ABF#3. It would encroach upon the safety setbacks for the tank farm (240 foot separation) and property line (200 foot separation) (Figure 5). To minimize excavation and disposal costs, the drainage would not be all in one direction so a pumping system would need to be installed to move captured water to the treatment facility. This alteration would cost approximately $930,000 more to construct than the proposed alternative as two high capacity trash pumps with pump houses and associated piping would be needed ($588,700), as well as 80,000 cubic yards of additional excavation ($340,000).

<u>Alternative to minimize impact to drainage swale with ponds remaining on the west (Design "K")</u>

This alternative would involve moving components of the process area out of the drainage swale. There would be less than 0.1 acres of fill of the drainage swale into PEMF#2 and 0.3 acres of fill of PEM/ABF#3. The overall drainage pattern would be the same except the surface water would be captured on the east side of the drainage swale and piped across to holding tank/pond as appropriate (Figure 6). The cost would be essentially the same as design "J", $200,000,000, because the increased cost of piping would be countered with the decreased excavation and fill costs.

Discussion

All of the alternatives moving the ponds to the east of the drainage swale considered for avoiding or minimizing the fill of the drainage swale will increase costs because of the need for additional excavation and may require pumping of captured surface water to treatment units. These costs need to be considered in light of the overall project. This project is proposed for the economic development of a sovereign nation with an unemployment rate of almost 71% and more than half of the tribal members living below the poverty level (BIA 2001), any increase in construction or operating costs would be impact the tribal goals for economic development by increasing the potential payback period. The Tribes have not conducted a comparative analysis on the payback period yet because of the payback period is based on market variables which are highly volatile for petroleum products and they are reluctant to speculate on this prior to imminent construction. It is intuitive that adding operational costs such as maintaining pumps will prolong the payback.

This is an oil refinery with potential for contamination of soils, ground water and surface water. Refinery designs have evolved over time to address this potential and minimize impacts. One of the basics is that the refinery design needs to capture all surface water falling within the foot print and treat it accordingly. The ideal situation is to use gravity for capture of surface water as this is a simple system with few outside variables for complications. Reliance on pumps to move surface water presents a number of variables for complications such as outright failure of pump(s), maintenance irregularities, or leakage during use at or in piping. This should be considered as increasing the potential for adverse environmental consequences in order to avoid 0.5 acres of impact to an agricultural drainage that has developed wetland characteristics which can be moved.

Leaving the drainage swale open within the refinery facility will expose a potential environmental hazard by having a conduit for hazardous material to flow offsite untreated if drainage systems fail or should a truck slip off a road removing material from the west side of the drainage during the winter. These systems could fail due to compromise in integrity or an unplanned event (i.e. multiple storm events greater than 100 year or catastrophic explosion). These scenarios and similar ones could present significant adverse environmental consequences to the tributary of the East Fork of Shell Creek

Another consideration for selecting an alternative now to avoid impact to the drainage into PEMF#2 would be that if the design has been such that the expansion of the refinery due to new market initiatives, technological advances, and/or regulatory changes. The Tribes may in the future request fill of the drainage for expansion of the processing area. According to the engineers experienced in refinery design expansion of the processing area is common due to new technologies and regulatory requirement changes. Therefore, this is a reasonably foreseeable if not distinctly identifiable development.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
999 18TH STREET, SUITE 300
DENVER, COLORADO 80202-2466

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. §1251 et seq; the "Act"),

the MHA Nation Clean Fuels Refinery

is authorized to discharge from its wastewater treatment facilities located in the NW 1/4 of Section 19, Township 152N, Range 87W, Fort Berthold Indian Reservation, Ward County, North Dakota

to wetlands tributary to the East Fork of Shell Creek,

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit.

This permit shall become effective **to be determined upon issuance**

This permit and the authorization to discharge shall expire at midnight, **to be determined upon issuance**

Signed this day of

____

Authorized Permitting Official

Stephen S. Tuber, Assistant Regional Administrator
Office of Partnerships and Regulatory Assistance
Title

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1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1.1. Definitions.

The *30-day (and monthly) average*, other than for fecal coliform bacteria and total coliform bacteria, is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria and total coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.

The *7-day (and weekly) average*, other than for fecal coliform bacteria and total coliform bacteria, is the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria and total coliform bacteria. The 7-day and weekly averages are applicable only to those effluent characteristics for which there are 7-day average effluent limitations. The calendar week, which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.

Daily Maximum (*Daily Max.*) is the maximum measured value for a pollutant discharged during a calendar day or any 24-hour period that reasonably represents a calendar day for purposes of sampling. For pollutants with daily maximum limitations expressed in units of mass (e.g., kilograms, pounds), the daily maximum is calculated as the total mass of pollutant discharged over the calendar day or representative 24-hour period. For pollutants with limitations expressed in other units of measurement (e.g milligrams/liter, parts per billion), the daily maximum is calculated as the average of all measurements of the pollutant over the calendar day or representative 24-hour period. If only one measurement or sample is taken during a calendar day or representative 24-hour period, the single measured value for a pollutant will be considered the daily maximum measurement for that calendar day or representative 24-hour period.

Daily Minimum (*Daily Min*.) is the minimum value allowable in any single sample or instantaneous measurement collected during the course of a day.

Mean (7-day mean, 30-day mean) is the arithmetic mean value of all results for samples collected during either a seven day period or calendar week whichever is applicable, or a thirty day period or a calendar month whichever is applicable.

Grab sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.

Instantaneous measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.

Composite samples shall be flow proportioned. The composite sample shall, at a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours, nor more than twenty-four (24) hours. Acceptable methods for the preparation of composite samples are as follows:

a. Constant time interval between samples, sample volume proportional to flow rate at the time of sampling;

b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time of the first sample was collected may be used;

c. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,

d. Continuous collection of sample with sample collection rate proportional to flow rate.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

Director means the Regional Administrator of EPA Region 8 or an authorized representative.

EPA means the United States Environmental Protection Agency.

Storm Water or *Stormwater* means storm water runoff, snow melt runoff, and surface runoff and drainage.

CWA means the Clean Water Act (formerly referred to as either the Federal Water Pollution Act or the Federal Water Pollution Control Act Amendments of 1972), Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117, and Pub. L. 100-4. In this permit the CWA may be referred to as "the Act".

Sewage Sludge is any solid, semi-solid or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary or advanced wastewater treatment processes; and a material derived from sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works.

Whole Effluent Toxicity, Acute toxicity occurs when 50 percent or more mortality is observed for either species (see Part 1.3.) at any effluent concentration. Mortality in the control must simultaneously be 10 percent or less for the effluent results to be considered valid. Chronic toxicity occurs when during a chronic toxicity test, the 25% inhibition concentration (IC_{25}) calculated on the basis of test organism survival and growth or survival and reproduction, is less than or equal to 100% effluent concentration.

Section 313 Water Priority Chemicals means a chemical or chemical categories which: 1) are listed at 40 CFR 372.65 pursuant to Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986); 2) are present at or above threshold levels at a facility subject of EPCRA Section 313 reporting requirements; and 3) that meet at least one of the following criteria: (i) are listed in Appendix D of 40 CFR 122 on either Table II (organic toxic pollutants), Table III (certain metals, cyanides, and phenols) or Table V (certain toxic pollutants and hazardous substances); (ii)are listed as a hazardous substance pursuant to section 311(b)(2)(A) of the CWA at 40 CFR 116.4; or (iii) are pollutants for which EPA has published acute or chronic water quality criteria.

1.2. Description of Discharge Point(s). The authorization to discharge provided under this permit is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under an NPDES permit is a violation of the Clean Water Act and could subject the person(s) responsible for such discharge to penalties under Section 309 of the Act.

Outfall Serial Number(s)	Description of Discharge Point(s)
001	Any discharge of uncontaminated stormwater from the Evaporation Ponds to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47°58’25” Latitude 101°52’11”
002	Any discharge from the Final Effluent Holding Ponds or the Final Release Tanks to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47°58’29” Latitude 101°52’9”
002a	Any discharge from the Stormwater Final Release Tanks to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47°58’29” Latitude 101°52’9”
003	Any discharge from the Sanitary Wastewater Treatment Plant to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47°58’??” Latitude 101°52’??”

1.3. Specific Limitations and Self-Monitoring Requirements

1.3.1. Effluent Limitations - Outfall 001. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Stormwater Evaporation Ponds by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation 30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, mgd	NA	NA	0.08
Oil and Grease, mg/L	NA	NA	15
Biochemical Oxygen Demand (5-day), mg/L	30	45	N/A
Total Suspended Solids, mg/L	30	45	N/A
Phenol, ug/L	300	N/A	N/A
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Selenium (tr), ug/L	5	N/A	20
Sulfate, mg/L	750	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		
The pH of the discharge shall not be less than 7.0 s.u.or greater than 9.0 s.u.at any time.			

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 001 shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

1.3.2 Self-Monitoring Requirements - Outfall 001. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), mg/L	Monthly	Composite
Total Suspended Solids, mg/L	Monthly	Composite
Phenol, ug/L	Quarterly	Composite
Ammonia as N, mg/L	Quarterly	Composite
Selenium (tr), ug/L	Quarterly	Composite
Manganese (tr), ug/L	Quarterly	Composite
Iron (tr), ug/L	Quarterly	Composite
Fluoride, mg/L	Quarterly	Composite
Sulfate, mg/L	Quarterly	Composite
Nitrate as N, mg/L	Quarterly	Composite
Total Phosphorous as P, mg/L	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Oil and grease, visual c/	Daily	Visual c/
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

tr – total recoverable

1.3.3. Effluent Limitations - Outfall 002. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Final Effluent Holding Ponds or Effluent Final Release Tanks by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation 30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, mgd	0.025	N/A	0.05
Biochemical Oxygen Demand (5-day), lbs./day	43	N/A	81
Chemical Oxygen Demand, lbs./day	255	N/A	500
Total Suspended Solids, lbs./day	35	N/A	55
Oil and Grease, lbs./day	13.7	N/A	25.4
Benzene, ug/L	2.2	N/A	NA
Ethyl benzene, ug/L	530	N/A	NA
Toluene, ug/L	1300	N/A	NA
Phenol, ug/L	300	N/A	NA
Phenolic Compounds, lbs./day	0.29	N/A	0.59
Hydrogen Sulfide, ug/L	2.0	N/A	NA
Ammonia as N, mg/L	1.1	N/A	3.2
Barium (tr), ug/L	1000	N/A	NA
Aluminum (tr), ug/L	87	N/A	750
Chromium (Total), lbs./day	0.035	N/A	1.22
Chromium (VI) , ug/L	11	N/A	16
Chromium (VI), lbs/day	0.0018	N/A	0.0067
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Mercury (Total), ug/L	0.0012	N/A	1.4
Nickel (tr), ug/L	132	N/A	1190
Selenium (tr), ug/L	5	N/A	20
Chloride, mg/L	230	N/A	860
Fluoride, mg/L	4.0	N/A	N/A
Sulfate, mg/L	750	N/A	N/A
Nitrite as N, mg/L	1.0	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Whole Effluent Toxicity, acute	LC_{50} > 100%		
Whole Effluent Toxicity, chronic	IC_{25} > 100%		
The pH of the discharge shall not be less than 7.0 s.u. or greater than 9.0 s.u. at any time.			

Effluent Characteristic	Effluent Limitation
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 002 shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

1.3.4 Self-Monitoring Requirements - Outfall 002. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), lbs./day	2X/Week	Composite
Chemical Oxygen Demand, lbs./day	Monthly	Composite
Total Suspended Solids, lbs./day	2X/Week	Composite
Oil and Grease, lbs/day	Weekly	Grab
Benzene, ug/L	Monthly	Grab
Ethyl benzene, ug/L	Monthly	Grab
Toluene, ug/L	Monthly	Grab
Phenol, ug/L	Monthly	Grab
Phenolic Compounds, lbs./day	Monthly	Grab
Hydrogen Sulfide, ug/L	Weekly	Grab
Ammonia as N, mg/L	Weekly	Composite
Barium (tr), ug/L	Monthly	Composite
Aluminum (tr), ug/L	Monthly	Composite

Effluent Characteristic	Frequency	Sample Type a/
Chromium (Total), lbs./day	Monthly	Composite
Chromium (VI), ug/L	Monthly	Grab
Chromium (VI), lbs./day	Monthly	Grab
Iron (tr), ug/L	Monthly	Composite
Manganese (tr), ug/L	Monthly	Composite
Mercury (Total), ug/L	Monthly	Composite
Nickel (tr), ug/L	Monthly	Composite
Selenium (tr), ug/L	Monthly	Composite
Chloride, mg/L	Monthly	Composite
Fluoride, mg/L	Monthly	Composite
Sulfate, mg/L	Monthly	Composite
Nitrite as N, mg/L	Monthly	Composite
Nitrate as N, mg/L	Monthly	Composite
Total Phosphorous as P, mg/L	Monthly	Composite
Whole Effluent Toxicity, acute	Quarterly	Grab
Whole Effluent Toxicity, chronic	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Temperature, ^{o}C	Daily	Grab
Oil and grease, visual c/	Daily	Grab
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

tr - total recoverable

1.3.5 Additional Self-Monitoring Requirements - Outfall 002.

Additional Monitoring Requirement for Outfall 002:

Approximately 90 days and 270 days after startup of the facility, monitoring shall be required for:

Total Metals – Table III §40CFR 122 Appendix D
Volatile, acid, and base/neutral compounds – Table II §40CFR 122 Appendix D

1.3.6 Effluent Limitations - Outfall 002a. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Stormwater Final Release Tanks by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, mgd	0.0065	N/A	0.027
Oil and Grease, mg/L	15	N/A	15
Total Organic Carbon, mg/L	110	N/A	110
Benzene, ug/L	2.2	N/A	NA
Ethyl benzene, ug/L	530	N/A	NA
Toluene, ug/L	1300	N/A	NA
Phenol, ug/L	300	N/A	NA
Hydrogen Sulfide, ug/L	2.0	N/A	NA
Ammonia as N, mg/L	1.1	N/A	3.2
Barium (tr), ug/L	1000	N/A	NA
Aluminum (tr), ug/L	87	N/A	750
Chromium (VI), ug/L	11	N/A	16
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Mercury (Total), ug/L	0.0012	N/A	1.4
Nickel (tr), ug/L	132	N/A	1190
Selenium (tr), ug/L	5	N/A	20
Chloride, mg/L	230	N/A	860
Fluoride, mg/L	4.0	N/A	N/A
Sulfate, mg/L	750	N/A	N/A
Nitrite as N, mg/L	1.0	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Whole Effluent Toxicity, acute	LC_{50} > 100%		
Whole Effluent Toxicity, chronic	IC_{25} > 100%		
The pH of the discharge shall not be less than 7.0 s.u. or greater than 9.0 s.u. at any time.			
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 002a shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

1.3.7 Self-Monitoring Requirements - Outfall 002a. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), mg/L	2X/Week	Composite
Total Organic Carbon, mg/L	Monthly	Composite
Total Suspended Solids, mg/L	2X/Week	Composite
Benzene, ug/L	Monthly	Grab
Ethyl benzene, ug/L	Monthly	Grab
Toluene, ug/L	Monthly	Grab
Phenol, ug/L	Monthly	Grab
Hydrogen Sulfide, ug/L	Weekly	Grab
Ammonia as N, mg/L	Weekly	Composite
Barium (tr), ug/L	Monthly	Composite
Aluminum (tr), ug/L	Monthly	Composite
Chromium (VI), ug/L	Monthly	Grab
Iron (tr), ug/L	Monthly	Composite
Manganese (tr), ug/L	Monthly	Composite
Mercury (Total), ug/L	Monthly	Composite
Nickel (tr), ug/L	Monthly	Composite
Selenium (tr), ug/L	Monthly	Composite
Chloride, mg/L	Monthly	Composite
Fluoride, mg/L	Monthly	Composite

Effluent Characteristic	Frequency	Sample Type a/
Sulfate, mg/L	Monthly	Composite
Nitrite as N, mg/L	Monthly	Composite
Nitrate as N, mg/L	Monthly	Composite
Total Phosphorous as P, mg/L	Monthly	Composite
Whole Effluent Toxicity, acute	Quarterly	Grab
Whole Effluent Toxicity, chronic	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Temperature, ^{o}C	Daily	Grab
Oil and Grease, visual c/	Daily	Grab
Oil and Grease, mg/L	Weekly	Grab
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

tr - Total recoverable

1.3.8 Effluent Limitations - Outfall 003. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Sanitary Wastewater Treatment Plant by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, MGD	NA	NA	0.08
Biochemical Oxygen Demand (5-day), mg/L	30	45	N/A
Total Suspended Solids, mg/L	30	45	N/A
Ammonia as N, mg/L	1.1	N/A	3.2
Total Residual Chlorine, ug/L	11	N/A	19
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Selenium (tr), ug/L	5	N/A	20
Sulfate, mg/L	750	N/A	N/A
Nitrite as N, mg/L	1.0	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		
The pH of the discharge shall not be less than 7.0 s.u.or greater than 9.0 s.u.at any time.			

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 003 shall be free from floating debris, oil, scum, and other floating materials attributable to municipal, industrial, or other discharges or agricultural practices in sufficient amounts to be unsightly or deleterious.

Percentage Removal Requirements (TSS and BOD_5 Limitation): In addition to the concentration limits for total suspended solids and BOD_5 indicated above, the arithmetic mean of the concentration for effluent samples collected in a 30-day consecutive period shall not exceed 15 percent of the arithmetic mean of the concentration for influent samples collected at approximately the same times during the same period (85 percent removal).

1.3.9 Self-Monitoring Requirements - Outfall 003. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), mg/L c/	Monthly	Composite
Total Suspended Solids, mg/L c/	Monthly	Composite
Ammonia as N, mg/L	Quarterly	Composite
Total Residual Chlorine, ug/L	Daily	Grab
Selenium (tr), ug/L	Quarterly	Composite
Manganese (tr), ug/L	Quarterly	Composite
Iron (tr), ug/L	Quarterly	Composite
Sulfate, mg/L	Quarterly	Composite
Nitrite as N, mg/L	Quarterly	Composite
Nitrate as N, mg/L	Quarterly	Composite
Total Phosphorous as P, mg/L	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ In addition to monitoring the final discharge, influent samples shall be taken and analyzed for this constituent at the same frequency as required for this constituent in the discharge.

tr – total recoverable

1.3.10 Whole Effluent Toxicity Testing - Chronic Toxicity

Starting in the first full quarter after the effective date of this permit, the permittee shall, at least once each quarter, conduct chronic short term toxicity tests on the final effluent from Outfalls 002 and 002a. There shall not be chronic toxicity in 100 percent concentration of the final effluent.

The monitoring frequency shall be quarterly. Quarterly samples shall be collected on a two day progression; i.e., if the first quarterly sample is on a Monday, during the next quarter, the sampling shall begin on a Wednesday. If chronic toxicity is detected, an additional test shall be conducted within two weeks of the date of when the permittee learned of the test failure. The need for any additional samples shall be determined by the permit issuing authority.

The chronic toxicity tests shall be conducted in accordance with the procedures set out in the latest revision of "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", EPA 821-R-02-013, Rev. Oct. 2002. Test species shall consist of *Ceriodaphnia dubia* and *Pimephales promelas*. A multi dilution test consisting of five concentrations and a control is required. If test acceptability criteria is not met for control survival, growth, or reproduction, the test shall be considered invalid. Chronic toxicity occurs when, during a chronic toxicity test, the 25% inhibition concentration (IC_{25}) calculated on the basis of test organism survival and growth or survival and reproduction, is less than or equal to 100% effluent concentration. The tests shall be done using effluent concentrations of 100%, 50%, 25%, 12.5%, 6.25%, and 0% (control).

Test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the calendar period during which the whole effluent test was run (e.g. results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining reports submitted with DMRs due each July 28, October 28, and January 28). Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with the latest revision of the "Region VIII Guidance for Chronic Whole Effluent Reporting" (Appendix C of Region VIII NPDES Whole Effluent Toxics Control Program, August 1997), and shall include all the physical and chemical testing as specified.

If the results for one year (four consecutive quarters) of whole effluent testing indicate no chronic toxicity, the permittee may request the permit issuing authority to allow the permittee to reduce testing frequency, and/or reduce testing to one species on an alternating basis, and/or modify testing to the acute test program. The permit issuing authority may approve, partially approve, or deny the request based on results and other available information. If approval is given, the modification will take place without a public notice.

1.3.11 Whole Effluent Toxicity Testing - Acute Toxicity

Starting in the first full quarter after the effective date of this permit, the permittee shall conduct quarterly acute static replacement toxicity tests on an effluent sample of the discharge from Outfalls 002 and 002a. The effluent shall be obtained from the sample required for the chronic toxicity tests as noted in Part 1.3.10. of this permit.

The replacement static toxicity tests shall be conducted in accordance with the procedures set out in the latest revision of “Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms”, EPA 821-R-02-012 (Rev Oct. 2002). The permittee shall conduct an acute 48-hour static toxicity test using *Ceriodaphnia dubia* an acute 96-hour static toxicity test using *Pimephales promelas*. The tests shall be done using effluent concentrations of 100%, 75%, 50%, 25%, 12.5%, 6.25% and 0% (control).

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration. If more than 10% control mortality occurs, the test shall be repeated until satisfactory control survival is achieved. If acute toxicity occurs, an additional test shall be conducted within two weeks of the date of when the permittee learned of the test failure. If only one species fails, retesting may be limited to this species. Should toxicity occur in the second test, testing shall occur once a month until further notified by the permit issuing authority.

Quarterly test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the reporting calendar quarter (e.g., whole effluent results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining reports submitted with DMRs due each July 28, October 28, and January 28). Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with the latest revision of the "Region VIII Guidance for Acute Whole Effluent Reporting" (Appendix C of Region VIII NPDES Whole Effluent Toxics Control Program, August 1997), and shall include all chemical and physical data as specified.

If the results for four consecutive quarters of testing indicate no acute toxicity, the permittee may request the permit issuing authority to allow a reduction to quarterly acute toxicity testing on only one species on an alternating basis.   The permit issuing authority may approve or deny the request based on the results and other available information without an additional public notice. If the request is approved, the test procedures are to be the same as specified above for the test species. If approval is given, the modification will take place without a public notice.

1.3.12 <u>Toxicity Identification Evaluation (TIE)/Toxicity Reduction Evaluation (TRE)</u>

Should acute toxicity and/or chronic toxicity be detected in two (2) consecutive tests of the permittee’s discharge, a TIE-TRE shall be undertaken by the permittee to establish the cause of the toxicity, locate the source(s) of the toxicity, and develop control of or treatment of the toxicity. Failure to initiate, or conduct an adequate TIE-TRE, or delays in the conduct of such tests, shall not be considered a justification for non-compliance with the whole effluent toxicity limitations contained in Part 1.3.3 and 1.3.6 of this permit. A TRE plan needs to be submitted to the permitting authority within 45 days after confirmation of the continuance of the effluent toxicity.

1.4 Stormwater Requirements

1.4.1 Storm Water Pollution Prevention Plans

The permittee shall continue to implement all existing best management practices (BMP) that may affect the quality of storm water runoff unless those BMPs are modified or replaced by the storm water pollution prevention plan required below. The permittee shall develop a storm water pollution prevention plan for the MHA Nation Clean Fuels Refinery site. The storm water pollution prevention plan shall be prepared in accordance with good engineering practices and in accordance with the factors outlined in 40 CFR 125.3(d)(2) or (3) as appropriate. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. The facility must implement the provisions of the storm water pollution prevention plan required under this Part as a condition of this permit.

1.4.1.1 Deadlines for Plan Preparation and Compliance.

The plan for a storm water discharge:

1.4.1.2 Shall be prepared and submitted to the permit issuing authority for review and approval no later than six months after the effective date of this permit (and updated at a minimum of every two years or more frequently if deemed appropriate). The plan shall be submitted to the U.S. EPA Region 8 Stormwater Program at the following address:

Greg Davis
EPA Region 8 Stormwater Program Coordinator
Mailcode: 8P-W-P
999 18th Street, Suite 200
Denver, CO 80202-2466

A copy of the plan shall also be submitted to the Three Affiliated Tribes Environmental Department at the following address:

Environmental Division
Three Affiliated Tribes
204 West Main
New Town, ND 58763

1.4.1.3 Shall provide for implementation and compliance with the terms of the plan on or before six months after the plan is approved by the U.S. EPA Region 8 Stormwater Program.

1.4.1.5 Upon a showing of good cause, the permit issuing authority may establish a later date in writing for preparation, implementation, and compliance with the plan.

1.4.1.6 Except as provided in Part 1.4.1.3 above, the plan shall be implemented in accordance with the approval of the permit issuing authority no later than one year after the effective date of this permit unless the permit issuing authority approves a later date.

1.4.1.7 The permit issuing authority may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provisions of the permit which are not being met by the plan, and identify which provisions of the plan require modifications in order to meet the minimum requirements of this Part. Within 30 days of such notification from the permit issuing authority, (or as otherwise provided by the permit issuing authority), the permittee shall make the required changes to the plan and shall submit to the permit issuing authority a written certification that the requested changes have been made.

1.4.1.8 Keeping Plans Current - The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the waters of the United States or if the storm water pollution prevention plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under Part 1.4.1.9.2 (description of potential pollutant sources) of this permit, or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity. Amendments to the plan shall be submitted for review to the permit issuing authority in the same manner as Part 1.4.1.2(above).

1.4.1.9 Contents of Plan - The plan shall include, at a minimum, the following:

1.4.1.9.1 Pollution Prevention Team - The plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

1.4.1.9.2 Description of Potential Pollutant Sources - The plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources. The plan shall include, at a minimum:

1.4.1.9.3 Inventory of Exposed Materials - An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of 3 years prior to the date of the issuance of this permit and the present; method and location of on-site storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of 3 years prior to the date of the issuance of this permit and the present; the location and a description of existing structural and non-structural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives. Note: The limitation of three (3) years prior to the date of the issuance of this permit does not apply to radioactive materials.

1.4.1.9.4 Drainage A site map indicating an outline of the portions of the drainage area of each storm water outfall that are within the facility boundaries, each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, locations where major spills or leaks identified under Part 1.4.1.9.6 (Spills and Leaks) of this permit have occurred, and the locations of the following activities where such activities are exposed to precipitation: fueling stations, vehicle and equipment maintenance and/or cleaning areas, loading/unloading areas, locations used for the treatment, storage or disposal of wastes, liquid storage tanks, processing areas and storage areas.

1.4.1.9.5 For each area of the facility that generates storm water discharges associated with industrial activity with a reasonable potential for containing pollutants, a prediction of the direction of flow, and an identification of the types of pollutants which are likely to be present in storm water discharges associated with industrial activity. Factors to consider include the toxicity of chemical; quantity of chemicals used, produced or discharged; the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants. Flows with a significant potential for causing erosion shall be identified.

1.4.1.9.6 Spills and Leaks: A list of significant spills and significant leaks of toxic, hazardous or radioactive pollutants that have occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of 3 years prior to the effective date of this permit. Such list shall be updated as appropriate during the term of the permit. Note: The limitation of three (3) years prior to the date of the issuance of this permit does not apply to radioactive materials:

1.4.1.9.7 Sampling Data: A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

1.4.1.9.8 Risk Identification and Summary of Potential Pollutant Sources: A narrative description of the potential pollutant sources from the following activities: loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities; significant dust or particulate generating processes; and on-site waste disposal practices. The description shall specifically list any significant potential source of pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g., radioactive materials, acids, solvents, etc.) of concern shall be identified.

1.4.1.9.9 Spills and Leaks: The permittee shall develop a description of storm water management controls appropriate for the MHA Nation Clean Fuels Refinery Site, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

1.4.1.9.10 Good Housekeeping: Good housekeeping requires the maintenance of areas which may contribute pollutants to storm waters discharges in a clean, orderly manner.

1.4.1.9.11 Preventive Maintenance: A preventive maintenance program shall involve timely inspection and maintenance of storm water management devices (e.g., cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

1.4.1.9.12 Spill Prevention and Response Procedures: Areas where potential spills which can contribute pollutants to storm water discharges can occur, and their accompanying drainage points shall be identified clearly in the storm water pollution prevention plan. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.

1.4.1.9.13 Inspections: In addition to or as part of the comprehensive site evaluation required under Part 1.4.1.9.18 of this permit, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility at appropriate intervals of no less than one time each year as specified in the plan. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained.

1.4.1.9.14 Employee Training: Employee training programs shall inform personnel responsible for implementing activities identified in the storm water pollution prevention plan or otherwise responsible for storm water management at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics such as spill response, good housekeeping and material management practices. The pollution prevention plan shall identify periodic dates for such training.

1.4.1.9.15 Record keeping and Internal Reporting Procedures: A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan.

1.4.1.9.16 Sediment and Erosion Control: The plan shall identify areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identify structural, vegetative, and/or stabilization measures to be used to limit erosion.

1.4.1.9.17 Management of Runoff: The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide the measures that the permittees determine to be reasonable and appropriate and these measures shall be implemented and maintained. The potential of various sources at the MHA Nation Clean Fuels Refinery Site to contribute pollutants to storm water discharges associated with industrial activity (see Part 1.4.1.9.2 shall be considered when determining reasonable and appropriate measures. Appropriate measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices.

1.4.1.9.18 Comprehensive Site Compliance Evaluation: Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but, in no case less than once a year. Such evaluations shall provide:

1.4.1.9.19 Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

1.4.1.9.20 The analytical results from the storm water monitoring required under Parts 1.3.2 and 1.3.7 shall be evaluated with the objective of determining whether or not the storm water discharges from the plant site are causing or contributing to water quality problems in the East Fork of Shell Creek. To the extent that data are available, the evaluation shall include data for the previous 12 months. Earlier data may be included to give an indication of trends. The data should also be evaluated in terms of giving an indication of whether or not the plan is effective in minimizing the discharge of pollutants or whether additional control measures are needed.

1.4.1.9.21 Based on the results of the visual inspection (Part 1.4.1.9.13 above) and the evaluation of the monitoring data (Part 1.4.1.9.20 above), the plan shall be revised as appropriate. The revision shall include, as appropriate, the description of potential pollutant sources identified in the plan and pollution prevention measures and controls identified in the plan. The revision shall be completed within four (4) weeks of such inspection and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than 12 weeks after the inspection unless additional time has been approved by the permit issuing authority.

1.4.1.9.22 A report summarizing the scope of the inspection, personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with Part 1.4.1.9.20 (above) of the permit shall be made and retained as part of the storm water pollution prevention plan for at least one year after coverage under this permit terminates. The report shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit.

1.4.1.9.23 Consistency with other plans: Storm water pollution prevention plans may reflect requirements for spill prevention control and countermeasure (SPCC) plans developed for the MHA Nation Clean Fuels Refinery under section 311 of the CWA; best management practices plans; or other environmental control plans prepared for the MHA Nation Clean Fuels Refinery. Provided such requirement(s) are incorporated into the storm water pollution prevention plan, or referenced by specific document title, volume, heading, and page number(s). All referenced documents must be available for review and inspection upon request.

1.4.2 Additional requirements for storm water discharges associated with industrial activity from facilities subject to EPCRA Section 313 requirements. In addition to the requirements of Part 1.4.1.9 through 1.4.1.9.22 of this permit and other applicable conditions of this permit, storm water pollution prevention plans for facilities subject to reporting requirements under EPCRA Section 313 for chemicals which are classified as 'Section 313 water priority chemicals' in accordance with the definition in PART I.A of this permit, shall describe and ensure the implementation of practices which are necessary to provide for conformance with the following guidelines:

1.4.2.1 In areas where Section 313 water priority chemicals are stored, processed or otherwise handled, appropriate containment, drainage control and/or diversionary structures shall be provided. At a minimum, one of the following preventive systems or its equivalent shall be used:

1.4.2.2 Curbing, culverting, gutters, sewers or other forms of drainage control to prevent or minimize the potential for storm water run-off to come into contact with significant sources of pollutants; or,

1.4.2.3 Roofs, covers or other forms of appropriate protection to prevent storage piles from exposure to storm water, and wind.

1.4.2.4 In addition to the minimum standards listed under Part 1.4.1.10.1 of this permit, the storm water pollution prevention plan shall include a complete discussion of measures taken to conform with the following applicable guidelines, other effective storm water pollution prevention procedures, and applicable Tribal rules, regulations and guidelines:

1.4.2.5 <u>Liquid storage areas where storm water comes into contact with any equipment, tank, container, or other vessel used for Section 313 water priority chemicals.</u>

1.4.2.5.1 No tank or container shall be used for the storage of a Section 313 water priority chemical unless its material and construction are compatible with the material stored and conditions of storage such as pressure and temperature, etc.

1.4.2.5.2 Liquid storage areas for Section 313 water priority chemicals shall be operated to minimize discharges of Section 313 chemicals. Appropriate measures to minimize discharges of Section 313 chemicals may include secondary containment provided for at least the entire contents of the largest single tank plus sufficient freeboard to allow for precipitation, a comprehensive spill contingency and integrity testing plan, and/or other equivalent measures.

1.4.2.6 <u>Material storage areas for Section 313 water priority chemicals other than liquids.</u> Material storage areas for Section 313 water priority chemicals other than liquids which are subject to runoff, leaching, or wind shall incorporate drainage or other control features which will minimize the discharge of Section 313 water priority chemicals by reducing storm water contact with Section 313 water priority chemicals.

1.4.2.7 <u>Truck and rail car loading and unloading areas for liquid Section 313 water priority chemicals</u>. Truck and rail car loading and unloading areas for liquid Section 313 water priority chemicals shall be operated to minimize discharges of Section 313 water priority chemicals. Protection such as overhangs or door skirts to enclose trailer ends at truck loading/unloading docks shall be provided as appropriate. Appropriate measures to minimize discharges of Section 313 chemicals may include: the placement and maintenance of drip pans (including the proper disposal of materials collected in the drip pans) where spillage may occur (such as hose connections, hose reels and filler nozzles) for use when making and breaking hose connections; a comprehensive spill contingency and integrity testing plan; and/or other equivalent measures.

1.4.2.8 <u>Areas where Section 313 water priority chemicals are transferred, processed or otherwise handled</u>. Processing equipment and materials handling equipment shall be operated so as to minimize discharges of Section 313 water priority chemicals. Materials used in piping and equipment shall be compatible with the substances handled. Drainage from process and materials handling areas shall minimize storm water contact with section 313 water priority chemicals. Additional protection such as covers or guards to prevent exposure to wind, spraying or releases from pressure relief vents from causing a discharge of Section 313 water priority chemicals to the drainage system shall be provided as appropriate. Visual inspections or leak tests shall be provided for overhead piping conveying Section 313 water priority chemicals without secondary containment.

1.4.2.9 <u>Discharges from areas covered by paragraphs 1.4.1.10.2.1 through 1.4.1.10.2.6</u>

1.4.2.9.1 Drainage from areas covered by paragraphs <u>1.4.1.10.2.1 through 1.4.1.10.2.6</u> of this Part should be restrained by valves or other positive means to prevent the discharge of a spill or other excessive leakage of Section 313 water priority chemicals. Where containment units are employed, such units may be emptied by pumps or ejectors; however, these shall be manually activated.

1.4.2.9.2 Flapper-type drain valves shall not be used to drain containment areas. Valves used for the drainage of containment areas should, as far as is practical, be of manual, open-and-closed design.

1.4.2.9.3 If facility drainage is not engineered as above, the final discharge of all in-facility storm sewers shall be equipped to be equivalent with a diversion system that could, in the event of an uncontrolled spill of Section 313 water priority chemicals, return the spilled material to the facility.

1.4.2.9.4 Records shall be kept of the frequency and estimated volume (in gallons) of discharges from containment areas.

1.4.2.9.5 Facility site runoff other than from areas covered by 1.4.1.10.2.1 through 1.4.1.10.2.6. Other areas of the facility (those not addressed in paragraphs 1.4.1.10.2.1 through 1.4.1.10.2.6, from which runoff which may contain Section 313 water priority chemicals or spills of Section 313 water priority chemicals could cause a discharge shall incorporate the necessary drainage or other control features to prevent discharge of spilled or improperly disposed material and ensure the mitigation of pollutants in runoff or leachate.

1.4.2.9.6 Preventive maintenance and housekeeping. All areas of the facility shall be inspected at specific intervals identified in the plan for leaks or conditions that could lead to discharges of Section 313 water priority chemicals or direct contact of storm water with raw materials, intermediate materials, waste materials or products. In particular, facility piping, pumps, storage tanks and bins, pressure vessels, process and material handling equipment, and material bulk storage areas shall be examined for any conditions or failures which could cause a discharge. Inspection shall include examination for leaks, wind blowing, corrosion, support or foundation failure, or other forms of deterioration or noncontainment. Inspection intervals shall be specified in the plan and shall be based on design and operational experience. Different areas may require different inspection intervals. Where a leak or other condition is discovered which may result in significant releases of Section 313 water priority chemicals to waters of the United States, action to stop the leak or otherwise prevent the significant release of Section 313 water priority chemicals to waters of the United States shall be immediately taken or the unit or process shut down until such action can be taken.

1.4.2.9.7 When a leak or noncontainment of a Section 313 water priority chemical has occurred, contaminated soil, debris, or other material must be promptly removed and disposed in accordance with Federal, Tribal, and local requirements and as described in the plan.

1.4.2.9.8 Facility security. Facilities shall have the necessary security systems to prevent accidental or intentional entry which could cause a discharge. Security systems described in the plan shall address fencing, lighting, vehicular traffic control, and securing of equipment and buildings.

1.4.2.9.9 Training. Facility employees and contractor personnel that work in areas where Section 313 water priority chemicals are use or stored shall be trained in and informed of preventive measures at the facility. Employee training shall be conducted at intervals specified in the plan, but not less than once per year, in matters of pollution control laws and regulations, and in the storm water pollution prevention plan and the particular features of the facility and its operation which are designed to minimize discharges of Section 313 water priority chemicals. The plan shall designate a person who is accountable for spill prevention at the facility and who will set up the necessary spill emergency procedures and reporting requirements so that spills and emergency releases of Section 313 water priority chemicals can be isolated and contained before a discharge of a Section 313 water priority chemical can occur. Contractor or temporary personnel shall be informed of facility operation and design features in order to prevent discharges or spills from occurring.

1.4.2.9.10 Engineering Certification. - The storm water pollution prevention plan for a facility subject to EPCRA Section 313 requirements for chemicals which are classified as 'Section 313 water priority chemicals' shall be reviewed by a Registered Professional Engineer and certified to by such Professional Engineer. A Registered Professional Engineer shall recertify the plan every 3 years thereafter or as soon as practicable after significant modification are made to the facility. By means of these certifications the engineer, having examined the facility and being familiar with the provisions of this Part, shall attest that the storm water pollution prevention plan has been prepared in accordance with good engineering practices. Such certifications shall in no way relieve the owner or operator of a facility covered by the plan of their duty to prepare and fully implement such plan.

1.4.3 Additional Requirements for Salt Storage.

1.4.3.1 Storage piles of salt used for deicing or other commercial or industrial purposes and which generate a storm water discharge associated with industrial activity which is discharged to a water of the United States shall be enclosed or covered to prevent exposure to precipitation, except for exposure resulting from adding or removing materials from the pile.

1.4.3.2 Dischargers shall demonstrate compliance with this provision as expeditiously as practicable, but in no event later than two years after the effective date of this permit. Piles do not need to be enclosed or covered where storm water from the pile is not discharged to waters of the United States.

2. MONITORING, RECORDING AND REPORTING REQUIREMENTS

2.1. Representative Sampling. Samples taken in compliance with the monitoring requirements established under Part 1. shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. Sludge samples shall be collected at a location representative of the quality of sludge immediately prior to use-disposal practice.

2.2. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Sludge monitoring procedures shall be those specified in 40 CFR 503, or as specified in the permit.

2.3. Penalties for Tampering. The Act provides that any person who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or by both. Second conviction is punishable by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both.

2.4. Reporting of Monitoring Results. Effluent monitoring results obtained during the previous **month** shall be summarized and reported on **one** Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported. Until further notice, sludge monitoring results may be reported in the testing laboratory's normal format (there is no EPA standard form at this time), but should be on letter size pages. Whole effluent toxicity (biomonitoring) results must be reported on the most recent version of EPA Region 8's Guidance For Whole Effluent Reporting. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the Signatory Requirements (see Part 4.), and submitted to the Planning and Targeting Program, and the TAT Environmental Department at the following addresses:

original to: U.S. EPA, REGION 8
PLANNING AND TARGETING PROGRAM (8ENF-PT)
ATTENTION: PCS COORDINATOR
999 18TH STREET, SUITE 300
DENVER, COLORADO 80202-2466

copy to: Environmental Division
Three Affiliated Tribes
204 West Main
New Town, ND 58763

2.5. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136, 40 CFR 503, or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

2.6. Records Contents. Records of monitoring information shall include:

2.6.1. The date, exact place, and time of sampling or measurements;
2.6.2. The initials or name(s) of the individual(s) who performed the sampling or measurements;
2.6.3. The date(s) analyses were performed;
2.6.4. The time(s) analyses were initiated;
2.6.5. The initials or name(s) of individual(s) who performed the analyses;
2.6.6. References and written procedures, when available, for the analytical techniques or methods used; and,
2.6.7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

2.7. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. Records of monitoring required by this permit related to sludge use and disposal activities must be kept at least five years (or longer as required by 40 CFR 503). This period may be extended by request of the Director at any time. Data collected on site, data used to prepare the DMR, copies of Discharge Monitoring Reports, and a copy of this NPDES permit must be maintained on site.

2.8. Twenty-four Hour Notice of Noncompliance Reporting.

2.8.1. The permittee shall report any noncompliance which may endanger health or the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the EPA, Region 8, Preparedness, Assessment and Response Program at (303) 293-1788, and the TAT Environmental Division at (701) 627-5469.

2.8.2. The following occurrences of noncompliance shall be reported by telephone to the EPA, Region 8, Technical Enforcement Program at (303) 312-6720 (8:00 a.m. - 4:30 p.m. Mountain Time) or the appropriate EPA State Program Manager, NPDES Program, (toll-free 866-457-2690) (8:00 a.m. - 4:30 p.m. Mountain Time) and the TAT Environmental Division at (701) 627-5469 (8:00 a.m. - 4:30 p.m. Central Time) by the first workday following the day the permittee became aware of the circumstances:

2.8.2.1. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part 3.7., Bypass of Treatment Facilities.);

2.8.2.2. Any upset which exceeds any effluent limitation in the permit (See Part 3.8., Upset Conditions.); or,

2.8.2.3. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit to be reported within 24 hours.

2.8.3. A written submission shall also be provided to the USEPA, Office of Enforcement, Compliance and Environmental Justice, and to the TAT Environmental Division within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

2.8.3.1. A description of the noncompliance and its cause;

2.8.3.2. The period of noncompliance, including exact dates and times;

2.8.3.3. The estimated time noncompliance is expected to continue if it has not been corrected; and,

2.8.3.4. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

2.8.4. The Director may waive the written report on a case-by-case basis for an occurrence of noncompliance listed under Part 2.8.2. above, if the incident has been orally reported in accordance with the requirements of Part 2.8.2.

2.8.5. Reports shall be submitted to the addresses in Part 2.4., Reporting of Monitoring Results.

2.9. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part 2.4. are submitted. The reports shall contain the information listed in Part 2.8.3.

2.10. Inspection and Entry. The permittee shall allow the Regional Administrator, or authorized representative (including an authorized contractor acting as a representative of the Administrator) upon presentation of credentials and other documents as may be required by law, to:

2.10.1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2.10.2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

2.10.3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

2.10.4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

3. COMPLIANCE RESPONSIBILITIES

3.1. Duty to Comply. The permittee must comply with all conditions of this permit. Any failure to comply with the permit may constitute a violation of the Clean Water Act and may be grounds for enforcement action, including, but not limited to permit termination, revocation and reissuance, modification, or denial of a permit renewal application. The permittee shall give the director advance notice of any planned changes at the permitted facility that will change any discharge from the facility, or of any activity that may result in failure to comply with permit conditions.

3.2. Penalties for Violations of Permit Conditions. The Clean Water Act provides for specified civil and criminal monetary penalties for violations of its provisions. However, the Federal Civil Penalties Inflation Adjustment Act of 1990, as amended by the Debt Collection Improvement Act of 1996, requires EPA to adjust the civil monetary penalties for inflation on a periodic basis. EPA previously adjusted its civil monetary penalties on December 31, 1996 (61 Fed. Reg. 69359-69365), with technical corrections and additions published on March 20, 1997 (62 Fed. Reg. 13514-13517) and June 27, 1997 (62 Fed. Reg. 35037-35041). On February 13, 2004 (69 Fed. Reg. 7121-7127) EPA once again adjusted its civil monetary penalties. The civil and criminal penalties, as of March 15, 2004, for violations of the Act (including permit conditions) are given below:

3.2.1. Any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $32,500 per day for each violation.

3.2.2. Any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment for not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment for not more than 2 years, or both.

3.2.3. Any person who *knowingly* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment for not more than 6 years, or both.

3.2.4. Any person who *knowingly* violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment for not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment for not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

3.2.5. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Where an administrative enforcement action is brought for a Class I civil penalty, the assessed penalty may not exceed $11,000 per violation, with a maximum amount not to exceed $32,500. Where an administrative enforcement action is brought for a Class II civil penalty, the assessed penalty may not exceed $11,000 per day for each day during which the violation continues, with the maximum amount not to exceed $157,500.

3.3. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3.4. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

3.5. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

3.5.1 The permittee shall, as soon as reasonable and practicable, but no later than six (6) months after the effective date of this permit, do the following as part of the operation and maintenance program for the wastewater treatment facility:

3.5.1.1. Have a current O & M Manual(s) that describes the proper operational procedures and maintenance requirements of the wastewater treatment facility;

3.5.1.2. Have the O & M Manual(s) readily available to the operator of the wastewater treatment facility and require that the operator become familiar with the manual(s) and any updates;

3.5.1.2. Have a schedule(s) for routine operation and maintenance activities at the wastewater treatment facility; and,

3.5.1.3. Require the operator to perform the routine operation and maintenance requirements in accordance with the schedule(s).

3.5.1.4. Deadlines for O&M Manual(s) Preparation.

The O&M Manual(s)

3.5.1.4.1 Shall be prepared and submitted to the permit issuing authority for review and approval no later than six months after the effective date of this permit (and updated at a minimum of every two years or more frequently if deemed appropriate). The plan shall be submitted to the U.S. EPA Region 8 NPDES Permits Unit at the following address:

EPA Region 8 NPDES Permits Unit
Mailcode: 8P-W-P
999 18th Street, Suite 300
Denver, CO 80202-2466

A copy of the plan shall also be submitted to the Three Affiliated Tribes Environmental Department at the following address:

Environmental Division
Three Affiliated Tribes
204 West Main
New Town, ND 58763

3.5.2. The permittee shall maintain a daily log in a **bound notebook(s)** containing a summary record of all operation and maintenance activities at the wastewater treatment facility. At a minimum, the notebook shall include the following information:

3.5.2.1. Date and time;
3.5.2.2 Name and title of person(s) making the log entry;
3.5.2.3. Name of the persons(s) performing the activity;
3.5.2.4. A brief description of the activity; and,
3.5.2.5. Other information, as appropriate.

The permittee shall maintain the notebook in accordance with proper record-keeping procedures and shall make the log available for inspection, upon request, by authorized representatives of the U.S. Environmental Protection Agency or the TAT Environmental Division.

3.6. Removed Substances. Collected screenings, grit, solids, sludge, or other pollutants removed in the course of treatment shall be buried or disposed in a manner consistent with all applicable federal and tribal regulations (i.e., 40 CFR 257, 40 CFR 258, 40 CFR 503, 40 CFR 268 and in a manner so as to prevent any pollutant from entering any waters of the United States or creating a health hazard. **In addition, the use and/or disposal of sewage sludge shall be done under the authorization of an NPDES permit issued for the use and/or disposal of sewage sludge by the appropriate NPDES permitting authority for sewage sludge.** Sludge/digester supernatant and filter backwash shall not be directly blended with or enter either the final plant discharge and/or waters of the United States.

3.7. Bypass of Treatment Facilities.

3.7.1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts 3.7.2. and 3.7.3.

3.7.2. Notice:

3.7.2.1. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass to the USEPA, Technical Enforcement Program, and the TAT Environmental Division.

3.7.2.2. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part 2.8., Twenty-four Hour Noncompliance Reporting, to the USEPA, Technical Enforcement Program, and the TAT Environmental Division.

3.7.3. Prohibition of bypass.

3.7.3.1. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

3.7.3.1.1. The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

3.7.3.1.2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and, 3.7.3.1.3. The permittee submitted notices as required under Part 3.7.2.

3.7.3.2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in Part 3.7.3.1.

3.8. Upset Conditions

3.8.1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of Part 3.8.2. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review (i.e., Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limitations).

3.8.2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

3.8.2.1. An upset occurred and that the permittee can identify the cause(s) of the upset;
3.8.2.2. The permitted facility was at the time being properly operated;
3.8.2.3. The permittee submitted notice of the upset as required under Part 2.8., Twenty-four Hour Notice of Noncompliance Reporting; and,
3.8.2.4. The permittee complied with any remedial measures required under Part 3.4., Duty to Mitigate.

3.8.3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

3.9. Toxic Pollutants. The permittee shall comply with effluent standards or prohibitions established under Section 307 (a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

3.10. Changes in Discharge of Toxic Substances. Notification shall be provided to the Director as soon as the permittee knows of, or has reason to believe:

3.10.1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

3.10.1.1. One hundred micrograms per liter (100 ug/L);

3.10.1.2. Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter 500 ug/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

3.10.1.3. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,

3.10.1.4. The level established by the Director in accordance with 40 CFR 122.44(f).

3.10.2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

3.10.2.1. Five hundred micrograms per liter (500 ug/L);

3.10.2.2. One milligram per liter (1 mg/L) for antimony:

3.10.2.3. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,

3.10.2.4. The level established by the Director in accordance with 40 CFR 122.44(f).

4. GENERAL REQUIREMENTS

4.1. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

4.1.1. The alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit; or,

4.1.2. There are any planned substantial changes to the existing sewage sludge facilities, the manner of its operation, or to current sewage sludge management practices of storage and disposal. The permittee shall give the Director notice of any planned changes at least 30 days prior to their implementation.

4.1.3. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source.

4.2. Anticipated Noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

4.3. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

4.4. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

4.5. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

4.6. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

4.7. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.

4.7.1. All permit applications shall be signed by either a principal executive officer or ranking elected official.

4.7.2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

4.7.2.1. The authorization is made in writing by a person described above and submitted to the Director; and,

4.7.2.2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

4.7.3. Changes to authorization. If an authorization under Part 4.7.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part 4.7.2. must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4.7.4. Certification. Any person signing a document under this section shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

4.8. <u>Penalties for Falsification of Reports</u>. The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

4.9. <u>Availability of Reports</u>. Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

4.10. <u>Oil and Hazardous Substance Liability</u>. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

4.11. <u>Property Rights</u>. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, tribal or local laws or regulations.

4.12. <u>Severability</u>. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

4.13. <u>Transfers</u>. This permit may be automatically transferred to a new permittee if:

4.13.1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

4.13.2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

4.13.3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part 4.13.2.

4.14.1. Permittees in Indian Country. EPA is issuing this permit pursuant to the Agency's authority to implement the Clean Water Act NPDES program in Indian country, as defined at 18 U.S.C. 1151.

4.14.2. Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

4.15.1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

4.15.2. Wasteload Allocation: A wasteload allocation is developed and approved by the TAT Tribes and/or EPA for incorporation in this permit.

4.15.3. Water Quality Management Plan: A revision to the current water quality management plan is approved and adopted which calls for different effluent limitations than contained in this permit.

4.16. Toxicity Limitation-Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include whole effluent toxicity limitations if whole effluent toxicity is detected in the discharge.

FACT SHEET/STATEMENT OF BASIS

MHA NATION CLEAN FUELS REFINERY
MAKOTI, NORTH DAKOTA

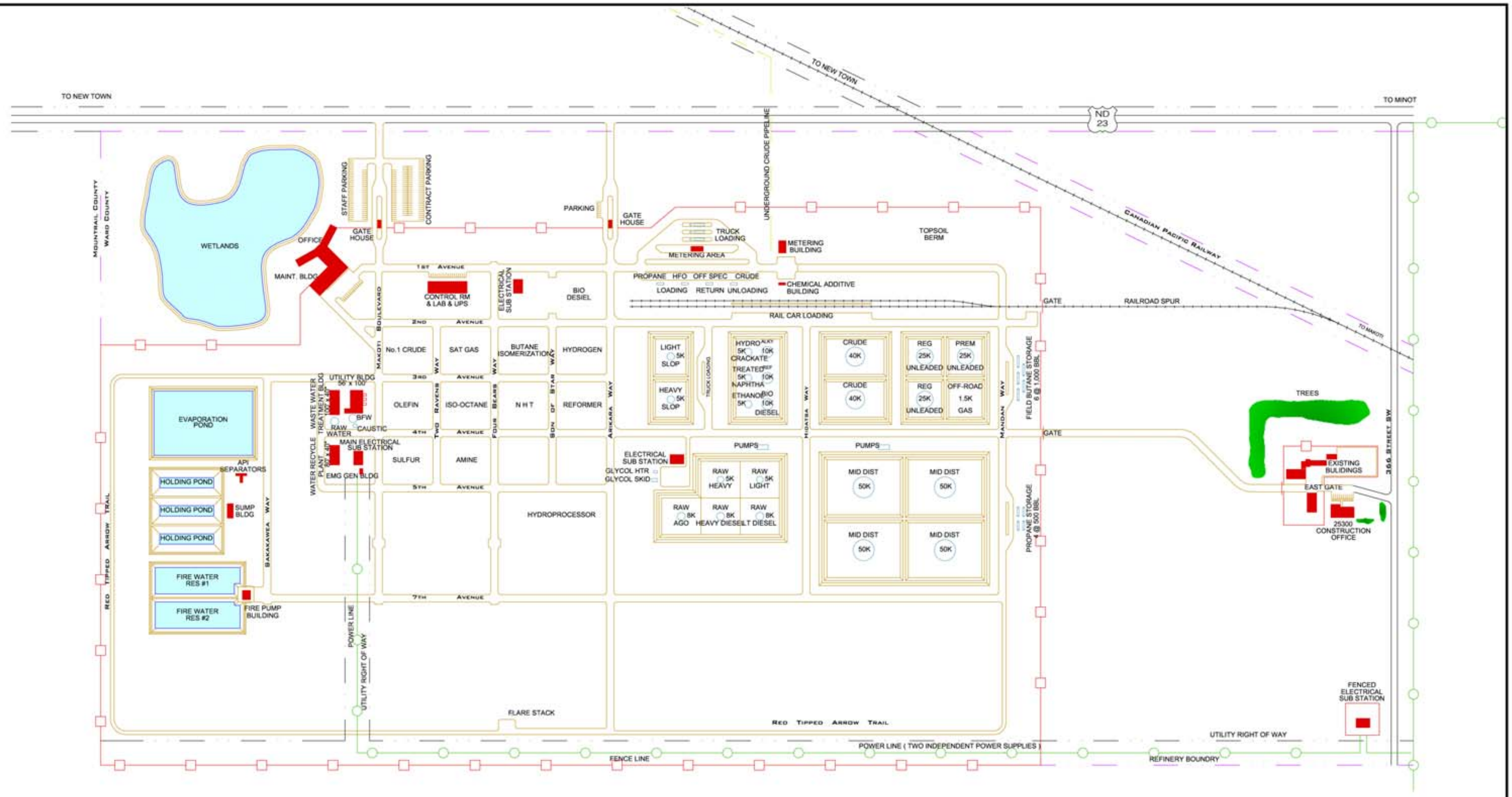
Facility Name:	MHA Nation Clean Fuels Refinery
NPDES Permit No:	ND-0030988
Responsible Official:	Tex G. Hall, Chairman Fort Berthold Tribal Business Council Three Affiliated Tribes
Facility Contact:	Horace Pipe, Refinery Project Manager
Phone Number:	(701) 726-5894
Permit Type:	New Major Industrial Facility/Indian Country

Background Information

This new permit is proposed for wastewater discharges associated with the planned Mandan, Hidatsa and Arikara Nation (MHA Nation) Clean Fuels Refinery to be located on the Fort Berthold Indian Reservation near Makoti in Ward County, North Dakota. The MHA Nation applied to EPA Region VIII for an NPDES permit on November 9, 2004.

The proposed refinery is a new facility yet to be constructed. Construction is scheduled to begin in 2007. Once operational, the facility will process synthetic crude oil and local butane supplies into various petroleum products including gasoline, diesel and other distillate blending fuels. Anticipated capacity of the facility is 10,000 barrels per stream day (BPSD) of synthetic crude and 3000 BPSD of field butane. Syncrude feedstock for the refinery will originate from northern Alberta, Canada and will be supplied via an already existing pipeline nearby. Field butane and natural gas will be supplied locally. A soybean based 300 BPSD Bio-diesel refinery is also planned for the site but may not be constructed as part of the initial effort.

The proposed refinery will include atmospheric distillation, hydrotreating, and hydrocracking processing units for the synthetic crude, a hydrogen plant utilizing natural gas, and butane processing units. Other areas of the proposed refinery affecting wastewater discharges include: rail and truck loading and unloading facilities, a tank farm, blending facilities, office and maintenance buildings, and fire suppression system. Contaminated (oily) stormwater will be managed separately from uncontaminated (non-oily) stormwater.
In the DEIS for the proposed facility, there are two different refinery configurations proposed. One is the Proposed Alternative (DEIS Figure 2-7) and the other under Alternative 4, a reconfiguration designed to minimize impacts to onsite wetlands and replacing the wastewater holding ponds with a tank system (DEIS Figure 2-15). Both configurations are being considered for final design and will be evaluated as part of the draft NPDES permit.



Legend
- Refinery Site Fenceline
- Power Line

200 0 200 400 FEET

MHA NATION FEE-TO-TRUST AND REFINERY EIS	
FIGURE 2-7 SITE LAYOUT	
Date: 1123/23/2005	File: 1600 DETAIL.dwg
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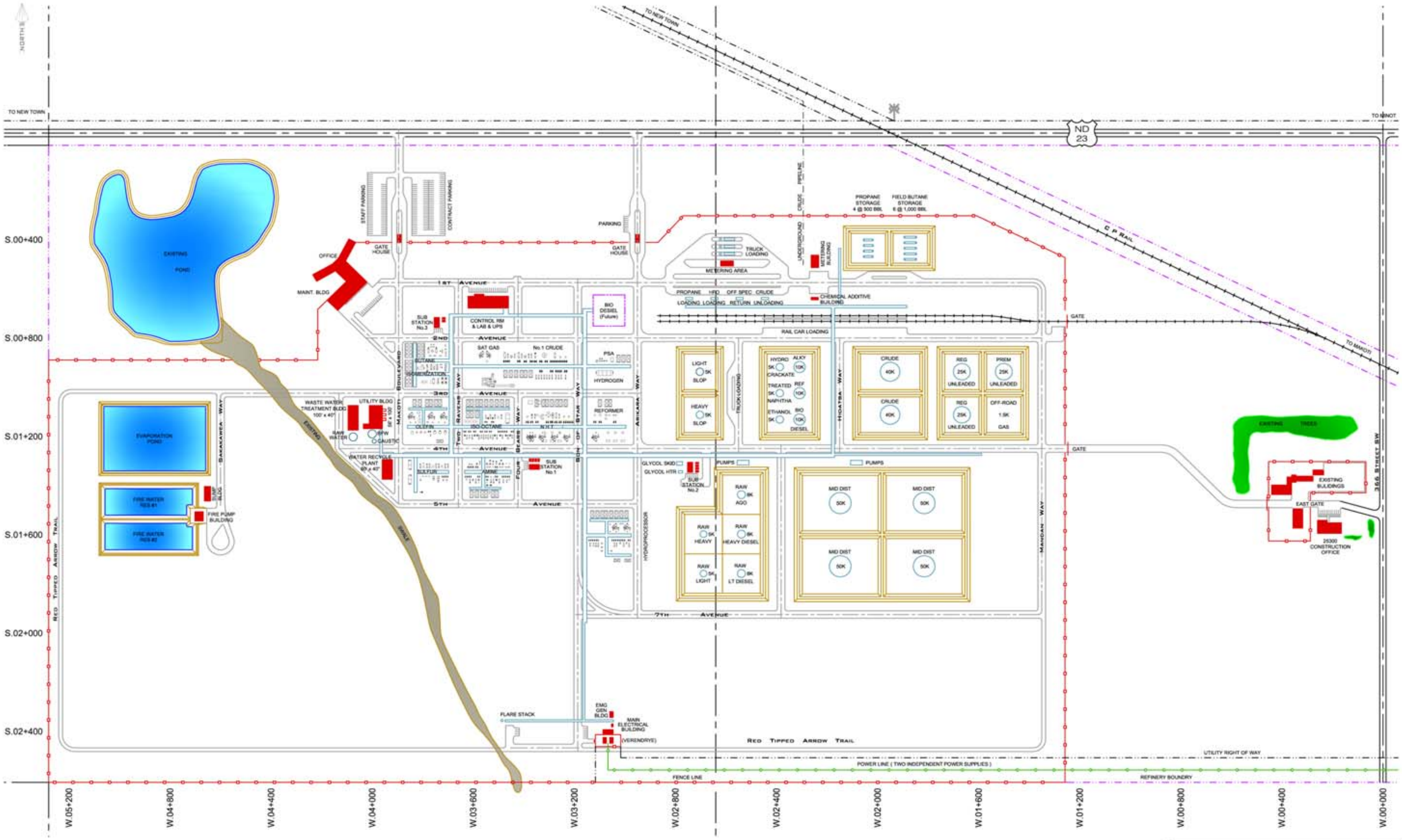


MHA NATION FEE-TO-TRUST AND REFINERY EIS

FIGURE 2-15
MODIFIED REFINERY LAYOUT
PLOT PLAN

Date: 02/16/06	File: I:/1600/../Fig_2-15_Layout.mxd
Drawn By: MSH	

Wastewater Sources and Treatment

There are four sources of wastewater associated with the operation of the proposed MHA Nation Clean Fuels Refinery:

- Process wastewater from refinery operations
- Contaminated (oily) stormwater from process areas of the refinery
- Uncontaminated (non-oily) stormwater from areas outside the process operations of the refinery
- Sanitary wastewater (POTENTIAL)

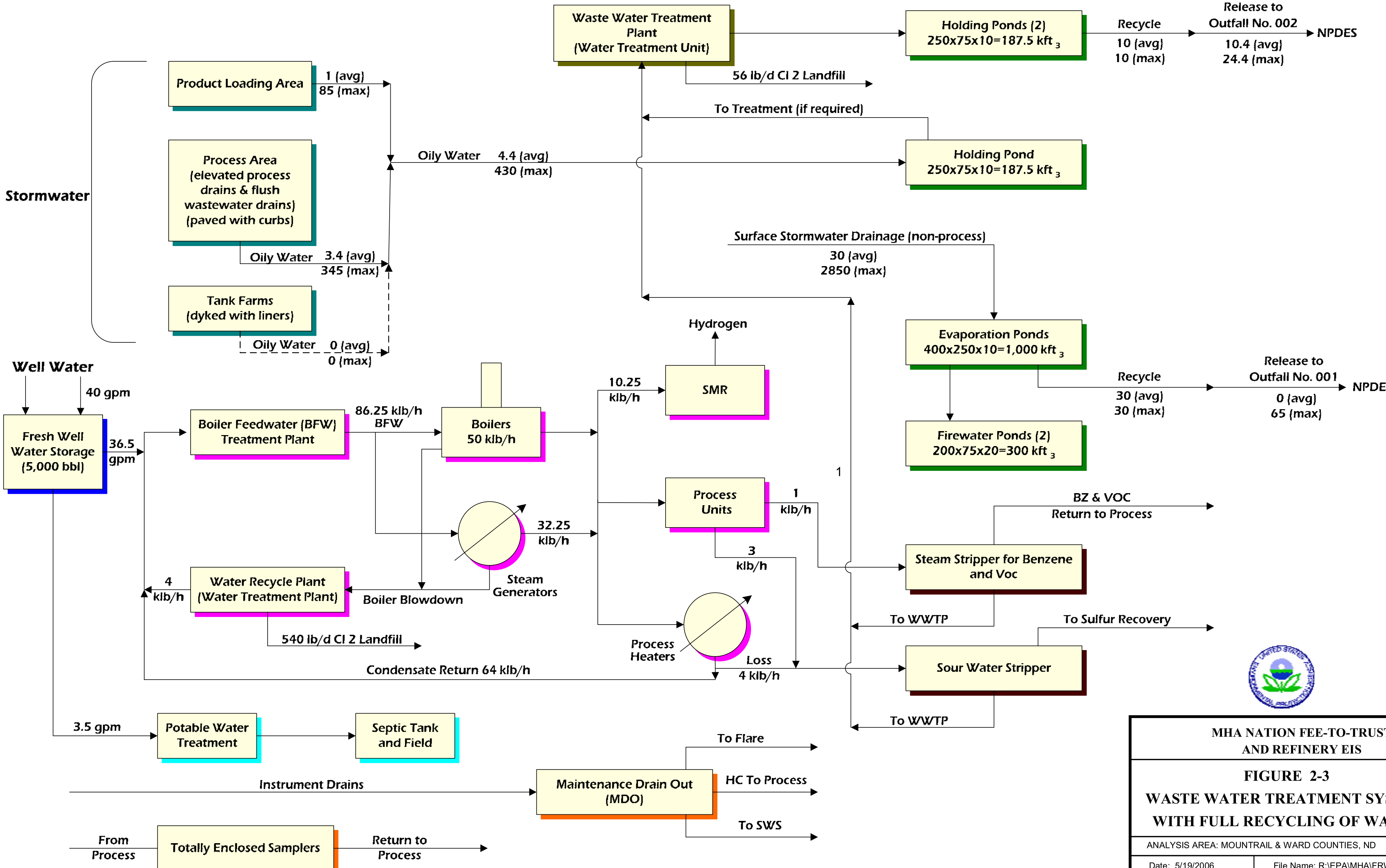
Process Wastewater

Process wastewater discharges associated with petroleum refining operations will be collected and treated prior to recycle back to refinery operations or discharged. The raw water source for the refinery operations is well water. The refinery design includes plans to utilize recycled water from certain operations to the extent feasible. Make-up water for process operations is treated prior to use in the boilers and steam generators for the refinery operations (hydrogen production, process units, process heaters). Blowdown from the boilers will be sent to a water recycling plant and recycled as make-up water. Condensate return flow from the process heaters can also be recycled as make-up water or be sent to the wastewater treatment processes if the quality becomes a problem for use as recycle. Other process wastewater includes water that is removed during crude processing operations in individual refinery units. All process wastewater will be collected in segregated closed drainage pipes and routed to either a steam stripper to remove VOCs and benzene or to a sour water stripper (SWS) to remove sulfides and ammonia. The process wastewater is then sent directly to the wastewater treatment plant. The wastewater treatment unit processes include the following units: API separator ►dissolved air floatation ►equalization tank ►biological treatment ►clarifier.

Under the Proposed Alternative in the DEIS, the wastewater (after treatment) will be directed to one of two final holding ponds. The treated process wastewater can then either sent as recycle back to make-up water system for process operations or discharged. DEIS Figure 2-3 shows the operation with no recycling and DEIS Figure 2-4 shows the operation with full recycling of treated wastewater.

Under Alternative 4 in the DEIS, the wastewater treatment system will be designed to meet the definitions of wastewater treatment unit and tank system under RCRA 40 CFR 260. The biological treatment will meet the aggressive biological treatment definition under hazardous waste rules at 40 CFR 261.31(b). The wastewater is then routed to final holding tanks prior to recycle or discharge. See DEIS Figure 2-16.

Potential pollutants contained in the discharge of process wastewater will be evaluated and limited under Outfall 002 in the proposed NPDES permit for this facility.



Source: Based on information from
Greystone Environmental Consultants, Inc.

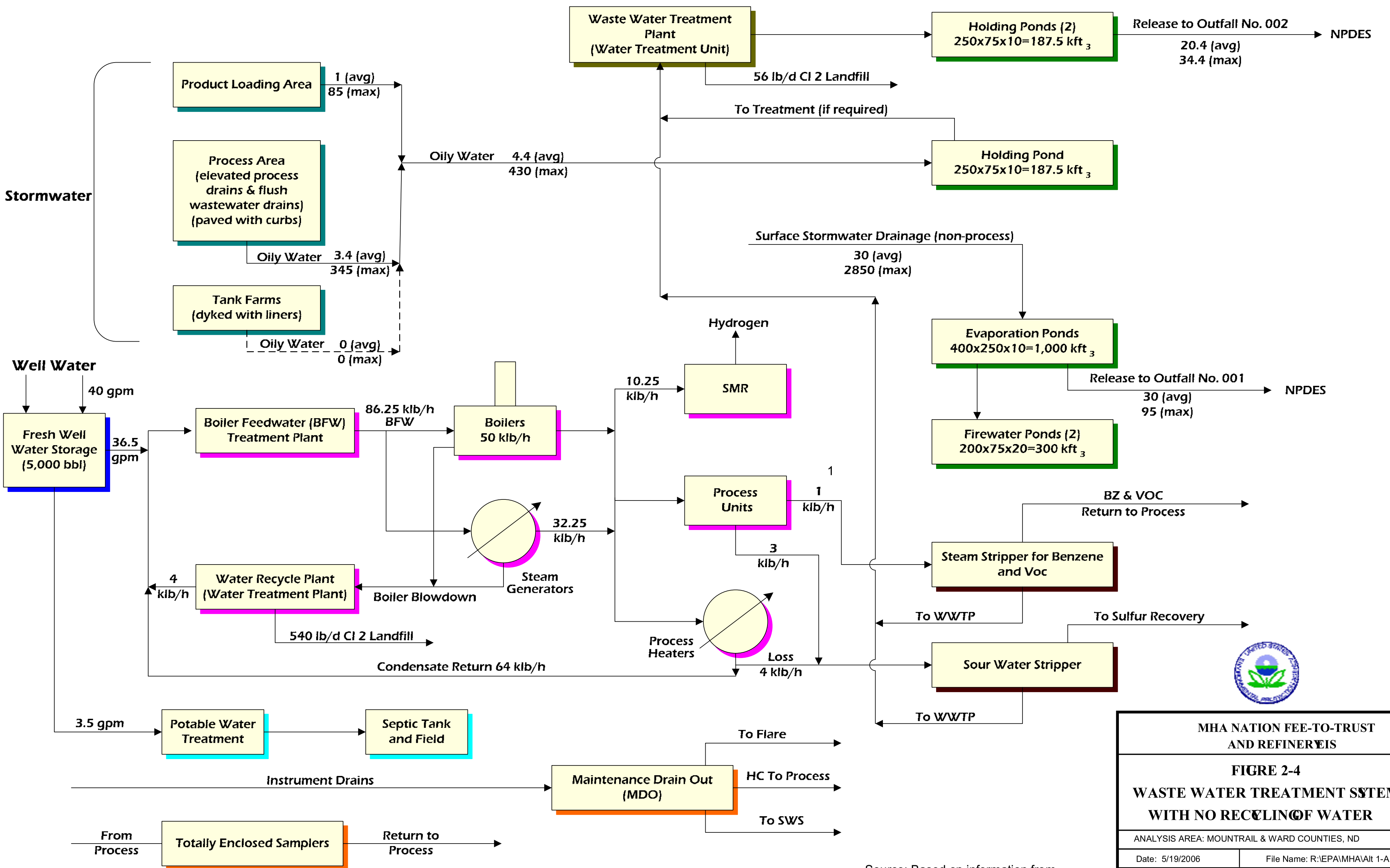
MHA NATION FEE-TO-TRUST
AND REFINERY EIS

FIGURE 2-3
WASTE WATER TREATMENT SYSTEM
WITH FULL RECYCLING OF WATER

ANALYSIS AREA: MOUNTRAIL & WARD COUNTIES, ND

Date: 5/19/2006 | File Name: R:\EPA\MHA\FRW_Alt 1-A.ppt

TETRA TECH EM INC.



Source: Based on information from Greystone Environmental Consultants, Inc.

MHA NATION FEE-TO-TRUST AND REFINERY EIS

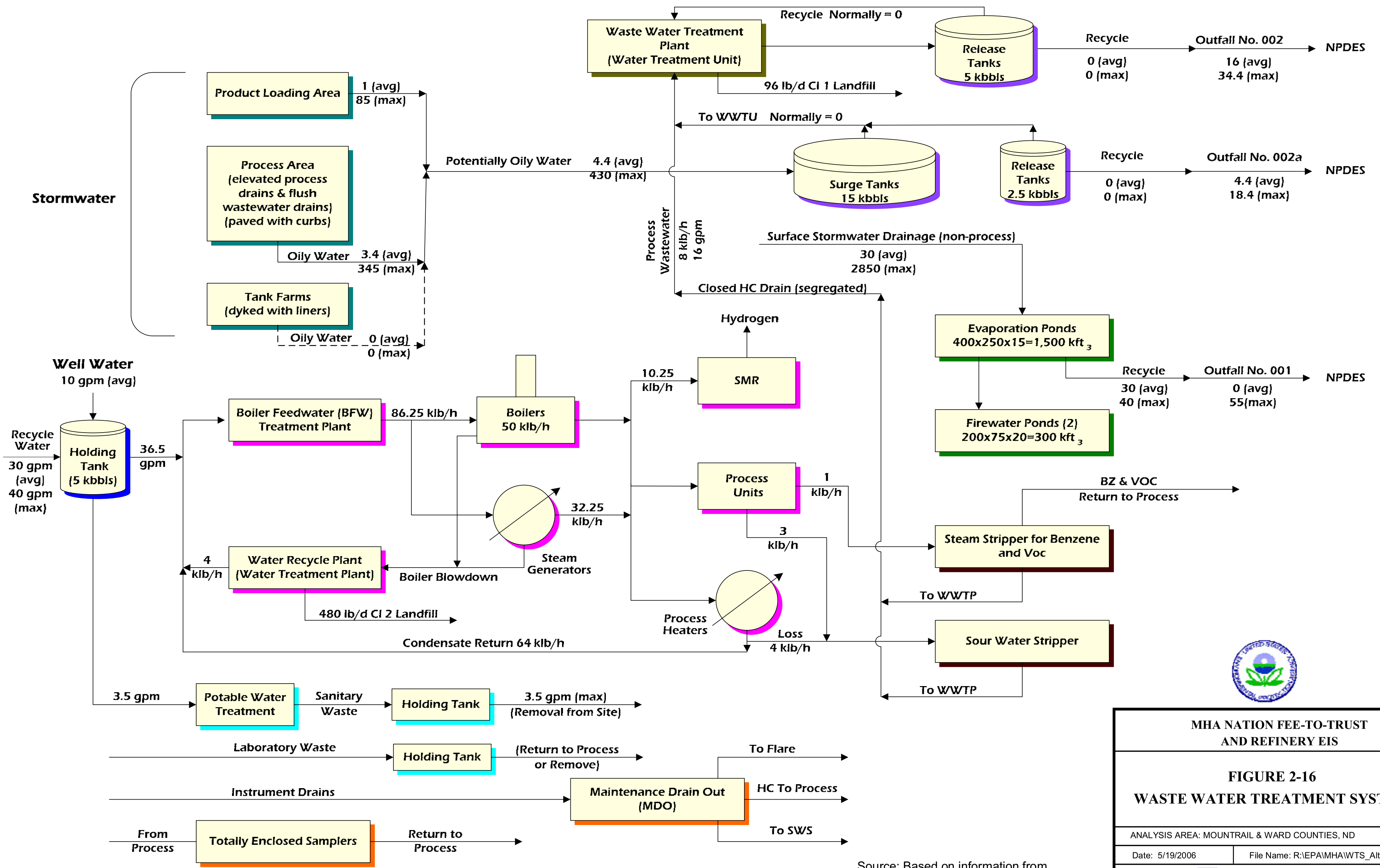
FIGURE 2-4

WASTE WATER TREATMENT SYSTEM WITH NO RECYCLING OF WATER

ANALYSIS AREA: MOUNTRAIL & WARD COUNTIES, ND

Date: 5/19/2006 | File Name: R:\EPA\MHA\Alt 1-A.ppt

TETRA TECH EM INC.



Source: Based on information from
Greystone Environmental Consultants, Inc.

MHA NATION FEE-TO-TRUST
AND REFINERY EIS

FIGURE 2-16
WASTE WATER TREATMENT SYSTEM

ANALYSIS AREA: MOUNTRAIL & WARD COUNTIES, ND

Date: 5/19/2006 | File Name: R:\EPA\MHA\WTS_Alt 4-A.ppt

TETRA TECH EM INC.

Contaminated (oily) Stormwater

Contaminated (oily) stormwater will be collected in segregated drains that collect runoff from precipitation that falls directly on the areas of the refinery that have a high potential for contact with oil, products and byproducts produced during refining operations. Areas surrounding each process unit, the loading and unloading areas, and equipment cleaning areas are considered as having a high potential for contact with those materials. The high potential contact areas will be paved and curbed to prevent precipitation runon and release of the wastewater to the area outside the area.

(Under the Proposed Alternative in the DEIS) Contaminated (oily) stormwater will be collected in segregated drains and sent to a holding pond. The wastewater will be tested and if further treatment is required, it will be routed to the wastewater treatment facility. If further treatment is not required, the wastewater will be directed to one of the two final effluent holding ponds and recycled or discharged through Outfall 002 as described above for the process wastewater.

(Under Alternative 4 in the DEIS) The contaminated (oily) stormwater will be collected in segregated drains and sent to a series of surge tanks. The wastewater will then be normally sent for further treatment in the wastewater treatment unit. In the event the capacity of the surge tanks and/or wastewater treatment unit hydraulic capacity is exceeded, the segregated oily stormwater can be sent to a series of release tanks and discharged or held to return back to the wastewater treatment unit if further treatment is necessary to meet discharge requirements. The treated wastewater could then be recycled or discharged through Outfall 002 as described above for the process wastewater. An additional discharge outfall (002a) will be required under this alternative as the holding capacity for treated wastewater has been substantially reduced and a discharge of segregated stormwater due to precipitation events may be necessary.

Potential pollutants contained in the discharge of contaminated (oily) stormwater will be evaluated and limited under Outfall 002 and Outfall 002a (for Alternative 4 in the DEIS) in the proposed NPDES permit.

Uncontaminated (non-oily) Stormwater

Uncontaminated (non-oily) stormwater will be collected as segregated runoff from precipitation that falls on areas of the refinery outside the areas considered as high potential contact with oil, product and byproducts. These areas within the boundaries of the site include roads in the process areas, unpaved areas, parking areas, building runoff, etc. The run-off from the site will be conveyed for collection using surface ditches next to roadways, etc. There may also be some site runon contribution from upgradient areas surrounding the refinery property that will contribute to the runoff from the site. The site configuration is designed to let precipitation flow generally towards the lowest elevation of the site where it will be collected, piped and sent to a large holding pond. The wastewater can then be used as make-up water for the firewater system as necessary or discharged.

The management of uncontaminated (non-oily) stormwater will be similar under the Proposed Alternative and Alternative 4 under the DEIS. Potential pollutants contained in the discharge of uncontaminated (non-oily) stormwater are evaluated and limited under Outfall 001 in the proposed NPDES permit.

(POTENTIAL) Sanitary Wastewater

Sanitary wastewater will be collected and treated in a package wastewater treatment plant. Flow is projected to be approximately 3.5 gpm or 5000 gallons per day. Potential pollutants contained in the discharge of sanitary wastewater are evaluated and limited under Outfall 003 in the proposed NPDES permit.

New Source Determination

On December 2, 2004, EPA Region 8 issued a New Source Determination for the proposed facility as required by 40 CFR §122.21(l)(2)(ii). EPA Region 8 determined that the proposed facility is in fact a new source (defined in 40 CFR §122.2) and is subject to New Source Performance Standards (NSPS) for the Petroleum Refining Point Source Category pursuant to 40 CFR §419. The New Source Determination was public noticed between December 23 and 29, 2004 in several newspaper publications in the geographical area of the proposed site location. A public comment period of 30 days was opened by the public notice and ended on January 29, 2005. One phone call was received by EPA during the public comment period from the Mountrail County Record requesting additional information on the proposed facility. No challenges to EPA's New Source Determination were received during the public comment period.

EPA NPDES Major/Minor Determination

EPA completed an NPDES Permit Rating Work Sheet for the proposed MHA Nation Clean Fuels Refinery in accordance with EPA policy on major/minor facility classification. (USEPA Memorandum from James Elder to Regional Water Management Division Directors. June 27, 1990). The proposed facility scored 95 points and received a ranking of "major". A minimum score of 80 is required for a "major" ranking. The Rating Work Sheet is contained in the Administrative Record for this permit.

EPA's Environmental Review Requirements

Since the proposed facility was determined by EPA to be New Source, and the issuance of an NPDES permit will be a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1970 (NEPA), the MHA Nation is required to comply with EPA's environmental review procedures for the New Source NPDES Program requirements of 40 CFR Part 6, Subparts A-D and F.

The United States Bureau of Indian Affairs (BIA) and EPA in cooperation with the U.S. Army Corps of Engineers, and the MHA Nation are developing an Environmental Impact Statement (EIS) that will fulfill both BIA and EPA environmental review requirements. A draft EIS (DEIS) will be completed prior to public notice of a proposed NPDES permit for the facility [40 CFR §124.10(b)] and will be included in the Administrative Record for the draft permit in accordance with 40 CFR §124.9. A final EIS (FEIS), including a recommendation to issue or deny an NPDES permit, will be included in the Administrative Record for the final NPDES permit in accordance with 40 CFR §124.18. If the FEIS recommends denying the NPDES permit, reasons for the recommendation will be identified and a list of measures, if any, which the MHA nation could take to cause the recommendation to be changed. If the FEIS recommends issuing the final permit, the FEIS will recommend the actions, if any, which the MHA Nation should take to prevent or minimize any adverse environmental impacts.

Endangered Species Act Coordination

Under the February 22, 2001 Memorandum of Agreement with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, EPA agreed to implement actions to demonstrate compliance with the Endangered Species Act (ESA) for certain activities under the NPDES permitting program. In accordance with the MOA, EPA must make a determination of effects on Threatened and Endangered Species (both listed and candidate species) for this federal action of issuing an NPDES permit.

For this action, EPA has determined that the issuance of this permit may affect but is not likely to adversely affect Threatened and Endangered species that are present in the project area. EPA will include information regarding its determination and related correspondence between EPA and the U.S. Fish and Wildlife Service in the Administrative Record kept for this permit.

EPA's determination regarding this permit's potential to affect Threatened and Endangered species is based on the permit requirements which have been included in the draft NPDES permit after considering existing Tribally-adopted water quality standards for the Fort Berthold Indian Reservation, and the State of North Dakota water quality standards without an allowance for mixing zones, i.e. end-of-pipe.

Since this is a new facility and there is no existing monitoring data for the discharge, the permit also contains additional monitoring requirements for priority pollutant compounds that may be present but are not anticipated. Re-opener provisions in the permit allow for inserting additional water quality based effluent limits protective of aquatic life and public water supply uses when unanticipated pollutants are detected during this additional monitoring.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires that federal agencies take into account the effects of a federal undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. According to Section 301 of the act, "undertaking" means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including (a) those carried out by or on behalf of the agency, (b) those carried out with federal financial assistance, (c) those requiring a federal permit license, or approval, and (d) those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency. Section 106 compliance also applies to non-federal lands when federal funding, licensing, permitting, and approval are required.

This permitted effluent discharge is not expected to affect historic or cultural resources. Moreover, because the locations of the outfalls were disturbed previously, construction of the outfalls would not affect historic or cultural resources.

The proposed facility is not expected to substantially affect cultural resources. The till plain and pothole setting of the project area has soils that are generally good for cultivation, but support a comparatively low diversity of natural resources. These conditions correspond to a low potential for prehistoric or historic cultural resources other than readily visible farm complexes.

A records search for the project site was completed through the North Dakota State Historical Society. The records search indicated that no cultural resource investigations and no known sites are on file for the project area. The North Dakota SHPO (Swenson 2005) and the Cultural Preservation Office of the Three Affiliated Tribes (Crows Breast 2005) have reviewed the available information for the project area. Both offices have concurred that there is a low potential for significant cultural resources in the project area, and both have recommended a determination of no historic properties affected.

The farm complex near the refinery site will not be affected by the proposed action and the farm complexes near the pipeline and power line corridors can be avoided. The primary affect resulting from implementation of this alternative would be modification of the old Soo Line Railroad branch line that runs through the property. The line itself would not be moved or removed, but a new siding would be constructed from the line into the refinery. This addition would not adversely impact the historic character of the rail line. The farm house and outbuildings would not be disturbed for construction of the refinery or production of the forage for buffalo.

Project Location

The proposed MHA Nation Clean Fuels Refinery will be located on 190 acres of land that is part of a 469 acre parcel of land purchased by the Three Affiliated Tribes (MHA Nation) on July 22, 2003. The remaining land, 279 acres, is proposed for growing feed for the MHA Nation buffalo herd. The land is located in the northeast corner of the Fort Berthold Indian Reservation and in Ward County, North Dakota. Following the purchase of the land, the MHA Nation requested the Department of the Interior, Bureau of Indian Affairs (BIA) accept the land into trust status. The land transfer is considered a major federal action and subject to environmental review in accordance with the National Environmental Policy Act (NEPA). BIA (in cooperation with EPA, F&WS and the MHA Nation) has primary responsibility to fulfill the NEPA requirements for the land transfer.

The general land area encompassing the proposed MHA Nation Clean Fuels Refinery site consists of nearly level glacial till plains and rolling hills. The area is within the glaciated prairie pothole region and includes numerous seasonal, semi-permanent, and permanent wetlands that capture seasonal snowmelt and rainwater. Prior to agricultural development of the land, mixed cool and warm season prairie grasses were predominant with intermix broad-leaved annual and perennial forbs and numerous legumes. Current land use is generally dry land farming of cereal crops (wheat and barley) intermixed with cattle ranching in the drier and hillier portions of the region.

The site itself is largely underdeveloped agricultural property with adjacent land primarily planted with wheat and barley. The site elevation ranges between 2074 and 2112 feet above mean sea level and its topography is relatively flat with slopes less than three percent. Drainage in the site area is generally east to west towards tributaries of the Missouri River (Lake Sakakawea). The East Fork of Shell Creek runs adjacent to the northern border of the project site and generally flows west towards Lake Sakakawea. Characteristics of the site include seasonal and semi-permanent wetlands, mixed grass prairie, wooded draws, intermittent seasonal drainages, and seasonal crops.

The climate of the site area is characterized by wide seasonal and diurnal temperature and precipitation variations. Average annual precipitation is 16.06 inches with the highest average monthly values (3.66 inches) in June and the lowest monthly average (0.33 inches) in February. Summer thunderstorms occur on about 34 days in the year and account for a majority of the total annual precipitation amounts. Approximately 80 percent of the annual precipitation total occurs between April and September. Spring snowmelt drains into wetland depressions and the depth of ponded water varies dependant on the amount of snow cover. In late spring and summer, these wetland depressions receive direct precipitation and runoff from the surrounding watershed and by late summer, the wetlands draw down or dry through evaporation and seepage.

Prairie Pothole Wetlands

Within the proposed MHA Nation Clean Fuels Refinery site boundaries, sixteen prairie pothole wetland areas totaling 33.6 acres were identified in a field investigation performed by Greystone Environmental Consultants, Inc. during development of the DEIS. Wetlands delineation was done in accordance with Level 2 Routine On-site Method as described in the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). The prairie pothole wetlands within the project area were classified as palustrine wetlands and further characterized as Palustrine-Emergent-Temporarily-Flooded (PEMA), Palustrine-Emergent-Seasonally-Flooded (PEMC) and Palustrine-Emergent-Semi-permanently-Flooded (PEMF).

The largest wetland characterized in the field investigation was an 11.7 acre wetland in the NW1/4 of Section 19. The location is on the lowest elevation contour in Section 19 and was classified as a PEMF wetland. The wetland collects precipitation and runoff primarily from the local watershed. This wetland likely contains areas of open water during certain times of the year and is drained by a culvert on the northern boundary. The culvert is constructed under Highway 23 and after flowing under an additional culvert under the railroad, drains to a tributary of the East Fork of Shell Creek. The large wetland appears to receive water from a north-south wetland swale that traverses the site on the west side of the proposed site. This wetland swale appears to receive surface flow from an off-site wetland across the south property boundary. Flow of the water is generally from south to north across the site. According to the preliminary site plans, the wetland swale is the location where treated process wastewater and stormwater discharges will be located. Soils in this wetland swale were characterized as Parnell (Pa) and consist of a silt loam with low chromas. The delineation also indicated that the hydrology may be influenced by groundwater due to the depth of the elevation contour; however, the area was dry during the October 2003 field investigation.

Both the 11.7 acre wetland and the wetland swale have been determined to be jurisdictional wetlands by the U.S. Army Corps of Engineers(2005) and will be considered waters of the U.S. for establishing effluent limitations and conditions in the proposed NPDES permit.

Receiving Water

As described above, the location receiving discharges from the proposed MHA Nation Clean Fuels Refinery will be the wetland swale located in the NW1/4 of Section 19, Township 152N, Range 87W. The wetland swale is tributary to the East Fork of Shell Creek through natural drainageways (wetlands, sloughs, swales) and constructed culverts under Highway 23 and the railroad, north of the wetland areas. Major site construction activities are not expected to occur in this area. Some modification of the north-south wetland swale that feeds into the wetland will take place during construction of the facility and drainage of direct precipitation on the site and watershed runoff into the wetland area may somewhat change the hydrologic characteristics of the wetland.

Tributaries of the East Fork of Shell Creek including the natural drainageways and the wetland swale discharge location best describe the receiving water for discharges from the proposed facility. No historic flow measurements are available for the tributaries but are assumed to be zero cubic feet per second (cfs). due to the hydrologic characteristics of the East Fork of Shell Creek described above. No flow data is available for the wetland swale or wetland system that will receive discharges from the facility but it will be assumed that there are times of the year that the low flow in the wetlands is zero cfs.

The East Fork of Shell Creek flows generally in a westerly direction towards Lake Sakakawea before entering the Van Hook Arm of the Lake at Parshall Bay, near Parshall, ND. The East Fork of Shell Creek is generally ephemeral and likely has extended periods with very low or no flow during the year. A USGS gage station is located on the East Fork of Shell Creek near Parshall, ND approximately fifteen miles from the project site location. There are no other monitoring stations closer to the site. The gage station (06332523) was established in 1991 and collects continuous data on stream flow. For the period from 1991 through 2002, annual mean flow ranges from 2.19 cubic feet per second (cfs) in 1992 to 15.1 cfs in 1999. Peak daily flows for the same period of record range from 31 cfs on May 12, 2000 to 1,170 cfs on March 27, 1999. Flow in the East Fork of Shell Creek is highly dependant on summer precipitation events and runoff that occurs during March and April. Low flows occur during winter months each year and in 2001, monthly low flows of zero cfs were recorded in January, February, August and September.

The East Fork of Shell Creek remains primarily within the external boundaries of the Fort Berthold Indian Reservation as it travels towards Lake Sakakawea, however, approximately one mile from the proposed project site it traverses the boundary of the Reservation into the State of North Dakota for a short distance, prior to returning back to the Reservation. As such, water quality based effluent limits (WQBELs) developed for the proposed facility will take into consideration both Tribally-adopted water quality standards and State of North Dakota water quality standards.

Monitoring Data for East Fork of Shell Creek

Limited data is available on water quality for the East Fork of Shell Creek in the vicinity of the proposed project location. Data was collected periodically on USGS gage station 06332523 located near the mouth below Parshall, ND. In 2001, Confluence Consulting performed additional monitoring at three locations of the East Fork of Shell Creek. The following data was presented in the Water Resources Technical Report developed by Greystone Environmental Consultants Inc. as part of the DEIS.

USGS April 1990 – June 1991

	Maximum	Minimum	Median
pH (s.u.)	9.9	8.4	8.9
Dissolved oxygen (mg/L)	10.8	7.3	--
Hardness (mg/L as CaCO3)	420	240	--

July 1991 – September 1992

	Maximum	Minimum	Median
pH (s.u.)	9.1	8.1	8.7
Dissolved oxygen (mg/L)	11.6	4.6	6.8
Hardness (mg/L as CaCO3)	470	250	350

USGS 1991-2002

	Maximum	Minimum	Median	Mean
pH (s.u.)	8.80	7.80	8.37	8.40
Dissolved oxygen (mg/L)	12.50	4.60	8.82	9.05

2001 Stream Survey

	2A	2B	2C
Temperature C°	20.2	18	18.9

Water Quality Standards (WQS)

Tribally-adopted Water Quality Standards

The MHA Nation adopted water quality standards for surface waters within the external boundaries of the Fort Berthold Indian Reservation (Tribally-adopted WQS) through a resolution adopted by the Tribal Business Council of the Three Affiliated Tribes of the Fort Berthold Reservation on May 11, 2000. The Tribally-adopted WQS are intended to protect surface water designated uses through specific numeric and narrative water quality criteria and antidegradation provisions. The Tribally-adopted WQS have not yet been federally approved by EPA, however, they will be considered for establishing effluent limitations for discharges from the proposed MHA Nation Clean Fuels Refinery in accordance with EPA's *Guidance on EPA's NPDES and Sludge Management Permit Procedures on Federal Indian Reservations* (November 16, 1993).

Wetlands: The Tribally-adopted WQS apply to all wetlands on the Reservation that are not constructed and considered "waters of the Tribes". The wetland located in the NW1/4 of Section 19 falls within these criteria. The Tribally-adopted WQS indicate wetlands shall be subject to narrative criteria and applicable antidegradation provisions and shall be generally considered capable of supporting aquatic biota (e.g. fish, macroinvertebrates, amphibians or hydrophytic vegetation) on a regular or periodic basis. The goal of water quality is described as maintaining naturally occurring levels within the natural range of variation for the individual wetland. For substances that are not naturally occurring, water quality requirements shall be based on protecting uses of the wetland consistent with antidegradation requirements, the Tribes narrative water quality criteria assigned to hydrologically connected surface waters, or appropriate criteria guidance issued by the Environmental Protection Agency.

The Tribally-adopted WQS include a Mixing Zone and Dilution Policy that prohibits mixing zones for point source discharges into wetlands. Paragraph (d) of the policy states "*Where dilution flow is not available at critical conditions, the discharge limits will be based on achieving water quality criteria at the end-of-pipe. In addition, discharge limits for all point source discharges to a wetland will be based on achieving water quality criteria at the end-of-pipe.*"

East Fork of Shell Creek: The Tribally-adopted WQS also apply to the East Fork of Shell Creek within the external boundaries of the Fort Berthold Indian Reservation. The Tribally-adopted WQS list designated uses for the East Fork of Shell Creek including Public Water Supply, Primary Contact Recreation, Secondary Contact Recreation, Coldwater Aquatic Life, Warmwater Aquatic Life, Industrial Water Supply, Agriculture and Navigation. Numeric criteria applicable to support aquatic life and public water supply (human health) are listed in Tables 1 & 2 of the Tribally-adopted WQS. The criteria include acute and chronic concentrations for organic constituents, pesticides, and metals as well as non-conventional pollutants such as hydrogen sulfide, ammonia nitrogen, temperature, etc., and indicator parameters such as dissolved oxygen.

These criteria were evaluated against information provided by the MHA Nation in their NPDES permit application, EPA Effluent Guidelines and Standards for the Petroleum Refining Point Source Category (40 CFR Part 419) and the *Development Document for Effluent Limitations Guidelines and Standards for the Petroleum Refining Point Source Category, Final October 1982, EPA 440/1-82/014*, in assessing reasonable potential for discharges to cause or contribute to exceedances of water quality standards. The list of appropriate criteria for this permit includes all pollutants that have been reported as expected to be present in the discharge at any concentration above the applicable analytical detection limit for the pollutant and where a water quality standard for that pollutant exists. Table 1 below lists the criteria for pollutants expected to be present in the discharges from the proposed MHA Nation Clean Fuels Refinery.

TABLE 1

Tribally-Adopted WQS (concentrations are dissolved ug/L)

Pollutant	CAS No.	Aquatic Life Acute (CMC)	Aquatic Life Chronic (CCC)	Aquatic Life Fish Cons.	Public Water Supply
Benzene	71-43-2	--	--	71	1.2
Ethyl benzene	100-41-4	--	--	29000	700
Toluene	108-88-3	--	--	200000	1000
Xylenes	1330-20-7	--	--	--	10000
Phenol	108-95-2	--	--	4600000	300
Hydrogen Sulfide	7783-06-4	--	2	--	--
Ammonia as N	7664-41-7	(b)	(b)	--	--
Barium (tr)	7440-39-3	--	--	--	2000
Aluminum (tr)	7429-90-5	750	87	--	--
Cadmium (tr)	7440-43-9	13.5 (a)	2.7 (a)	84	5.0
Chromium (III) (tr)	7440-47-3	4270 (a)	509 (a)	--	100 (T)
Chromium (VI)		16	11	3400	100
Copper (tr)	7440-50-8	49.9 (a)	30.2 (a)	--	1000
Iron (tr)	7439-89-6	--	1000	--	300
Manganese (tr)	7439-96-5	--	--	--	50
Lead (tr)	7439-92-1	331 (a)	12.9 (a)	--	15
Mercury (T)	7439-97-6	2.4	0.012	0.051	0.050
Nickel (tr)	7440-02-0	3592 (a)	399 (a)	4600	100
Selenium (tr)	7782-49-2	20	5	9000	50
Silver (tr)	7440-22-4	26.8 (a)	--	110000	170
Zinc (tr)	7440-66-6	297 (a)	269 (a)	69000	5000
Chlorine (TRC)	7782-50-5	19	11	--	--
Chloride	16887-00-6	860000	230000	--	--

Fluoride	7782-41-4	--	--	--	4000
Nitrite as N	14797-65-0	--	--	--	1000
Nitrate as N	14797-55-8	--	--	--	10000
pH (s.u.)		7.0-9.0	7.0-9.0	7.0-9.0	--

tr- total recoverable; T- total

(a) *Hardness based concentrations for metals calculated using a hardness of 300 mg/L as $CaCO_3$ and the following formulas:*

***CMC** = exp{ma[ln(hardness)}+ba}* ***CCC** = exp{mc[ln(hardness)]+bc}*

	ma	*ba*	*mc*	*bc*
cadmium	*1.128*	*-3.828*	*0.7852*	*-3.490*
copper	*0.9422*	*-1.464*	*0.8545*	*-1.465*
chromium (III)	*0.8190*	*3.688*	*0.8190*	*1.561*
lead	*1.273*	*-1.460*	*1.273*	*-4.705*
nickel	*0.8460*	*3.3612*	*0.8460*	*1.1645*
silver	*1.72*	*-6.52*	*-*	*-*
zinc	*0.8473*	*0.8604*	*0.8473*	*0.7614*

(b) *Ammonia as N (unionized) is calculated using the following formula:*

CMC *= 0.52/FT/FPH/2 where:*

FT $=10^{0.03(20-TCAP)}$; $TCAP \leq T \leq 30$
$=10^{0.03(20-T)}$; $0 \leq T < TCAP$

FPH $= 1$; $8 \leq pH \leq 9$
$= (1+ 10^{7.4-pH})/1.25$; $6.5 \leq pH < 8$

TCAP *= 20 C ; coldwater aquatic life use (IIIA)*
= 25 C ; warmwater aquatic life use (IIIB)

The usual CMC averaging period of one hour may not be appropriate if excursions of concentrations greater than 1.5 times the average occur during the hour; in such cases, a shorter averaging period may be needed. To convert these values to mg/L as N, multiply by 0.822.

CCC *= 0.80/FT/FPH/RATIO where FT and FPH are as above and :*

RATIO $= 13.5$; $7.7 \leq pH \leq 9$
$= 20\ (10^{7.7-pH}/1 + 10^{7.4-pH})$; $6.5 \leq pH < 7.7$

TCAP *= 15 C ; coldwater aquatic life use (IIIA)*
= 20 C ; warmwater aquatic life use (IIIB)

Temperature:

Eighty-five degrees Fahrenheit (29.44 degrees Celsius). The maximum increase shall not be greater than five degrees Fahrenheit (2.78 degrees Celsius) above background conditions.

Dissolved Oxygen:

	Aquatic Life (IIIA) Use		*Aquatic Life (IIIB) Use*	
	Early Life Stages[1,2]	*Other Life Stages*	*Early Life Stages*[2]	*Other Life Stages*
30-Day Mean	NA	6.5	NA	5.5
7-Day Mean	9.5 (6.5)	NA	6.0	NA
7-Day Mean Minimum[3]	NA	5.0	NA	4.0
1-Day Minimum[3]	8.0 (5.0)	4.0	5.0	3.0

[1] *These are water column concentrations to achieve the required intergravel dissolved oxygen concentrations shown in parentheses.*
[2] *Includes all embryonic and larval stages and all juvenile forms to 30-days following hatching.*
[3] *All minima should be considered as instantaneous concentrations to be achieved at all times.*

Narrative Tribally-adopted Water Quality Standards:

Narrative Tribally-adopted Water Quality Standards describe general characteristics of surface waters and discharges. The narrative standards include the following:

a) All surface waters on the Reservation shall be free from substances attributable to wastewater discharges or other pollutant sources that:
- *(1) settle to form objectionable deposits,*
- *(2) float as debris, scum, oil, foam or other matter forming nuisances,*
- *(3) produce objectionable color, odor, taste or turbidity,*
- *(4) cause injury to, or are toxic to, or produce adverse physiological responses in humans, animals, or plants; or*
- *(5) produce undesirable or nuisance aquatic life.*

State of North Dakota Standards

The State of North Dakota has adopted water quality standards (State WQS) for surface waters of the State including the East Fork of Shell Creek within the State jurisdiction (NDAC 33-16-02.1). The East Fork of Shell Creek remains primarily within the external boundaries of the Fort Berthold Indian Reservation as it travels towards Lake Sakakawea, however, approximately one mile from the proposed project site it traverses the boundary of the Reservation into the State of North Dakota for a short distance, prior to returning back to the Reservation. The State WQS standards became effective June 1, 2001 and have been approved by EPA. The standards indicate designated uses for waters of the State, specify narrative and numeric criteria to protect those uses, and antidegradation provisions. The State has classified the East Fork of Shell Creek as a Class III stream. According to §33-16-02.1-09, Class III streams are suitable for agriculture and industrial uses such as stock watering, irrigation, washing and cooling. They are of limited seasonal value for immersion recreation, fish life, and aquatic biota. The quality of these waters must be maintained to protect recreation, fish, and aquatic biota. The State WQS were evaluated against the MHA Nation NPDES permit application, etc. as described above to determine reasonable potential for exceedance of water quality standards. Appropriate numeric criteria for Class III streams include values listed in Table 2 and the following additional numeric standards:

Substance or Characteristic	Maximum Limit
Barium (total)	1.0 mg/L
Chlorides (total)	250 mg/L
Chlorine Residual (total)	acute 0.019 mg/L Chronic 0.011 mg/L
Dissolved Oxygen	not less than 5 mg/L
Fecal Coliform	200 fecal coliforms per 100 mL. (applies May 1 – Sept 30)
Nitrates (N) (diss.)	1.0 mg/L
pH	7.0 – 9.0
Phenols (total)	0.3 mg/L (organoleptic criterion)
Phosphorous (P) (total)	0.1 mg/L
Sulfate (total)	750 mg/L
Temperature	Eighty-five degrees Fahrenheit (29.44 degrees Celsius) The maximum increase shall not be greater than five degrees Fahrenheit (2.78 degrees Celsius) above natural background conditions.

TABLE 2
North Dakota State WQS
(concentrations are dissolved, ug/L)

Pollutant	CAS No.	Aquatic Life Value Classes I, IA, II, III		Human Health Value	
		Acute	Chronic	Classes I, IA, II	Class III
Benzene	71-43-2	--	--	1.2	71
Ethyl benzene	100-41-4	--	--	700	29000
Toluene	108-88-3	--	--	1000	200000
Xylenes	1330-20-7	--	--	10000	
Phenol	108-95-2	--	--	21000	4600000
Cadmium (tr)	7440-43-9	15.6 (a)	5.8 (a)	5	--
Chromium (III) (tr)	7440-47-3	4430 (a)	212 (a)	--	100 (T)
Chromium (VI)		16	11	--	100 (T)
Copper (tr)	7440-50-8	39.4 (a)	23.8 (a)	--	1000
Lead (tr)	7439-92-1	331 (a)	12.9 (a)	--	15
Mercury (T)	7439-97-6	1.7	0.91	0.050	0.051
Nickel (tr)	7440-02-0	1190 (a)	132 (a)	100	4600
Selenium (tr)	7782-49-2	20	5	50	--
Silver (tr)	7440-22-4	26.8 (a)	--	--	--
Zinc (tr)	7440-66-6	304 (a)	304 (a)	9100	69000
Fluoride (T)	7782-41-4	--	--	4000	--
Nitrite as N	14797-65-0	--	--	1000	--

tr- total recoverable; T- total

(a) Hardness based concentrations for metals calculated using a hardness of 300 mg/L as $CaCO_3$ and the following formulas:

***CMC** = exp{ma[ln(hardness)}+ba}* ***CCC** = exp{mc[ln(hardness)]+bc}*

	ma	*ba*	*mc*	*bc*
cadmium	*1.128*	*-3.6867*	*0.7852*	*-2.715*
copper	*0.9422*	*-1.700*	*0.8545*	*-1.702*
chromium (III)	*0.8190*	*3.7256*	*0.8190*	*0.6848*
lead	*1.273*	*-1.460*	*1.273*	*-4.705*
nickel	*0.8460*	*2.255*	*0.8460*	*0.0584*
silver	*1.72*	*-6.52*	*-*	*-*
zinc	*0.8473*	*0.884*	*0.8473*	*0.884*

Ammonia:

Ammonia (Total as N)

Acute Standard – The one hour average concentration of total ammonia (expressed as N in mg/L) does not exceed more often than once every three years on the average the numerical value given by the following formula:

$$\frac{0.411}{1 + 10^{7.204 - pH}} + \frac{58.4}{1 + 10^{pH - 7.204}}$$

Where salmonids are absent; or

$$\frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$$

Where salmonids are present.

Chronic Standard- The 30-day average concentration of total ammonia (expressed as N in mg/L) does not exceed more often than once every three years on the average the numerical value given by the following formula; and the highest 4-day average concentration of total ammonia within the 30-day averaging period does not exceed 2.5 times the numerical value given by the following formula:

$$\left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}}\right) * CV$$

Where: $CV = 2.85$ when $T \leq 14^0C$; or

$CV = 1.45 * 10^{0.028*(25-T)}$ when $T > 14^0C$.

Narrative North Dakota State Water Quality Standards

The State of North Dakota water quality standards at 33-16-02.1-08 also include general narrative provisions that are applied to surface waters.

"The following minimum conditions are applicable to all waters of the State except Class II ground waters. All waters of the state shall be:

> "Free from substances attributable to municipal, industrial, or other discharges or agricultural practices that will cause the formation of putrescent or otherwise objectionable sludge deposits.
>
> Free from floating debris, oil, scum, and other floating materials attributable to municipal, industrial, or other discharges or agricultural practices in sufficient amounts to be unsightly or deleterious.
>
> Free from materials attributable to municipal, industrial, or other discharges or agricultural practices producing color, odor, or other conditions to such a degree as to

create a nuisance or render any undesirable taste to fish flesh or, in any way, make fish inedible.

Free from substances attributable to municipal, industrial, or other discharges or agricultural practices in concentrations or combinations which are toxic or harmful to humans, animals, plants, or resident aquatic biota. For surface water, this standard will be enforced in part through appropriate whole effluent toxicity requirements in North Dakota pollutant discharge elimination system permits.

Free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters."

EPA §304(a) Water Quality Criteria

EPA's Office of Science and Technology publishes water quality criteria (EPA Criteria) as guidance for use by States and/or Tribes for use in adopting numeric criteria for protection of designated uses. The EPA Criteria are updated periodically with the latest major revision published in November 2002, *National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047*. Revisions to the aquatic life criteria for cadmium, mercury and ammonia and human health criteria for benzene and mercury were included in the 2002 revisions. In addition, the calculation of hardness dependant metals criteria was updated. EPA also updated its criteria in December 2003, *EPA-822-F-03-012,* for 15 human health water quality criteria including ethylbenzene and toluene. The Tribally-adopted WQS and State WQS did not include some or part of the 2002 and 2003 updates as they were developed prior to publication EPA Region 8 anticipates that both the Tribes and the State will adopt the updated EPA Criteria within the term of the permit.

The updated hardness dependant metals criteria are calculated using the following factors:

CMC *= exp{ma[ln(hardness)}+ba}* ***CCC*** *= exp{mc[ln(hardness)]+bc}*

	ma	*ba*	*mc*	*bc*
cadmium	*1.0166*	*-3924*	*0.7409*	*-4.719*
copper	*0.9422*	*-1.700*	*0.8545*	*-1.702*
chromium (III)	*0.8190*	*3.7256*	*0.8190*	*0.6848*
lead	*1.273*	*-1.460*	*1.273*	*-4.705*
nickel	*0.8460*	*2.255*	*0.8460*	*0.0584*
silver	*1.72*	*-6.59*	*-*	*-*
zinc	*0.8473*	*0.884*	*0.8473*	*0.884*

Ammonia:

The updated ammonia criterion is calculated as follows:

(CMC) Acute Criterion – The one-hour average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more often than once every three years on the average, the CMC (acute criterion) calculated using the following equations:

$$\frac{0.411}{1 + 10^{7.204 - pH}} + \frac{58.4}{1 + 10^{pH-7.204}}$$

Where salmonids are absent; or

$$\frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH-7.204}}$$

Where salmonids are present.

(CCC) Chronic Criterion- The thirty-day average concentration of total ammonia nitrogen (expressed as N in mg/L) does not exceed, more often than once every three years on the average, the CCC (chronic criterion) calculated using the following equations:

$$\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \quad * \quad \mathrm{MIN}\,(2.85,\ 1.45*10^{0.028(25-T)})$$

When early life stages are present;

$$\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \quad * \quad 1.45*10^{0.028(25-\mathrm{MAX}(T,7))}$$

When early life stages are absent.

In addition, the highest 4-day average within the 30-day period should not exceed 2.5 times the CCC.

Benzene:

The human health based criterion for benzene was changed to maximum values of 2.2 ug/L for water consumption and 51 ug/L for water plus fish consumption.

Mercury:

The human health based criterion for water plus fish consumption for mercury was changed to a methylmercury fish tissue concentration of 0.3 mg/kg. The updated aquatic life criteria CMC (acute criterion) is 1.4 ug/L and the CCC (chronic criterion) is 0.77 ug/L. EPA Region 8 is recommending that the previous CCC for mercury of 0.012 ug/L be applied to assure protection of the new methylmercury fish tissue criterion.

Ethylbenzene:

The human health based criterion for water + organism and organism only were changed to 530 ug/L and 2,100 ug/L respectively.

Toluene:

The human health based criterion for water + organism and organism only were changed to 1,300 ug/L and 15,000 ug/L respectively.

Summary of Tribally-adopted WQS and State WQS and EPA 304(a) Criteria

The East Fork of Shell Creek remains primarily within the external boundaries of the Fort Berthold Indian Reservation as it travels towards Lake Sakakawea, however, approximately one mile from the proposed project site it traverses the boundary of the Reservation into the State of North Dakota for a short distance, prior to returning back to the Reservation. As such, WQBELs developed for the proposed facility will take into consideration both Tribally-adopted WQS and State of North Dakota WQS.

Narrative Tribally-adopted WQS and State WQS for prohibiting discharges of toxics in toxic amounts [NDAC 33-16-02.1-08: General Water Quality Standards 1.a.(4)], and Tribal *Narrative Water Quality Criteria a. (4)*, will be considered for the proposed facility.

Tribally-adopted WQS and State WQS for temperature will also be considered for the proposed facility. The standard is eighty-five degrees Fahrenheit (29.44 degrees Celsius) and a maximum increase of greater than five degrees Fahrenheit (2.78 degrees Celsius) above natural background condition.

Tribally-adopted WQS for dissolved oxygen will also be considered for the proposed facility. They will be expressed as a seasonal standards for April 1-September 30 of 8.0 mg/L (1-day minimum), 9.5 mg/L (7-day mean), and 6.5 mg/L (30-day mean); and October 1-March 31 of 4.0 mg/L (1-day minimum), 5.0 mg/L (7-day mean), and 6.5 mg/L (30-day mean).

Table 3 presents a summary of the combined Tribally-adopted WQS, State WQS and EPA Criteria that will be evaluated for effluent limitations and monitoring requirements in this permit. The most stringent WQS are in bold. Where the EPA Criteria are more or less stringent than the Tribally-adopted WQS and/or State WQS, the EPA Criteria have been designated as the applicable value in anticipation of adoption of the EPA Criteria by the State or Tribes. Hardness dependant metals standards are calculated using a hardness of 300 mg/L as $CaCO_3$.

In order to determine if there is reasonable potential for pollutants expected in the discharge to cause or contribute to a violation of water quality standards, a comparison of expected discharge pollutant concentrations with Tribally-adopted WQS, State WQS and EPA water quality criteria was completed. The reasonable potential analysis is presented in Table 4.

TABLE 3
Comparison of Tribally-adopted and State WQS and EPA Criteria

Pollutant	Tribally-adopted WQS		State WQS		EPA Criteria	
	Acute	Chronic	Acute	Chronic	Acute	Chronic
Benzene	--	1.2[1]	--	71	--	**2.2**
Ethyl benzene	--	700	--	29000	--	**530**
Toluene	--	1000[1]	--	200000	--	**1300**
Xylenes	--	**10000**	--	--	--	--
Phenol	--	**300**	--	**300**	--	**300**
Hydrogen Sulfide	--	**2**	--	--	--	**2.0**
Ammonia as N	1.9[1]	0.43[1]	**3.2**[2]	**1.1**[2]	**3.2**[2]	**1.1**[2]
Barium (tr)	--	2000	--	**1000**	--	**1000**
Aluminum (tr)	**750**	**87**	--	--	**750**	**87**
Cadmium (tr)	13.5	2.7	15.6	5.8	**6.5**	**0.61**
Chromium (III) (tr)	4270[1]	100[1]	**4430**	**212**	**4430**	**212**
Chromium (VI)	**16**	**11**	**16**	**11**	**16**	**11**
Copper (tr)	49.9	30.2	**39.4**	**23.8**	**39.4**	**23.8**
Iron (tr)	--	**300**	--	--	--	**300**
Manganese (tr)	--	**50**	--	--	--	**50**
Lead (tr)	**331**	**12.9**	**331**	**12.9**	**331**	**12.9**
Mercury (T)	2.4	**0.012**	1.7	0.051	**1.4**	**0.012**[3]
Nickel (tr)	3592	100[1]	**1190**	**132**	**1190**	**132**
Selenium (tr)	**20**	**5**	**20**	**5**	**20**	**5**
Silver (tr)	26.8	--	26.8	--	**25.0**	--
Zinc (tr)	297[1]	269[1]	**304**	**304**	**304**	**304**
Chlorine (TRC)	**19**	**11**	**19**	**11**	**19**	**11**
Chloride	**860000**	**230000**	--	250000	**860000**	**230000**
Fluoride	--	**4000**	--	--	--	--
Sulfate	--	--	--	**750000**	--	--
Nitrite as N	--	**1000**	--	--	--	--
Nitrate as N	--	**10000**	--	1000[4]	--	**10000**
Phosphorous as P	--	--	--	100[4]	--	--
PH (s.u.)	**7.0 – 9.0**		**7.0 – 9.0**		6.5 - 9	

[1] Tribally-adopted WQS is more stringent than EPA Criteria and will be updated to EPA Criteria value.
[2] Ammonia-N values calculated using a pH of 8.5 and a temperature of 15^{0}C. For State WQS and EPA Criteria, salmonid fish are presumed absent (acute) and early life stages are presumed present (chronic).
[3] EPA Region 8 recommends using a water column concentration of 0.012 ug/L Hg (T) to protect the chronic methylmercury fish tissue criterion.
[4] The values for nitrate and phosphorous are interim guidance. In no case shall the standard for nitrates exceed 10 mg/L for any waters used as municipal drinking water supply.

TABLE 4

Reasonable Potential Analysis
(Treated Process Wastewater and Contaminated Stormwater)
(in ug/L unless otherwise indicated)

Pollutant	NPDES Permit Application		Applicable WQS		Reasonable Potential	
	Daily Maximum	Average Daily	Acute	Chronic	Acute	Chronic
Benzene	10	10	--	2.2	--	Yes
Ethyl benzene	0.0	0.0	--	530	--	No[1]
Toluene	0.0	0.0	--	1300	--	No[1]
Xylenes	NE	NE	--	10000	--	No
Phenol	300	300	--	300	--	Yes
Hydrogen Sulfide	0.0	0.0	--	2.0	--	No[2]
Ammonia as N (mg/L)	145	90	3.2	1.1	Yes	Yes
Barium (tr)	200	10	--	1000	--	Yes
Aluminum (tr)	80	10	750	87	Yes	Yes
Cadmium (tr)	0.0	0.0	6.5	0.61	No[3]	No[3]
Chromium (III) (tr)	0.0	0.0	4430	212	No[2]	No[2]
Chromium (VI)	NR	NR	16	11	No[2]	No2
Copper (tr)	0.0	0.0	39.4	23.8	No[3]	No[3]
Iron (tr)	250	40	--	300	--	Yes
Manganese (tr)	50	20	--	50	--	Yes
Lead (tr)	0.0	0.0	331	12.9	No[3]	No[3]
Mercury (T)	0.0	0.0	1.4	0.012	No[1]	No[1]
Nickel (tr)	50	50	1190	132	Yes	Yes
Selenium (tr)	10	10	20	5	Yes	Yes
Silver (tr)	0.0	0.0	25.0	--	No[3]	--
Zinc (tr)	0.0	0.0	304	304	No[3]	No[3]
Chlorine (TRC)	0.0	0.0	19	11	No	No
Chloride	NR	NR	860000	230000	No[1]	No[1]
Fluoride	3500	1000	--	4000	--	Yes
Sulfate	150000	90000	--	750000	--	Yes
Nitrite as N	NR	NR	--	1000	--	No[1]
Nitrate as N	40	20	--	10000	--	Yes
Phosphorous as P	200	120	--	100[4]	--	Yes[4]
PH (s.u.)	8.00– 8.50		7.0 – 9.0		Yes	

[1] Reported as 0.0 ppm in permit application but likely to be present in discharge. Limits and monitoring will be required for this parameter.
[2] Reported as 0.0 ppm in permit application but likely to be present in discharge. Also covered by ELG. Limits and monitoring will be required for this parameter.
[3] Reported as 0.0 ppm in permit application but likely to be present in the discharge at low concentration so monitoring only will apply.
[4] State WQS is a guideline only, so monitoring only will be required.
NE- reported as not expected to be present
NR- not reported in application

note: Boron was reported in the permit application at 1500 ug/L (daily maximum) and 100 ug/L (average daily) but there are no applicable WQS or EPA Criteria.

Technology Based Effluent Limitations

The proposed MHA Nation Clean Fuels refinery will be a new source and must comply with New Source Performance Standards (NSPS) under the Effluent Limitations Guidelines and Standards for the Petroleum Refining Point Source Category pursuant to §40 CFR 419.36. The proposed refinery size is 10,000 bpsd of synthetic crude plus 3,000 bpsd of field butane for a total refinery throughput of of 13,000 bpsd. The proposed refinery process configuration is covered under Subpart C Petrochemical Subcategory of the Petroleum Refining Point Source Category.

Process Effluent Limitations

Process Configuration (1000 bbl/day) [see §40 CFR 419.42(b)(3)]

Feedstock Process	Feedstock Rate	Relative Rate	Weight Factor	Process Configuration
Crude- Atm. Dist	10	0.769	1	0.769
Cracking (Hydrocracking)	6.872	0.529	6	3.17
Isomerization 3	0.231	13	3.00	
Total				**6.94**

Using the above Process Configuration (6.94) and a 13, 000 bbl/day capacity, a Size Factor (SF) of 0.73 and a Process Factor (PF) of 1.08 are derived pursuant to §40 CFR 419.36(b).

New Source Performance Standards (NSPS): Using the above Capacity, Size and Process factors, the following table shows applicable effluent limitations for this facility. [Limit (lbs/1000 bbl) X (PF) X (SF) = Effluent Limit (lbs/day)] [§40 CFR 419.36(a)]:

TABLE 5

	Effluent Limitation		Effluent Limitations	
	Daily Maximum (lbs/1000 bbl)	Average Daily (lbs/1000 bbl)	Daily Maximum (lbs/day)	Average Daily (lbs/day)
Pollutant				
BOD_5	7.7	4.1	78.92	42.02
TSS	5.2	3.3	53.30	33.82
COD	47.0	24.0	481.71	245.98
Oil and Grease	2.4	1.3	24.60	13.32
Phenolic Compounds	0.056	0.027	0.57	0.28
Ammonia as N	8.3	3.8	85.07	38.95
Sulfide	0.050	0.022	0.51	0.23
Total Chromium	0.116	0.068	1.19	0.70
Hexavalent Chromium	0.0096	0.0044	0.098	0.045
pH			6.0 to 9.0	

BAT, BPT, BCT : Limitations for BAT, BPT, and BCT were also evaluated using the above factors. Only BAT limitations for ammonia as N were more stringent than NSPS standards above. The following BAT limits will be evaluated against water quality standards [§40 CFR 419.33(a)]:

	Daily Maximum (lbs./day)	Average Daily (lbs./day)
Ammonia as N	84.56	38.95

Contaminated Runoff Allowance

Best Professional Judgment (BPJ)

The NSPS do not contain pollutant allowances for contaminated stormwater runoff from process areas. Regulations under §40 CFR 419.36(e) were reserved. The BPT [§40 CFR 419.32(e), BAT [§40 CFR 419.33(f)], and BCT [§40 CFR 419.34(e)] allowances for contaminated runoff were evaluated using best professional judgment (BPJ) for this proposed facility. The BPT/BAT/BCT allowances are based on flow and for this facility, average contaminated stormwater flows of 4.4 gallons per minute (6,336 gallons per day) as reported in the NPDES permit application was used for the allowance calculation. BPT allowances were equivalent to BAT and BCT except for BAT for total chromium was more stringent. The stormwater allowances shown in Table 6 will be added to the process allowances for the total facility effluent limitations (see Table 7).

TABLE 6

	Effluent Limitation		Effluent Limitations	
	Daily Maximum (lbs/1000 gal)	Average Daily (lbs/1000 gal)	Daily Maximum (lbs/day)	Average Daily (lbs/day)
Pollutant				
BOD_5	0.40	0.22	2.53	1.39
TSS	0.28	0.18	1.77	1.14
COD	3.0	1.5	19.01	9.5
Oil and Grease	0.13	0.067	0.82	0.42
Phenolic Compounds	0.0029	0.0014	0.0184	0.0089
Ammonia as N	0	0	0	0
Sulfide	0	0	0	0
Total Chromium	0.0050	0.0018	0.032	0.011
Hexavalent Chromium	0.00052	0.00023	0.0033	0.0015
pH	6.0 to 9.0		6.0 to 9.0	

Total Technology Effluent Limitations

(Process + Stormwater = Total)

TABLE 7

	Process Effluent Limitation		Stormwater Effluent Limitations		Total Effluent Limitations	
	Daily Maximum (lbs/day)	Average Daily (lbs/day)	Daily Maximum (lbs/day)	Average Daily (lbs/day)	Daily Maximum (lbs/day)	Average Daily (lbs/day)
Pollutant						
BOD_5	78.92	42.02	2.53	1.39	81.45	43.41
TSS	53.30	33.82	1.77	1.14	55.07	34.96
COD	481.71	245.98	19.01	9.50	500.72	255.48
Oil and Grease	24.60	13.32	0.82	0.42	25.42	13.74
Phenolic Compounds	0.57	0.28	0.0184	0.0089	0.59	0.29
Ammonia as N	84.56	38.95	0	0	84.56	38.95
Sulfide	0.51	0.23	0	0	0.51	0.23
Total Chromium	1.19	0.70	0.032	0.011	1.222	0.711
Hexavalent Chromium	0.098	0.045	0.0033	0.0015	0.101	0.046
pH	6.0 to 9.0				6.0 to 9.0	

Conversion of Technology Based Mass Limits to Concentration Limits

The mass based technology limits above were converted to concentration based limits using flow information provided in the NPDES Permit Application (Table 8). Under the proposed alternative in the DEIS, with full recycle, the average daily flow is anticipated to be approximately 15,000 gallons per day (gpd) and the maximum daily flow of approximately 35,000 gpd. (See DEIS Figure 2-3) Without recycle average daily and maximum daily flows are anticipated to be approximately 30,000 gpd and 50,000 gpd. (See DEIS Figure 2-4.) Under Alternative 4 of the DEIS, maximum flow is expected to be 76,320 gpd and average 28,800 gpd. For this conversion, the highest maximum flow (Alternative 4) will be used as it would be protective of technology requirements regardless of recycle rates or choice of discharge alternative. Conversion factors are 3.785 l/gal, and 454,500 mg/lb.

TABLE 8

	Effluent Limitation		Effluent Limitations	
	Daily Maximum (lbs/day)	Average Daily (lbs/day)	Daily Maximum (mg/L)	Average Daily (mg/L)
Pollutant				
BOD_5	81.45	43.41	128	68
TSS	55.07	34.96	87	55
COD	500.72	255.48	788	402
Oil and Grease	25.42	13.74	40	22
Phenolic Compounds	0.59	0.29	0.93	0.45
Ammonia as N	84.56	38.95	133	61
Sulfide	0.51	0.23	0.8	0.4
Total Chromium	1.222	0.711	1.9	1.1
Hexavalent Chromium	0.101	0.046	0.16	0.07

Comparison of Water Quality Based and Technology Based Effluent Limitations

Table 9 contains a comparison of water quality and technology based requirements. The more stringent limit will be carried forward as an effluent limitation in the proposed permit:

TABLE 9

Pollutant	Technology Based Limit (ug/L)		Water Quality Based Limit (ug/L)		Most Stringent Limit (ug/L)	
	Daily Maximum	Average Daily	Daily Maximum	Average Daily	Daily Maximum	Average Daily
BOD_5 (lbs/day)	**81**	**43**	**(a)**	**(a)**	81 (a)	43 (a)
COD (lbs/day)	**500**	**255**	**(a)**	**(a)**	500 (a)	255 (a)
TSS (lbs/day)	**55**	**35**	N/A	N/A	55	35
Oil and Grease (lbs/day)	**25.4**	**13.7**	N/A	N/A	25.4	13.7
Benzene	N/A	N/A	--	**2.2**	--	2.2
Ethyl benzene	N/A	N/A	--	**530**	--	530
Toluene	N/A	N/A	--	**1300**	--	1300
Phenol	N/A	N/A	--	**300**	--	300
Phenolic Compounds (lbs/day)	**0.59**	**0.29**	N/A	N/A	0.59	0.29
Hydrogen Sulfide	800	400	--	**2.0**	--	2.0
Ammonia as N (mg/L)	133	61	**3.2**	**1.1**	3.2	1.1
Barium (tr)	N/A	N/A	--	**1000**	--	1000
Aluminum (tr)	N/A	N/A	**750**	**87**	750	87
Cadmium (tr)	N/A	N/A	**6.5**	**0.61**	MON	MON
Chromium (III) (tr)	**1900**	1100	4430	**212**	MON	MON
Chromium (Total) (lbs/day)	**1.22**	0.71	1.84	**0.035**	1.22	0.035
Chromium (VI)	160	70	**16**	**11**	16	11
Chromium (VI) (lbs/day)	0.101	0.046	**0.0067**	**0.0018**	0.0067	0.0018
Copper (tr)	N/A	N/A	**39.4**	**23.8**	MON	MON
Iron (tr)	N/A	N/A	--	**300**	--	300
Manganese (tr)	N/A	N/A	--	**50**	--	50
Lead (tr)	N/A	N/A	**331**	**12.9**	MON	MON
Mercury (T)	N/A	N/A	**1.4**	**0.012**	1.4	0.012
Nickel (tr)	N/A	N/A	**1190**	**132**	1190	132
Selenium (tr)	N/A	N/A	**20**	**5**	20	5
Silver (tr)	N/A	N/A	**25.0**	--	MON	--
Zinc (tr)	N/A	N/A	**304**	**304**	MON	MON
Chloride	N/A	N/A	**860000**	**230000**	860000	230000
Fluoride	N/A	N/A	--	**4000**	--	4000
Sulfate	N/A	N/A	--	**750000**	--	750000
Nitrite as N	N/A	N/A	--	**1000**	--	1000
Nitrate as N	N/A	N/A	--	**10000**	--	10000
Phosphorous as P	N/A	N/A	--	**100**	--	MON
pH (s.u.)	6.0– 9.0		**7.0 – 9.0**		7.0 – 9.0	

(a) Oxygen demanding parameters (BOD, COD) will also be limited by WQS for dissolved oxygen.
MON- Monitor Only

Whole Effluent Toxicity Limitations (Outfall 002)

The MHA Nation Water Quality Standards (Tribally-adopted WQS) contain narrative conditions that ensure surface waters of the Reservation are free from substances in wastewater discharges that "*cause injury to, or are toxic to, or produce adverse physiological responses in humans, animals or plants…"* Implementation of the narrative Tribally-adopted WQS for purposes of NPDES permits "*shall result in appropriate acute and chronic effluent quality limitations consistent with the federal water quality-based permitting found at 40 CFR 122.44(d),* ***including whole effluent toxicity (WET) limitations*** *as required in the latest edition of the EPA Region VIII NPDES Whole Effluent Toxics Control Program document."* (1997 Region 8 WET Policy)

Since the proposed MHA Nation Clean Fuels Refinery will have discharges from Outfall 002 that may contain substances that alone or in combination with other substances that exhibit toxicity to aquatic organisms, whole effluent toxicity (WET) limitations will be imposed in the proposed permit. In accordance with the Region 8 WET Policy, the permit will require both acute and chronic WET limits and monitoring for two species, *ceriodaphnia dubia* and *pimephales promelas* on a quarterly basis. The requirement for both acute and chronic WET limits and monitoring is due to the uncertain nature of the treated process wastewater discharge from this new facility. If the results of at least ten WET tests during this permit term show there is no reasonable potential for acute and/or chronic WET the discharge, the permittee may request a reduction in test frequency and/or number of species. The WET monitoring data collected during this proposed permit term will also be evaluated at the time of permit reissuance for reasonable potential and if a reduction in test frequency and/or number of species tested is warranted.

Proposed effluent limitations and monitoring frequencies for Outfall 002 are presented in Tables 10 and 11 respectively.

Proposed Numeric Effluent Limitations (Outfall 002)

TABLE 10

Pollutant	Effluent Limit (ug/L)		Basis for Effluent Limitation
	Daily Maximum	Average Daily	
Flow, MGD	0.08	0.03	Permit Application , DEIS
BOD_5 (lbs/day)	81	43	§40 CFR 419
COD (lbs/day)	500	255	§40 CFR 419
TSS (lbs/day)	55	35	§40 CFR 419
Oil and Grease (lbs/day)	25.4	13.7	§40 CFR 419
Benzene	NA	2.2	EPA 304(a) Criterion
Ethyl benzene	NA	530	EPA 304(a) Criterion
Toluene	NA	1300	EPA 304(a) Criterion
Phenol	NA	300	EPA 304(a) Criterion, State WQS, Tribal WQS
Phenolic Compounds (lbs/day)	0.59	0.29	§40 CFR 419
Hydrogen Sulfide	NA	2.0	EPA 304(a) Criterion, Tribal WQS
Ammonia as N (mg/L)	3.2	1.1	EPA 304(a) Criterion, State WQS
Barium (tr)	NA	1000	EPA 304(a) Criterion, State WQS
Aluminum (tr)	750	87	EPA 304(a) Criterion, Tribal WQS
Cadmium (tr)	MON	MON	EPA 304(a) Criterion
Chromium (Total) (lbs/day)	1.22	0.035	§40 CFR 419, State WQS,EPA 304(a) Criterion
Chromium (VI)	16	11	EPA 304(a) Criterion, State WQS, Tribal WQS
Chromium (VI) (lbs/day)	0.0067	0.0018	EPA 304(a) Criterion, State WQS, Tribal WQS
Copper (tr)	MON	MON	EPA 304(a) Criterion, State WQS
Iron (tr)	NA	300	EPA 304(a) Criterion, Tribal WQS
Manganese (tr)	NA	50	EPA 304(a) Criterion, Tribal WQS
Lead (tr)	MON	MON	EPA 304(a) Criterion, State WQS, Tribal WQS
Mercury (T)	1.4	0.0012	EPA 304(a) Criterion, Tribal WQS
Nickel (tr)	1190	132	EPA 304(a) Criterion, State WQS
Selenium (tr)	20	5	EPA 304(a) Criterion, State WQS, Tribal WQS
Silver (tr)	MON	MON	EPA 304(a) Criterion
Zinc (tr)	MON	MON	EPA 304(a) Criterion, State WQS
Chloride	860000	230000	EPA 304(a) Criterion, Tribal WQS
Fluoride	NA	4000	Tribal WQS
Sulfate	NA	750000	State WQS
Nitrite as N	NA	1000	Tribal WQS
Nitrate as N	NA	10000	EPA 304(a) Criterion, Tribal WQS
Phosphorous as P	MON	MON	State WQS
pH (s.u.)	7.0– 9.0		State WQS, Tribal WQS
WET, acute	LC_{50} > 100%		Narrative Tribal WQS and State WQS
WET, chronic	IC_{25} > 100%		Narrative Tribal WQS and State WQS
Dissolved Oxygen (mg/L)	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		Tribal WQS

MON- Monitor Only

The discharge from Outfall 002 shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

Proposed Effluent Monitoring Requirements (Outfall 002)

TABLE 11

Pollutant	Monitoring Frequency	Sample Type
Flow, MGD	Daily	Continuous, Recorder
BOD_5 , lbs/day	2X/Week	Composite
COD, lbs/day	Monthly	Composite
TSS, lbs/day	2X/Week	Composite
Oil and Grease, lbs/day	Weekly	Grab
Benzene, ug/L	Monthly	Grab
Ethyl benzene, ug/L	Monthly	Grab
Toluene, ug/L	Monthly	Grab
Phenol, ug/L	Monthly	Grab
Phenolic Compounds, lbs/day	Monthly	Grab
Hydrogen Sulfide, ug/L	Weekly	Grab
Ammonia as N, mg/L	Weekly	Composite
Barium (tr), ug/L	Monthly	Composite
Aluminum (tr), ug/L	Monthly	Composite
Chromium (Total), lbs/day	Monthly	Composite
Chromium (VI), ug/L	Monthly	Grab
Chromium (VI), lbs/day	Monthly	Grab
Iron (tr), ug/L	Monthly	Composite
Manganese (tr), ug/L	Monthly	Composite
Mercury (T), ug/L	Monthly	Composite
Nickel (tr), ug/L	Monthly	Composite
Selenium (tr), ug/L	Monthly	Composite
Chloride, ug/L	Monthly	Composite
Fluoride, ug/L	Monthly	Composite
Sulfate, ug/L	Monthly	Composite
Nitrite as N, ug/L	Monthly	Composite
Nitrate as N, ug/L	Monthly	Composite
Phosphorous as P, ug/L	Monthly	Composite
pH (s.u.)	Daily	Grab or Continuous
WET, acute	Quarterly	Composite
WET, chronic	Quarterly	Grab
Dissolved Oxygen, mg/L	Daily	Grab
Temperature, ^{o}C	Daily	Grab

Additional Monitoring Requirement for Outfall 002:

Approximately 90 days and 270 days after startup of the facility, monitoring shall be required for:

Total Metals – Table III §40CFR 122 Appendix D
Volatile, acid, and base/neutral compounds – Table II §40CFR 122 Appendix D

Contaminated (oily) Stormwater (Outfall 002a)

Under Alternative 4 of the DEIS, an additional Outfall (002a) is proposed for discharges of segregated contaminated (oily) stormwater. The discharge of this wastewater may be necessary due to the lack of storage capacity in the wastewater tank system to contain all runoff resulting from unusual or episodic precipitation events.

Technology Limitations

Best Professional Judgment (BPJ)

The NSPS for Petroleum Refining (§40 CFR 419.36) also do not contain provisions for release of segregated contaminated stormwater runoff from process areas. As discussed under Outfall 002 above, regulations under §40 CFR 419.36(e) were reserved.

The BPT [§40 CFR 419.32(e)], BAT [§40 CFR 419.33(f)], and BCT [§40 CFR 419.34(e)] provisions for discharge of segregated contaminated runoff were evaluated using best professional judgment (BPJ) for this proposed facility. The BPT/BAT/BCT provisions limit discharge to segregated contaminated (oily) stormwater that is not commingled or treated with process wastewater that meets the following limitations:

BPT	Oil and Grease <15 mg/L
BAT	Total Organic Carbon <110 mg/L
BCT	Oil and Grease <15 mg/L

The limits cannot be exceeded in either a grab or composite sample of the discharge.

Water Quality Based Effluent Limitations

Numeric and Narrative Water Quality Standards and Criteria

Numeric water quality standards considered in establishing limitations for this discharge would be the same as presented in Table 3 above.

Narrative water quality standards (dissolved oxygen, whole effluent toxicity, etc.) considered in establishing effluent limitations would also be the same as described for discharges through Outfall 002 above.

Reasonable Potential

Water quality standard based effluent limitations will also be evaluated for the discharges of segregated contaminated (oily) stormwater. Pollutants reported in the permit application for the combined process and contaminated (oily) stormwater for Outfall 002 were compared with Tribally-adopted WQS, State WQS and EPA criteria. Table 12 shows the comparison. Tables 13 and 14 show proposed effluent limits and monitoring requirements for Outfall 002a.

Reasonable Potential Analysis (Contaminated (oily) Stormwater)
(in ug/L unless otherwise indicated)
Table 12

Pollutant	NPDES Permit Application		Applicable WQS		Reasonable Potential	
	Daily Maximum	Average Daily	Acute	Chronic	Acute	Chronic
Benzene	10	10	--	2.2	--	Yes
Ethyl benzene	0.0	0.0	--	530	--	No[1]
Toluene	0.0	0.0	--	1300	--	No[1]
Xylenes	NE	NE	--	10000	--	No
Phenol	300	300	--	300	--	Yes
Hydrogen Sulfide	0.0	0.0	--	2.0	--	No[2]
Ammonia as N (mg/L)	145	90	3.2	1.1	Yes	Yes
Barium (tr)	200	10	--	1000	--	Yes
Aluminum (tr)	80	10	750	87	Yes	Yes
Cadmium (tr)	0.0	0.0	6.5	0.61	No[3]	No[3]
Chromium (III) (tr)	0.0	0.0	4430	212	No[2]	No[2]
Chromium (VI)	NR	NR	16	11	No[2]	No2
Copper (tr)	0.0	0.0	39.4	23.8	No[3]	No[3]
Iron (tr)	250	40	--	300	--	Yes
Manganese (tr)	50	20	--	50	--	Yes
Lead (tr)	0.0	0.0	331	12.9	No[3]	No[3]
Mercury (T)	0.0	0.0	1.4	0.012	No[1]	No[1]
Nickel (tr)	50	50	1190	132	Yes	Yes
Selenium (tr)	10	10	20	5	Yes	Yes
Silver (tr)	0.0	0.0	25.0	--	No[3]	--
Zinc (tr)	0.0	0.0	304	304	No[3]	No[3]
Chlorine (TRC)	0.0	0.0	19	11	No	No
Chloride	NR	NR	860000	230000	No[1]	No[1]
Fluoride	3500	1000	--	4000	--	Yes
Sulfate	150000	90000	--	750000	--	Yes
Nitrite as N	NR	NR	--	1000	--	No[1]
Nitrate as N	40	20	--	10000	--	Yes
Phosphorous as P	200	120	--	100[4]	--	Yes[4]
PH (s.u.)	8.00– 8.50		7.0 – 9.0		Yes	

[1] Reported as 0.0 ppm in permit application but likely to be present in discharge. Limits and monitoring will be required for this parameter.
[2] Reported as 0.0 ppm in permit application but likely to be present in discharge. Also covered by ELG. Limits and monitoring will be required for this parameter.
[3] Reported as 0.0 ppm in permit application but likely to be present in the discharge at low concentration so monitoring only will apply.
[4] State WQS is a guideline only, so monitoring only will be required.
NE- reported as not expected to be present
NR- not reported in application

note: Boron was reported in the permit application at 1500 ug/L (daily maximum) and 100 ug/L (average daily) but there are no applicable WQS or EPA Criteria.

Proposed Numeric Effluent Limitations (Outfall 002a)

TABLE 13

Pollutant	Effluent Limit (ug/L)		Basis for Effluent Limitation
	Daily Maximum	Average Daily	
Flow, MGD	0.027	0.0065	Permit Application, DEIS
Oil and Grease, mg/L	15	15	BPJ (40 CFR 419)
Total Organic Carbon, mg/L	110	110	BPJ (40 CFR 419)
Benzene	NA	2.2	EPA 304(a) Criterion
Ethyl benzene	NA	530	EPA 304(a) Criterion
Toluene	NA	1300	EPA 304(a) Criterion
Phenol	NA	300	EPA 304(a) Criterion, State WQS, Tribal WQS
Hydrogen Sulfide	NA	2.0	EPA 304(a) Criterion, Tribal WQS
Ammonia as N (mg/L)	3.2	1.1	EPA 304(a) Criterion, State WQS
Barium (tr)	NA	1000	EPA 304(a) Criterion, State WQS
Aluminum (tr)	750	87	EPA 304(a) Criterion, Tribal WQS
Cadmium (tr)	MON	MON	EPA 304(a) Criterion
Chromium (VI)	16	11	EPA 304(a) Criterion, State WQS, Tribal WQS
Copper (tr)	MON	MON	EPA 304(a) Criterion, State WQS
Iron (tr)	NA	300	EPA 304(a) Criterion, Tribal WQS
Manganese (tr)	NA	50	EPA 304(a) Criterion, Tribal WQS
Lead (tr)	MON	MON	EPA 304(a) Criterion, State WQS, Tribal WQS
Mercury (T)	1.4	0.0012	EPA 304(a) Criterion, Tribal WQS
Nickel (tr)	1190	132	EPA 304(a) Criterion, State WQS
Selenium (tr)	20	5	EPA 304(a) Criterion, State WQS, Tribal WQS
Silver (tr)	MON	MON	EPA 304(a) Criterion
Zinc (tr)	MON	MON	EPA 304(a) Criterion, State WQS
Chloride	860000	230000	EPA 304(a) Criterion, Tribal WQS
Fluoride	NA	4000	Tribal WQS
Sulfate	NA	750000	State WQS
Nitrite as N	NA	1000	Tribal WQS
Nitrate as N	NA	10000	EPA 304(a) Criterion, Tribal WQS
Phosphorous as P	MON	MON	State WQS
pH (s.u.)	7.0– 9.0		State WQS, Tribal WQS
WET, acute	LC_{50} > 100%		Narrative Tribal WQS and State WQS
WET, chronic	IC_{25} > 100%		Narrative Tribal WQS and State WQS
Dissolved Oxygen (mg/L)	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		Tribal WQS

MON- Monitor Only

The discharge from Outfall 002a shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

Proposed Effluent Monitoring Requirements (Outfall 002a)

Table 14

Pollutant	Monitoring Frequency	Sample Type
Flow, MGD	Daily	Continuous, Recorder
TOC, mg/L	Weekly	Composite
Oil and Grease, mg/L, visual	Daily	Visual[1]
Oil and Grease, mg/L	Weekly	Grab
Benzene, ug/L	Monthly	Grab
Ethyl benzene, ug/L	Monthly	Grab
Toluene, ug/L	Monthly	Grab
Phenol, ug/L	Monthly	Grab
Hydrogen Sulfide, ug/L	Weekly	Grab
Ammonia as N, mg/L	Weekly	Composite
Barium (tr), ug/L	Monthly	Composite
Aluminum (tr), ug/L	Monthly	Composite
Chromium (VI), ug/L	Monthly	Grab
Iron (tr), ug/L	Monthly	Composite
Manganese (tr), ug/L	Monthly	Composite
Mercury (T), ug/L	Monthly	Composite
Nickel (tr), ug/L	Monthly	Composite
Selenium (tr), ug/L	Monthly	Composite
Chloride, ug/L	Monthly	Composite
Fluoride, ug/L	Monthly	Composite
Sulfate, ug/L	Monthly	Composite
Nitrite as N, ug/L	Monthly	Composite
Nitrate as N, ug/L	Monthly	Composite
Phosphorous as P, ug/L	Monthly	Composite
pH (s.u.)	Daily	Grab or Continuous
WET, acute	Quarterly	Composite
WET, chronic	Quarterly	Grab
Dissolved Oxygen, mg/L	Daily	Grab
Temperature, ^{o}C	Daily	Grab

1 A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

Uncontaminated (non-oily) Stormwater (Outfall 001)

Water Quality Based Effluent Limits

Water quality based effluent limits are evaluated for the discharges of uncontaminated (non-oily) stormwater from Outfall 001. A reasonable potential analysis for pollutants expected to be in the discharge from Outfall 001 is presented in Table 15.

TABLE 15 - Reasonable Potential Analysis (Uncontaminated (non-oily) Stormwater)
(in ug/L unless otherwise indicated)

Pollutant	NPDES Permit Application		Applicable WQS		Reasonable Potential	
	Daily Maximum	Average Daily	Acute	Chronic	Acute	Chronic
Benzene	0.0	0.0	--	2.2	--	No
Ethyl benzene	0.0	0.0	--	530	--	No
Toluene	0.0	0.0	--	1300	--	No
Xylenes	NE	NE	--	10000	--	No
Phenol	300	0.0	--	300	--	Yes
Hydrogen Sulfide	0.0	0.0	--	2.0	--	No
Ammonia as N (mg/L)	0.0	0.0	3.2	1.1	No	No
Barium (tr)	0.0	0.0	--	1000	--	No
Aluminum (tr)	0.0	0.0	750	87	No	No
Cadmium (tr)	0.0	0.0	6.5	0.61	No	No
Chromium (III) (tr)	0.0	0.0	4430	212	No	No
Chromium (VI)	NR	NR	16	11	No	No
Copper (tr)	0.0	0.0	39.4	23.8	No	No
Iron (tr)	200	0.0	--	300	--	Yes
Manganese (tr)	50	0.0	--	50	--	Yes
Lead (tr)	0.0	0.0	331	12.9	No	No
Mercury (T)	0.0	0.0	1.4	0.012	No	No
Nickel (tr)	0.0	0.0	1190	132	No	No
Selenium (tr)	10	0.0	20	5	Yes	Yes
Silver (tr)	0.0	0.0	25.0	--	No	--
Zinc (tr)	0.0	0.0	304	304	No	No
Chlorine (TRC)	0.0	0.0	19	11	No	No
Chloride	NR	NR	860000	230000	No	No
Fluoride	0.0	0.0	--	4000	--	Yes
Sulfate	60000	0.0	--	750000	--	Yes
Nitrite as N	NR	NR	--	1000	--	No
Nitrate as N	40	0.0	--	10000	--	Yes
Phosphorous as P	300	0.0	--	100[4]	--	Yes
pH (s.u.)	8.00– 8.50		7.0 – 9.0		Yes	

[4] State WQS is a guideline only, so monitoring only will be required.
NE- reported as not expected to be present
NR- not reported in application

note: Boron was reported in the permit application at 1000 ug/L (daily maximum) but there are no applicable WQS or EPA Criteria.

Limits for Outfall 001

Uncontaminated (non-oily) wastewater discharges from Outfall 001 will meet the effluent limitations shown in Table 16. The limits are based on numeric and narrative water quality standards. Proposed monitoring requirements for Outfall 001 are shown in Table 17.

Proposed Numeric Effluent Limitations (Outfall 001)

TABLE 16

Pollutant	Effluent Limit (ug/L)		Basis for Effluent Limitation
	Daily Maximum	Average Daily	
Flow, MGD	0.095	NA	Permit Application, DEIS
Oil and Grease	15	NA	Narrative Tribal WQS
Biochemical Oxygen Demand 5-Day (mg/L)	45	30	Narrative Tribal WQS
Total Suspended Solids (mg/L)	45	30	Narrative Tribal WQS
Phenol	NA	300	EPA 304(a) Criterion, State WQS, Tribal WQS
Iron (tr)	NA	300	EPA 304(a) Criterion, Tribal WQS
Manganese (tr)	NA	50	EPA 304(a) Criterion, Tribal WQS
Selenium (tr)	20	5	EPA 304(a) Criterion, State WQS, Tribal WQS
Sulfate	NA	750000	State WQS
Nitrate as N	NA	10000	EPA 304(a) Criterion, Tribal WQS
Phosphorous as P	MON	MON	State WQS
pH (s.u.)	7.0– 9.0		State WQS, Tribal WQS
Dissolved Oxygen (mg/L)	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		Tribal WQS

MON- Monitor Only

The discharge from Outfall 001 shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

Proposed Effluent Monitoring Requirements (Outfall 001)

TABLE 17

Pollutant	Monitoring Frequency	Sample Type
Flow, MGD	Daily	Continuous, Recorder
Oil and Grease, mg/L	Daily	Visual[1]
Biochemical Oxygen Demand 5-Day, mg/L	Monthly	Composite
Total Suspended Solids, mg/L	Monthly	Composite
Ammonia as N, mg/L	Quarterly	Composite
Phenol, ug/L	Quarterly	Composite
Iron (tr), ug/L	Quarterly	Composite
Manganese (tr), ug/L	Quarterly	Composite
Selenium (tr), ug/L	Quarterly	Composite
Fluoride, ug/L	Quarterly	Composite
Sulfate, ug/L	Quarterly	Composite
Nitrate as N, ug/L	Quarterly	Composite
Phosphorous as P, ug/L	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Dissolved Oxygen, mg/L	Daily	Grab

[1] A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

Best Management Practices (BMPs)

In addition to the numeric effluent limits and monitoring requirements for process and contaminated stormwater discharges (Outfall 002 and 002a) and uncontaminated stormwater (Outfall 001), additional requirements will be added to the permit for control of pollutants that are likely to be present in the stormwater systems at the proposed facility.

The permittee will be required to develop and implement a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will identify members of the facility's pollution prevention team, contain a site description, a summary of potential pollutant sources and pollutants, and stormwater controls that will be implemented at the site. Specific Best Management Practices (BMPs) will be identified by the permittee in the SWPPP. Examples of appropriate BMPs for this facility include good housekeeping, eliminating or minimizing exposure, preventative maintenance, spill prevention, runoff management, routine facility inspections, and employee training programs, as well as any more stringent measures necessary to meet the water quality standards provisions of the permit. The SWPPP must remain compliant with relevant State, Tribal and local regulations.

There are two distinct stormwater systems proposed for the facility, one to manage oily or contaminated stormwater from process areas and the other for uncontaminated stormwater. For the SWPPP, the permit will require the permittee to evaluate both stormwater systems, uncontaminated and contaminated, for appropriate controls and actions that will minimize pollutants discharged via stormwater from the facility.

The SWPP must be completed and the contents approved for compliance with the terms of this permit by the EPA Region 8 Stormwater Program Coordinator.

(POTENTIAL) Sanitary Wastewater (Outfall 003)

Technology Limitations (BPJ)

Technology requirements for sanitary wastewater discharges (POTWs) are found in 40 CFR Part 133, Secondary Treatment Requirements. The proposed package plant to treat sanitary wastewater is not a POTW but will treat the sanitary wastewater in a similar manner and should be capable of meeting the POTW technology standards. The following technology requirements (40 CFR 133.102) in Table 18 are applied as Best Professional Judgment (BPJ) to discharges from Outfall 003:

TABLE 18 -Effluent Limitation

Pollutant	7-Day Average (mg/L)	Average Daily (mg/L)
BOD_5	45	30
TSS	45	30
pH		6.0 to 9.0

Percentage Removal Requirements

85% BOD_5
85% TSS

Water Quality Based Effluent Limitations

Numeric and Narrative Water Quality Standards and Criteria

Water quality based effluent limits are evaluated for the discharges of treated sanitary wastewater from Outfall 003. The NPDES Permit application for this facility did not include information on the potential sanitary wastewater discharge due to recent design changes for the proposed project that are described under Alternative 4 of the DEIS. Therefore estimates of pollutants present in the discharge were obtained from similar types of sanitary wastewater treatment facilities and the potable water supply information provided in the DEIS. A reasonable potential analysis for pollutants expected to be in the discharge from Outfall 003 is presented in Table 19.

TABLE 19 -Reasonable Potential Analysis (Sanitary Wastewater)
(in ug/L unless otherwise indicated)

Pollutant	NPDES Permit Application		Applicable WQS		Reasonable Potential	
	Daily Maximum	Average Daily	Acute	Chronic	Acute	Chronic
Ammonia as N (mg/L)	NR	NR	3.2	1.1	Yes	Yes
Barium (tr)	NR	NR	--	1000	--	No
Aluminum (tr)	NR	NR	750	87	No	No
Cadmium (tr)	NR	NR	6.5	0.61	No	No
Chromium (III) (tr)	NR	NR	4430	212	No	No
Chromium (VI)	NR	NR	16	11	No	No
Copper (tr)	NR	NR	39.4	23.8	No	No
Iron (tr)	NR	NR	--	300	--	Yes
Manganese (tr)	NR	NR	--	50	--	Yes
Lead (tr)	NR	NR	331	12.9	No	No
Mercury (T)	NR	NR	1.4	0.012	No	No
Nickel (tr)	NR	NR	1190	132	No	No
Selenium (tr)	NR	NR	20	5	Yes	Yes
Silver (tr)	NR	NR	25.0	--	No	--
Zinc (tr)	NR	NR	304	304	No	No
Chlorine (TRC)	NR	NR	19	11	Yes	Yes
Chloride	NR	NR	860000	230000	No	No
Fluoride	NR	NR	--	4000	--	No
Sulfate	NR	NR	--	750000	--	Yes
Nitrite as N	NR	NR	--	1000	--	Yes
Nitrate as N	NR	NR	--	10000	--	Yes
Phosphorous as P	NR	NR	--	100[1]	--	Yes
pH (s.u.)	NR		NR		Yes	

[1]State WQS is a guideline only, so monitoring only will be required.
NR- No information provided in application.

Narrative water quality standards (dissolved oxygen, whole effluent toxicity, etc.) considered in establishing effluent limitations would also be the same as described for discharges through Outfall 002 above, however toxicity is not reasonably expected to be present in the sanitary wastewater discharge.

Proposed effluent limitations and monitoring requirements for Outfall 003 are presented in Tables 20 and 21 respectively.

(POTENTIAL) Proposed Numeric Effluent Limitations (Outfall 003)

TABLE 20

Pollutant	Effluent Limit (ug/L)			Basis for Effluent Limitation
	Daily Maximum	7-Day Average	Daily Average	
Flow, MGD	0.007	NA	0.005	DEIS
Biochemical Oxygen Demand 5-Day (mg/L)	NA	45	30	BPJ (40 CFR 133)
Total Suspended Solids (mg/L)	NA	45	30	BPJ (40 CFR 133)
Ammonia as N (mg/L)	3.2	NA	1.1	EPA 304(a) Criterion, State WQS
Total Residual Chlorine	19	NA	11	EPA 304(a) Criterion, State WQS
Iron (tr)	NA	NA	300	EPA 304(a) Criterion, Tribal WQS
Manganese (tr)	NA	NA	50	EPA 304(a) Criterion, Tribal WQS
Selenium (tr)	20	NA	5	EPA 304(a) Criterion, State WQS, Tribal WQS
Sulfate	NA	NA	750000	State WQS
Nitrite as N	NA	NA	1000	Tribal WQS
Nitrate as N	NA	NA	10000	EPA 304(a) Criterion, Tribal WQS
pH (s.u.)	7.0– 9.0			State WQS, Tribal WQS
Dissolved Oxygen (mg/L)	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)			Tribal WQS

The discharge from Outfall 003 shall be free from floating debris, oil, scum, and other floating materials attributable to municipal, industrial, or other discharges or agricultural practices in sufficient amounts to be unsightly or deleterious.

Percentage Removal Requirements (TSS and BOD_5 Limitation): In addition to the concentration limits for total suspended solids and BOD_5 indicated above, the arithmetic mean of the concentration for effluent samples collected in a 30-day consecutive period shall not exceed 15 percent of the arithmetic mean of the concentration for influent samples collected at approximately the same times during the same period (85 percent removal).

(POTENTIAL) Proposed Effluent Monitoring Requirements (Outfall 003)

TABLE 21

Pollutant	Monitoring Frequency	Sample Type
Flow, MGD	Daily	Continuous, Recorder
Biochemical Oxygen Demand 5-Day, mg/L a/	Monthly	Composite
Total Suspended Solids, mg/L a/	Monthly	Composite
Total Residual Chlorine, ug/L	Daily	Grab
Ammonia as N, mg/L	Quarterly	Composite
Iron (tr), ug/L	Quarterly	Composite
Manganese (tr), ug/L	Quarterly	Composite
Selenium (tr), ug/L	Quarterly	Composite
Sulfate, ug/L	Quarterly	Composite
Nitrite as N, ug/L	Quarterly	Composite
Nitrate as N, ug/L	Quarterly	Composite
Phosphorous as P, ug/L	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Dissolved Oxygen, mg/L	Daily	Grab

a/ In addition to monitoring the final discharge, influent samples shall be taken and analyzed for this constituent at the same frequency as required for this constituent in the discharge.

Solids

Solids generated in the process wastewater treatment unit processes and other solid and hazardous wastes associated with the refinery operations will be managed in accordance with all applicable laws.

Refinery unit processes will generate both listed and characteristic hazardous wastes under RCRA Part 261.

Proposed Alternative DEIS

Under the proposed alternative in the DEIS, the facility would be classified as a Treatment, Storage, and Disposal Facility (TSDF) under RCRA. . The wastewater treatment facility would be designed to meet all RCRA construction requirements for a TSDF. Wastewater management units (ponds, tanks, etc.) would generate sludges that are either listed or characteristic hazardous wastes. Solids removed will be containerized and sent to a third party off-site facility that handles hazardous waste. All treatment storage and disposal of hazardous wastes would comply with 40 CFR Part 268.

Alternative 4 DEIS

Under Alternative 4 of the DEIS, The MHA Nation Clean Fuels Refinery is expected to maintain a status as a Large Quantity Generator under RCRA. All hazardous waste generated at the refinery will be managed in accordance with RCRA regulations. The wastewater treatment unit would be designed to meet the RCRA definitions at 40 CFR 260.10 for wastewater treatment unit, tank, and tank system. The wastewater unit will also meet the requirements under 40 CFR 261.31(b)(2) for aggressive biological treatment. As long as the sludges remain in the wastewater treatment system, they would be exempt from listing under F037.

Sludges generated and removed from the wastewater treatment processes (API Separator, DAF, biological treatment sludge) via the sludge thickening process, possibly a centrifuge with a solvent wash (naptha) will be managed as hazardous waste. Solids removed will be containerized and sent to a third party off-site facility that handles hazardous waste. All disposal of hazardous wastes would comply with 40 CFR Part 268.

In addition, the package sanitary wastewater treatment plant would generate biological sludges that would be disposed of in accordance with 40 CFR Part 503 regulations for biosolids.

Reporting Requirements

Since this facility is classified as a major discharger, monthly reporting requirements will apply. Monitoring results from the previous month's discharge will be required to be reported on a standard Discharge Monitoring Report (DMR) Form, *EPA 3320-1*.

Bruce Kent, USEPA Region VIII
6/16/2006

Comments and responses to comments;

BIA and EPA announced the availability of the Draft EIS, including the NPDES permit in the Federal Register (Volume 71, Number 125, Pages 37092-37093), in press releases and in mailed announcements on June 29, 2006. BIA and EPA held seven public hearings on the Draft EIS including the NPDES permit in Twin Buttes, White Shield, Parshall, Mandaree, New Town, and Makoti, North Dakota between July 31 and August 5, 2006. Written comments were accepted until September 14, 2006.

All comments and responses to those comments can be reviewed in the "Response to Comments on the Draft Environmental Impact Statement for the Mandan, Hidatsa, and Arikara Nation's Proposed Clean Fuels Refinery Project". The NPDES specific comments can be found in section D.3 of the Response to Comments in Appendix E of the FEIS.

In addition the NPDES permit specific comments are attached to the NPDES permit fact sheet.

EPA is issuing the NPDES permit with an effective date 30 days after issuance. EPA regulations at 40 C.F.R. 124.19 provide that within 30 days of the final decision on the NPDES permit any person who filed comments on the draft permit or participated in the public hearings may petition the Environmental Appeals Board. 40 C.F.R. 124.19 states in part "…The petition shall include a statement of the reasons supporting that review, including a demonstration that any issues being raised were raised during the public comment period (including any public hearing) to the extent required by these regulations and when appropriate, a showing that the condition in question is based on:(1) A finding of fact or conclusion of law which is clearly erroneous, or (2) An exercise of discretion or an important policy consideration which the Environmental Appeals Board should, in its discretion, review."

Questions should be addressed to:

Robert B. Brobst P.E.
EPA Region 8
TAT questions
Wastewater Unit (8P-W-WW)
1595 Wynkoop Street
Denver, Colorado 80202

Or e-mail Brobst.bob@epa.gov

Robert B. Brobst, P.E.
Wastewater Unit

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
999 18TH STREET, SUITE 300
DENVER, COLORADO 80202-2466

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. §1251 et seq; the "Act"),

the MHA Nation Clean Fuels Refinery

is authorized to discharge from its wastewater treatment facilities located in the NW 1/4 of Section 19, Township 152N, Range 87W, Fort Berthold Indian Reservation, Ward County, North Dakota

to wetlands tributary to the East Fork of Shell Creek,

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit.

This permit shall become effective **to be determined upon issuance**

This permit and the authorization to discharge shall expire at midnight, **to be determined upon issuance**

Signed this day of

____
Authorized Permitting Official

Stephen S. Tuber, Assistant Regional Administrator
Office of Partnerships and Regulatory Assistance
Title

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1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1.1. Definitions.

The *30-day (and monthly) average*, other than for fecal coliform bacteria and total coliform bacteria, is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria and total coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.

The *7-day (and weekly) average*, other than for fecal coliform bacteria and total coliform bacteria, is the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria and total coliform bacteria. The 7-day and weekly averages are applicable only to those effluent characteristics for which there are 7-day average effluent limitations. The calendar week, which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.

Daily Maximum (*Daily Max.*) is the maximum measured value for a pollutant discharged during a calendar day or any 24-hour period that reasonably represents a calendar day for purposes of sampling. For pollutants with daily maximum limitations expressed in units of mass (e.g., kilograms, pounds), the daily maximum is calculated as the total mass of pollutant discharged over the calendar day or representative 24-hour period. For pollutants with limitations expressed in other units of measurement (e.g milligrams/liter, parts per billion), the daily maximum is calculated as the average of all measurements of the pollutant over the calendar day or representative 24-hour period. If only one measurement or sample is taken during a calendar day or representative 24-hour period, the single measured value for a pollutant will be considered the daily maximum measurement for that calendar day or representative 24-hour period.

Daily Minimum (*Daily Min*.) is the minimum value allowable in any single sample or instantaneous measurement collected during the course of a day.

Mean (7-day mean, 30-day mean) is the arithmetic mean value of all results for samples collected during either a seven day period or calendar week whichever is applicable, or a thirty day period or a calendar month whichever is applicable.

Grab sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.

Instantaneous measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.

Composite samples shall be flow proportioned. The composite sample shall, at a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours, nor more than twenty-four (24) hours. Acceptable methods for the preparation of composite samples are as follows:

a. Constant time interval between samples, sample volume proportional to flow rate at the time of sampling;

b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time of the first sample was collected may be used;

c. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,

d. Continuous collection of sample with sample collection rate proportional to flow rate.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

Director means the Regional Administrator of EPA Region 8 or an authorized representative.

EPA means the United States Environmental Protection Agency.

Storm Water or *Stormwater* means storm water runoff, snow melt runoff, and surface runoff and drainage.

CWA means the Clean Water Act (formerly referred to as either the Federal Water Pollution Act or the Federal Water Pollution Control Act Amendments of 1972), Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117, and Pub. L. 100-4. In this permit the CWA may be referred to as "the Act".

Sewage Sludge is any solid, semi-solid or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary or advanced wastewater treatment processes; and a material derived from sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works.

Whole Effluent Toxicity, Acute toxicity occurs when 50 percent or more mortality is observed for either species (see Part 1.3.) at any effluent concentration. Mortality in the control must simultaneously be 10 percent or less for the effluent results to be considered valid. Chronic toxicity occurs when during a chronic toxicity test, the 25% inhibition concentration (IC_{25}) calculated on the basis of test organism survival and growth or survival and reproduction, is less than or equal to 100% effluent concentration.

Section 313 Water Priority Chemicals means a chemical or chemical categories which: 1) are listed at 40 CFR 372.65 pursuant to Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986); 2) are present at or above threshold levels at a facility subject of EPCRA Section 313 reporting requirements; and 3) that meet at least one of the following criteria: (i) are listed in Appendix D of 40 CFR 122 on either Table II (organic toxic pollutants), Table III (certain metals, cyanides, and phenols) or Table V (certain toxic pollutants and hazardous substances); (ii)are listed as a hazardous substance pursuant to section 311(b)(2)(A) of the CWA at 40 CFR 116.4; or (iii) are pollutants for which EPA has published acute or chronic water quality criteria.

1.2. Description of Discharge Point(s). The authorization to discharge provided under this permit is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under an NPDES permit is a violation of the Clean Water Act and could subject the person(s) responsible for such discharge to penalties under Section 309 of the Act.

Outfall Serial Number(s)	Description of Discharge Point(s)
001	Any discharge of uncontaminated stormwater from the Evaporation Ponds to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47^{o}58’25” Latitude 101^{o}52’11”
002	Any discharge from the Final Effluent Holding Ponds or the Final Release Tanks to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47^{o}58’29” Latitude 101^{o}52’9”
002a	Any discharge from the Stormwater Final Release Tanks to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47^{o}58’29” Latitude 101^{o}52’9”
003	Any discharge from the Sanitary Wastewater Treatment Plant to the wetland swale located in the NW1/4 Section 19, Township 152 North, Range 87 West. Longitude 47^{o}58’??” Latitude 101^{o}52’??”

1.3. Specific Limitations and Self-Monitoring Requirements

1.3.1. Effluent Limitations - Outfall 001. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Stormwater Evaporation Ponds by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, mgd	NA	NA	0.08
Oil and Grease, mg/L	NA	NA	15
Biochemical Oxygen Demand (5-day), mg/L	30	45	N/A
Total Suspended Solids, mg/L	30	45	N/A
Phenol, ug/L	300	N/A	N/A
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Selenium (tr), ug/L	5	N/A	20
Sulfate, mg/L	750	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		
The pH of the discharge shall not be less than 7.0 s.u.or greater than 9.0 s.u.at any time.			

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 001 shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

1.3.2 Self-Monitoring Requirements - Outfall 001. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), mg/L	Monthly	Composite
Total Suspended Solids, mg/L	Monthly	Composite
Phenol, ug/L	Quarterly	Composite
Ammonia as N, mg/L	Quarterly	Composite
Selenium (tr), ug/L	Quarterly	Composite
Manganese (tr), ug/L	Quarterly	Composite
Iron (tr), ug/L	Quarterly	Composite
Fluoride, mg/L	Quarterly	Composite
Sulfate, mg/L	Quarterly	Composite
Nitrate as N, mg/L	Quarterly	Composite
Total Phosphorous as P, mg/L	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Oil and grease, visual c/	Daily	Visual c/
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

tr – total recoverable

1.3.3. Effluent Limitations - Outfall 002. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Final Effluent Holding Ponds or Effluent Final Release Tanks by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, mgd	0.025	N/A	0.05
Biochemical Oxygen Demand (5-day), lbs./day	43	N/A	81
Chemical Oxygen Demand, lbs./day	255	N/A	500
Total Suspended Solids, lbs./day	35	N/A	55
Oil and Grease, lbs./day	13.7	N/A	25.4
Benzene, ug/L	2.2	N/A	NA
Ethyl benzene, ug/L	530	N/A	NA
Toluene, ug/L	1300	N/A	NA
Phenol, ug/L	300	N/A	NA
Phenolic Compounds, lbs./day	0.29	N/A	0.59
Hydrogen Sulfide, ug/L	2.0	N/A	NA
Ammonia as N, mg/L	1.1	N/A	3.2
Barium (tr), ug/L	1000	N/A	NA
Aluminum (tr), ug/L	87	N/A	750
Chromium (Total), lbs./day	0.035	N/A	1.22
Chromium (VI) , ug/L	11	N/A	16
Chromium (VI), lbs/day	0.0018	N/A	0.0067
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Mercury (Total), ug/L	0.0012	N/A	1.4
Nickel (tr), ug/L	132	N/A	1190
Selenium (tr), ug/L	5	N/A	20
Chloride, mg/L	230	N/A	860
Fluoride, mg/L	4.0	N/A	N/A
Sulfate, mg/L	750	N/A	N/A
Nitrite as N, mg/L	1.0	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Whole Effluent Toxicity, acute	LC_{50} > 100%		
Whole Effluent Toxicity, chronic	IC_{25} > 100%		
The pH of the discharge shall not be less than 7.0 s.u. or greater than 9.0 s.u. at any time.			

Effluent Characteristic	Effluent Limitation
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 002 shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

1.3.4 Self-Monitoring Requirements - Outfall 002. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), lbs./day	2X/Week	Composite
Chemical Oxygen Demand, lbs./day	Monthly	Composite
Total Suspended Solids, lbs./day	2X/Week	Composite
Oil and Grease, lbs/day	Weekly	Grab
Benzene, ug/L	Monthly	Grab
Ethyl benzene, ug/L	Monthly	Grab
Toluene, ug/L	Monthly	Grab
Phenol, ug/L	Monthly	Grab
Phenolic Compounds, lbs./day	Monthly	Grab
Hydrogen Sulfide, ug/L	Weekly	Grab
Ammonia as N, mg/L	Weekly	Composite
Barium (tr), ug/L	Monthly	Composite
Aluminum (tr), ug/L	Monthly	Composite

Effluent Characteristic	Frequency	Sample Type a/
Chromium (Total), lbs./day	Monthly	Composite
Chromium (VI), ug/L	Monthly	Grab
Chromium (VI), lbs./day	Monthly	Grab
Iron (tr), ug/L	Monthly	Composite
Manganese (tr), ug/L	Monthly	Composite
Mercury (Total), ug/L	Monthly	Composite
Nickel (tr), ug/L	Monthly	Composite
Selenium (tr), ug/L	Monthly	Composite
Chloride, mg/L	Monthly	Composite
Fluoride, mg/L	Monthly	Composite
Sulfate, mg/L	Monthly	Composite
Nitrite as N, mg/L	Monthly	Composite
Nitrate as N, mg/L	Monthly	Composite
Total Phosphorous as P, mg/L	Monthly	Composite
Whole Effluent Toxicity, acute	Quarterly	Grab
Whole Effluent Toxicity, chronic	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Temperature, ^{o}C	Daily	Grab
Oil and grease, visual c/	Daily	Grab
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

tr - total recoverable

1.3.5 Additional Self-Monitoring Requirements - Outfall 002.

Additional Monitoring Requirement for Outfall 002:

Approximately 90 days and 270 days after startup of the facility, monitoring shall be required for:

Total Metals – Table III §40CFR 122 Appendix D
Volatile, acid, and base/neutral compounds – Table II §40CFR 122 Appendix D

1.3.6 Effluent Limitations - Outfall 002a. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Stormwater Final Release Tanks by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, mgd	0.0065	N/A	0.027
Oil and Grease, mg/L	15	N/A	15
Total Organic Carbon, mg/L	110	N/A	110
Benzene, ug/L	2.2	N/A	NA
Ethyl benzene, ug/L	530	N/A	NA
Toluene, ug/L	1300	N/A	NA
Phenol, ug/L	300	N/A	NA
Hydrogen Sulfide, ug/L	2.0	N/A	NA
Ammonia as N, mg/L	1.1	N/A	3.2
Barium (tr), ug/L	1000	N/A	NA
Aluminum (tr), ug/L	87	N/A	750
Chromium (VI), ug/L	11	N/A	16
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Mercury (Total), ug/L	0.0012	N/A	1.4
Nickel (tr), ug/L	132	N/A	1190
Selenium (tr), ug/L	5	N/A	20
Chloride, mg/L	230	N/A	860
Fluoride, mg/L	4.0	N/A	N/A
Sulfate, mg/L	750	N/A	N/A
Nitrite as N, mg/L	1.0	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Whole Effluent Toxicity, acute	LC_{50} > 100%		
Whole Effluent Toxicity, chronic	IC_{25} > 100%		
The pH of the discharge shall not be less than 7.0 s.u. or greater than 9.0 s.u. at any time.			
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 002a shall be free from oil and grease attributable to wastewater, which causes a visible film or sheen upon the waters or any discoloration of the surface of adjoining shoreline or causes a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines or prevents classified uses of such waters.

1.3.7 Self-Monitoring Requirements - Outfall 002a. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), mg/L	2X/Week	Composite
Total Organic Carbon, mg/L	Monthly	Composite
Total Suspended Solids, mg/L	2X/Week	Composite
Benzene, ug/L	Monthly	Grab
Ethyl benzene, ug/L	Monthly	Grab
Toluene, ug/L	Monthly	Grab
Phenol, ug/L	Monthly	Grab
Hydrogen Sulfide, ug/L	Weekly	Grab
Ammonia as N, mg/L	Weekly	Composite
Barium (tr), ug/L	Monthly	Composite
Aluminum (tr), ug/L	Monthly	Composite
Chromium (VI), ug/L	Monthly	Grab
Iron (tr), ug/L	Monthly	Composite
Manganese (tr), ug/L	Monthly	Composite
Mercury (Total), ug/L	Monthly	Composite
Nickel (tr), ug/L	Monthly	Composite
Selenium (tr), ug/L	Monthly	Composite
Chloride, mg/L	Monthly	Composite
Fluoride, mg/L	Monthly	Composite

Effluent Characteristic	Frequency	Sample Type a/
Sulfate, mg/L	Monthly	Composite
Nitrite as N, mg/L	Monthly	Composite
Nitrate as N, mg/L	Monthly	Composite
Total Phosphorous as P, mg/L	Monthly	Composite
Whole Effluent Toxicity, acute	Quarterly	Grab
Whole Effluent Toxicity, chronic	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Temperature, ^{o}C	Daily	Grab
Oil and Grease, visual c/	Daily	Grab
Oil and Grease, mg/L	Weekly	Grab
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ A daily visual observation is required. If a visible sheen is detected, a grab sample shall be taken and analyzed immediately. The concentration of oil and grease shall not exceed 15 mg/L in any sample.

tr - Total recoverable

1.3.8 Effluent Limitations - Outfall 003. Effective immediately and lasting through the life of this permit, the quality of effluent discharged from the Sanitary Wastewater Treatment Plant by the facility shall, as a minimum, meet the limitations as set forth below:

Effluent Characteristic	Effluent Limitation 30-Day Average a/	7-Day Average a/	Daily Maximum a/
Flow, MGD	NA	NA	0.08
Biochemical Oxygen Demand (5-day), mg/L	30	45	N/A
Total Suspended Solids, mg/L	30	45	N/A
Ammonia as N, mg/L	1.1	N/A	3.2
Total Residual Chlorine, ug/L	11	N/A	19
Iron (tr), ug/L	300	N/A	N/A
Manganese (tr), ug/L	50	N/A	N/A
Selenium (tr), ug/L	5	N/A	20
Sulfate, mg/L	750	N/A	N/A
Nitrite as N, mg/L	1.0	N/A	N/A
Nitrate as N, mg/L	10	N/A	N/A
Dissolved Oxygen, mg/L:	April 1 – Sept 30 8.0 (1-day min.) 9.5 (7-day mean) 6.5 (30-day mean) Oct 1 – March 31 4.0 (1-day min.) 5.0 (7-day mean) 6.5 (30-day mean)		
The pH of the discharge shall not be less than 7.0 s.u.or greater than 9.0 s.u.at any time.			

a/ See Definitions, Part 1.1., for definition of terms.

tr – total recoverable

The discharge from Outfall 003 shall be free from floating debris, oil, scum, and other floating materials attributable to municipal, industrial, or other discharges or agricultural practices in sufficient amounts to be unsightly or deleterious.

Percentage Removal Requirements (TSS and BOD_5 Limitation): In addition to the concentration limits for total suspended solids and BOD_5 indicated above, the arithmetic mean of the concentration for effluent samples collected in a 30-day consecutive period shall not exceed 15 percent of the arithmetic mean of the concentration for influent samples collected at approximately the same times during the same period (85 percent removal).

1.3.9 Self-Monitoring Requirements - Outfall 003. As a minimum, upon the effective date of this permit, the following constituents shall be monitored at the frequency and with the type of measurement indicated; samples or measurements shall be representative of the volume and nature of the monitored discharge. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, mgd b/	Daily	Continuous, Recorder
Biochemical Oxygen Demand (5-day), mg/L c/	Monthly	Composite
Total Suspended Solids, mg/L c/	Monthly	Composite
Ammonia as N, mg/L	Quarterly	Composite
Total Residual Chlorine, ug/L	Daily	Grab
Selenium (tr), ug/L	Quarterly	Composite
Manganese (tr), ug/L	Quarterly	Composite
Iron (tr), ug/L	Quarterly	Composite
Sulfate, mg/L	Quarterly	Composite
Nitrite as N, mg/L	Quarterly	Composite
Nitrate as N, mg/L	Quarterly	Composite
Total Phosphorous as P, mg/L	Quarterly	Composite
pH (s.u.)	Daily	Grab or Continuous
Dissolved Oxygen, mg/L	Daily	Grab

a/ See Definitions, Part 1.1., for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate (in million gallons per day) during the reporting period and the maximum flow rate observed (in mgd) shall be reported.

c/ In addition to monitoring the final discharge, influent samples shall be taken and analyzed for this constituent at the same frequency as required for this constituent in the discharge.

tr – total recoverable

1.3.10 Whole Effluent Toxicity Testing - Chronic Toxicity

Starting in the first full quarter after the effective date of this permit, the permittee shall, at least once each quarter, conduct chronic short term toxicity tests on the final effluent from Outfalls 002 and 002a. There shall not be chronic toxicity in 100 percent concentration of the final effluent.

The monitoring frequency shall be quarterly. Quarterly samples shall be collected on a two day progression; i.e., if the first quarterly sample is on a Monday, during the next quarter, the sampling shall begin on a Wednesday. If chronic toxicity is detected, an additional test shall be conducted within two weeks of the date of when the permittee learned of the test failure. The need for any additional samples shall be determined by the permit issuing authority.

The chronic toxicity tests shall be conducted in accordance with the procedures set out in the latest revision of "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", EPA 821-R-02-013, Rev. Oct. 2002. Test species shall consist of *Ceriodaphnia dubia* and *Pimephales promelas*. A multi dilution test consisting of five concentrations and a control is required. If test acceptability criteria is not met for control survival, growth, or reproduction, the test shall be considered invalid. Chronic toxicity occurs when, during a chronic toxicity test, the 25% inhibition concentration (IC_{25}) calculated on the basis of test organism survival and growth or survival and reproduction, is less than or equal to 100% effluent concentration. The tests shall be done using effluent concentrations of 100%, 50%, 25%, 12.5%, 6.25%, and 0% (control).

Test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the calendar period during which the whole effluent test was run (e.g. results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining reports submitted with DMRs due each July 28, October 28, and January 28). Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with the latest revision of the "Region VIII Guidance for Chronic Whole Effluent Reporting" (Appendix C of Region VIII NPDES Whole Effluent Toxics Control Program, August 1997), and shall include all the physical and chemical testing as specified.

If the results for one year (four consecutive quarters) of whole effluent testing indicate no chronic toxicity, the permittee may request the permit issuing authority to allow the permittee to reduce testing frequency, and/or reduce testing to one species on an alternating basis, and/or modify testing to the acute test program. The permit issuing authority may approve, partially approve, or deny the request based on results and other available information. If approval is given, the modification will take place without a public notice.

1.3.11 Whole Effluent Toxicity Testing - Acute Toxicity

Starting in the first full quarter after the effective date of this permit, the permittee shall conduct quarterly acute static replacement toxicity tests on an effluent sample of the discharge from Outfalls 002 and 002a. The effluent shall be obtained from the sample required for the chronic toxicity tests as noted in Part 1.3.10. of this permit.

The replacement static toxicity tests shall be conducted in accordance with the procedures set out in the latest revision of “Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms”, EPA 821-R-02-012 (Rev Oct. 2002). The permittee shall conduct an acute 48-hour static toxicity test using *Ceriodaphnia dubia* an acute 96-hour static toxicity test using *Pimephales promelas*. The tests shall be done using effluent concentrations of 100%, 75%, 50%, 25%, 12.5%, 6.25% and 0% (control).

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration. If more than 10% control mortality occurs, the test shall be repeated until satisfactory control survival is achieved. If acute toxicity occurs, an additional test shall be conducted within two weeks of the date of when the permittee learned of the test failure. If only one species fails, retesting may be limited to this species. Should toxicity occur in the second test, testing shall occur once a month until further notified by the permit issuing authority.

Quarterly test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the reporting calendar quarter (e.g., whole effluent results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining reports submitted with DMRs due each July 28, October 28, and January 28). Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with the latest revision of the "Region VIII Guidance for Acute Whole Effluent Reporting" (Appendix C of Region VIII NPDES Whole Effluent Toxics Control Program, August 1997), and shall include all chemical and physical data as specified.

If the results for four consecutive quarters of testing indicate no acute toxicity, the permittee may request the permit issuing authority to allow a reduction to quarterly acute toxicity testing on only one species on an alternating basis. The permit issuing authority may approve or deny the request based on the results and other available information without an additional public notice. If the request is approved, the test procedures are to be the same as specified above for the test species. If approval is given, the modification will take place without a public notice.

1.3.12 Toxicity Identification Evaluation (TIE)/Toxicity Reduction Evaluation (TRE)

Should acute toxicity and/or chronic toxicity be detected in two (2) consecutive tests of the permittee’s discharge, a TIE-TRE shall be undertaken by the permittee to establish the cause of the toxicity, locate the source(s) of the toxicity, and develop control of or treatment of the toxicity. Failure to initiate, or conduct an adequate TIE-TRE, or delays in the conduct of such tests, shall not be considered a justification for non-compliance with the whole effluent toxicity limitations contained in Part 1.3.3 and 1.3.6 of this permit. A TRE plan needs to be submitted to the permitting authority within 45 days after confirmation of the continuance of the effluent toxicity.

1.4 Stormwater Requirements

1.4.1 Storm Water Pollution Prevention Plans

The permittee shall continue to implement all existing best management practices (BMP) that may affect the quality of storm water runoff unless those BMPs are modified or replaced by the storm water pollution prevention plan required below. The permittee shall develop a storm water pollution prevention plan for the MHA Nation Clean Fuels Refinery site. The storm water pollution prevention plan shall be prepared in accordance with good engineering practices and in accordance with the factors outlined in 40 CFR 125.3(d)(2) or (3) as appropriate. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. The facility must implement the provisions of the storm water pollution prevention plan required under this Part as a condition of this permit.

1.4.1.1 Deadlines for Plan Preparation and Compliance.

The plan for a storm water discharge:

1.4.1.2 Shall be prepared and submitted to the permit issuing authority for review and approval no later than six months after the effective date of this permit (and updated at a minimum of every two years or more frequently if deemed appropriate). The plan shall be submitted to the U.S. EPA Region 8 Stormwater Program at the following address:

Greg Davis
EPA Region 8 Stormwater Program Coordinator
Mailcode: 8P-W-P
999 18th Street, Suite 200
Denver, CO 80202-2466

A copy of the plan shall also be submitted to the Three Affiliated Tribes Environmental Department at the following address:

Environmental Division
Three Affiliated Tribes
204 West Main
New Town, ND 58763

1.4.1.3 Shall provide for implementation and compliance with the terms of the plan on or before six months after the plan is approved by the U.S. EPA Region 8 Stormwater Program.

1.4.1.5 Upon a showing of good cause, the permit issuing authority may establish a later date in writing for preparation, implementation, and compliance with the plan.

1.4.1.6 Except as provided in Part 1.4.1.3 above, the plan shall be implemented in accordance with the approval of the permit issuing authority no later than one year after the effective date of this permit unless the permit issuing authority approves a later date.

1.4.1.7 The permit issuing authority may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provisions of the permit which are not being met by the plan, and identify which provisions of the plan require modifications in order to meet the minimum requirements of this Part. Within 30 days of such notification from the permit issuing authority, (or as otherwise provided by the permit issuing authority), the permittee shall make the required changes to the plan and shall submit to the permit issuing authority a written certification that the requested changes have been made.

1.4.1.8 Keeping Plans Current - The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the waters of the United States or if the storm water pollution prevention plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under Part 1.4.1.9.2 (description of potential pollutant sources) of this permit, or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity. Amendments to the plan shall be submitted for review to the permit issuing authority in the same manner as Part 1.4.1.2(above).

1.4.1.9 Contents of Plan - The plan shall include, at a minimum, the following:

1.4.1.9.1 Pollution Prevention Team - The plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

1.4.1.9.2 Description of Potential Pollutant Sources - The plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources. The plan shall include, at a minimum:

1.4.1.9.3 Inventory of Exposed Materials - An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of 3 years prior to the date of the issuance of this permit and the present; method and location of on-site storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of 3 years prior to the date of the issuance of this permit and the present; the location and a description of existing structural and non-structural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives. Note: The limitation of three (3) years prior to the date of the issuance of this permit does not apply to radioactive materials.

1.4.1.9.4 Drainage A site map indicating an outline of the portions of the drainage area of each storm water outfall that are within the facility boundaries, each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, locations where major spills or leaks identified under Part 1.4.1.9.6 (Spills and Leaks) of this permit have occurred, and the locations of the following activities where such activities are exposed to precipitation: fueling stations, vehicle and equipment maintenance and/or cleaning areas, loading/unloading areas, locations used for the treatment, storage or disposal of wastes, liquid storage tanks, processing areas and storage areas.

1.4.1.9.5 For each area of the facility that generates storm water discharges associated with industrial activity with a reasonable potential for containing pollutants, a prediction of the direction of flow, and an identification of the types of pollutants which are likely to be present in storm water discharges associated with industrial activity. Factors to consider include the toxicity of chemical; quantity of chemicals used, produced or discharged; the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants. Flows with a significant potential for causing erosion shall be identified.

1.4.1.9.6 Spills and Leaks: A list of significant spills and significant leaks of toxic, hazardous or radioactive pollutants that have occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of 3 years prior to the effective date of this permit. Such list shall be updated as appropriate during the term of the permit. Note: The limitation of three (3) years prior to the date of the issuance of this permit does not apply to radioactive materials:

1.4.1.9.7 Sampling Data: A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

1.4.1.9.8 Risk Identification and Summary of Potential Pollutant Sources: A narrative description of the potential pollutant sources from the following activities: loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities; significant dust or particulate generating processes; and on-site waste disposal practices. The description shall specifically list any significant potential source of pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g., radioactive materials, acids, solvents, etc.) of concern shall be identified.

1.4.1.9.9 Spills and Leaks: The permittee shall develop a description of storm water management controls appropriate for the MHA Nation Clean Fuels Refinery Site, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

1.4.1.9.10 Good Housekeeping: Good housekeeping requires the maintenance of areas which may contribute pollutants to storm waters discharges in a clean, orderly manner.

1.4.1.9.11 Preventive Maintenance: A preventive maintenance program shall involve timely inspection and maintenance of storm water management devices (e.g., cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

1.4.1.9.12 Spill Prevention and Response Procedures: Areas where potential spills which can contribute pollutants to storm water discharges can occur, and their accompanying drainage points shall be identified clearly in the storm water pollution prevention plan. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.

1.4.1.9.13 Inspections: In addition to or as part of the comprehensive site evaluation required under Part 1.4.1.9.18 of this permit, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility at appropriate intervals of no less than one time each year as specified in the plan. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained.

1.4.1.9.14 Employee Training: Employee training programs shall inform personnel responsible for implementing activities identified in the storm water pollution prevention plan or otherwise responsible for storm water management at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics such as spill response, good housekeeping and material management practices. The pollution prevention plan shall identify periodic dates for such training.

1.4.1.9.15 Record keeping and Internal Reporting Procedures: A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan.

1.4.1.9.16 Sediment and Erosion Control: The plan shall identify areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identify structural, vegetative, and/or stabilization measures to be used to limit erosion.

1.4.1.9.17 Management of Runoff: The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide the measures that the permittees determine to be reasonable and appropriate and these measures shall be implemented and maintained. The potential of various sources at the MHA Nation Clean Fuels Refinery Site to contribute pollutants to storm water discharges associated with industrial activity (see Part 1.4.1.9.2 shall be considered when determining reasonable and appropriate measures. Appropriate measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices.

1.4.1.9.18 Comprehensive Site Compliance Evaluation: Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but, in no case less than once a year. Such evaluations shall provide:

1.4.1.9.19 Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

1.4.1.9.20 The analytical results from the storm water monitoring required under Parts 1.3.2 and 1.3.7 shall be evaluated with the objective of determining whether or not the storm water discharges from the plant site are causing or contributing to water quality problems in the East Fork of Shell Creek. To the extent that data are available, the evaluation shall include data for the previous 12 months. Earlier data may be included to give an indication of trends. The data should also be evaluated in terms of giving an indication of whether or not the plan is effective in minimizing the discharge of pollutants or whether additional control measures are needed.

1.4.1.9.21 Based on the results of the visual inspection (Part 1.4.1.9.13 above) and the evaluation of the monitoring data (Part 1.4.1.9.20 above), the plan shall be revised as appropriate. The revision shall include, as appropriate, the description of potential pollutant sources identified in the plan and pollution prevention measures and controls identified in the plan. The revision shall be completed within four (4) weeks of such inspection and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than 12 weeks after the inspection unless additional time has been approved by the permit issuing authority.

1.4.1.9.22 A report summarizing the scope of the inspection, personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with Part 1.4.1.9.20 (above) of the permit shall be made and retained as part of the storm water pollution prevention plan for at least one year after coverage under this permit terminates. The report shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit.

1.4.1.9.23 Consistency with other plans: Storm water pollution prevention plans may reflect requirements for spill prevention control and countermeasure (SPCC) plans developed for the MHA Nation Clean Fuels Refinery under section 311 of the CWA; best management practices plans; or other environmental control plans prepared for the MHA Nation Clean Fuels Refinery. Provided such requirement(s) are incorporated into the storm water pollution prevention plan, or referenced by specific document title, volume, heading, and page number(s). All referenced documents must be available for review and inspection upon request.

1.4.2 Additional requirements for storm water discharges associated with industrial activity from facilities subject to EPCRA Section 313 requirements. In addition to the requirements of Part 1.4.1.9 through 1.4.1.9.22 of this permit and other applicable conditions of this permit, storm water pollution prevention plans for facilities subject to reporting requirements under EPCRA Section 313 for chemicals which are classified as 'Section 313 water priority chemicals' in accordance with the definition in PART I.A of this permit, shall describe and ensure the implementation of practices which are necessary to provide for conformance with the following guidelines:

1.4.2.1 In areas where Section 313 water priority chemicals are stored, processed or otherwise handled, appropriate containment, drainage control and/or diversionary structures shall be provided. At a minimum, one of the following preventive systems or its equivalent shall be used:

1.4.2.2 Curbing, culverting, gutters, sewers or other forms of drainage control to prevent or minimize the potential for storm water run-off to come into contact with significant sources of pollutants; or,

1.4.2.3 Roofs, covers or other forms of appropriate protection to prevent storage piles from exposure to storm water, and wind.

1.4.2.4 In addition to the minimum standards listed under Part 1.4.1.10.1 of this permit, the storm water pollution prevention plan shall include a complete discussion of measures taken to conform with the following applicable guidelines, other effective storm water pollution prevention procedures, and applicable Tribal rules, regulations and guidelines:

1.4.2.5 <u>Liquid storage areas where storm water comes into contact with any equipment, tank, container, or other vessel used for Section 313 water priority chemicals.</u>

1.4.2.5.1 No tank or container shall be used for the storage of a Section 313 water priority chemical unless its material and construction are compatible with the material stored and conditions of storage such as pressure and temperature, etc.

1.4.2.5.2 Liquid storage areas for Section 313 water priority chemicals shall be operated to minimize discharges of Section 313 chemicals. Appropriate measures to minimize discharges of Section 313 chemicals may include secondary containment provided for at least the entire contents of the largest single tank plus sufficient freeboard to allow for precipitation, a comprehensive spill contingency and integrity testing plan, and/or other equivalent measures.

1.4.2.6 <u>Material storage areas for Section 313 water priority chemicals other than liquids.</u> Material storage areas for Section 313 water priority chemicals other than liquids which are subject to runoff, leaching, or wind shall incorporate drainage or other control features which will minimize the discharge of Section 313 water priority chemicals by reducing storm water contact with Section 313 water priority chemicals.

1.4.2.7 <u>Truck and rail car loading and unloading areas for liquid Section 313 water priority chemicals</u>. Truck and rail car loading and unloading areas for liquid Section 313 water priority chemicals shall be operated to minimize discharges of Section 313 water priority chemicals. Protection such as overhangs or door skirts to enclose trailer ends at truck loading/unloading docks shall be provided as appropriate. Appropriate measures to minimize discharges of Section 313 chemicals may include: the placement and maintenance of drip pans (including the proper disposal of materials collected in the drip pans) where spillage may occur (such as hose connections, hose reels and filler nozzles) for use when making and breaking hose connections; a comprehensive spill contingency and integrity testing plan; and/or other equivalent measures.

1.4.2.8 <u>Areas where Section 313 water priority chemicals are transferred, processed or otherwise handled</u>. Processing equipment and materials handling equipment shall be operated so as to minimize discharges of Section 313 water priority chemicals. Materials used in piping and equipment shall be compatible with the substances handled. Drainage from process and materials handling areas shall minimize storm water contact with section 313 water priority chemicals. Additional protection such as covers or guards to prevent exposure to wind, spraying or releases from pressure relief vents from causing a discharge of Section 313 water priority chemicals to the drainage system shall be provided as appropriate. Visual inspections or leak tests shall be provided for overhead piping conveying Section 313 water priority chemicals without secondary containment.

1.4.2.9 <u>Discharges from areas covered by paragraphs 1.4.1.10.2.1 through 1.4.1.10.2.6</u>

1.4.2.9.1 Drainage from areas covered by paragraphs <u>1.4.1.10.2.1 through 1.4.1.10.2.6</u> of this Part should be restrained by valves or other positive means to prevent the discharge of a spill or other excessive leakage of Section 313 water priority chemicals. Where containment units are employed, such units may be emptied by pumps or ejectors; however, these shall be manually activated.

1.4.2.9.2 Flapper-type drain valves shall not be used to drain containment areas. Valves used for the drainage of containment areas should, as far as is practical, be of manual, open-and-closed design.

1.4.2.9.3 If facility drainage is not engineered as above, the final discharge of all in-facility storm sewers shall be equipped to be equivalent with a diversion system that could, in the event of an uncontrolled spill of Section 313 water priority chemicals, return the spilled material to the facility.

1.4.2.9.4 Records shall be kept of the frequency and estimated volume (in gallons) of discharges from containment areas.

1.4.2.9.5 <u>Facility site runoff other than from areas covered by 1.4.1.10.2.1 through 1.4.1.10.2.6</u>. Other areas of the facility (those not addressed in paragraphs <u>1.4.1.10.2.1 through 1.4.1.10.2.6</u>, from which runoff which may contain Section 313 water priority chemicals or spills of Section 313 water priority chemicals could cause a discharge shall incorporate the necessary drainage or other control features to prevent discharge of spilled or improperly disposed material and ensure the mitigation of pollutants in runoff or leachate.

1.4.2.9.6 <u>Preventive maintenance and housekeeping</u>. All areas of the facility shall be inspected at specific intervals identified in the plan for leaks or conditions that could lead to discharges of Section 313 water priority chemicals or direct contact of storm water with raw materials, intermediate materials, waste materials or products. In particular, facility piping, pumps, storage tanks and bins, pressure vessels, process and material handling equipment, and material bulk storage areas shall be examined for any conditions or failures which could cause a discharge. Inspection shall include examination for leaks, wind blowing, corrosion, support or foundation failure, or other forms of deterioration or noncontainment. Inspection intervals shall be specified in the plan and shall be based on design and operational experience. Different areas may require different inspection intervals. Where a leak or other condition is discovered which may result in significant releases of Section 313 water priority chemicals to waters of the United States, action to stop the leak or otherwise prevent the significant release of Section 313 water priority chemicals to waters of the United States shall be immediately taken or the unit or process shut down until such action can be taken.

1.4.2.9.7 When a leak or noncontainment of a Section 313 water priority chemical has occurred, contaminated soil, debris, or other material must be promptly removed and disposed in accordance with Federal, Tribal, and local requirements and as described in the plan.

1.4.2.9.8 <u>Facility security.</u> Facilities shall have the necessary security systems to prevent accidental or intentional entry which could cause a discharge. Security systems described in the plan shall address fencing, lighting, vehicular traffic control, and securing of equipment and buildings.

1.4.2.9.9 <u>Training</u>. Facility employees and contractor personnel that work in areas where Section 313 water priority chemicals are use or stored shall be trained in and informed of preventive measures at the facility. Employee training shall be conducted at intervals specified in the plan, but not less than once per year, in matters of pollution control laws and regulations, and in the storm water pollution prevention plan and the particular features of the facility and its operation which are designed to minimize discharges of Section 313 water priority chemicals. The plan shall designate a person who is accountable for spill prevention at the facility and who will set up the necessary spill emergency procedures and reporting requirements so that spills and emergency releases of Section 313 water priority chemicals can be isolated and contained before a discharge of a Section 313 water priority chemical can occur. Contractor or temporary personnel shall be informed of facility operation and design features in order to prevent discharges or spills from occurring.

1.4.2.9.10 Engineering Certification. - The storm water pollution prevention plan for a facility subject to EPCRA Section 313 requirements for chemicals which are classified as 'Section 313 water priority chemicals' shall be reviewed by a Registered Professional Engineer and certified to by such Professional Engineer. A Registered Professional Engineer shall recertify the plan every 3 years thereafter or as soon as practicable after significant modification are made to the facility. By means of these certifications the engineer, having examined the facility and being familiar with the provisions of this Part, shall attest that the storm water pollution prevention plan has been prepared in accordance with good engineering practices. Such certifications shall in no way relieve the owner or operator of a facility covered by the plan of their duty to prepare and fully implement such plan.

1.4.3 Additional Requirements for Salt Storage.

1.4.3.1 Storage piles of salt used for deicing or other commercial or industrial purposes and which generate a storm water discharge associated with industrial activity which is discharged to a water of the United States shall be enclosed or covered to prevent exposure to precipitation, except for exposure resulting from adding or removing materials from the pile.

1.4.3.2 Dischargers shall demonstrate compliance with this provision as expeditiously as practicable, but in no event later than two years after the effective date of this permit. Piles do not need to be enclosed or covered where storm water from the pile is not discharged to waters of the United States.

2. MONITORING, RECORDING AND REPORTING REQUIREMENTS

2.1. Representative Sampling. Samples taken in compliance with the monitoring requirements established under Part 1. shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. Sludge samples shall be collected at a location representative of the quality of sludge immediately prior to use-disposal practice.

2.2. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Sludge monitoring procedures shall be those specified in 40 CFR 503, or as specified in the permit.

2.3. Penalties for Tampering. The Act provides that any person who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or by both. Second conviction is punishable by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both.

2.4. Reporting of Monitoring Results. Effluent monitoring results obtained during the previous **month** shall be summarized and reported on **one** Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported. Until further notice, sludge monitoring results may be reported in the testing laboratory's normal format (there is no EPA standard form at this time), but should be on letter size pages. Whole effluent toxicity (biomonitoring) results must be reported on the most recent version of EPA Region 8's Guidance For Whole Effluent Reporting. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the Signatory Requirements (see Part 4.), and submitted to the Planning and Targeting Program, and the TAT Environmental Department at the following addresses:

original to: U.S. EPA, REGION 8
PLANNING AND TARGETING PROGRAM (8ENF-PT)
ATTENTION: PCS COORDINATOR
999 18TH STREET, SUITE 300
DENVER, COLORADO 80202-2466

copy to: Environmental Division
Three Affiliated Tribes
204 West Main
New Town, ND 58763

2.5. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136, 40 CFR 503, or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

2.6. Records Contents. Records of monitoring information shall include:

2.6.1. The date, exact place, and time of sampling or measurements;
2.6.2. The initials or name(s) of the individual(s) who performed the sampling or measurements;
2.6.3. The date(s) analyses were performed;
2.6.4. The time(s) analyses were initiated;
2.6.5. The initials or name(s) of individual(s) who performed the analyses;
2.6.6. References and written procedures, when available, for the analytical techniques or methods used; and,
2.6.7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

2.7. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. Records of monitoring required by this permit related to sludge use and disposal activities must be kept at least five years (or longer as required by 40 CFR 503). This period may be extended by request of the Director at any time. Data collected on site, data used to prepare the DMR, copies of Discharge Monitoring Reports, and a copy of this NPDES permit must be maintained on site.

2.8. Twenty-four Hour Notice of Noncompliance Reporting.

2.8.1. The permittee shall report any noncompliance which may endanger health or the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the EPA, Region 8, Preparedness, Assessment and Response Program at (303) 293-1788, and the TAT Environmental Division at (701) 627-5469.

2.8.2. The following occurrences of noncompliance shall be reported by telephone to the EPA, Region 8, Technical Enforcement Program at (303) 312-6720 (8:00 a.m. - 4:30 p.m. Mountain Time) or the appropriate EPA State Program Manager, NPDES Program, (toll-free 866-457-2690) (8:00 a.m. - 4:30 p.m. Mountain Time) and the TAT Environmental Division at (701) 627-5469 (8:00 a.m. - 4:30 p.m. Central Time) by the first workday following the day the permittee became aware of the circumstances:

2.8.2.1. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part 3.7., Bypass of Treatment Facilities.);

2.8.2.2. Any upset which exceeds any effluent limitation in the permit (See Part 3.8., Upset Conditions.); or,

2.8.2.3. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit to be reported within 24 hours.

2.8.3. A written submission shall also be provided to the USEPA, Office of Enforcement, Compliance and Environmental Justice, and to the TAT Environmental Division within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

2.8.3.1. A description of the noncompliance and its cause;

2.8.3.2. The period of noncompliance, including exact dates and times;

2.8.3.3. The estimated time noncompliance is expected to continue if it has not been corrected; and,

2.8.3.4. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

2.8.4. The Director may waive the written report on a case-by-case basis for an occurrence of noncompliance listed under Part 2.8.2. above, if the incident has been orally reported in accordance with the requirements of Part 2.8.2.

2.8.5. Reports shall be submitted to the addresses in Part 2.4., Reporting of Monitoring Results.

2.9. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part 2.4. are submitted. The reports shall contain the information listed in Part 2.8.3.

2.10. Inspection and Entry. The permittee shall allow the Regional Administrator, or authorized representative (including an authorized contractor acting as a representative of the Administrator) upon presentation of credentials and other documents as may be required by law, to:

2.10.1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2.10.2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

2.10.3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

2.10.4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

3. COMPLIANCE RESPONSIBILITIES

3.1. Duty to Comply. The permittee must comply with all conditions of this permit. Any failure to comply with the permit may constitute a violation of the Clean Water Act and may be grounds for enforcement action, including, but not limited to permit termination, revocation and reissuance, modification, or denial of a permit renewal application. The permittee shall give the director advance notice of any planned changes at the permitted facility that will change any discharge from the facility, or of any activity that may result in failure to comply with permit conditions.

3.2. Penalties for Violations of Permit Conditions. The Clean Water Act provides for specified civil and criminal monetary penalties for violations of its provisions. However, the Federal Civil Penalties Inflation Adjustment Act of 1990, as amended by the Debt Collection Improvement Act of 1996, requires EPA to adjust the civil monetary penalties for inflation on a periodic basis. EPA previously adjusted its civil monetary penalties on December 31, 1996 (61 Fed. Reg. 69359-69365), with technical corrections and additions published on March 20, 1997 (62 Fed. Reg. 13514-13517) and June 27, 1997 (62 Fed. Reg. 35037-35041). On February 13, 2004 (69 Fed. Reg. 7121-7127) EPA once again adjusted its civil monetary penalties. The civil and criminal penalties, as of March 15, 2004, for violations of the Act (including permit conditions) are given below:

3.2.1. Any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $32,500 per day for each violation.

3.2.2. Any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment for not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment for not more than 2 years, or both.

3.2.3. Any person who *knowingly* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment for not more than 6 years, or both.

3.2.4. Any person who *knowingly* violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment for not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment for not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

3.2.5. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Where an administrative enforcement action is brought for a Class I civil penalty, the assessed penalty may not exceed $11,000 per violation, with a maximum amount not to exceed $32,500. Where an administrative enforcement action is brought for a Class II civil penalty, the assessed penalty may not exceed $11,000 per day for each day during which the violation continues, with the maximum amount not to exceed $157,500.

3.3. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3.4. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

3.5. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

3.5.1 The permittee shall, as soon as reasonable and practicable, but no later than six (6) months after the effective date of this permit, do the following as part of the operation and maintenance program for the wastewater treatment facility:

3.5.1.1. Have a current O & M Manual(s) that describes the proper operational procedures and maintenance requirements of the wastewater treatment facility;

3.5.1.2. Have the O & M Manual(s) readily available to the operator of the wastewater treatment facility and require that the operator become familiar with the manual(s) and any updates;

3.5.1.2. Have a schedule(s) for routine operation and maintenance activities at the wastewater treatment facility; and,

3.5.1.3. Require the operator to perform the routine operation and maintenance requirements in accordance with the schedule(s).

3.5.1.4. <u>Deadlines for O&M Manual(s) Preparation</u>.

The O&M Manual(s)

3.5.1.4.1 Shall be prepared and submitted to the permit issuing authority for review and approval no later than six months after the effective date of this permit (and updated at a minimum of every two years or more frequently if deemed appropriate). The plan shall be submitted to the U.S. EPA Region 8 NPDES Permits Unit at the following address:

EPA Region 8 NPDES Permits Unit
Mailcode: 8P-W-P
999 18th Street, Suite 300
Denver, CO 80202-2466

A copy of the plan shall also be submitted to the Three Affiliated Tribes Environmental Department at the following address:

Environmental Division
Three Affiliated Tribes
204 West Main
New Town, ND 58763

3.5.2. The permittee shall maintain a daily log in a **bound notebook(s)** containing a summary record of all operation and maintenance activities at the wastewater treatment facility. At a minimum, the notebook shall include the following information:

3.5.2.1. Date and time;
3.5.2.2 Name and title of person(s) making the log entry;
3.5.2.3. Name of the persons(s) performing the activity;
3.5.2.4. A brief description of the activity; and,
3.5.2.5. Other information, as appropriate.

The permittee shall maintain the notebook in accordance with proper record-keeping procedures and shall make the log available for inspection, upon request, by authorized representatives of the U.S. Environmental Protection Agency or the TAT Environmental Division.

3.6. Removed Substances. Collected screenings, grit, solids, sludge, or other pollutants removed in the course of treatment shall be buried or disposed in a manner consistent with all applicable federal and tribal regulations (i.e., 40 CFR 257, 40 CFR 258, 40 CFR 503, 40 CFR 268 and in a manner so as to prevent any pollutant from entering any waters of the United States or creating a health hazard. **In addition, the use and/or disposal of sewage sludge shall be done under the authorization of an NPDES permit issued for the use and/or disposal of sewage sludge by the appropriate NPDES permitting authority for sewage sludge.** Sludge/digester supernatant and filter backwash shall not be directly blended with or enter either the final plant discharge and/or waters of the United States.

3.7. Bypass of Treatment Facilities.

3.7.1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts 3.7.2. and 3.7.3.

3.7.2. Notice:

3.7.2.1. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass to the USEPA, Technical Enforcement Program, and the TAT Environmental Division.

3.7.2.2. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part 2.8., Twenty-four Hour Noncompliance Reporting, to the USEPA, Technical Enforcement Program, and the TAT Environmental Division.

3.7.3. Prohibition of bypass.

3.7.3.1. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

3.7.3.1.1. The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

3.7.3.1.2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and, 3.7.3.1.3. The permittee submitted notices as required under Part 3.7.2.

3.7.3.2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in Part 3.7.3.1.

3.8. Upset Conditions

3.8.1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of Part 3.8.2. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review (i.e., Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limitations).

3.8.2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

3.8.2.1. An upset occurred and that the permittee can identify the cause(s) of the upset;
3.8.2.2. The permitted facility was at the time being properly operated;
3.8.2.3. The permittee submitted notice of the upset as required under Part 2.8., Twenty-four Hour Notice of Noncompliance Reporting; and,
3.8.2.4. The permittee complied with any remedial measures required under Part 3.4., Duty to Mitigate.

3.8.3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

3.9. Toxic Pollutants. The permittee shall comply with effluent standards or prohibitions established under Section 307 (a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

3.10. Changes in Discharge of Toxic Substances. Notification shall be provided to the Director as soon as the permittee knows of, or has reason to believe:

3.10.1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

3.10.1.1. One hundred micrograms per liter (100 ug/L);

3.10.1.2. Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter 500 ug/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

3.10.1.3. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,

3.10.1.4. The level established by the Director in accordance with 40 CFR 122.44(f).

3.10.2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

3.10.2.1. Five hundred micrograms per liter (500 ug/L);

3.10.2.2. One milligram per liter (1 mg/L) for antimony:

3.10.2.3. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,

3.10.2.4. The level established by the Director in accordance with 40 CFR 122.44(f).

4. GENERAL REQUIREMENTS

4.1. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

4.1.1. The alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit; or,

4.1.2. There are any planned substantial changes to the existing sewage sludge facilities, the manner of its operation, or to current sewage sludge management practices of storage and disposal. The permittee shall give the Director notice of any planned changes at least 30 days prior to their implementation.

4.1.3. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source.

4.2. Anticipated Noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

4.3. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

4.4. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

4.5. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

4.6. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

4.7. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.

4.7.1. All permit applications shall be signed by either a principal executive officer or ranking elected official.

4.7.2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

4.7.2.1. The authorization is made in writing by a person described above and submitted to the Director; and,

4.7.2.2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

4.7.3. Changes to authorization. If an authorization under Part 4.7.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part 4.7.2. must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4.7.4. Certification. Any person signing a document under this section shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

4.8. Penalties for Falsification of Reports. The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

4.9. Availability of Reports. Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

4.10. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

4.11. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, tribal or local laws or regulations.

4.12. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

4.13. Transfers. This permit may be automatically transferred to a new permittee if:

4.13.1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

4.13.2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

4.13.3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part 4.13.2.

4.14.1. Permittees in Indian Country. EPA is issuing this permit pursuant to the Agency's authority to implement the Clean Water Act NPDES program in Indian country, as defined at 18 U.S.C. 1151.

4.14.2. Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

4.15.1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

4.15.2. Wasteload Allocation: A wasteload allocation is developed and approved by the TAT Tribes and/or EPA for incorporation in this permit.

4.15.3. Water Quality Management Plan: A revision to the current water quality management plan is approved and adopted which calls for different effluent limitations than contained in this permit.

4.16. Toxicity Limitation-Reopener Provision . This permit may be reopened and modified (following proper administrative procedures) to include whole effluent toxicity limitations if whole effluent toxicity is detected in the discharge.

MANDAN, HIDATSA & ARIKARA NATION
Three Affiliated Tribes • Ft. Berthold Reservation
404 Frontage Road • New Town, ND 58763-9402

Mr. Horace Pipe/ Project Engineer
Oil & Gas Refinery
Three Affiliated Tribes
404 Frontage Road
New Town, North Dakota
58763

April 4, 2005

Dear Mr. Pipe

The Cultural Preservation Office of the Three Affiliated Tribes, and in coordination with the State Historical Society of North Dakota has completed a Class I survey of NW1/4 of Section 20; Township 152 North; Range 87 West, and the North ½ of Section 19; Township 152 North; Range 87 West.

The Cultural Preservation office of the Three Affiliated Tribes gives a "**No Historic Properties Effected**" for the two sites for the Oil Refinery, which will be located on the above mentioned land description. No sites or previous cultural resources were located.

However, there's always the possibility of inadvertent discoveries of Archaeological and Cultural Resources during the construction phase of the project, i.e.; access roads, water & sewer etc. **If there is a discovery, all work must stop and my office is to be contacted immediately.** If you have any further questions or concerns, please feel free to call me @ 627-4781 or stop by my office. Thank you.

File

Elgin Crows Breast
Elgin Crows Breast
Cultural Preservation Office
Three Affiliated Tribes
404 Frontage Road
New Town, No. Dakota
58763

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

24 March 2005

Elgin Crows Breast
Cultural Preservation Office
Three Affiliated Tribes
404 Frontage Road
New Town ND 58763

RE: SHPO#98-0343; MHA Nation's Clean Fuel Refinery Project

Dear Elgin:

We have reviewed the locations of the proposed refinery, as requested . For both T152N R87W Section 20 NW1/4 and T152N R87W Section 19 N1/2 there are no recorded sites but there has not been a cultural resource inventory. Based on the proposed location this area appears to have a low probability for cultural resources. If consulted by the lead federal agency, we would recommend a *no historic properties affected* determination.

Thank you for the opportunity to review these projects. If you need additional information, please feel free to contact me at 701-328-3575.

Sincerely,

Fern Swenson
Deputy State Historic
Preservation Officer

North Dakota Heritage Center • 612 East Boulevard Avenue, Bismarck, ND 58505-0830 • Phone 701-328-2666 • Fax: 701-328-3710
Email: histsoc@state.nd.us • Web site: http://DiscoverND.com/hist • TTY: 1-800-366-6888

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: 8P

MAR 0 8 2007

Marcus Wells, Jr., Chairman
Three Affiliated Tribes
404 Frontage Road
New Town, North Dakota 58763

Re: Mandan, Hidatsa, and Arikara Nation's Proposed Clean Fuels Refinery Project

Dear Chairman Wells:

The EPA is working with BIA to prepare a response to the comments received from the public on the Draft Environmental Impact Statement (DEIS) and draft National Pollutant Discharge Elimination System (NPDES) permit for the proposed refinery. The issue of the Tribes' ability to pay for any clean-up that may be required as a result of refinery operations or future closure appears to be of significant concern to the public. EPA believes that it is important that the Tribes have sufficient funds available for clean-up and closure regardless of the chosen construction alternative.

EPA has previously discussed the need for an adequate clean-up fund with the Tribes to address either a substantial chronic release or a catastrophic event at the refinery. If Option 1A (the Tribes' original proposed alternative) is selected as the preferred alternative, a demonstration of financial assurance (in the form of a clean-up funding mechanism) will be required by a Resource Conservation and Recovery Act (RCRA) permit.

We understand from your letter of January 22, 2007, that the Tribes now favor Option 4A. Under Option 4A, a demonstration of financial assurance is not required pursuant to RCRA, as long as the proposed refinery operates as a generator. Please note, however, that the proposed refinery could lose its generator-only status by, for example, storing hazardous waste for greater than 90 days. In the event of a loss of generator-only status, the facility will be required to obtain a RCRA permit and to demonstrate financial assurance.

We also understand that there was a January 16, 2007 meeting between Mr. William Benjamin, Regional Director, BIA, and the Tribal Business Council for TAT, during which the Tribes committed to establishing such a clean-up fund on a voluntary basis. EPA strongly supports this action. We have provided TAT via electronic mail and during teleconference discussions, a range of potentially suitable financial tools, as well as estimates for conducting environmental response activities at refinery facilities.

As this issue is related to our completion of the Response-To-Comments and Final Environmental Impact Statement (FEIS), we request that the Tribal Business Council confirm its intent by March 27, 2007, to establish a voluntary clean-up fund for the proposed refinery. EPA will continue to work with TAT and BIA to develop and implement the necessary tools to address any potential long-term contamination of the proposed refinery site.

We have enclosed the information previously provided to you concerning different financial instruments and a general range of clean-up costs for your consideration. We look forward to your response. If you have any questions about this letter, please contact Steve Wharton, Team Leader for this project, at 303-312-6935 or Carol Campbell, Senior Leadership Champion at 303-312-6340.

Sincerely,

Robert E. Roberts
Regional Administrator

Enclosures

cc: Horace Pipe (HD Geological, Refinery Project Manager)
William Benjamin (Regional Director, BIA, Aberdeen Regional Office)
Diane Mann-Klager (BIA, Aberdeen Regional Office)
Roger Bird Bear (TAT Legal Department)
Frank White Calf (Treasurer, TAT Business Council)
Mervin Packineau (TAT Business Council)
Nathan Hale (TAT Business Council)
Malcolm Wolf (TAT Business Council)
Judy Brugh (TAT Business Council)
Barry Benson (TAT Business Council)
Chris Many Deeds (TAT BIA Agency Superintendent)
Elton Spotted Horse (Director, TAT Environmental Department)
Bob Woolley (Triad)

U.S. EPA Region 8
Solid and Hazardous Waste Program

Three Affiliated Tribes Proposed Refinery DEIS
Response to Comments

Estimated Potential RCRA-Related Cleanup Costs

March 7, 2007

Introduction and Background

This document provides an estimated range of potential RCRA-related cleanup costs for the Three Affiliated Tribes (TAT), Fort Berthold, North Dakota proposed petroleum refinery. The estimates shown below were developed as part of EPA's response to public comments on the Draft Environmental Impact Statement (DEIS) and to assist the project proponents in planning for potential cleanup costs regardless of the selected alternative.***** The amounts are based on the use of contractor personnel only, and are based on the size, type, design, operational practices, operational life, and potential for releases from the facility.****** As discussed below, **the average annual potential cleanup costs could range from $100,000 to $1,000,000 for each year that the refinery operates**. The potential range of costs was estimated by considering likely cleanup activities and the types of professionals needed to conduct those activities.***

Potential Facility Investigations and Remedial Activities

The following is a listing of potential facility investigation and remediation activities related to corrective action at RCRA facilities. Such activities could include:

-Preparation of work plans
-Investigations of and responses to leaks, spills, and releases
-Ground water monitoring wells installation and monitoring
-Soil borings installation and sampling
-Surface water monitoring
-Wetlands monitoring and restoration
-Laboratory analysis of environmental data
-Removal actions for contaminated soil and wastes
-Transportation of wastes to off-site locations
-Off-site treatment and disposal of wastes
-Ground water remediation systems operation
-Subsurface hydraulic containment systems or barrier walls installation
-Soil vapor extraction systems operation
-Insitu treatment systems operation
-Installation of caps over contamination including Corrective Action Management Units
-Installation of waste unit liners

-Installation and operation of waste treatment units
-Emergency responses
-Health and safety concerns
-Implementation of interim measures
-Data quality assurance
-Community outreach
-Determination of remedial goals
-Implementation of long-term final remedial goals
-Periodic review of selected remedies
-Reporting

Contractor Personnel Likely Needed

The following is a listing of contractor personnel that would likely be needed to perform the types of tasks listed above:

Project Manager
Hydrogeologist
Geologist
Toxicologist
Biologist
Risk Assessment Specialist
Senior Engineer
Staff Engineer
Senior Chemist
Staff Chemist
Environmental Scientist
GIS Analyst
Public Involvement Specialist
Health and Safety Specialist
Database Programmer
Clerical / Administrative
Records Management Specialist
Financial Analyst
Field Technicians
Training Specialist
Subcontractors

Rough Assumptions

As this is a proposed facility, a number of rough assumptions about potential cleanup costs must be made. The cost for future cleanup expenses could potentially range anywhere from $100,000 per year to $1,000,000 per year depending on the amount, type, and distribution of contamination. The operational life of the refinery is assumed to be at least 25-years. The costs estimates provided below are potential average annual costs over the life of the refinery. The design and operational practices of the refinery are the most important variables in determining potential cleanup cost estimates. Other methods to calculate potential cleanup costs are also available***. Two examples are provided below to illustrate a $100,000 to $1,000,000 range of potential annual cleanup expenses:

Example #1 - The Refinery is Well Designed and Well Operated to Prevent and/or Immediately Respond to Releases- Potential Average Cleanup Costs: $100,000 per year.

The new refinery has been well designed and operated in environmental terms and there have been only minor spills, leaks, and releases. This includes the use of double wall and double bottom tanks with leak detection and recovery systems. This also includes double wall pipelines with leak detection and recovery systems for all underground pipelines. All spills and leaks are properly responded to immediately. As such, the following assumptions could be made:

1. Average annual salary of the above personnel: $100,000

2. Average number of full-time personnel needed per year (from all contributions of personnel listed above): 0.5

3. Average annual cost of monitoring and remediation equipment installation, maintenance, and monitoring: $30,000

4. Average annual off-site laboratory costs: $10,000

5. Average annual off-site remediation waste shipping, treatment and disposal costs: $10,000

The total annual cost of items 1 through 5 above is $100,000. Therefore, financial assurance for annual cleanup costs in this amount may be appropriate. [Note: Actual cleanup costs could be lower or higher for any given year.]

Example #2 - The Refinery is Designed and Operated Such That Significant Releases Occur- Potential Average Cleanup Costs: $1,000,000 per year.

The refinery is operated such that there are a number of significant spills, leaks, and releases. Tanks do not have double walls, double bottoms and leak detection and recovery systems. Not all underground pipelines have double walls with leak detection and recovery systems. Spills and leaks are not always responded to immediately and adequately. As such, the following assumptions could be made:

1. Average annual salary of the above personnel: $100,000

2. Average number of full-time personnel needed per year: 6

3. Average annual cost of monitoring and remediation equipment installation, maintenance, and monitoring: $300,000

4. Average annual off-site laboratory costs: $50,000

5. Average annual off-site remediation waste shipping, treatment, and disposal costs: $25,000

6. Miscellaneous costs: $25,000

The total annual cost of items 1 through 6 above is $1,000,000. Therefore, financial assurance for annual cleanup costs in this amount may be appropriate. [Note: Actual cleanup costs could be lower or higher for any given year. It should also be noted that total cleanup costs at refineries may be much higher (see examples from other refineries provided below).]

Conclusions and Recommendations

The estimated range of potential average annual cleanup costs using the approach outlined above is $100,000 to $1,000,000. Other methods could also be used to calculate a range of potential cleanup costs.*** However, as this is a proposed facility, the types, amounts and distribution of contamination that could occur are not known. As such, the estimates in this paper are valid based on our best professional judgment.

It is recommended that some type of financial assurance mechanism be established for the proposed project to cover the potential range of cleanup costs discussed above. We suggest that the MHA Nation establish a financial assurance mechanism in the mid-range of these values as a conservative approach for planning for cleanups. The type and duration of the instrument should be one that would be acceptable to all MOA parties.

Financial assurance for cleanup costs would be required under a RCRA permit as part of corrective action. The type and amount of financial assurance would be specified in the RCRA permit. A RCRA permit would be required for all alternatives except Alternative 4&A. Under Alternative 4&A, the facility would be a RCRA generator only, and would not be subject to RCRA permitting requirements. In that case, EPA strongly recommends that a financial assurance mechanism still be established to cover potential cleanup costs. This will help ensure that the facility is properly cleaned-up during and after its operational life regardless of the selected alternative.

Supporting Information

Examples of RCRA Cleanup Cost at Selected Refineries:

Examples of RCRA cleanup costs at an existing and a former refinery are provided below:

-Existing Refinery: Giant Refining, Yorktown, Virginia. Period of operation: 1956-present. Production capacity: approximately 56,000 barrels per day. Products include: gasoline, diesel, fuel oil, and liquid propane gas. Approximate cleanup costs: $25,000,000 to $30,000,000 (Source: Robert Greaves, EPA Region 3)

-Former Refinery: BP Amoco, Casper Wyoming. Period of operation: 1912-1991. Former production capacity: approximately 48,000 barrels per day. Products included: gasoline, diesel, fuel oil, liquid propane gas, and asphalt. Approximate cleanup costs: >$100,000,000 (Source: Felix Flechas, EPA Region 8)

Notes:

***** Under Alternative 4&A, the facility would be a RCRA generator only, and would not be subject to RCRA permitting requirements which would include financial assurance for corrective action as appropriate.

****** Legal counsel costs are not included**.**

******* There are other ways to calculate potential cleanup costs. For example, one could also estimate the size, type, and duration of potential leaks, spills and releases. In that case, one could estimate the cubic yards of contaminated soil and waste to be removed for treatment or off-site disposal. One could also estimate the amount of contaminated ground water to be treated, etc. Models such as RACER (available from Earth Tech, Inc.) are available for developing such cost estimates for existing facilities with known contamination. However, in this case (a proposed facility) it may be difficult to come up with representative input parameters for such models.

Three Affiliated Tribes
MANDAN ★ HIDATSA ★ ARIKARA

THREE AFFILIATED TRIBES

FILE COPY

Mandan, Hidatsa & Arikara · Fort Berthold Reservation
404 Frontage Road · New Town, North Dakota 58763-9402
Phone: (701) 627-4781 Fax: (701) 627-3503

From Chairman's Office
Marcus D. Wells, Jr. "Ee-Ba-Da-Gish"
(Bald Eagle)

19 April 2007

Mr. Robert B. Roberts, Regional Administrator
United States Environmental Protection Agency
Region VIII
1595 Wynkoop Street
Denver, Colorado 80202-1129

Re: TAT Clean Fuels Refinery Project

Dear Regional Administrator Roberts:

The Three Affiliated Tribes hereby confirm a commitment expressed during their conference with BIA Regional Director William Benjamin held January 16, 2007. Of course, that expression and this confirmation may apply only to the extent financial assurance may or may not be required by circumstance, the permit or applicable law.

EPA correctly understands that the Tribes favor Option 4A. As you are aware, Option 4A would not require a RCRA permit or subsequent demonstration of financial assurance because the refinery would operate as a generator rather than a storage facility. Even in the very remotest scenario, it is highly unlikely that the facility could ever store waste beyond the 90-day threshold because the operation would dispose waste well before the deadline.

Although the Tribes remain committed to pay for clean-up costs, selection of a specific funding method is premature because any selection must reconcile with BIA, which is unknown at this point. The Tribes appreciate EPA's assistance in developing the refinery, and look forward to completing this process. You may contact either Horace Pipe at (701) 726-5894 or Roger Birdbear at (701) 627-4781 for any questions regarding this matter.

Sincerely,

Marcus D. Wells, Jr.
Tribal Chairman
Three Affiliated Tribes

xc: Tribal Business Council
BIA Regional Director
Triad.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

RECEIVED
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GREAT PLAINS
REGIONAL DIRECTOR'S

MEMORANDUM

AUG 2 2 2006

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BRANCH OF NATURAL RESOURCES
ABERDEEN AREA OFFICE

To: Regional Director, Bureau of Indian Affairs, Great Plains Region
Aberdeen, South Dakota

From: Jeffrey K. Towner
Field Supervisor, North Dakota Field Office
Bismarck, North Dakota

Subject: Section 7 Consultation on the Proposed Construction and Operation of the Mandan, Hidatsa and Arikara Nation's Clean Fuels Refinery

The U.S. Fish and Wildlife Service (Service) has reviewed the Bureau of Indian Affairs' (BIA) biological assessment related to the Mandan, Hidatsa and Arikara (MHA) Nation's proposal to construct and operate a clean fuels refinery on the Fort Berthold Reservation in Ward County, North Dakota. The Service offers the following comments in accordance with the provisions of the Endangered Species Act (16 U.S.C. 153 et seq.).

The MHA Nation proposes to construct and operate a new 15,000 barrels per day clean fuels refinery and produce forage for buffalo on a 469-acre tract of land on the Fort Berthold Reservation located near Makoti, North Dakota (N ½, Sec. 19 and NW ¼, Sec. 20, T. 152 N., R. 87 W., Ward County). A Draft Environmental Impact Statement (DEIS) has been prepared that analyzes the environmental impacts of the following Federal decisions pertaining to the MHA Nation's proposed refinery:

- Whether the BIA should accept a 469-acre parcel into trust for purposes of the MHA Nation's proposal to construct and operate a clean fuels petroleum refinery, and produce buffalo forage;
- Whether EPA should issue a NPDES permit for processed water discharges associated with operation of the proposed refinery.

Both the EPA and BIA incorporated, into the DEIS, their respective biological assessments and subsequent affect determinations as stipulated in the Endangered Species Act, Section 7(c)(1). The Service's comments and concurrence language in this memorandum pertain only to BIA's affect determination to threatened and endangered species. A separate concurrence letter will be sent to EPA pertaining to their affect determination.

BIA's biological assessment considered the affect of their proposed action (taking 469 acres of land into trust for purposes of the MHA Nation's proposal to construct and

Route	Initial	Date
✓ Regional Director		
✓ Deputy Regional Director	[illegible]	8/25/06
✓ 301		
✓ 208		

operate a clean fuels petroleum refinery, and produce buffalo forage) upon the following endangered, threatened or candidate species: gray wolf (*Canis lupus*), Dakota skipper (*Hesperia dacotae*), interior least tern (*Sterna antillarum*), whooping crane (*Grus americana*), pallid sturgeon (*Scaphirhynchus albus*), bald eagle (*Haliaeetus leucocephalus*), and the piping plover (*Charadrius melodus*).

BIA has determined, through its biological assessment, that the construction and operation alternatives discussed in the DEIS will have "no affect" on the gray wolf, Dakota skipper, interior least tern, bald eagle, and pallid sturgeon. Further, BIA has determined that the construction and operation alternatives "may affect, but are not likely to adversely effect" piping plovers and whooping cranes. The "not likely to adversely effect" determination is based on the required implementation of conservation measures the Service suggested in a memorandum dated January 11, 2006.

The Service concurs with both the "no affect" and "may affect, not likely to adversely effect" determinations. Under requirements of Section 7 of the Endangered Species Act, further consultation is not necessary. Should the construction and operation alternatives change from those described in the DEIS, a reassessment of impacts to threatened or endangered species and designated critical habitat is necessary.

The above comments and recommendations constitute the report of the Department of the Interior on the proposed BIA action, and serves as notice that we do not object to the action. Thank you for the opportunity to provide comments and if you have any questions or require additional information, please contact Kevin Johnson of my staff at (701) 250-4481, or at the letterhead address.

cc: EPA, Region 8, Water Program
(Attn: B. Kent)
USACE, Bismarck Regulatory Office
(Attn: D. Cimarosti)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

JAN 11 2006

MEMORANDUM

To: Regional Director, Great Plains Region, Bureau of Indian Affairs
Aberdeen, South Dakota

From: Jeffrey K. Towner
Field Supervisor, North Dakota Field Office
Bismarck, North Dakota

Subject: Development of an Environmental Impact Statement (EIS) for the Mandan, Hidatsa and Arikara Nation's Clean Fuels Refinery

In response to your December 8, 2005, request, the U.S. Fish and Wildlife Service (Service) has reviewed the subject Draft Environmental Impact Statement (DEIS). The DEIS discusses the Three Affiliated Tribes' (Tribes) request that the United States Department of the Interior Bureau of Indian Affairs (BIA) accept 469 acres of land into trust status for the Tribes. This land is located within the Fort Berthold Indian Reservation boundaries. The Tribes plan to construct a clean fuels refinery on 160 acres of the 468 acres, with the remaining land being used for the production of feed for buffalo. The land proposed to be taken into trust is located in the northeast corner of the Fort Berthold Indian Reservation along the south side of North Dakota Highway 23, about 2 miles west of the turnoff to Makoti, North Dakota, in Sections 19 and 20 of Township 152 North, Range 87 West.

The Service offers the following general and specific comments under the authority of and in accordance with the requirements of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), Migratory Bird Treat Act (16 (U.S.C. 703 et seq.), and the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.).

General Comments

Service Easements - The preferred alternative's newly constructed power lines and pipelines would cross, or run adjacent to, parcels where the Service administers wetland and grassland easements. Provisions of wetland easements prohibit draining, filling, leveling or burning; and provisions of grassland easements prohibit alteration or destruction of vegetative cover; and no haying, mowing, or seed harvesting until after

July 15. BIA and the Environmental Protection Agency (EPA) will need to coordinate with the Service's Audubon Wetland District Manager (701- 442-5474) and Lostwood Wetland District Manager (701-848-2466) to ensure compliance with existing or new right-of-ways in Ward and Mountrail Counties, respectively. The final EIS will need to discuss project impacts and implications to the easement encumbrances.

Wetlands - The final EIS needs to discuss in detail a wetland mitigation plan. Several wetlands will be impacted from construction activities outlined in the DEIS. These construction activities are subject to permitting and authorization under Section 404 of the Clean Water Act, and the provisions of Executive Order 11990. Thus, wetland impacts also will need to be mitigated subject to 404 permitting and EO 11990. The mitigation plan should outline acreages of wetlands impacted and mitigated, mitigation type, location of mitigation, and future management of these mitigation areas. The Service recommends unavoidable wetland losses be replaced on a functional value-for-value basis. Additionally, trees or shrubs should also be replaced on a 2:1 basis. If grasslands are disturbed during project construction, reseed disturbed areas with native grass species. If construction is unavoidable in or near wetlands, the Service recommends deferring the timing of construction to late summer (after July 15) or fall, so as not to disrupt waterfowl or other wildlife during the nesting season and to avoid high water conditions.

Constructed Ponds - The federally threatened piping plover breeds on wetlands within close proximity (3 miles) to the proposed refinery site. Plovers breed and forage on un-vegetated, gravel shorelines of wetlands. It is reasonable to expect that plovers would use exposed shorelines of constructed ponds while foraging. Therefore, 4-6" rock (as opposed to gravel) should be used to line exposed in-slopes of all wastewater/storage ponds. Any ponds having the potential to hold contaminated water should be netted. The larger rock and netting will prevent the creation of an attractive nuisance for piping plovers and other migratory shorebirds.

Power Lines - The Service recommends for overhead lines that poles and other construction be sited to avoid placement of fill in wetlands along the routes. Projects which involve the burying of cable likely will not significantly affect wetlands, provided precautions are taken during installation of underground facilities to restore the existing basin contours and to compact trenches sufficiently through the wetlands to prevent any drainage along the trench or through bottom seepage. Procedures similar to those for wetlands should be applied in the restoration of stream channels.

To minimize the electrocution hazard to birds, the Service, with support from the Rural Utilities Service, recommends that new or updated overhead power lines be constructed in accordance with the current guidelines for preventing raptor electrocutions. The recommended guidelines can be found in "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996". To increase power line visibility and reduce bird fatalities resulting from collisions with power lines, the Service recommends new power lines be modified according to "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994". Both publications can be obtained by writing or calling the

Edison Electric Institute, P.O. Box 266, Waldorf, Maryland, 20604-0266, (1-800-334-5453) or visiting their website at www.eei.org.

Threatened and Endangered Species - The current DEIS states the preferred alternative will not affect any federally threatened or endangered species in North Dakota. The Service does not concur with that determination at this time. The Service believes the preferred alternative, as proposed in the DEIS, may affect, and is likely to adversely affect, threatened piping plovers and endangered whooping cranes. As stated above, without netting or use of proper substrate, the constructed ponds pose a risk to piping plovers. Additionally, the proposed overhead power lines pose a collision risk to plovers and endangered whooping cranes. Current and historic records show the proposed construction area to be an important corridor for the movements of both these species. However, if overhead power lines are either buried or have visual markers (as outlined in "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994"), and netting and proper substrate are used on constructed ponds, then the preferred alternative may affect, but is not likely to adversely affect, threatened piping plovers and endangered whooping cranes.

Specific Comments

Page v: Delete "~~U.S. Fish and Wildlife Service, Bismarck, North Dakota~~" as a Cooperating Agency. The Service, in a December 12, 2005, memo to the BIA Great Plains Regional Office declined to participate as a Cooperating Agency in development of the EIS.

Page xiv; par. 4: "BIA asked the FWS to participate as a cooperating agency ~~because of its authority for threatened or endangered species under the Endangered Species Act (ESA)~~. The FWS declined to participate as a cooperating agency. Although FWS will not participate as a cooperating agency, it did agree to provide information and data where it could and review documents. BIA and EPA must determine if their decisions about the parcels of land and refinery "may affect" species listed as threatened or endangered or "adversely modify" critical habitats. If BIA or EPA determine their decisions "may affect" a listed species or "adversely affect" critical habitat, they must consult with FWS."

Page xv; par. 3: Delete "~~FWS~~"

Page 1-3, par. 4: "BIA asked the FWS to participate as a cooperating agency ~~because of its authority for threatened or endangered species under the Endangered Species Act (ESA)~~. The FWS declined to participate as a cooperating agency. Although FWS will not participate as a cooperating agency, it did agree to provide information and data where it could and review documents. BIA and EPA must determine if...

Page 1-4; par. 4: Delete "~~FWS~~"

Page 1-7; 2nd column; 1st line: "Protects federally listed threatened or endangered species and their designated critical habitats."

Page 1-7; 3rd column; 1st line: "Any project activity that potentially affects species listed as or proposed for listing as threatened or endangered, and/or their designated critical habitats."

Page 1-7; 3rd column; 2nd line: "All federally funded, permitted, or authorized ~~surface disturbing~~ activities."

Page 1-7; 3rd column; 3rd line: "All federally funded, permitted, or authorized ~~surface disturbing~~ activities."

Page 3-59; Special-Status Species; 1st line: "Several species that occur or potentially occur within the project area are classified as federally threatened or endangered..."

Page 3-63; par. 4: "FWS designated critical habitat for the Great Plains breeding population of piping plovers on September 11, 2002. North Dakota, Nebraska, and South Dakota contain critical habitat for the piping plover. Habitat included in the federal designation includes midstream sandbars of the Missouri and Yellowstone Rivers and along shorelines of saline wetlands (U.S. Fish and Wildlife Service 2004). North Dakota is the most important State in the U.S. Great Plains for nesting piping plovers. The State's population of piping plovers was 496 breeding pairs in 1991 and 399 breeding pairs in 1996 (U.S. Fish and Wildlife Service 2004). Several areas of designated piping plover critical habitat are located within a 7 mile radius of the project site. The closest area of critical habitat (Section 9, T. 152 N., R. 87 W., Ward County) is approximately 3 miles northeast of the project site. ~~There is a designated piping plover critical habitat east of the project are within a FWS Waterfowl Production Area wetland near Ryder, North Dakota.~~"

Page 3-64; par. 2: Delete the last sentence "~~Nesting locations occur along the Missouri and Yellowstone River in McKenzie, Mercer, and Williams Counties.~~"

Page 6-1; par. 1: Delete "~~FWS,~~"

Page 6-1; Table 6-3: Delete all of Table 6-3

Thank you for the opportunity to provide comments on the DEIS. I look forward to seeing another draft. If you have any questions, please have your staff contact Kevin Johnson, of my staff, or contact me directly at (701) 250-4481 or at the letterhead address.

cc: Chairman, Three Affiliated Tribes Business Council, New Town
Environmental Protection Agency, Denver
(Attn: M. Morales)
U.S. Army Corps of Engineers, Bismarck
(Attn: D. Cimerosti)
Audubon Wetland District Manager, Coleharbor
Lostwood Wetland District Manager, Kenmare
U.S. Fish & Wildlife Service, Region 6, Denver
(Attn: C. Young-Dubovsky)

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

February 28, 2007

Carol Campbell
Deputy Assistant Regional Administrator
US EPA Region VIII
999 18th Street, Suite #300
Denver, CO 80202-2466

Dear Ms. Campbell,

Please consider this letter as the response to your April 21, 2006 request for ATSDR assistance resolving public/environmental health concerns associated with development of the proposed Mandan, Hidatsa and Arikara Nation (MHA) Clean Fuels Refinery at the Fort Berthold Indian Reservation in North Dakota. An initial ATSDR response letter, dated July 25, 2006, identified two specific areas where assistance/information could be provided to the U.S. Environmental Protection Agency (EPA):

1) "Coordinate a [supplemental] literature review summarizing what is known about the adverse health effects (i.e. cancer and asthma) observed in communities living near such refineries,"
2) "Conduct a baseline health assessment for the Fort Berthold Indian Reservation with an emphasis on asthma and cancer."

ATSDR organized and worked closely with an interagency team to prepare a response to EPA's request. Representatives from the EPA Region 8, the Bureau of Indian Affairs (BIA) (Great Plains Regional Office, Aberdeen, SD), and an Indian Health Service (IHS) epidemiologist (Aberdeen, SD), met monthly with ATSDR to identify and obtain the necessary public health information. Assistance was also obtained from the North Dakota Health Department, and the Public Health Agency of Canada officials (Edmonton, Alberta).

ATSDR reviewed the available literature and public health information. The literature citations, public health and epidemiological information used by ATSDR to conduct the supplemental literature and the chemical review and the baseline health assessment are enclosed.

Below are summaries of the ATSDR activities:

1) Supplemental Literature Review

The goal of the literature review was to identify references and information not already cited in the draft EPA Environmental Impact Statement. The literature review targeted information pertaining to health outcomes of residents living near a refinery. The review also attempted to identify and describe chemicals and compounds present in the oil industry that might be related to cancer (e.g. criteria air contaminants, volatile organic compounds, and polycyclic aromatic hydrocarbons). To conduct the supplemental literature review, ATSDR queried staff at the Centers for Disease Control and Prevention (CDC) Library Resources who conducted a search, searched using the National Library of Medicine's PubMed, and contacted several air quality researchers and experts. The CDC Library Resources staff found 30 different sources of information; three articles were newly identified. Review of these articles revealed that health outcome studies conducted of conventional refineries using old technology did not adequately represent potential exposures that might result from the new technological processes at the proposed MHA Clean Fuels Refinery. Researchers and experts in air quality and adverse health outcomes associated with refineries were also contacted. These contacts shared industry-specific reports for projects in western Canada during the years 2001-2006 regarding chemicals of concern for an increased cancer risk. The list of chemicals of concern was included in the document, "Literature Review and Summary of Potential Adverse Health Effects Associated with Living near and/or Working at an Oil Refinery."

2) Baseline Risk Assessment for Cancer and Asthma, North Dakota

Cancer—Occupational studies of workers who have been exposed to high levels of oil or gasoline have indicated an increased incidence in cancers of the kidney and non-Hodgkin's lymphoma. Attached is the document, "Baseline Health Assessment for Cancer and Asthma, North Dakota;" Appendix A includes the reported age-adjusted average annual cancer incidence (per 100,000 population) for kidney cancer and non-Hodgkin's lymphoma in North Dakota between the years 1997-2004 for McLean, Mountrail, and Ward counties and for North Dakota; data were from the North Dakota Cancer Registry. The reported incidence of these cancers among persons living in these three counties is similar to the rate in all persons living in North Dakota. The small population size in each of the three counties hinders the ability to statistically detect changes in cancer rates.

Asthma—ATSDR used asthma data collected from the North Dakota Department of Health to determine baseline data regarding the prevalence of asthma among adults and children living in North Dakota. Between 2001 and 2005, the prevalence rate of lifetime asthma among North Dakota adults ranged from 9.1%

to 11.1%. In 2005, the lifetime asthma prevalence rate among children in North Dakota was 9.7% (range 7.8% to 11.6%). According to self-reported asthma surveillance, the prevalence rates of lifetime asthma in adults in North Dakota were similar to the U.S. and American Indian prevalence rates during this period. The method used to assess asthma prevalence rates hinders the statistical detection of changes in asthma incidence at the county-level.

ATSDR appreciates the assistance provided by the EPA, BIA, IHS, the Public Health Agency of Canada and the State of North Dakota. Please contact me if you have any questions or comments regarding this response.

Sincerely,

G. David Williamson

G. David Williamson, PhD
Director
Division of Health Studies
Agency for Toxic Substances and Disease Registry

cc
Tina Forster, Director, Division of Regional Operations (DRO), ATSDR
Clement Welsh, Deputy Director, DRO, ATSDR
Dan Strausbaugh, DRO, Region VIII, ATSDR
Chris Poulet, DRO, Region VIII, ATSDR
Steve Wharton, EPA, Region VIII
Diane Mann-Klager, BIA Great Plains Regional Office
Sarah Patrick, IHS Contract Epidemiologist
Stephen Pickard, Medical Epidemiologist, North Dakota Department of Health

Enclosures:
1. Literature Review and Summary of Potential Adverse Health Effects Associated with Living near and/or Working at an Oil Refinery
2. Baseline Health Assessment for Cancer and Asthma, North Dakota
3. Appendix A. Average Annual Incidence Rates for Selected Cancers, North Dakota and McLean, Mountrail and Ward Counties, 1997-2004, North Dakota Cancer Registry
4. Appendix B. Childhood Reported Asthma, North Dakota

Appendix E – Response to Comments

Response to Comments
on the
Draft Environmental Impact Statement for the
MHA Nation's
Proposed Clean Fuels Refinery Project

The Bureau of Indian Affairs (BIA) and the Environmental Protection Agency (EPA) jointly published the Draft Environmental Impact Statement (DEIS) for the Mandan, Hidatsa, and Arikara Nation's Proposed Clean Fuels Refinery Project in June 2006. The U.S. Army Corps of Engineers (USACE) is a cooperating agency for this National Environmental Policy Act (NEPA) analysis and the Three Affiliated Tribes (Mandan, Hidatsa and Arikara Nation [MHA Nation]) is a Cooperating Sovereign Nation.

BIA and EPA announced the availability of the DEIS and the start of the public comment period in the Federal Register (Volume 71, Number 125, Pages 37092-37093), in press releases and mailed announcements on June 29, 2006. BIA and EPA held seven public hearings on the DEIS in Twin Buttes, White Shield, Parshall, Mandaree, New Town, and Makoti, North Dakota between July 31 and August 5, 2006. Written comments were received until September 14, 2006. Comments (questions and statements) received orally at the hearings were recorded by a court reporter. Additional written comments were received on comment cards at these hearings and in letters to BIA and/or EPA.

This Response to Comments document is organized by topic categories so that similar comments can be responded to collectively. The overall topics for the comments received are:

- National Environmental Policy Act Process
  (DEIS Information and Public Participation)
- Government Responsibilities
  (EPA, BIA, Tribal Government and Joint Responsibilities)
- Project Definition
  (Project Description and Technologies and Alternatives)
- Environmental Impacts
  (Geology, Ground Water, Surface Water, Solid and Hazardous Wastes, Vegetation, Wildlife, Cultural Resources, Air Quality, Socioeconomics, Environmental Justice, Human Health)
- Emergencies, Spills and Safety
- Closure

During the public review period, BIA and EPA received 31 letters submitted by individuals and organizations; 65 people testified at the seven public hearings on the DEIS and 20 comment cards were submitted during the public hearings. BIA and EPA have reviewed and evaluated every letter, card, and oral statement submitted during the public review period. To effectively and efficiently summarize and respond to the comments, the agencies: (1) organized by topic and subtopic, an outline of issues raised (see Response to Comments Table of Contents); (2) evaluated each issue raised in every written or oral statement; (3) categorized each issue and as appropriate, included issues in corresponding topics and subtopics; and (4) responded to every categorized comment. Generally, BIA and EPA used the following approach to responding to comments received on the DEIS:

- When a comment requests further information, the response has been written to point out where in the DEIS the requested information can be found; why such information is not relevant, not available, or not needed; or indicate where new information or clarification of existing information has been added in the Final Environmental Impact Statement (FEIS).

- When a comment challenges information on a specific topic, the response was developed to explain why the information presented was correct, or indicate that inaccurate or unclear information in the DEIS information has been corrected in the FEIS.

- When a comment expressed concern about specific topics or issues addressed in the DEIS, if the concern is relevant to the environmental impacts analysis, the response explains how the issue is adequately addressed in the DEIS, how it is adequately addressed in the FEIS by the addition of new information or by clarification of existing information, or why it cannot or should not be addressed.

- The agencies received numerous comments to which no responses are required. Many commenters expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. Some comments reflect differences in opinions or preferred outcomes, to which an agency response is not appropriate.

Following this approach, BIA and EPA have considered, evaluated, and as appropriate, responded to all comments received. Most comments have been responded to directly in the Response to Comments. Some responses in this document reflect revisions made in the FEIS and/or technical reports. The public comments received on the DEIS have been included in the FEIS as an appendix on CD-ROM. Individual commenter's names are obscured in the transcripts, comment cards and comment letters due to several requests for anonymity. The names of individuals representing corporations, government entities or organizations remain in the comments. Individuals who would like information on where and how their comments were addressed may contact: Steve Wharton in EPA's Office of Partnerships and Regulatory Assistance at 303-312-6935.

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A. NEPA PROCESS

A.1. ADEQUACY OF INFORMATION AND REQUESTS FOR ADDITIONAL INFORMATION

Comment 1: Comments stated the DEIS is inadequate and/or should be withdrawn so that more adequate analysis, more detailed analysis and more complete disclosure of "actual" impacts could be included. A related comment stated the DEIS frequently discounts impacts or characterizes them as benign and that the DEIS instills a false sense of security. Comments asserted all information on impacts was based on projections and not facts and even when information was provided it was technical and very difficult to interpret. Comments also asserted new circumstances and information provided by commenters are significant enough that the DEIS should be rewritten.

Response 1: BIA and EPA prepared the DEIS analysis of projected environmental impacts associated with the proposed project and alternatives in a manner consistent with the requirements of NEPA. The DEIS Affected Environment chapter provides factual information on the current conditions of various environmental resources and the DEIS Environmental Consequences chapter includes our agencies' analysis of potential impacts from the proposed project and alternatives. This approach provides information on both the existing conditions and the potential environmental impacts from the proposed project and alternatives, consistent with the requirements of NEPA. When commenters identified specific DEIS omissions, inconsistencies and/or confusing information presented in the DEIS, the agencies have addressed those comments in the FEIS to the extent possible with the information available. For example, the FEIS clarifies the analysis and information in the air impacts and environmental justice sections, and the health and safety section includes additional baseline information on human health. While we recognize it is always possible, and from some perspectives also desirable, to expand the information in a NEPA document, there must be some realistic limits on the scope and time allotted for the environmental analysis. The DEIS content and public participation processes provided for meaningful opportunities for public participation and are consistent with the requirements of NEPA.

Comment 2: A comment stated that the DEIS and information provided by the project proponent and consultants are extremely deficient due to the failure to identify air emissions and because they provide no security that these emissions will be limited through permit conditions.

Response 2: Table 4-14 in the DEIS (page 4-105) provides information regarding projected air emissions from the facility. The Air Quality section in Chapter 4 of the FEIS includes additional information on air emissions. Based on the projected emissions, a Clean Air Act Prevention of Significant Deterioration (PSD) (related to construction) permit is not required. The refinery will be subject to New Source Performance Standards (NSPS) under the Clean Air Act that will apply to various units and equipment at the refinery. The NSPS in effect when the DEIS went out for public review did not require the refinery to obtain a Title V (operating) permit. However, since that time, the requirement for a Title V permit (operating) was triggered upon the publication of new source NSPS Subpart GGGa. {FEIS changes in Section 4.13.1.1}

Comment 3: There was a request that more information from the *Air Quality Technical Report* be incorporated in readable form into the EIS so that it is readily available.

Response 3: EPA has summarized relevant portions of the revised *Air Quality Technical Report* (December 2007) and included the summaries in the Air Quality section of Chapter 4 in the FEIS. {FEIS changes in Section 4.13.1.1}

Comment 4: A comment stated that the DEIS did not adequately address previously-made scoping comments, including comments on Environmental Justice, various resources, socioeconomic issues, cumulative effects, etc. There was also a request for new scoping for this project.

Response 4: Scoping is an important part of the EIS process and is conducted to identify significant environmental issues for analysis. NEPA scoping regulations require solicitation of public input but do not prescribe the exact method of public participation. During the scoping phase for this project, BIA provided public notice of the scoping process from November 7, 2003 to December 8, 2003, BIA and EPA provided opportunity for public review and comment on the draft scoping report of the EIS from October 1, 2004 to November 18, 2004, held a public meeting on November 9, 2004, at which representatives from both the BIA and EPA were present, and developed a Final Scoping Report. Therefore, BIA and EPA consider that there has been adequate scoping for this project and decline the request for a new scoping process. The Agencies believe the EIS documents adequately address the issues raised during the scoping process.

Comment 5: A comment noted that BIA was previously asked for a copy of "the feedstock" and had not received a response.

Response 5: Requests were made for copies of the FrontEnd Engineering Design (FEED) study from BIA. The FEED study was conducted for the Tribes by their consultants. The Tribes have not provided, nor are required to provide, the study to either BIA or EPA. Individuals requesting this study were informed that they should request the information from the Tribes. BIA and EPA requested and received information from MHA Nation and their consultants pertinent to various analyses for the NEPA process and technical report completion that may have been part of the FEED study.

Comment 6: A comment requested information on who prepared the DEIS.

Response 6: Persons who prepared the DEIS and their affiliation were listed in Chapter 6.0 of the DEIS.

Comment 7: A comment asked why the process of refinery approval is taking such a long time and how long the Tribes will have to wait for the refinery.

Response 7: The refinery must be evaluated under the NEPA process because it involves major federal actions that may significantly affect the human environment. For this project, BIA's decision on accepting the land into trust status and EPA's issuance of a Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit invoke NEPA and the federal agencies are required to conduct an environmental analysis as part of the decision-making process. The NEPA process has specific requirements that must be met and that take time. The NEPA process also includes public involvement periods that have prescribed minimum timeframes. Generally, the more complex a project the more time required to adequately analyze the environmental impacts for the decision-making process.

A.2. AVAILABILITY OF DEIS INFORMATION

Comment 1: There were requests for copies of the appendices and technical reports and concerns that information from the appendices, and technical reports needed to be reviewed but were not readily available. Several comments expressed concerns regarding the time it took to receive the DEIS and/or the technical reports. It was noted that access to technical information was hindered by lack of computer/internet access by Tribal members.

Response 1: The agencies mailed copies of the DEIS to individuals on the mailing list on the same date that the notice of the availability of the DEIS appeared in the Federal Register. Upon request, technical reports were also mailed to interested parties. The agencies posted the DEIS and technical reports on the Internet for review or download (with the exception of the Environmental Justice (EJ) report as discussed below). Copies of the DEIS were also available for public review in each of the MHA Nation segment offices and at the garage in Makoti, ND. Documents were available for public review at the following 11 locations: Bureau of Indian Affairs (Aberdeen, SD and New Town, ND), EPA Region 8 Library (Denver, CO), Three Affiliated Tribes (Legal Department and Office of the Secretary in New Town, ND), Twin Buttes Segment Office, White Shield Segment Office, Parshall Segment Office, Mandaree Segment Office, Four Bears Segment Office, North Segment Office and Rensch Garage in Makoti, ND. Addresses for these offices were included in the public notice and posted on EPA's web site for this project. Addresses and phone numbers of whom to contact in order to receive (paper) copies of these documents were also provided in the notice and on the web. Requests for further information on the DEIS were directed to those same contacts. These contacts were available to assist the public in accessing available information, and to ensure that all questions related to the DEIS were addressed.

Comment 2: Several comments asked how EPA developed the draft "Three Affiliated Tribes Environmental Justice Analysis". Comments also questioned why EPA and BIA released the DEIS for public comment in June 2006, but EPA did not release the draft Environmental Justice analysis until August 2006. Comments stated that the DEIS erroneously listed June 2006 as the publication date for the Environmental Justice analysis and expressed concern that they did not have adequate time to consider and respond to the Environmental Justice analysis.

Response 2: During the summer of 2006, EPA Region 8 developed guidance on incorporating EJ into the Region's permitting process. In anticipation of the issuance of this guidance, Region 8 commenced preparation of an Environmental Justice Tier 1 analysis related to the possible issuance of a Clean Water Act NPDES permit for the MHA Nation's proposed refinery project. The EJ Tier 1 analysis was prepared using EPA's "Tool Kit for Assessing Potential Allegations of Environmental Justice." On August 1, 2006, Region 8 issued guidance entitled "Incorporating Environmental Justice in the Permitting Process." The guidance calls for EPA to determine the appropriate type of EJ assessment that should be conducted for a particular permit (i.e., screening level, level 1, level 2). The guidance further calls for EPA to evaluate, respond to, and address comments on the EJ assessment or other EJ concerns raised during the permit comment period.

While the EJ analysis included in the DEIS satisfies the legal requirements for analysis pursuant to NEPA and its implementing regulations, EPA determined that because the additional information contained in the draft EJ Tier 1 analysis was relevant to the analysis, it would be helpful to reference this report. The draft EJ Tier 1 analysis was completed in August 2006, rather than in June 2006, as referenced in the DEIS. The erroneous reference has been corrected. EPA released the draft EJ Tier 1 analysis as soon as it was completed in August 2006. A revised EJ Tier 1 analysis has been prepared for the FEIS, *Environmental Justice Tier One Analysis for the Mandan, Hidatsa, and Arikara Nation's*

"Clean Fuels Refinery" Project, December 21, 2007. The analysis is available as a technical report and is available on EPA's web site or upon request.

Comment 3: Comment stated the final Scoping Report was not made publicly available until before the release of the DEIS, preventing the public from providing an adequate review and comment on the DEIS.

Response 3: The final scoping report was completed in April 2005. The scoping report was not required to be distributed for public review. The report is available as part of the public record. In addition as discussed on page 2-2 of the DEIS, a draft of the Scoping Report was available for public comment in fall of 2004 and BIA and EPA held a public hearing on November 9, 2004, to take comments on the draft Scoping Report and gather additional information on the proposed scope of the EIS. The Scoping Report and public comment received on the draft Scoping Report was used by BIA, EPA, and the EIS contractors in preparing the DEIS.

A.3. DEIS PUBLIC PARTICIPATION PROCESS

Comment 1: There were a number of requests for additional time to comment on the Draft EIS, technical reports and/or NPDES permit. These comments stated that the comment period coincided with Tribal cultural, social and spiritual events. Deaths of Tribal members, mourning periods, funerals, pow-wows, sundances, school preparations, and campaigns were given as examples. Comments questioned the timing of the public comment period. Comments also stated that such a large and technical document requires time and concentration to review, that the original 60-day comment period was not sufficient time to review of the documents, and also stated that the 14-day extension granted during the hearing process was insufficient.

Response 1: The length of the public comment period is a balance between maintaining a reasonable schedule to complete the environmental review for the project and seeking public comment on the environmental impacts of the proposed action. The Council on Environmental Quality established regulations requiring a minimum of 45 days for public review and opportunity to comment on a DEIS. Section 40 CFR 1506.10. BIA's policy and procedures call for a minimum of 60 days for comment on a DEIS. BIA's NEPA Handbook, 30 BIAM Supplement 1. The development of this EIS began prior to BIA's revision of the NEPA Handbook, 59 IAM 3-H, in May 2005, which establishes a 45-day comment period.

The timing for the public comment period was dictated by when the DEIS was completed. The agencies worked to complete the DEIS in as expeditious a manner as possible given the complexity of the project.

EPA and BIA recognize that reviewing a DEIS takes time that would otherwise be used differently. However, we believe two months should be sufficient time to accommodate such a review, particularly when an additional two weeks were added to the initial 60 days in order to assist those who had not yet completed their review. In addition, there were question and answer sessions prior to each of the public hearings which were attended by BIA, EPA, as well as representatives from the Tribes and their contractors. This afforded the public time to ask questions about the NEPA process, permitting requirements, and technical aspects of the project. The agencies extended the comment period from August 29, 2006 to September 14, 2006, for a total of 76 days. The agencies consider 76 days to be adequate time to review this DEIS.

Comment 2: Comment requested that EPA withdraw the NPDES permit comment period until the DEIS is re-done or at least extended another 90 days.

Response 2: EPA felt that the public notice of the NPDES permit together with the DEIS and the associated public hearings would provide more information to the public than public noticing the NPDES separately. EPA followed the timeframe of the DEIS and any extensions granted for the DEIS review were also granted for the NPDES permit. After the FEIS wait period, the EPA will issue a record of decision (ROD) regarding issuance of the EPA's NPDES permit. Following issuance of the final decision (ROD), EPA will issue the final permit. The effective date of the permit will be 30 days following issuance.

Comment 3: Comment stated the public participation process was insufficient and suggested that opportunities for public education on NEPA and more systematic efforts to involve communities in NEPA were needed, citing the National Environmental Justice Advisory Council, report of the Environmental Justice Enforcement and Compliance Assurance Roundtable, U.S. EPA, Oct. 1996. Comments stated there was a lack of educational opportunities for the public to learn about the pros and cons of the refinery and a lack of concern for ensuring the public was educated about the refinery resulted in an absence of trust in those associated with the refinery.

Response 3: Recognizing the dispersed population in the project vicinity, BIA and EPA provided additional opportunities for public outreach than are typically offered and more outreach than that prescribed by the NEPA regulations. BIA and EPA conducted public hearings at seven different locations, and copies of the DEIS were provided at 11 different locations (nine of which were local to the project area) as well as on two internet sites. In addition, the comment period on the DEIS was initially 60 days, rather than the prescribed 45 days and the agencies extended the comment deadline by two weeks. BIA and EPA also set up one-hour listening sessions before each of the public hearings to provide the public an opportunity to ask questions about the EIS, the project and the NEPA process.

Comment 4: Comment inquired about whether there are loans/grants available for public outreach and education to assist Tribal members in learning about environmental issues.

Response 4: There are two kinds of grants available: Environmental Justice Small Grants (EJSG) and Community for a Renewed Environment (CARE) Program grants. EJSG are competitive grants designed to provide funding for eligible applicants working on, or planning to work on, a project that addresses a local environmental and/or public health issue within an affected community. The EJSG Program is a multi-statute program designed to help communities understand and address their exposure to multiple environmental harms and risks. The primary purposes of the proposed projects should be to create and/or develop collaborative partnerships, educate the community, develop a comprehensive understanding of environmental and/or public health issues, and identify ways to address these issues at the local level.

The long-term goals of the EJSG Program are to help build the capacity of an affected community and create self-sustaining, community-based partnerships that will continue to improve local environments in the future. An eligible applicant must be either: a 501 (c) (3) non-profit organization as designated by the Internal Revenue Service; or a non-profit organization, recognized by the state, territory, commonwealth, or tribe in which it is located. In addition, an eligible applicant must be able to demonstrate that is it has worked directly with, or provided services to, the affected community.

An "affected community" for the purposes of this program, is a community that is disproportionately impacted by environmental harms and risks and has a local environmental and/or public health issue that is identified in the proposal. The focus of this assistance agreement program is to build the capacity of community-based organizations to address environmental and/or public health issues at the local level. These assistance agreements require that each project must include activities that are related to Federal environmental statutes including the: Clean Water Act, Safe Drinking Water Act, Solid Waste Disposal Act, Clean Air Act, Toxic Substances Control Act, Federal Insecticide, Fungicide and Rodenticide Act, or Marine Protection, Research and Sanctuaries Act. For more information, please refer to: http://www.epa.gov/compliance/environmentaljustice/grants/index.html.

The Community for a Renewed Environment (CARE) Program is a unique competitive, community-based, community driven, multimedia demonstration program designed to help communities understand and reduce risks due to toxics and environmental pollutants from all sources. The CARE grant program will help communities form collaborative partnerships, develop a comprehensive understanding of the many sources of risk from toxics and environmental pollutants, set priorities, and identify and carry out projects to reduce risks through collaborative action at the local level. CARE's long term goal is to help communities build self-sustaining, community-based partnerships that will continue to improve human health and local environments into the future. EPA awards two types of cooperative agreements under this program: Level I and Level II cooperative agreements. Level I cooperative agreements will support the following types of activities: forming community-based collaborative partnerships; developing a comprehensive understanding of the many sources of risk from toxics and environmental pollutants; and setting community risk reduction priorities. The Level II cooperative agreements will fund activities to identify and demonstrate actual risk reduction projects "on the ground" in their community. Level II agreements are for communities that have already completed the actions typically taken in a Level I agreement. However, receipt of a Level I cooperative agreement is not a prerequisite to receiving a Level II cooperative agreement.

To be selected for funding, a project must consist of activities within the statutory terms of EPA's research and demonstration grant authorities. Most of the statutes authorize financial assistance for the following activities: "research, investigations, experiments, training, demonstrations, surveys and studies."

Local, public non-profit institution/organizations, Federally recognized Indian Tribal government, Native American organizations, Private nonprofit institution/organizations, quasi-public nonprofit institution/organizations both interstate and intrastate, local government, colleges, and universities are all eligible. For more information, please refer to: www.epa.gov/care. For other grants that may be available please check: www.grants.gov

Comment 5: Comment requested that EPA hold additional public hearings on the EIS after the EJ analysis is available.

Response 5: The federal agencies will consult with the Tribes prior to issuance of the FEIS, but will not schedule additional public hearings. EPA and BIA are planning to hold a public meeting or open house after the FEIS is published.

Comment 6: Comment stated there is a silent majority of individuals who would not come to the hearing to speak, so it is much better for the agencies to go out and talk to people. Comments stated concerns of intimidation; fears of retaliation by the Tribal government, including the potential to exacerbate lay-offs that were underway during this time period; general reluctance to participate based on historical suspicions of government motives and oppression. A comment also stated that rebuttals during the public meetings were "attacks" on commenters.

Response 6: The agencies and Tribal representatives have been available throughout the NEPA process via phone or through correspondence. In addition, EPA and BIA conducted a public hearing on the scoping report in 2004. Before the public hearing on the scoping report, a meeting was held with concerned citizens and EPA's Environmental Justice staff on community issues. There were question and answer sessions prior to each of the public hearings for the DEIS which were attended by BIA, EPA, and representatives from the Tribes and their contractors. These sessions afforded the public time to ask questions about the NEPA process, permitting requirements, and technical aspects of the project.

Judge Elyana Sutin, who presided over the public hearings, encouraged participants to mail, hand carry, or telefax written comments on the DEIS to the EPA and BIA, if speaking publicly was uncomfortable. Specific contact information was provided in a brochure available at the hearings, and comment cards were handed out to participants who that might want to submit written statements. Judge Sutin stated in her opening instructions that rebuttals to someone else's comments were not appropriate. This was reinforced during some testimonies, so that any rebuttals that did occur were cut short.

Comment 7: Comment criticized the absence of BIA and EPA at the early (September 2003) meetings about the project where the commenter claimed Tribal officials and Triad were promoting the project and giving the impression that it was a "done deal", but did not provide information about the project or its impacts or appear receptive to open dialog or expressed concerns.

Response 7: The September 2003 meetings referenced in this comments were informational meetings organized by the Tribal government and were not part of the formal NEPA process, thus federal agency representatives were not present. The meetings occurred prior to the start of the formal scoping process for the EIS which began on November 7, 2003 with the publication of the Notice of Intent to Prepare an EIS in the Federal Register. The meetings provided information about the proposed refinery and NEPA process. Comments received during these meetings were considered by the Tribes and Federal Agencies.

Comment 8: Comment indicated concern about the length of time to speak at the public hearings and questioned why the Tribal Chairman was afforded time to make an opening statement at each of the hearings.

Response 8: Each presenter at the public hearings was afforded at least 5 minutes to make a statement. Most people were provided as much time as they needed; however, in order to provide time for everyone, some were asked to conclude their statements when they had spoken for over 20 minutes. If time was available at the end of the public hearing, speakers were allowed to continue giving testimony. Many speakers spoke at several of the seven public hearings. The Tribal Chairman, as spokesperson for the project and in recognition of the Tribes' status as a Cooperating Sovereign Nation for this DEIS, was offered the opportunity to make an opening statement at each of the public hearings.

Comment 9: Comments expressed concern that EPA's Environmental Justice staff did not respond to requests for assistance during the development of the DEIS.

Response 9: In late 2004, the Fort Berthold Environmental Awareness Committee (the "Committee") requested a meeting with EPA EJ staff to discuss the proposed refinery project. EPA EJ staff met with the Committee in November 2004. EPA EJ staff attempted on numerous occasions to follow up on this initial meeting with the Committee's designated point of contact. EPA also sought assistance in these efforts from the Indigenous Environmental Network. In spite of these early efforts, EPA EJ staff and the Committee did not engage in further substantive discussions until April 2006.

Comment 10: Comment requested further opportunities for questions to be answered.

Response 10: Diane Mann-Klager of BIA can be reached at 605-226-7621 and Steve Wharton of EPA can be reached at 303-312-6935 for further questions regarding the EIS. Bob Brobst of EPA can be reached at 303-312-6129 for questions regarding the NPDES permit.

B. GOVERNMENT ROLES AND RESPONSIBILITIES

B.1. EPA RESPONSIBILITIES

Comment 1: Comments stated EPA should proceed with the NPDES permitting process so the refinery can be built and the federal agencies should remain focused on the issues, such as NPDES permitting and not stray into issues unrelated to the regulatory process.

Response 1: EPA and BIA are required by NEPA to analyze the impacts of major federal actions on the human environment. By statute and policy, the federal agencies are required to look at the full range of impacts on the environment, cultural resources, and socioeconomics regardless of agency regulatory authority. EPA and BIA cannot complete their actions on this project until an adequate NEPA analysis has been completed.

Comment 2: Comment that EPA should provide additional expertise specifically on oil refinery air emissions to reassess the project, including review of the project's lack of a PSD permit far beyond minimal assessment provided by the project proponents and their consultants.

Response 2: EPA staff with oil refinery expertise have evaluated the emissions information for the project and reached the conclusion that a PSD permit (construction permit under the Clean Air Act) is not required for the refinery based on the proposed equipment, emissions projections, and feedstocks.

Comment 3: Comment indicating concern about how well-funded and qualified EPA will be to monitor the refinery.

Response 3: The majority of monitoring requirements under EPA permits are conducted by the permitted facility. However, EPA will occasionally inspect the facility and monitor wastewater discharges. If a RCRA TSD permit is not required for the facility (Alternative 4 and A), it is unlikely that EPA would monitor ground water. Some unit specific monitoring for air quality will be required under the New Source Performance Standards (NSPS). Additionally, the Tribes' Environmental Program plans to install and operate a new "ambient" air quality monitoring station near the refinery. The ambient monitoring station will not specifically monitor air emissions from the refinery. Instead the monitoring station will collect background air quality data near the site for SO_2, NO_2 and $PM_{2.5}$; and meteorological conditions prior to construction and operation of the refinery. Air quality data for the same pollutants will be collected during operation of the refinery and compared to the background data to verify the modeling results of minimal impacts from the refinery to the National Ambient Air Quality Standards (NAAQS).

B.2. BIA RESPONSIBILITIES

Comment 1: There were comments regarding BIA's process for acquiring the land into United States ownership in trust for the Tribes. These comments included questions on acquisition of land into trust status that may become contaminated, burden on taxpayers, and burdens on the BIA Fort Berthold Agency.

Response 1: The Indian Reorganization Act of 1934, 25 USC § 465, is the general source of authority for the Secretary of the Interior to acquire land for Indians. The land acquisition policy for the Secretary of the Interior is provided in 25 CFR Part 151. The authority to acquire land in trust status for this application is considered discretionary by the Secretary as the acquisition is not mandated by legislation. This proposed acquisition is considered to be an on-reservation acquisition as this property lies within the exterior boundaries of the Fort Berthold Reservation. Therefore, the BIA must consider all of the criteria listed in 25 CFR Part 151-Land Acquisitions, including those requirements listed for on-reservation acquisitions in 25 CFR § 151.10, when reviewing the Tribes' application for acquisition of this land in trust status. These criteria are:

a. the existence of statutory authority for the acquisition and limitations contained in such authority;
b. the need of the individual Indian or the tribe for additional land;
c. the purposes for which the land will be used;
d. if the land is to be acquired for an individual Indian, the amount of trust or restricted land already owned by or for that individual and the degree to which assistance in handling their affairs is needed;
e. if the land is to be acquired in unrestricted fee status, the impact on the State and its political subdivisions resulting from the removal of the land from the tax rolls;
f. jurisdictional problems and potential conflicts of land use which may arise;
g. if the land to be acquired is in fee status, whether the BIA is equipped to discharge the additional responsibilities resulting from the acquisition of land in trust status; and
h. the extent to which the applicant has provided information that allows the Secretary to comply with 516 DM 6, Appendix 4, National Environmental Policy Act Revised Implementing Procedure, and 602 DM 2, Land Acquisitions: Hazardous Substances Determinations.

Originally, the authority to acquire on-reservation land into trust was delegated to the Fort Berthold Superintendent pursuant to authority delegated to the Assistant Secretary-Indian Affairs by 209 DM 8, 230 DM 1, to the Great Plains Regional Director by 3 IAM 4 (Release No. 00-03), and to the Superintendents by Great Plains Regional Addendum 3 IAM 4 (Release No. 0502). In April 2007, the Regional Director, under his authority as delegated from the Secretary, assumed jurisdiction for decision from the Fort Berthold Agency to his office. In April 2008, the Assistant Secretary – Indian Affairs assumed jurisdiction to make a final determination regarding the Tribes' application due to take the land on which the refinery would be constructed into trust.

The Assistant Secretary must consider each of the above criteria in his decision whether or not to acquire the land in trust status. The criteria are not weighted or ranked as to importance. The analysis of the criteria must be included in the Administrative Record of the decision for this application.

The State and its political subdivisions have provided information on the impacts of removal of this land from the tax rolls. The information has been provided to the Tribes for response. This will be considered with the other criteria in the decision on this application.

The Department must analyze whether the BIA is equipped to discharge the additional responsibilities resulting from the acquisition of land in trust status. An analysis of the services required by the acquisition of the property in trust and how the BIA is able to provide the required services will be conducted.

The Departmental Manual on Land Acquisitions: Hazardous Substances Determinations, 602 DM 2, refers to the Department of the Interior's policy on acquiring land with the presence or potential presence of contamination. In accordance with the policy, a pre-acquisition Environmental Site Assessment was completed in November 2004. See Phase I Environmental Site Assessment, Makoti, North Dakota. A second Phase I Environmental Site Assessment was completed in January 2008 to comply with requirements for BIA decisions on the acquisition of land into trust status.

This EIS will provide information to the Assistant Secretary on the environmental impacts of the proposed use of the land that BIA is being requested to acquire in trust status. These impacts will be considered with the other criteria in the decision. All land and activities on the land in trust status must adhere to Federal laws and regulations unless specifically exempted.

The Assistant Secretary's decision will be final for the Department of the Interior. A party wishing to appeal must therefore appeal the decision to the appropriate federal court. If the Assistant Secretary approves the Tribe's application, section 151.12 requires the publication in the *Federal Register* or in a local newspaper a notice of the decision to acquire the land into trust for the Tribes. The notice will state that the final agency determination to take land into trust has been made, and that the Secretary shall acquire title in the name of the United States for the Three Affiliated Tribes, no sooner than 30 days after the notice is published.

Comment 2: There were some comments regarding the process times for BIA's acquisition of land into trust, including a request to expedite this acquisition of land into trust status and a question of why this application was being processed ahead of other applications.

Response 2: The processing time for an acquisition of land into trust status varies with the type of land, location, and purpose. A simple application is one for land that is within the exterior boundaries of the reservation and would continue to be used for the same purpose, such as agricultural land that will remain agricultural land. Depending upon the actions needed to obtain a clear title, the process may take up to two years. More complex applications such as those for gaming purposes or for other economic development, or those outside of the reservation boundary generally take more time because there are additional issues and concerns that must be analyzed. In addition to the time required to obtain a clear title and comply with applicable regulations such as NEPA, the procedures for resolution of any appeals can also extend the total time to acquire land in trust status.

On March 17, 2003, the Three Affiliated Tribes submitted a written request for trust acquisition to BIA's Fort Berthold Agency by Tribal Resolution No. 03-020-RP dated March 14, 2003. The resolution requested that the BIA acquire land into trust for the Three Affiliated Tribes for the future site of the MHA Nation Clean Fuels Refinery. The decision on the Tribes' application for this acquisition of land into trust status will impact the economic condition of the Tribes, and requires careful analysis by the BIA. However, the BIA can and is working on several cases simultaneously for individual applicants or the tribe during their individual phases. The BIA has referred the concerns expressed at the public hearings about the time for processing applications to the Great Plains Regional Director and Fort Berthold Superintendent.

Comment 3: Comment conveying concern about BIA accepting the land into trust and the management issues regarding that land, including whether it would place a burden on the current taxpayers and schools in the area.

Response 3: Please refer to Response 1 in this section. The Department must consider each of the 25 CFR § 151.10 criteria in its decision whether or not to acquire the land in trust status. The impact from the removal of the land to the State and political subdivisions is analyzed under criteria contained in 25 CFR § 151.10 (e).

The proposed project is located on fee land within the exterior boundaries of the Fort Berthold Indian Reservation. If acquired in trust, this property would be treated the same as other trust land within the boundaries of the reservation, and would thus be exempt from State and local taxation. The BIA believes the impact of the removal of the tax assessment would be minimal since the tax levy and other services would be addressed by the BIA and/or Tribe and would not have to be provided by Ward County.

If the land is placed into trust status, jurisdiction would be then be transferred to the BIA Law Enforcement and other services would be provided by the BIA and/or Tribe, which are equipped to assume the additional responsibilities.

Comment 4: Comment requested BIA technical assistance to stop the project.

Response 4: The BIA has provided technical assistance on the acquisition of land into trust status and the NEPA process to any individual or Tribe who has requested it. The BIA is responding to the Tribal government's application for the acquisition of land into trust status for economic development, specifically for construction and operation of a petroleum refinery and to produce buffalo forage. See also response C.1.(a) regarding support or opposition to the refinery.

Comment 5: There were some comments on BIA facilitation in requesting a referendum on the refinery and interactions with the Three Affiliated Tribes Business Council.

Response 5: The Secretary of the Interior must call an election on any proposed amendment to the Tribes' constitution when requested by a two-thirds vote of the Tribal Council, or upon presentation of a petition signed by one-third of the qualified voters pursuant to the Indian Reorganization Act Constitution of the Three Affiliated Tribes Business Council. Unless specifically requested or otherwise provided by regulation, the Secretary of the Interior cannot become engaged in operations of a Tribal government.

Comment 6: There was a comment regarding BIA's responsibility for monitoring to detect contamination of the land or water.

Response 6: BIA is not an enforcement agency for environmental laws. BIA is required to comply with Federal environmental laws that apply to land held in trust status.

Comment 7: Comment asked for the proposed date of the ROD for BIA's decision.

Response 7: The ROD for BIA's decision will be available after the 30 day wait period for the Final EIS in accordance with applicable NEPA regulations.

Comment 8: Comment asked how BIA incorporates or applies the draft and final EIS documents into its decision.

Response 8: Refer to Response 1 under B2. The EIS is one of several criteria that are considered by the Approving Official in acquiring the land into trust status.

Comment 9: There was a comment concerning permits for haying.

Response 9: A permit for haying would be required if the land is under a BIA Agricultural lease as per 25 CFR § 162 or a Grazing permit as per 25 CFR § 166. A permit would not be required if the Tribes manage the land unless there was a comparable Tribal regulation requiring a permit for that activity.

Comment 10: Comment asked whether the business plan would be available to Tribal members.

Response 10: As the economic viability or the financial aspects for the project are not part of the Federal Agency decision making process, a business plan has not been requested by the agencies. The BIA reviews business plans for economic benefits associated with the proposed business purpose for off-Reservation acquisitions or business lease agreements.

According to 25 CFR § 151.3(a)(3), land may be acquired in trust status for a tribe "[w]hen the Secretary determines that the acquisition of the land is necessary to facilitate Tribal self-determination, economic development, or Indian Housing." This clause does not require the Secretary or his designated official to mandate that the Tribe go into great detail regarding their intended use of the land, but that they specify what it will be used for. As long as Tribes or Individual Indians meet all of the criteria regarding these acquisitions for trust status according to 25 CFR § 151, the Secretary of the Interior or his designated Approving Official may approve the fee to trust transactions. The Approving Official must ensure that all of the required steps regarding these land acquisitions are completed appropriately before approval.

B.3. TRIBAL GOVERNMENT RESPONSIBILITIES

Comment 1: There were a number of comments regarding Tribal Council support of the project without having acquired support of the Tribal membership, distrust of the Tribal government, including the Tribes' handling of revenue from the refinery and accountability. There were also comments stating the refinery will support Tribal sovereignty and the Tribal Council understands the entity that manages the refinery will have to be insulated from Tribal politics and that it will have to be run as a business.

Response 1: As part of the well-established federal policy of respect for Tribal self- government, the BIA defers to tribes and Tribal members to resolve intra-tribal disputes. Therefore, BIA will provide these comments to the Tribes for consideration.

Comment 2: Comments requested that the Tribes hold a referendum on whether or not the refinery should be built.

Response 2: BIA and EPA have referred these comments to the Tribal government for consideration. In addition, please note that the Constitution of the Three Affiliated Tribes has an article on referendums, Article VIII. It states that upon receipt of a petition signed by at least 10 percent of the qualified voters of each community and demanding a referendum on any proposed or enacted ordinance or resolution of the Tribal Business Council, the Council shall call an election and the vote of a majority of the qualified voters voting in such referendum shall be binding upon the Tribal Business Council, provided that at least 30 percent of the eligible voters shall vote in such referendum.

Comment 3: Comments questioned the Tribes' ability to maintain and operate the refinery and questioning the Tribes' training and knowledge about health impacts.

Response 3: The MHA Nation, as owner and operator, will be required to ensure that the refinery operates in compliance with all applicable federal laws, including federal environmental and health laws and regulations. The MHA Nation states that the Tribes will have a management team in place to handle the day-to-day operations and that this team will be qualified to maintain and operate the refinery. The MHA Nation has also indicated that the Tribes are working with BIA, IHS, and other agencies on health issues

Comment 4: Comment requested information on Tribal environmental laws, rules, regulations and protections that apply to the proposed refinery.

Response 4: For information regarding Tribal laws and regulations, please contact the Tribal Secretary's Office or the Tribal Legal Department at 701-627-4781.

Comment 5: Comment on the potential liability of the Tribes for accidents, explosions, fires, spills, health impacts.

Response 5: The MHA Nation as owner and operator of this facility will be required to ensure that the refinery is constructed and operates in compliance with all applicable federal laws, including federal environmental and health laws and regulations. Failure to do so may result in federal enforcement actions. In addition, the MHA Nation has stated that it is setting up a fund to cover the costs of mitigating accidents such as spills, fires and explosions. For more information, see the April 19, 2007 letter regarding financial assurance from the Three Affiliated Tribes to Robert E. Roberts EPA Region 8 in Appendix D of FEIS.

Comment 6: Comment that the Tribes should address clean up for the facility.

Response 6: Any clean up actions will need to be performed in compliance with applicable federal laws and regulations. In addition, the MHA Nation has stated that the Tribes' management team for the refinery will establish industry standards and the environmental mandates to ensure clean up for the facility.

Comment 7: Comment on the potential for legal conflicts with the State over taxation, zoning, and jurisdiction that could erode Tribal sovereignty.

Response 7: This comment raised issues that are beyond the scope of this NEPA analysis.

Comment 8: Comments requested that Tribal Council representatives meet with individuals with concerns about the refinery, provide Tribal members with more information, and hold a public hearing.

Response 8: BIA and EPA have provided these comments to the Tribes for consideration.

B.4. JOINT GOVERNMENT RESPONSIBILITIES

Comment 1: Comment that the federal government is pushing this process forward and ignoring the will of the sovereign people.

Response 1: The MHA Nation is the proponent for the project. The Tribes have presented BIA with an application to acquire land into trust status for the proposed refinery. The Tribes have also applied to EPA for a NPDES discharge permit for the proposed refinery. In response to the Tribes' requests, the federal agencies have prepared the EIS so that they may consider the environmental impacts of the proposed project when making their respective decisions about acquiring the land into trust status and issuing the NPDES discharge permit.

Comment 2: Comments expressed concerns about the capability of EPA, BIA and the MHA Nation to ensure that the facility would be consistently operated and maintained in a manner to avoid pollution, and adequately limit/control pollution emissions. Additional comments asked what would happen after the refinery is built and begins operation, if the facility was not designed as proposed, emissions are greater than proposed in the DEIS or some of the pollution prevention measures are not installed or do not perform adequately. Another commenter expressed concerns that standards would be waived by the regulatory agencies or violations would be overlooked.

Other comments were submitted regarding citizen complaints, monitoring and enforcement including: who will respond to and investigate citizen complaints; who will conduct independent review of emissions and other reporting and how often; who will monitor the refinery's records; how often and will that information be made publicly available; who will investigate discrepancies or violations of improper reporting and take enforcement actions; and who will pursue legal actions when administrative penalties have failed to bring continuous compliance?

Response 2: The owner and operator of the refinery, the MHA Nation, is responsible for the proper design, construction, operation and closure of the facility. EPA, as authorized by Congress, directly implements the federal environmental protection laws and regulations as they may apply to this facility including, but not limited to, the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Safe Drinking Water Act and Oil Pollution Act.

EPA's NPDES permit contains effluent limits and monitoring requirements with respect to wastewater discharges to surface water. EPA is authorized to take enforcement actions against a facility if conditions of a permit are violated, such as if effluent limits are exceeded, or if there is a failure to monitor. NPDES permit discharge monitoring information is available to the public.

Estimated air pollution emissions from the proposed refinery are below the pollution thresholds for a Clean Air Act "major source" permit under the Prevention of Significant Deterioration (PSD) construction permitting program and under the Title V operating permit program. Currently, there is no federal program for minor sources of air pollution emissions. If air emissions are later found to exceed any of the "major source" permitting thresholds, EPA can take enforcement actions and require the facility to obtain the appropriate "major source" permit(s). The proposed refinery will be subject to several Clean Air Act New Source Performance Standards (NSPS) (40 CFR part 60), which will impose emission limits, fuel gas specifications and design requirements. NSPS requirements include testing, monitoring, record keeping, and reporting of emissions for many of the refinery units. These specific applicable NSPS requirements are discussed in more detail in section D.8 of this Response to Comments document, and in Sections 3.12 and 4.13 in the FEIS.

EPA has also promulgated NSPS, subpart GGGa (November 16, 2007), which triggered the requirement for the refinery to apply for a 40 CFR Part 71 operating permit within 12 months of commencing operation. EPA is also promulgating new regulations to establish a preconstruction air permitting program for "minor" stationary sources throughout Indian country. The rule was proposed in the August 21, 2006 *Federal Register.* The effective date for implementing the new regulations is anticipated to be 60 days after the final regulations are published in the *Federal Register*. These regulations may apply to the proposed facility depending upon when construction on the refinery commences relative to the effective date of these regulations.

Routine ambient air quality monitoring is not currently conducted in this area. In 2007, EPA worked with the Tribes' Environmental Division on revisions to their Annual Network Review, which is a review of the Tribes' current monitoring network to determine if monitoring needs for the Reservation are being met. One of EPA's comments on the Annual Network Review suggested siting an air monitoring station near Makoti and the proposed refinery location prior to construction of the refinery. The Tribes' Environmental Division is currently in the process of locating and commencing operation of a monitoring station near the proposed refinery site to monitor for SO_2,, NO_2 and $PM_{2.5}$. Currently there are no plans to monitor hazardous air pollutants.

EPA's ability to regulate the management of hazardous wastes at the facility depends on the selected alternative. All alternatives except Alternative 4 and A require a RCRA Treatment Storage and Disposal (TSD) permit under 40 CFR Part 264. Any RCRA TSD permit issued by EPA would include requirements for proper design and operation of hazardous waste management units. A RCRA TSD permit would also contain a number of other specific requirements, including: ground water monitoring, corrective action, financial assurance, training, inspections, emergency response plans, closure, and reporting requirements. No hazardous wastes are planned to be disposed of onsite.

If the proposed refinery qualifies for RCRA "generator-only" status, under Alternative 4 and A, it will not be required to obtain a RCRA TSD permit. The facility would be subject to the RCRA generator requirements of 40 CFR Part 262. As a generator, the proposed refinery would be required to, among other things: 1) notify EPA of the initiation of hazardous waste activities and obtain an EPA identification number; 2) properly store hazardous wastes and appropriately label containers used to store or transport hazardous wastes; 3) use a manifest to track hazardous waste shipments from the site of generation to their final destination; 4) maintain records and file reports of all hazardous waste activities with EPA; 5) institute waste minimization procedures to reduce the amount of toxicity of hazardous wastes; and 6) prepare, maintain, and implement as needed, required contingency plans. In addition, the proposed facility would be subject to RCRA generator closure performance standards and procedures related to disposal or decontamination of equipment, structures, and contaminated soils.

If the facility were to lose its generator status, EPA could require the facility to obtain a RCRA TSD permit. The facility could lose its generator status in a number of ways. For example, the facility could lose its generator status by: 1) storing hazardous waste onsite for greater than 90-days, 2) disposing, discarding, or abandoning hazardous wastes onsite (this would include failure to clean-close hazardous waste management units), 3) placing listed or characteristic hazardous wastes in non-hazardous waste management units, and 4) allowing or not correcting routine or systematic releases of hazardous wastes or hazardous waste constituents to the environment. If the generator requirements are violated, EPA could take enforcement action as appropriate in lieu of or in addition to requiring a RCRA permit.

There is no federal program protecting ground water in a manner similar to the Clean Water Act, which protects surface water. Ground water would be required to be monitored as part of the RCRA TSD permit for all Alternatives except for Alternative 4 and A. For Alternative 4 and A, the agencies have recommended that the refinery develop a ground water monitoring program. If the wastewater would be disposed into an injection well(s) (Alternative C), the refinery would be required to obtain an Underground Injection Control permit which would include monitoring and construction requirements. The UIC program has both inspection and enforcement authorities.

Comment 3: Comment asked if the public could inspect the refinery with an expert of its choosing.

Response 3: Members of the public and their representatives would not generally be allowed to inspect the refinery, although the refinery might provide tours to members of the public or their representatives if requested. Inspections would be conducted by federal regulatory agencies and Tribal officials.

Comment 4: Comment encouraged the co-leads and cooperating agencies to expeditiously approve the applications and issue the Clean Water Act (CWA) NPDES and 404 permits to allow the project to proceed.

Response 4: EPA has released the NPDES draft permit for public review and comment. EPA will make a decision on issuance of the NPDES permit and BIA will decide whether to acquire the land into trust status after the EIS process is complete. The U.S. Army Corps of Engineers will make a decision on issuance of the CWA 404 permit after receipt of an application, which will incorporate information from this NEPA process.

Comment 5: Comment expressed concerns about the DEIS in conjunction with the Memorandum of Understanding (MOU) among EPA, BIA and the MHA Nation, stating that an amendment to the MOU making EPA a Co-Lead agency on the EIS has not been signed by the MHA Nation. Comment that the public does not know the decision-making processes of federal agencies based on the MOU. Comment asked if the MOU obligated the MHA Nation to implement NEPA.

Response 5: EPA, BIA and the MHA Nation have agreed to and signed the MOU amendment. The MOU and MOU amendment do not affect the required content or status of the EIS, but outline the roles and responsibilities of each agency and the MHA Nation to help the NEPA process run more smoothly. BIA and EPA, and potentially the USACE are responsible for implementing NEPA, as the federal agencies taking major federal actions associated with the proposed project. The MHA Nation does not have a NEPA obligation.

Comment 6: Comment asked who will be accountable for addressing Tribal members' environmental concerns and providing Tribal members with information concerning the refinery.

Response 6: For environmental concerns which have permitting requirements such as the NPDES permit, information on monitoring and compliance with the permit requirements and NSPS (CAA) reports will be available from EPA. Other environmental information developed by the MHA Nation as the refinery operator would not be available from EPA or BIA.

Comment 7: A comment stated that EPA and BIA should fulfill their trust responsibilities to the Tribes with respect to this project.

Response 7: The federal government has a trust responsibility to federally-recognized Indian tribes that arises from Indian treaties, statutes, executive orders and the historical relations between the United States and Indian tribes. With regard to the proposed project, EPA and BIA have continuously consulted with the Three Affiliated Tribes on a government-to-government basis, and have proceeded and will continue to proceed in a manner consistent with the federal trust responsibility.

C. PROJECT DEFINITION

C.1. PROJECT DESCRIPTION AND TECHNOLOGIES

C.1.(a). Support For and Opposition To the Refinery

Comment 1: Comments received in support of the refinery included statements that the environmental impacts of the refinery would be minimal; that the refinery will bring much-needed jobs, money, and economic benefit to the Tribes; the refinery will make the Tribes leaders in energy production; in support of the biodiesel to be produced at the refinery; urging EPA to approve the NPDES permit; discussing how owning and operating the refinery will enhance the Tribes' sovereignty; that the Tribes do not intend to sell the refinery, but to own it and manage it using a Tribal entity; and that the refinery will be environmentally safe with minimal impacts to the environment.

Comment 2: Comments received in opposition to the refinery include statements: in support of Alternative 2 (land put into trust with no refinery built); in support of Alternative 5 (no action); in support of effluent discharge Alternative D (no action, no NPDES permit); and opposing the refinery because of concerns about impacts to health from potential air, ground water, surface water and soil contamination and potential impacts to wetlands; and concern about the Tribal government profiting from the project.

Responses 1 and 2: The agencies have noted these comments.

C.1.(b). Project Description

Comment 1: Comments stated that the project descriptions were incomplete and requested that the incomplete project descriptions and discrepancies be addressed, including air emissions controls such as compressors to prevent flaring, and other standard controls.

Response 1: The agencies have attempted to ensure the project information in the EIS is complete and correct. However, because the environmental analysis is conducted before the final design, some specific design details are not available. The EIS describes the preliminary design of the proposed refinery (and alternatives), including the site layout of the refinery and process units. Appendix A of the *Air Quality Technical Report* (May 2006) lists the emission controls for each proposed refinery unit. The *Air Quality Technical Report* (December 2007) has been revised to include applicable NSPS requirements for each regulated refinery unit, which will impose emission limits, fuel gas specifications, or design requirements and require testing, monitoring, record keeping, and reporting. The Air Quality section in Chapter 4 of the FEIS summarizes the emission controls and the applicable NSPS requirements.

Comment 2: Comments stated that the DEIS included inconsistencies in proposed refinery capacity – 10,000 versus 15,000 bpsd (barrels per stream day)(BPSD).

Response 2: As stated on page 2-7 of the DEIS and on page 3-2 of the May 2006 *Air Quality Technical Report*, the proposed refinery would process 10,000 BPSD synthetic crude oil, 3,000 BPSD of field butane, 6 million standard cubic feet per day (MMSCFD) of natural gas, and 300 barrels of biodiesel. Emissions projections in the *Air Quality Technical Report* are based on these feedstocks. Product from the refinery (see page 2-7 of the DEIS) would consist of about 5,750 BPSD of diesel fuel, 6,770 BPSD of gasoline, and 300 BPSD of propane or about 13,000 BPSD of product (not 15,000 BPSD). The FEIS has been revised to account for any discrepancies in the feedstock and product capacities.

Comment 3: Several comments addressed the source of feedstock for the refinery. Comments inquired where the oil will come from and how much will be needed. Comment stated that the refinery should use Williston Crude feedstock. Some comments raised concerns regarding the use of sour crude oil which would contain hydrogen sulfide gas.

Response 3: The preliminary design for the proposed facility utilizes synthetic crude from the Alberta tar sands which is a low sulfur feedstock. The facility has not been designed to accept local crude products which would require additional refining similar to the upgrading that is performed on the bitumen from the Alberta tar sands to form synthetic crude.

Comment 4: Comment asked how much chlorine would be used and stored at the refinery and whether any chlorine would arrive in 90-ton or 180,000 pound railroad tank cars.

Response 4: Refineries frequently use chlorine gas on-site. Typical uses for chlorine at refineries are to treat water to reduce fouling and to disinfect treated wastewater. The preliminary design does not identify any chlorine gas use at the proposed refinery; however there is a possibility as the design is finalized chlorine gas may be used. The facility could also use liquid or solid forms of hypochlorite instead of chlorine gas. If the refinery opts to truck employee wastewater to a municipal wastewater treatment plant, then one of the areas of chlorine use at the facility would be eliminated.

Comment 5: Comment recommended a change in the project purpose – rather than stating the remaining acreage will be used for growing hay for bison, the use of the land parcel should be for "uses determined by the management goals and objectives of the Three Affiliated Tribes."

Response 5: The Tribe must define the proposed use of the land being acquired into trust status as part of the application process, 25 CFR §151.10(c). The proposed use of the land was designated by the Tribe as 190 acres for the refinery and 279 acres for growing hay. If the Tribe decides to change uses of the land after it is acquired into trust status, additional NEPA compliance may be necessary.

Comment 6: Comment asked how impacts would be confined to the project site as indicated in the EIS, when the necessary storage tanks, pipelines, transmission lines would indicate that there would be impacts offsite.

Response 6: Most impacts will occur on or near the project site. However, the utility and pipeline corridors will be constructed outside of the refinery site. Chapter 4 of the EIS describes the impacts for each resource including the areal extent of the impacts for the refinery site and utility corridors.

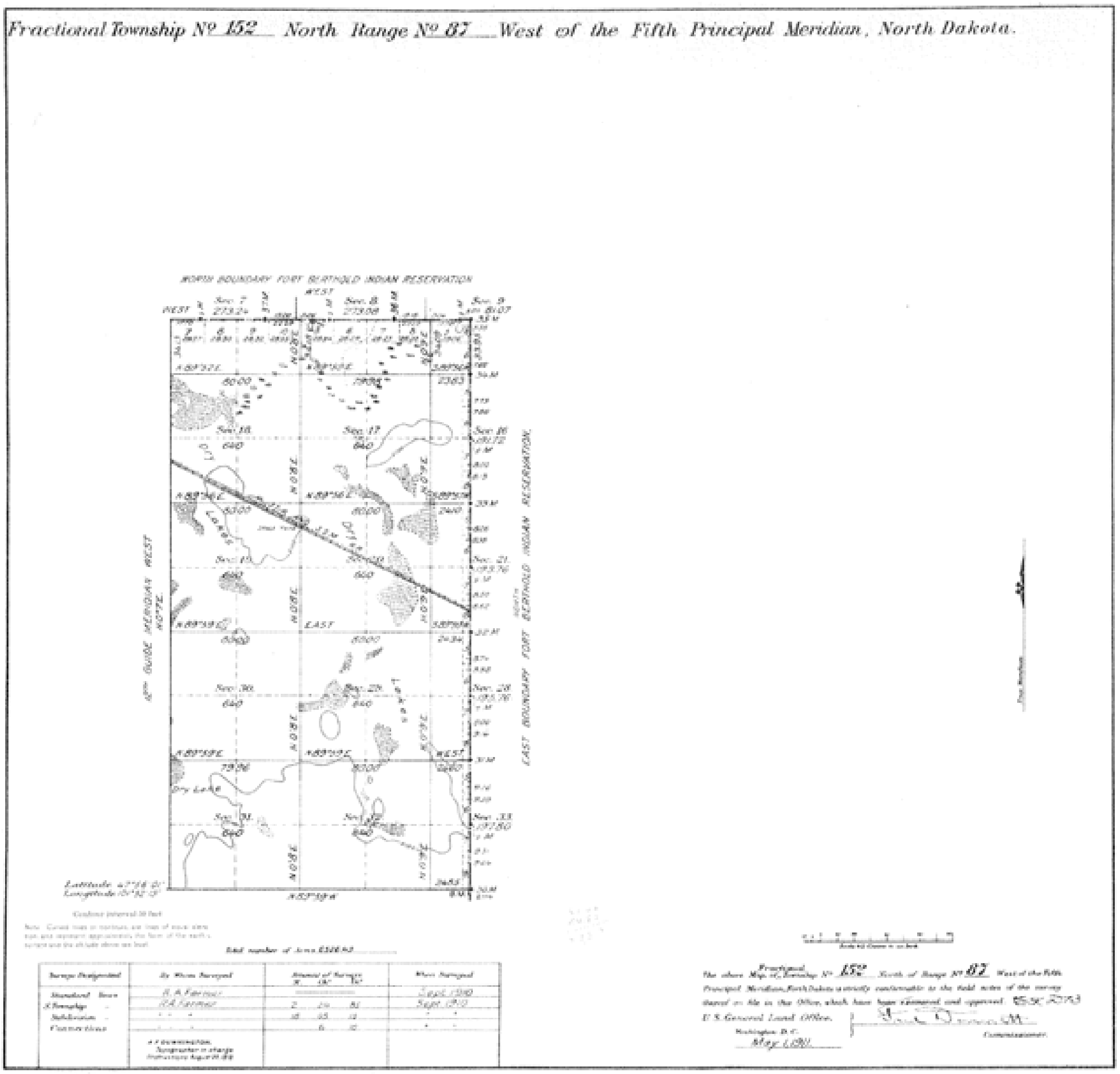
Comment 7: Comment asked how environmental conclusions can be reached when various technologies have not been discussed.

Response 7: The environmental impacts of the project were determined using the preliminary design of the refinery, the capacity of the refinery and types of processes in conjunction with information regarding environmental impacts from other refineries and industrial facilities. As with any analysis based on preliminary data, there may be changes in the assumptions used in the environmental analysis, and there may be some deviations between projected and actual impacts. However the type of impacts from refineries are well documented and there is a substantial amount of environmental information available on impacts from existing refineries.

Comment 8: Comment that this project is not located within the exterior boundaries of the Fort Berthold Reservation

Response 8: The legal description for the project site is described as: N½ of Section 19, and the NW¼, Section 20, both located within Township 152 North, Range 87 West, 5th Principal Meridian, Ward County, North Dakota, containing 468.39 acres more or less after consideration of existing easements. This land is located on fee land within the exterior boundaries of the Fort Berthold Reservation. The following figure indicates the official north-east corner of the Fort Berthold Reservation.

Figure 1 -- Plat designation for North East Boundary for Fort Berthold Reservation 1911



C.1.(c). Design and Technology

Comment 1: Comment stated that there is no hydrogen supply mentioned in treating stabilized naphtha for sulfur removal and asked if the refinery will use a different process. Comment also stated that there is not a source of hydrogen in the area, so another technology would have to be used and this runs up the cost of the process.

Response 1: Stabilized naphtha from the saturated gas plant would, in fact, be mixed with hydrogen, heated, and mixed with a catalyst to remove sulfur. Please refer to the DEIS, page 2-11, Unit B—Naphtha Hydrotreater. According to the DEIS (Page 2-16), a significant amount of hydrogen would be required to operate specific refining processes. Some hydrogen would be produced within the refinery operations, but the supply would not be sufficient for the refinery's operations. The refinery would use a steam-methane reforming (SMR) plant and a Pressure Swing Adsorption (PSA) plant to produce the additional amount of hydrogen required for operations.

Comment 2: Comments stated the refinery processes to be used at the MHA refinery are not substantially different from those used at other refineries; therefore, the term "clean fuels refinery" is inappropriate; that there is no clean fuels process invented – the feedstock is used motor oil containing metal from the motors of automobiles,

Response 2: The "clean fuels" terminology has several meanings. The use of the term "clean fuels refinery" as the project name comes from the title of the MHA Nation proposal for the refinery. The term is also used in describing the proposed refinery products - special formulations of gasoline to help communities reduce air pollution and comply with the Clean Air Act. The term "clean fuels" is a refinery industry standard referring to the production of low sulfur emission gasoline and diesels containing less than 15 ppm sulfur. The feedstock for the MHA refinery will be synthetic crude oil that has already been refined once in Canada to remove the heavier fractions that are typically part of refining processes at standard petroleum refineries. The term also relates to modern construction technology that would be used at any new refinery or refinery expansion.

Comment 3: Comments discussed the 1992 closure of the Turbo refinery, which used the same technology as the proposed MHA refinery and questioned the use of emissions data from the Turbo refinery as a basis for the air modeling conducted for the MHA refinery.

Response 3: The EIS has been changed to reflect the closure of the Turbo refinery. Emissions data from the Turbo refinery were not used to calculate potential or maximum emissions from the proposed refinery or used in the air quality modeling analysis. Potential emissions from the proposed refinery were calculated using manufacturer's data and EPA's publication Compilation of Air Pollution Emission Factors, Volume I: Stationary Point and Area Sources, (commonly known as "AP-42"). The calculated potential emissions were input into the air model for the air quality analysis.

Comment 4: Comment addressed the design of the proposed MHA refinery and asked if the design is based on 30-year old technology or on new technology and whether the technology would be applicable for the next 30 or 40 years. Comments asked what the "state-of-the-art" technologies are to be used in the refinery and where they are currently being used. Comments asked why no other refineries using this technology have been built within the last 30 years if the technology is so superior to that of other refineries, and stated concerns about importing the oil from Canada, problems with the technology, and projections that the refinery will eventually shut down.

Response 4: The design of the proposed refinery will be comparable to other refineries that have been retrofitted in the last decade to refine the synthetic crude or other refineries that have added on units to refine the synthetic crude.

Comment 5: Comments questioning the safety and potential increased emissions from the use of used equipment and tanks with "light rust." The comments state that although the proposed MHA refinery is billed as "new" construction, it appears that many of the tanks are used and it is unclear if other equipment will also be used.

Response 5: The phrase "light rust" appears in the *Calculations* section - Appendix C of the *Air Quality Technical Report* for the DEIS. Specifically, "light rust" is listed as an internal shell condition paint characteristic for each of the floating roof storage tanks listed in the output files for the *TANKS 4.0 Emissions Reports*. Volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions from working and breathing losses for each proposed refinery storage tank were calculated using the *TANKS* program. *TANKS* is a computer software program that is used to estimate VOC and

HAP emissions from fixed- and floating-roof storage tanks. *TANKS* is based on the emission estimation procedures from Chapter 7 of EPA's *Compilation of Air Pollutant Emission Factors* (AP-42) and is designed for use by local, tribal, state, and federal agencies, environmental consultants, and others who need to calculate air pollutant emissions from organic liquid storage tanks. The *TANKS* program requires information about the construction and physical characteristics of a storage tank in order to calculate a tank's air emissions. One of the tank physical characteristics needed as an input to the *TANKS* program is the "Internal Shell Condition" for floating roof tanks. Inputs for the "Internal Shell Condition" are limited to three choices, which are "Light Rust," "Dense Rust," and "Gunite Lining." Gunite is a concrete mixture sprayed under pressure. The *TANKS* program recommends that if the internal condition of the tank shell is unknown, then "Light Rust" should be used as the default condition. The MHA Nation's refinery proposal did not include lining the refinery storage tanks with gunite, so the default of "Light Rust" was used for conservatively estimating VOC and HAP storage tank emissions. This does not mean that the proposed refinery will use rusted storage tanks. Tanks and equipment storing or processing flammable and/or oily materials will have to meet rigorous safety specifications under OSHA rules.

Comment 6: Comment expressed concern that the extreme temperatures in this part of North Dakota would require considerably more engineering to keep finished products moving and flowing when in storage.

Response 6: There are refineries operating in the region near Bismarck, ND and near Edmonton, Alberta, Canada. The engineers hired by the Tribes to conduct the Front End Engineering Design study are familiar with refineries in northern climates as well as other areas of the world.

Comment 7: Comment asked whether a plant configuration engineering plan has been filed with the State.

Response 7: The engineering plan has not been filed with the State. As the proposed facility is located within the Fort Berthold Indian Reservation, there are no plans to submit information to the State except for information needed for emergency response coordination.

C.1.(d). Cost and Employment

Comment 1: Comment stated information is lacking on the costs associated with refinery construction and operations and concerns about taxpayer money been misspent.

Response 1: General cost estimates for the refinery have been mentioned in several meetings. Several very preliminary estimates have been made by the Tribes for construction of a refinery. However, the cost estimates have not been available in writing and are not detailed enough to evaluate the difference in costs between different refinery alternatives. Environmental review documents usually do not include cost estimates, unless the federal government will be paying for part of the project or if costs will be used as a decision factor by the federal agencies (e.g., demonstrating that one alternative is unfeasible due to cost). For proponent driven environmental reviews such as the proposed refinery, construction costs are rarely included. There are no plans to use federal funds for construction of the refinery. However, BIA, Department of Energy, and EPA did fund some of the work to prepare the EIS and preliminary engineering. The project also received additional funding from the Economic Development Administration for project feasibility and preliminary engineering studies.

The source of construction money is not part of the decision making process for the federal agencies as the project has been proposed by the Tribes. However, should the Tribes decide to enter into a business lease with a third party, the regulations as specified under 25 CFR § 162 for the BIA would be applicable.

Comment 2: Comments asked who will build the refinery and whether Tribal members will be employed.

Response 2: Please refer to the DEIS, page 4-111, Economy and Employment. According to the Tribes' (Page 4-111), the majority of the construction and operation workforce would be local hires. The labor pool is anticipated to be hired through the MHA Nation and through private contractors. The MHA Nation has a set hiring practice in accordance with Tribal Employment Rights Office (TERO). Therefore, qualified Tribal members will have a hiring preference.

The Fort Berthold Community College currently offers a 2-year program for construction trades. In addition, the College had an energy technologies program that graduated 17 students in 2006. However, due to funding limitations the course was suspended.

C.1.(e). Future Expansion

Comment 1: Comments expressed concern about the undefined future expansion of the refinery, pressure to expand, stated that the project description does not provide actual refinery maximum capacity and omits description of plans to further expand and further increase air emissions.

Response 1: The only known plan regarding expansion of the proposed refinery is to add a unit to produce soybean oil. The refinery will initially truck in soybean oil to add to various products. In the future, the refinery could add a process for making soybean oil on-site. The EIS already includes the impact analysis for this expansion. Based on discussions with the Tribes, the agencies have concluded there are no current plans for expansion beyond the soybean processing unit in the foreseeable future.

C.2. PROJECT ALTERNATIVES

C.2.(a). Alternate Economic Development

Comment 1: There were several comments that requested BIA consider different alternatives for economic development, including: transitioning away from fossil fuels and toward renewable energy; including a biofuels plant alongside the traditional fossil fuel refinery; considering wind power, biodiesel, ethanol, solar power and other alternate land uses.

Response 1: The BIA is acting on the Tribes' request to acquire the land into trust status for the purposes of constructing and operating a clean fuels refinery and for producing buffalo forage. The alternatives available to BIA are to acquire the land into trust status for the proposed use, acquire the land into trust for the present use as an agricultural property with the Tribes' consent, or not acquire the land into trust status. BIA cannot speculate on other alternate uses for the land other than those proposed by the applicant. As part of the regulations for acquisition of land in trust status, the applicant must identify the purpose for which the land will be used.

C.2.(b). Alternate Site Location

Comment 1: Comment addressed the location of the proposed MHA refinery and stated that it was too close to Makoti, ND.

Response 1: The location of the proposed refinery with respect to the nearby communities and the potential impacts to these communities were evaluated during development of the Proposed Project

Action. The final site selection process was conducted by the Tribes prior to purchasing the property. The potential for effects to communities was evaluated based upon proximity to an adequate population base to supply the work force and distance from a community such that impacts from prevailing winds, air quality, noise levels, and traffic hazards are minimized. Because of the other factors involved with the site selection, namely, proximity to highway, railroad, and pipelines, all of the sites were within 5 miles of a community. The sites greater than 2 miles from a community were considered to have less impact than those closer to a community. The site selection process was conducted prior to the Federal agencies' involvement and is not part of the NEPA analysis. Impacts to the surrounding communities are part of the NEPA analysis and have been addressed in Chapter 4 of the EIS, especially in the air and human health sections.

Comment 2: Comment asked whether the refinery could be located closer to Mandaree because it is close to a large oil reservoir.

Response 2: The refinery will not be using Williston Basin crude oil. Two of the main factors in selecting the proposed refinery site were proximity to the synthetic crude oil pipeline which is located several miles north of the selected site and proximity to the railroad spur which bisects the site.

D. ENVIRONMENTAL IMPACTS ANALYSIS

D.1. GEOLOGY

Comment 1: Comment that the DEIS states that events such as landslides, mudslides, etc., would be unlikely, however, the DEIS also states that landslide incidents are moderate in the vicinity and the DEIS should consider future projects in this area and the cumulative impacts this could have on landslides.

Response 1: The references in Chapter 3 and 4 regarding landslide potential refer to the soils and geology in the area. The third component of landslide potential is topography. As discussed on page 4-1 of the DEIS the landslide potential is not a factor at the refinery site because of the relatively flat topography with rolling hills/ridges. Landslide prone areas tend to be on or next to steep slopes with at least a moderate difference in elevation from top to bottom, or loss of soil from the toe of the slope. For example, landslides tend to occur along river bluffs or steep highway embankments.

D.2. GROUND WATER

D.2.(a). Ground Water Resources, Impacts and Contamination

Comment 1: Contamination of Shallow Ground Water: Several comments expressed concern regarding possible contamination of the ground water, including shallow aquifers beneath the refinery, movement of the contamination to wells in the shallow aquifers in the surrounding area, susceptibility of ground water to contamination by land use practices, and ground water contamination in general.

Response 1: Ground water quality could be affected by septic discharge, effluent discharges, and spills or leaks from the refinery. Discharges to ground water are not expected to affect nearby offsite wells due to the low permeability and slow ground water flow velocity of the shallow deposits (0.4 to 2.4 feet per year) (DEIS pages 4-6 and 4-8). There are six shallow ground water wells on the refinery site; five constructed for the proposed project to monitor ground water and one existing well for the farmhouse. Over the life of the refinery, some of the shallow wells will be affected by the proposed refinery. In 50 years, the shallow ground water is projected to move approximately 20 to 120 feet. The closest refinery component to the edge of property line is the transfer station on the north side of the property with a distance of 300 feet from proposed location to the edge of property line.

Spills and leaks have been identified as the most likely contributor to ground water pollution. Although spills and leaks will need to be cleaned up promptly, some of the material may enter the soil and the ground water. The spill analysis section of the DEIS (pages 4-25 to 4-45) indicates that certain large spills could impact the shallow ground water in the proximity of the refinery, although the low permeability and associated low ground water flow velocities of the till (see above flow rates) will retard the movement of contamination. Another factor affecting movement of pollutants in ground water is the depth to ground water beneath the refinery which is about 10 to 15 feet. The time required for contaminated spills to migrate vertically to the water table would be dependant on the magnitude and duration of the spill or leak. Depending on the nature of the leak or spill, the contaminated water will either move vertically downward to the water table in the till deposits, or in a less common scenario, will move as interflow (saturated shallow ground water flow following the surface topography) towards the nearest surface depression. Ground water in the till flows towards the southwest at a velocity estimated to be between 0.4 and 2.4 feet per year.

Effluent discharges to the wetlands are not expected to have any impact on shallow ground water quality in the area because the effluent will be treated prior to discharge and the resulting water quality will exceed that of the aquifer (DEIS page 4-7).

For information regarding potential impacts to shallow ground water wells from refinery operations, please refer to the DEIS pages 4-4 through 4-11. Also see the draft NPDES permit (Appendix C) for the proposed effluent water quality criteria.

Comment 2 - Probability of Ground Water Contamination: Comment stated the use of the word "probably" with respect to ground water contamination was not accurate and the EIS should state if there are any impacts to ground water.

Response 2: Based on environmental conditions at historic and existing refineries, EPA believes that the shallow ground water in the till immediately underneath the refinery will eventually become contaminated by leaks and spills. Other ground water resources are not expected to be affected by contamination. See page 4-7 of the DEIS, Water Quality Impacts to Ground Water Resources, Accidental Spills and Leaks which states: "Normal refinery operations during the life of the refinery would result in some contamination of ground water and soils beneath the refinery. Ground water contamination could extend off-site if leaks and spills are not properly addressed or if a catastrophic spill occurred. Modern refinery design, construction and operation practices would be more protective of ground water then "historic practices."

The Tribe proposes to implement ground water monitoring that will detect leaks prior to migration from the refinery site. In an April 26, 2007, letter to the MHA Nation, EPA outlined a recommended ground water monitoring program for the proposed refinery. The letter and attachments are available in Appendix D of the FEIS.

Comment 3 - Existing Contamination: Comments stated that the aquifers in the area are already contaminated from activities, including chemicals from farming, and expressed concern about adding additional contaminants to already polluted ground water.

Response 3: The Tribes have evaluated ground water quality at the proposed refinery site by installing a series of monitoring wells and analyzing samples from these wells for water quality. The data from the report shows no indication that ground water in the vicinity of the refinery is contaminated by agricultural chemicals.

Comment 4 - White Shield Aquifers: Comment expressed concern regarding contamination of aquifers in the White Shield area and asked where the refinery was going to dump its waste.

Response 4: As discussed above in comments 1, 2, and 3, the aquifers near White Shield will not be impacted by the proposed refinery. Please also refer to the DEIS at pages 2-19 and 2-20 for a discussion of the types of wastewater that would be generated at the refinery. The locations where treated wastewater may be discharge are discussed on page 2-45, 2-58 through 2-60, and 2-68 through 2-70. Disposal of other wastes generated at the refinery is discussed on pages 2-52 through 2-57.

Comment 5: Comment stated that the aquifer extends from here to Texas and that if the ground water becomes contaminated, the water will purify itself as it moves through the subsurface.

Response 5: Potential impacts from the refinery to ground water would be very localized. In 50 years, the shallow ground water is projected to move approximately 20 to 120 feet.

D.2.(b). Underground Injection Control

Comment 1: Comment stated lack of concern about wastewater from the refinery being injected into ground water because the wastewater will be injected well below the zones that people are using for water supply and that the regulators will monitor the wastewater injection. Comment stated generally that injection will not have an impact on drinking water aquifers.

Response 1: For wastewater discharge Alternative C, refinery wastewater would be injected well below aquifers used for public drinking water supply (this means that the wastewater would be injected below the Fox Hills aquifer). Prior to injecting any wastewater, the owner of the refinery would need to obtain an Underground Injection Control (UIC) permit from EPA.

Comment 2: Comments expressed concern regarding injecting pollutants into the ground water and that injection of treated refinery wastewater into ground water will contaminate the Fox Hills-Hell Creek aquifer that underlies the reservation. Comment stated the DEIS should evaluate the actual depth of the injection zone rather than merely stating the injection zone will be located below the "lowest potential underground sources of drinking water."

Response 2: The underground injection well would be a Class I, non-hazardous underground injection well that would be used to dispose of treated wastewater. The well would be completed into an isolated formation or formations beneath and hydrologically isolated from the lowermost existing or potential future underground source of drinking water (USDW). At a minimum, the injection well would inject into a formation below and hydrologically isolated from the Fox Hills aquifer. The UIC regulations under which a permit would be issued require injection wells to be sited, constructed, operated, and plugged and abandoned in a manner that is protective of USDWs. Therefore, there would be very little chance that any potential drinking water aquifers could be adversely affected. The quality of the fluids injected, and the design and maintenance of the well, would be regulated by EPA under its UIC regulations (DEIS, page 2-70).

D.2.(c). Uses of the Ground Water and Water Supply

Comment 1 - Agricultural Use: Comment expressed concern about impacts to farmers and ranchers if their ground water wells could no longer be used for watering cattle and asked who would provide clean water to the users and at what cost.

Response 1: The refinery could affect ground water wells in two ways: by dropping the water level in the aquifer and by contaminating the ground water. Ground water contamination is discussed above. It is unlikely that pumping the water supply wells for the refinery will impact water levels in ground water wells near the refinery, as the refinery water supply will be extracted from wells in the Fox Hills aquifer which is a separate, much deeper aquifer than the wells in the area which are used for agriculture. The Fox Hills is also an extensive aquifer with a substantial amount of water (DEIS page 4-4). The closest wells in the Fox Hills aquifer are four to five miles from the refinery. If Alternatives 1, 3 or 4 is selected and the refinery operator chooses not to recycle water; wells in the Fox Hills may experience some additional drawdown of water levels. Shallow wells in the till deposits which are generally used by farmers in the area (less than 150 feet deep) and the buried valley aquifers would not be affected by pumping in the Fox Hills aquifer because the shallow aquifers are isolated from the Fox Hills.

Comment 2: Several comments stated that the area is in its tenth year of drought and there are cities in North Dakota and Minnesota seeking to obtain water from Lake Sakakawea, expressing concern about the increasing demands on water on the Fort Berthold Reservation.

Response 2: As discussed in the DEIS at page 4-4, the proposed refinery plans to use a combination of ground water from the Fox Hills aquifer and runoff collected from the site. The estimated yearly water use at the proposed facility, without recycling wastewater, would be 64.5 acre-feet per year (page 4-4 of the DEIS) while Garrison Dam (Lake Sakakawea) has a storage capacity of 23.8 million acre-feet. The refinery will be a relatively minor water consumer compared to cities and more water intensive industries.

Comment 3: Comments requested information regarding the water supply, where the water for the refinery will come from, and whether it will deplete Tribal resources.

Response 3: The water supply for the refinery will be supplied by four wells completed into the Fox Hills-Hell Creek aquifer and/or recycled water. Please see Response 1 above and page 4-4 "Water Supply for the Project" of the DEIS for more details.

Comment 4: Comment stated that people on the Reservation currently cannot drink ground water and they do not have the money to provide quality drinking water. The commenter also requested information regarding how the developers of the refinery propose to maintain the quality of Reservation aquifers.

Response 4: The development of the refinery is not likely to change the current situation for individual well users. As discussed in the ground water contamination section, D.2.(a) above, only the shallow wells in the immediate vicinity of the refinery may be affected by contamination from leaks and spills.

Comment 5: Comment expressed concern that the ground water to be used for the potable water supply is of poor aesthetic quality and may require treatment to ensure compliance with the Safe Drinking Water Act (SDWA). The commenter recommended evaluation of an alternative source of drinking water, such as an existing public water system.

Response 5: The proposed refinery will include treatment of ground water prior to use in the potable water system, see page 2-19 of the DEIS. The water quality of the Fox Hills aquifer proposed for water supply is discussed on page 3-23 and 3-24 of the DEIS. The Fox Hills aquifer is relatively salty, therefore treatment will be needed prior to use in the boilers and the potable water system. In the future, the refinery could be a potential customer of the regional drinking water system being developed in this area of North Dakota. Currently the regional drinking water system does not serve this area.

Comment 6: Comment stated that the proposed refinery will qualify as a non-transient, non-community public water system under the SDWA. The comment stated that because the water supply for the refinery will come from wells in the Fox Hills-Hell Creek bedrock aquifer, the DEIS should be revised to reflect the fact that the ground water supply would be classified as "not under the direct influence of surface water." In addition, the comment requested that a discussion concerning monitoring and reporting requirements under SDWA be included in the FEIS.

Response 6: Information has been added to the FEIS (page 2-19) to clearly document the absence of interconnection between the proposed potable water system and the process water system.

Comment 7: Comment stated that the projected sources of water for the facility are ground water wells, but the facility anticipates using recycled water and stormwater runoff during operations after facility startup. The commenter recommended that the FEIS include a statement that there will be no interconnection between the proposed potable water system and the process water portion of the facility. This will ensure that the potable water supply would not be classified as surface water and subject to additional and stricter monitoring requirements under SDWA.

Response 7: Information has been added to the FEIS on page 2-19 to clearly document the absence of interconnection between the proposed potable water system and the process water system.

D.2.(d). Ground Water Monitoring

Comment 1: Several comments expressed concerns about ground water monitoring and the measures that would be taken to protect ground water resources and stated the DEIS should be revised to include a requirement for ground water monitoring and protection measures.

Response 1: A ground water monitoring plan has been recommended as mitigation by BIA and EPA for the proposed refinery. The monitoring program would be designed to detect any changes in ground water quality before it leaves the property and trigger cleanup activities when needed. The Tribes, as the refinery owner, could agree to develop a ground water monitoring program for the refinery. The Tribes also have the option of developing a Reservation-wide ground water protection program. In a May 14, 2007 letter, the Tribes have agreed to development and implement a ground water protection program for the proposed refinery and the Reservation.

All alternatives except 4 and A would require a RCRA TSD permit which requires a ground water monitoring plan as part of the permit. Without a RCRA TSD permit, there would not be a federal requirement for the refinery to develop and implement a ground water monitoring plan. Under a RCRA TSD permit, EPA can require an owner or operator of any facility that has a release of hazardous wastes to clean up the release [42 U.S.C. sec. 6924(u)]. Therefore, under alternatives requiring a TSD permit, it is likely that the refinery would be responsible for either cleaning up the contamination in the ground water or providing an alternative water supply to the residents with contaminated wells. For Alternative 4 and A, there would be limited cleanup actions that could be required under RCRA.

D.2.(e). Ground Water Mitigation

Comment 1: Comments expressed concern regarding the proposed mitigation for refinery construction and operation impacts, including ground water monitoring and reporting requirements may not be required, the list of best management practices (BMP) for ground water protection may not be complete, and the DEIS does not define “effective irrigation farm management plan.”

Response 1: Recommendations for ground water monitoring and reporting have been conveyed to the Tribes. If an construction alternative other than Alternatives 4 and A is selected, additional ground water monitoring requirements will be developed as part of the RCRA TSD permit for the refinery. The list of potential ground water protection BMPs that could apply to the refinery site is very large; it is typical to provide a list of only the BMPs most likely to be used at the site. If these do not prove to be effective, other BMPs would be evaluated and implemented. The irrigation farm management plan would be developed to identify waste water application rates and practices for the crops being grown, and to meet the requirements for solid waste disposal. [Under the RCRA regulations, land applied, treated wastewater would be considered a "solid waste”.]

D.3. SURFACE WATER RESOURCES

D.3.(a). Surface Water Impacts

Comment 1: Several comments expressed concern about discharges from the refinery to Shell Creek and Lake Sakakawea and whether the treated water will be safe.

Response 1: The proposed location for discharges from the proposed refinery will be to the wetland swale located in the NW1/4 of Section 19, Township 152N, Range 87W. The wetland is tributary to the East Fork of Shell Creek. The East Fork of Shell Creek flows generally in a westerly direction towards Lake Sakakawea before entering the Van Hook Arm of the Lake at Parshall Bay, near Parshall, ND. EPA evaluated both the acute and chronic effects of the proposed discharges from the refinery. In general the acute effects are associated with the near time effects where as the chronic effects are associate with long term effects. EPA evaluated inorganic, organic, and other (e.g. pH) potential pollutants to minimize effects on the waters impacted by the potential discharge. EPA reviewed standards and criteria for these waters including EPA criteria, Tribal criteria as well as the criteria of the State of North Dakota. EPA has placed in the permit for discharge the most appropriate effluent limits. For additional details, please see Appendix C of the EIS, which describes, in much greater detail, the NPDES permit that will control the quality of surface water discharges leaving the refinery.

Comment 2: A comment stated that the DEIS minimizes the severity of the cumulative impacts to surface water by offering seemingly simple guidelines, which in reality are not that simple at all.

Response 2: There are no additional construction activities proposed in the foreseeable future that would contribute to cumulative impacts on the surface water. Therefore, the impacts from the refinery were the only ones analyzed in the EIS.

Comment 3 - Mercury: The existing mercury in the water is coming from the fishing boats (oils) and from tourism dollars, not from the industrial plant.

Response 3: Mercury pollution in lakes typically comes from atmospheric deposition. Petroleum refineries including the proposed facility have not been identified as significant sources of mercury. For more information about mercury in the environment, please see EPA's web page at: http://www.epa.gov/mercury/.

Comment 4: Comments expressed concern about the cumulative effects of the Red River Valley Water Project and the Northwest Area Water Supply project.

Response 4: The proposed Red River Valley Water project (RRVWP) and the Northwest Area Water Supply (NAWSP) project both would divert water from the Missouri River Basin to the Red River Basin via pumps placed in Lake Sakakawea. The proposed refinery would obtain water from ground water aquifers and the refinery discharge would be to the Missouri River basin. While the volumes being considered for all three projects are very small [RRVWP = 122 cfs (average), NAWSP = 40 cfs (average), proposed refinery = 0.25 cfs (maximum)] when compared to the Missouri River flows [20,000 cfs (average)], the RRVWP and NAWSP would result in minor depletion to the Missouri River and the proposed refinery would result in a minor addition to the Missouri River Basin.

D.3.(b). NPDES Permit

Comment 1: Some comments were related to the time table for final issuance of the NPDES permit. In addition to inquiries about the existing timetable, a comment was made suggesting that a new timeline for a new draft NPDES permit should be established.

Response 1: The FEIS, including the response to comments on the DEIS, and draft NPDES permit will be issued for a 30 day review or "wait" period. Following the FEIS wait period, EPA will make its decision on the NPDES permit. EPA will prepare a Record of Decision (ROD) explaining its NPDES decision and publish the ROD after the wait period has ended. EPA will also notify the NPDES applicant (the Tribes) and each person who has submitted written comments or requested notice of the final permit decision. Following that notification, if an NPDES permit is to be issued, EPA would issue the NPDES permit with an effective date 30 days after issuance. The EPA regulations at 40 C.F.R. 124.19 provide that within 30 days after the final decision on the NPDES permit is noticed to the public, any person who filed comments on the draft permit or participated in the public hearings may petition the Environmental Appeals Board to review a condition of the permit decision which was raised during the public comment period. Any person who failed to file comments or failed to participate in the public hearings on the draft permit may petition for administrative review only to the extent of the changes from the draft to the final permit decision.

Comment 2: Some comments raised concerns regarding the environmental effects of the NPDES discharges and the science supporting the effluent limitations in the NPDES permit. One comment questioned whether the NPDES permit would adequately regulate a hazardous discharge into the environment and the long-term impacts of the discharges from the facility, which is expected to discharge up to 5 million gallons per year.

Response 2: The environmental analysis of discharges under the NPDES discharge permit are described on page 4-18 of the DEIS, which discloses that there will be some minor changes in water quality from the existing conditions. Water quality will change from agricultural runoff to a combination of treated wastewater from the refinery and uncontaminated runoff. The environmental impacts that are typically analyzed for projects that affect water quality have already been analyzed in the development of the NPDES permit. Please see the “Statement of Basis” for the permit discharge limits included as Appendix C of the EIS. For example, the wastewater discharged under the NPDES permit will be required to meet water quality standards which are protective of aquatic life, wildlife, and drinking water use.

Water quality scientists have been studying the environmental and human health effects of aquatic pollutants for many years. For each parameter in the NPDES permit, a series of research efforts and experiments were conducted to evaluate the effects of the pollutant on the environment. The process to establish or change EPA's water quality criteria is a rigorous process, requiring public and scientific input from many sources. Information on water quality criteria can be found on EPA's web page at: http://www.epa.gov/ebtpages /water.html.

The discharge limitations and monitoring requirements in the NPDES permit have been developed to be protective of both human health and aquatic life (e.g., fish, insects). The permit limits are based on the water quality criteria and standards and are consistent with EPA regulations, policy and guidance.

The permit application anticipated an average discharge of 10 gpm for Alternatives 1 and A, 3 and A, and 20 gpm for Alternative 4 and A, some or all of which may be recycled at any given time. The process wastewater from the refinery, the potentially contaminated stormwater, and the sanitary waste will only be discharged following treatment to assure compliance with the NPDES permit limits. See the NPDES Permit Fact Sheet for more information about the discharges, Appendix C of the EIS.

There are four sources of wastewater associated with the operation of the proposed refinery, all of which are covered by the NPDES discharge permit:

- **Process wastewater** from refinery operations, following treatment in the wastewater treatment facility, can either be recycled into the process water system or discharged through outfall 002.
- **Potentially contaminated (oily) stormwater** will be collected in segregated drains. This wastewater will be tested and if further treatment is required it will be routed to the wastewater treatment facility. Depending on the alternative selected this flow may be discharged through outfalls 002 or 002a, or recycled.
- **Uncontaminated (non-oily) stormwater** will be collected from areas outside the process operations of the refinery. The site configuration is designed so that uncontaminated (non-oily) stormwater flow by gravity to be collected for the large holding pond or discharge. The uncontaminated (non-oily) stormwater can be used as make-up water for the firewater system, recycled, or discharged through outfall 001 as necessary.
- **Sanitary wastewater** (potential). If any the sanitary wastewater is collected it would be treated in a package wastewater treatment plant and discharged through outfall 003, if necessary.

Comment 3 - Ground Water and NPDES A few comments expressed concern that the DEIS states that treated discharge from outfalls will have to meet the effluent discharge criteria and therefore would likely be of higher quality than the ground water, thus implying that as a result it will not affect the water quality. The comments noted that simply because the water will meet NPDES standards does not mean that the water will be clean, and that adding contaminated water to an already contaminated water source increases the contamination.

Response 3: As described on pages 4-6 and 4-7 of the DEIS, surface water discharges from the facility are unlikely to increase water levels in the shallow aquifers due to the relatively small rate of discharge and the low hydraulic conductivity of the shallow material. Wastewater discharges from the facility will tend to stay at the surface, flowing slowly towards the East Fork of Shell Creek instead of entering the ground water. Ground water in the area tends to be salty; the discharge from the refinery will tend to be less salty because the water source will be from either runoff or from ground water that has been treated to remove salinity.

Comment 4: Outfall Locations: One comment expressed uncertainty about the location of the discharge and expressed concern that EPA could not evaluate the impacts without knowing the location.

Response 4: As explained in the DEIS, the exact location of the discharge pipe or outfall has not been designed at this time. The location of the outfalls will be in the northwest corner of the site in or near the wetland complex. The range of potential outfall locations is relatively small; all outfalls will discharge into the wetland that flows north under Highway 23 through a culvert as a tributary of the

East Fork of Shell Creek. The environmental analysis in the wetlands and surface water sections (Chapter 4) of the DEIS also discusses these potential impacts. For mitigation, the refinery will be encouraged to recycle as much water as possible, particularly during dry months of the year. For example the refinery could construct a wetland pond on site to ameliorate flow rates when the refinery is unable to recycle water.

D.3.(c). Water Quality Standards

Comment 1: Several comments expressed concern and sought clarification about why federal water quality standards were being used rather than the more stringent water quality standards adopted by the Tribes.

Response 1: EPA's Office of Science and Technology publishes water quality criteria recommendations (CWA 304(a) Criteria) as guidance for use by States and/or Tribes in adopting numeric criteria protective of designated uses. EPA's 304(a) Criteria are updated periodically with the latest major revision published in November 2002, National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047. Revisions to the aquatic life criteria for cadmium, mercury, and ammonia; and human health criteria for benzene and mercury were included in the 2002 revisions. In addition, the calculations of some of the hardness-dependant metals criteria were updated. EPA also published a CWA 304(a) criteria update in December 2003, EPA-822-F-03-012, for 15 human health water quality criteria including ethylbenzene and toluene. The MHA Nation adopted WQS for surface waters within the external boundaries of the Fort Berthold Indian Reservation on May 11, 2000. The Tribally-adopted WQS did not include some or part of the 2002 and 2003 updates as Tribally-adopted WQS were developed prior to publication. Tribes regularly review and modify their WQS, and it is anticipated that the Tribes will adopt the new CWA 304(a) criteria during their next update. Normally, a review is every three years. Where the EPA's updated criteria are different than the Tribally-adopted WQS, the EPA criteria have been designated as the applicable values. EPA criteria are appropriately designated as the applicable values, because the EPA criteria are updated as needed to reflect new information and data.

Comment 2**:** One comment expressed the concern that the Tribal dissolved oxygen (DO) criterion was not consistent with the State criterion.

Response 2: The DO criteria, in milligrams per liter (mg/L), as proposed in the Permit are:

April 1 – Sept 30	Oct 1 – March 31
8.0 (1-day min.)	4.0 (1-day min.)
9.5 (7-day mean)	5.0 (7-day mean)
6.5 (30-day mean)	6.5 (30-day mean)

The State criterion is 5.0 mg/L as a minimum. Since surface water discharges for the proposed project could flow through both Tribal and State waters, permit limits must remain protective of both Tribal and State waters. EPA believes that using the Tribal WQS meets the intent of the States standards. During the summer months, the Tribal criteria are more stringent (i.e., the required DO is higher than the 5.0 mg/L minimum). During the colder months, all but the one-day minimums were greater than or equal to the 5.0 mg/L minimum criterion.

Comment 3: A few commenters were concerned that the benzene criteria in the Tribally-adopted water quality standards (WQS) and EPA's *National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047* differed.

Response 3: The Tribes' Water Quality Standards (WQS) for benzene and other pollutants were based on EPA's water quality criteria at the time the standards were adopted. The MHA Nation adopted water quality standards for surface waters within the external boundaries of the Fort Berthold Indian Reservation on May 11, 2000. The Tribally-adopted WQS predate, and did not include, a recently published updated criterion for benzene. The latest major revision was published in November 2002, National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047. Revisions to the human health criteria for benzene were included in the 2002 revisions. In addition, the equations for some of the hardness-dependant metals criteria were updated. EPA also updated its criteria in December 2003, EPA-822-F-03-012, for 15 human health water quality criteria including ethylbenzene and toluene.

EPA anticipates that the Tribes will adopt the updated EPA Criteria, including benzene, as well as other parameters, within the term of the permit. The human health-based criterion for benzene was changed to a maximum value of 2.2 micrograms per liter (µg/L) for water consumption and 51 µg/L for water plus fish consumption. Therefore, EPA's permit will continue to use the human health-based criterion of 2.2 µg/L for the average daily concentration in the NPDES permit.

D.3.(d). Surface Water Quantity

Comment 1: One comment raised concerns about the range of flows from the facility. Another commenter observed that the volume of water projected to be discharged from the refinery is 20 gpm, which is roughly the equivalent of two garden hoses.

Response 1: Flows will vary from the facility, depending on rainfall, snow melt, and the amount of water recycling. Natural conditions in the area also generate a wide variety of flows. In this region of North Dakota it is quite common to have large spring flows and little to no flows during droughts and dry parts of the year. There will be some hydraulic adjustments in the wetlands and the unnamed tributary in the immediate area of the refinery, due to higher peak flows from precipitation events and a more continuous discharge throughout the year depending upon the selected alternative. Plants and riparian life populations will shift towards species that prefer more continuous water flow, such as those currently found in the lower portion of the East Fork of Shell Creek. Most prairie pothole wetlands do not naturally receive water on a continuous basis. They normally have significant dry periods throughout the year.

Comment 2: One comment raised concerns about discharge during the winter or under ice and the potential for discharges to form ice dams. The comment noted that typically the State of North Dakota requires 180 days of storage to avoid discharge during the winter months.

Response 2: The discharge of treated wastewater during the winter months would be allowed and storage would not be required. One way to minimize formation of ice dams is to increase storage and recycling of wastewater during the colder winter months. EPA is unable regulate the quantity of water discharged directly or the timing of the discharge. The 180 day storage requirement is a State of North Dakota requirement and is for domestic wastewater treatment plants that use a lagoon for treatment, not for storage. North Dakota has many facilities that discharge year around. The North Dakota lagoon regulations would not apply to this facility because the facility is industrial, will utilize mechanical wastewater treatment, and is sited within the boundaries of the Reservation.

Comment 3: A comment expressed concerns about the potential for ponding of water in a field downstream of the proposed refinery. (Additional discussions with the commenter identified concerns about the potential for ponding of a field near the wetland under FWS easement approximately a mile downstream of the proposed refinery.)

Response 3: The hydraulics of the channel discharging north from the refinery site will change as a result of the proposed refinery. The flow will be more continuous throughout the year, especially for Alternative 4 and A. Peak runoff flows from the site will also increase due to the gravel and impermeable surfaces at the proposed refinery. Water from the site will flow north, under Highway 23, across a small field and under a railroad eventually reaching the East Fork of Shell Creek. After discharges from the refinery begin, it is likely there will be a wider band of wetland type vegetation, increased runoff flows from storm events will cause the channel to adjust (widen, deepen) to accommodate higher flows and, depending on the topography and the inlet elevation of the culvert under the railroad, there may be additional ponding upstream of the railroad culvert.

The refinery site is about 2% of the overall drainage for an unnamed tributary. This unnamed tributary is approximately 11% of the drainage at the location approximately one mile downstream. It is unlikely that there would be any discernable impacts to this area from the refinery. A review of area topography, indicates that there is a natural constriction in this area. This was confirmed by FWS in that there are no man-made impounding features on the easement.

D.3.(e). Surface Water Monitoring

Comment 1: A few comments addressed the water effluent monitoring that would be conducted by the refinery staff to ensure that the permit water quality limits were met. Water quality would also be monitored further downstream and a contingency plan would be prepared and corrective action taken if downstream water quality was impaired by the refinery.

Response 1: Comment noted. Thank you for participating in the NEPA process.

Comment 2: One comment on tribal sovereignty stated that Tribal monitoring is similar to that of the State and Federal governments.

Response 2: The Tribe as a sovereign entity has the authority to promulgate regulations on monitoring similar to State and Federal governments. Under certain conditions and Federal regulations, the Tribe may assume responsibility for monitoring and permitting under certain Federal environmental laws.

Comment 3: The North Dakota Department of Health requested to be involved with the monitoring of the East Fork of Shell Creek.

Response 3: Water quality of the tributary to East Fork of Shell Creek would be monitored as explained in the NPDES permit found in Appendix C to the EIS. This monitoring data would be available to the North Dakota Department of Health on request.

D.3.(f). Surface Water Mitigation

Comment 1: Several comments pertained to mitigation related to erosion and sediment control during refinery construction and operation. The issues raised were as follows:

- "Effective irrigation farm management plan" under Erosion and Sediment Control is not defined in the DEIS.
- How can a best management practice be improved as discussed in the last bullet under Erosion and Sediment Control in the DEIS.
- Under Streams and Ponds, the DEIS states that "all reasonable precautions" will be taken to minimize turbidity; this is too vague.

- Under Roads, the DEIS states that the length and grade of roadbeds will be restricted, but does not say how, and that the roads will be surfaced with durable material, but does not state what that is.

Response 1: As stated in the DEIS (page 4-15, 4-24, section 4.17 in FEIS), mitigation measures will be defined in the Stormwater Pollution Prevention Plans (SWPPPs) prepared as part of the NPDES construction and industrial stormwater permits. These mitigation measures are all defined as "best management practices" or BMPs. The term BMP does not imply that any one specific activity, such as installation of silt fence at a construction site to reduce sediment and turbidity of stormwater leaving the site, is the *best* management practice for all sites. The goal of a BMP is to reduce erosion, improve revegetation, and/or improve stormwater runoff quality. Sometimes a BMP that worked at one site does not work as well at another site. The NPDES permit requires the permit holder to assess the adequacy of all the BMPs at the site and replace any BMPs that are not adequately controlling erosion or improving the stormwater quality discharging to the receiving water body. The details related to the soil erosion BMPs for roads would be defined in the SWPPP once the NPDES permit is issued and before refinery construction begins. Details related to the irrigation farm management plan would also be developed for the SWPPP. The NPDES permit for the refinery (Appendix C of the EIS) does not have a specific effluent limit for turbidity; therefore, "all reasonable precautions" to minimize turbidity would comply with the proposed permit. The permit does, however, establish a limit for total suspended solids.

D.4. HAZARDOUS WASTE AND RCRA

Comment 1: There were numerous comments expressing concerns that potential releases of hazardous or toxic substances from the proposed refinery will harm the surrounding environment and communities.

Response 1: The majority of potential environmental impacts associated with the refinery are expected from spills and leaks that are not contained or cleaned up promptly. Spills and leaks are inherent risks in operating a refinery, and could impact the ground water and soils beneath and immediately surrounding the proposed refinery. Areas used for transporting, handling, and storing, of chemicals and hazardous materials will be engineered to maximize containment, thereby minimizing impacts. As discussed in the EIS, numerous regulatory programs, including emergency response planning, oil spill response planning and containment measures, NPDES permits, and RCRA and OSHA requirements, would be implemented at the proposed facility to prevent or control potential releases. With proper construction and operation of the refinery, potential impacts to the health of the general public are anticipated to be negligible. Pollutants or materials which would be of concern to public health would be contained within the refinery, treated to nontoxic levels, or disposed of at approved hazardous waste facilities.

Comment 2: Comment expressed concern about the amount of hazardous waste generated each year.

Response 2: As discussed in Section 2, Page 2-70 and 2-71 of the DEIS, under all other alternatives except Alternative 4 and A, the refinery would be designed as a RCRA Treatment, Storage, and Disposal (TSD) facility requiring the refinery to obtain a RCRA TSD permit. A TSD permit would significantly increase the regulatory requirements for the proposed refinery project as outlined in 40 CFR Part 264. A RCRA TSD permit would also contain a number of specific requirements, including: ground water monitoring, corrective action, financial assurance, training, inspections, emergency response plans, closure, and reporting requirements. No hazardous wastes are planned to be disposed onsite. The permitting process would also place additional construction (e.g., double liners for surface impoundments) and management (e.g., treatment, storage, and disposal requirements; limits for wastes stored in storage areas) requirements on hazardous wastes treated, and stored at the proposed refinery, which will minimize the potential for human receptors to contact the waste or for release of hazardous chemicals to the environment.

Under Alternative 4 and A, no RCRA TSD permit would be required, as the facility would be classified as a RCRA generator under 40 CFR Part 262. As a generator, there would be much less regulatory oversight. For example, there would be no requirements for ground water monitoring, corrective action, or financial assurance for closure. As a generator under RCRA, the refinery would be required to prepare and implement contingency plans for releases from hazardous waste management units. However, as stated above, generators are not subject to full corrective action requirements. That could impede or preclude adequate cleanup at the facility if significant releases to soils and ground water occur. If the facility does not comply with the RCRA generator requirements, EPA has enforcement authority to require the facility to correct violations and complete clean closure for hazardous waste management units. If the hazardous waste management units are not clean closed, the facility becomes a subject to subject to RCRA TSD permitting requirements.

The amount of hazardous waste expected to be generated at the proposed refinery annually (approximately 20,000 pounds) is significant and must be properly managed onsite to prevent releases. All hazardous waste must also be properly transported and disposed offsite at an approved disposal facility.

Comment 3: Comment stated if the facility is located on trust land, then it would not be subject to RCRA.

Response 3: This comment is incorrect. The facility would still be subject to RCRA if it is sited on land held in trust status by the U.S. Government for the Tribes or individual Indians.

Comment 4: The comment states the DEIS incorrectly explains that spills are not expected refinery events.

Response 4: Please see the section on spills in Chapter 4 starting on page 4-25 of the DEIS which discusses different kinds of spills, the magnitude of potential spills and the relative probability of the spills occurring.

D.5. VEGETATION

D.5.(a). Agricultural Impacts

Comment 1: Comments expressed concerns that the proposed forage producing area would be irrigated with contaminated water and/or that chemical fallout will be absorbed by those forage plants that will ultimately be fed to Reservation buffalo.

Response 1: Under Alternatives 1 and 3, the MHA nation proposes to use 279 acres of the project site to grow forage for the 650 head of buffalo that they raise elsewhere on the Reservation. Currently, bales of forage must be purchased from outside sources to sufficiently feed the herd during the winter months. The acreage would initially be seeded with oats and crested wheatgrass, and then changed to alfalfa and a mixture of grasses. Crops would be swathed, baled, and hauled to lands where the Tribal herd is managed. Buffalo would not be grazing within the proposed refinery property. Under Alternative 2, no refinery would be constructed, so the entire 469-acre project site would continue to be used for the agricultural uses that have historically been present there—intensive dry land farming (e.g., cereal row crops like barley and wheat). Under this same alternative, the MHA Nation could decide to use this entire project site for growing buffalo forage crops.

Only effluent discharge Alternative B allows surplus treated wastewater to be disposed of through both NPDES permitted outfalls and irrigation. The irrigation management plan would establish treated wastewater application rates thereby limiting the volume applied. As stated in Section 4.8.3.1 of the FEIS, a risk assessment should be performed to establish treatment levels for any wastewaters used to irrigate forage or other crops that may be potentially consumed by livestock or wildlife. Such a risk assessment would also consider potential risks from human consumption of livestock or wildlife that have eaten forage crops irrigated with treated wastewater. See also page 4-60 of the DEIS (Section 4.17 FEIS), which lists standard mitigation measures to reduce the potential adverse effects of effluents on soil and vegetation resources.

EPA evaluated other exposure pathways in addition to direct inhalation of emissions. EPA has added text to Chapter 4 of the FEIS, which provides a qualitative comparison of modeled emitted concentrations of contaminants from the proposed refinery with actual emitted concentrations of similar contaminants from existing refineries that are processing synthetic crude or the precursor material to synthetic crude, bitumen, or a combination of these feedstocks. These refineries include: Petro-Canada, Scotford, Heartland, and North West refineries located in Alberta, Canada. Canadian environmental studies conducted for these refineries included an evaluation of the effects of air emissions on the surrounding environment. Bioaccumulative effects of the potentially emitted HAPs, as well as other contaminants that may adversely effect the environment, such as benzene, PAHs, and formaldehyde, were considered to be insignificant for each of the refineries, which are many times larger than the proposed refinery. Finally, EPA conducted a quantitative analysis of emissions for the proposed refinery, which included an evaluation of toxic air emissions potentially entering the food chain through various pathways including plants, wildlife, and bison. The results of this analysis indicate that there would be no adverse impacts to humans consuming the foods grown or raised in proximity to the refinery. This information is available in Section 4.16 of the FEIS and the technical report - *Qualitative and Quantitative Human Health Risk Assessment: TAT Refinery EIS*, December 2007.

Comment 2: Comment expressing concern for impacts to soils and specifically, the impact the proposed refinery will have on crops grown in the area. Comment concerned about the impacts the wastewater discharge could have on locally-grown crops.

Response 2: See response to Comment 1 above.

Comment 3: Comment that the DEIS presents the impacts of possible greater amounts of vegetation in an overly optimistic light, providing as an example, the DEIS statement that “there may be a perception of greater lushness.” Comment uses this example to indicate a concern about the neutrality and reliability of the DEIS analysis.

Response 3: The level and type of environmental analysis varies depending on the resource, the type(s) of impacts, and the degree of impact. Each NEPA analysis should focus on the important issues and resources for that project. The same type of project may have very different environmental analysis depending upon the specific resources that are affected. The impact analysis regarding more continuous flow to the wetlands which concluded there would be “a perception of greater lushness” is consistent with the type of impacts anticipated from more year-round flow. Currently, the wetland system dries out or reduces in size during the dry season. With more continuous flows, the vegetation would stay greener and is less likely to go dormant during dry periods, hence the term “greater lushness.”

D.5.(b). Wetlands

Comment 1: A comment requested that a complete analysis regarding threat to the many wetlands found within North Dakota be performed.

Response 1: The DEIS presents a complete inventory (types, distribution and areal extent) of the wetlands on the project site (pages 3-56 and 3-57). Analysis of the environmental consequences by each of the alternatives to the site's wetland and riparian areas is discussed in Chapter 4 of the DEIS, pages 4-64 to 4-71, including a brief narrative on cumulative impacts. A complete analysis of threats to many of North Dakota's wetlands is beyond the scope of this EIS. The technical reports to the FEIS also include a summary of the water quality sampling of wetland PEMF-2 conducted in April 2006.

Comment 2: A comment stated that the "Waterfowl" narrative on page 4-76 and 4-77 of the DEIS minimizes the effects of destruction of wetlands to waterfowl habitat by stating that the amount of wetlands that will be lost is "relatively small compared with the areal extent of these habitats that would not be affected." A related comment disagreed that holding ponds would compensate for those losses.

Response 2: Depending on the alternative selected, the range of potential loss of wetlands would be 0.8 acres (Alts. 1, 3) to 0.4 acres (Alt. 4). This is a relatively small amount compared to the areal extent of wetland habitat available in the area. The wetlands have historically been impacted by agricultural activities thereby affording limited habitat value to waterfowl. While the various utility line impacts remain constant for Alternatives 1, 3 and 4, those impacts will be transient and reduced further through avoidance and minimization practices during construction. The FEIS also discusses the wetland mitigation to compensate for the loss of wetlands. {FEIS changes in Section 4.17.}

The comment on the holding ponds compensating for losses is correct. The use of the holding ponds by bird species would be discouraged by using cobbles as stated in the species of concern section.

Comment 3: Comments expressed concern that the proposed refinery's run-off will alter the historic flows to wetlands and that it will likely contain contaminants which could be harmful to wetlands.

Response 3: The operation of the proposed refinery would change the hydrology of the watershed, increasing flow rates and changing the system to a more continuous flow regime. Over time, it is expected that the wetlands and tributaries would adapt to these changes in hydrologic conditions. All wastewater discharges would be treated to meet the limits in the NPDES permit. Because all discharges will be treated and the peak discharge is designed to be low (about 0.25cfs), the downstream changes should be slow and minimal.

Comment 4: A comment stated that land application of contaminated wastewater should take into account vulnerability of wetlands.

Response 4: If Alternative B is selected, an irrigation management plan would be developed to identify application rates and wastewater treatment levels, in accordance with Land Disposal regulations under RCRA. Application rates would be set such that runoff and erosion potential is minimized.

Comment 5: A comment stated that changes in the flow of water from wetlands could disrupt the recharge of the shallow aquifer, which is accessed by area residents.

Response 5: The operation of the proposed refinery would change the hydrology of the watershed, increasing flow rates to wetland PEMF#2 and then downstream. The increase in permanent water level should be exhibited as an increase in the area inundated by water in wetland PEMF#2. The water released to the local surface drainage, will provide little to no recharge of the shallow aquifers, because of the low permeability of the till, presence of the clay layer underlying the site, and the low average flow of the refinery discharge of about 10 gallons per minute (gpm) for Alternatives 1 and A and 3 and A with recycling, and 20 gpm for Alternative 4 and A.

Comment 6: A comment expressed concerned that a nearby slough, which does not have very good drainage, would get bigger due to the runoff going into the slough.

Response 6: The average discharge for the refinery is estimated to be 10 gpm, for Alternative 1 and A and 3 and A with recycling, and 20 gpm for Alternative 4 and A (about 30 acre feet per year). Wetland PEMF #2 is about 11.7 acres in size. PEMF#2 will become a more consistently wet, wetland, but its outer margin should not increase significantly. Because the peak discharges are designed to be low (about 0.25cfs), the downstream changes should be slow and minimal.

Comment 7: A comment expressed concern that in Alternatives 1, 3 and 4, a jurisdictional wetland would be impacted. The comment noted that wetlands provide habitat for many species of plants and animals and provide recharge to the shallow aquifers, which are accessed by area residents. Changes in flow of water could disrupt the recharge of the shallow aquifer.

Response 7: The comment is correct. All of the construction alternatives will impact a jurisdictional wetland, PEMF#2. Alternatives 1 and 3 have the greatest impact of 0.5 acres through fill and redirection of the drainage swale. Alternative 4 reduces the direct impacts to the jurisdictional wetland on the project area to less than 0.1 acres for culverted crossings over the drainage swale associated with wetland, PEMF#2. The alterations in flow have been discussed previously under Comment 6.

Comment 8: A comment stated that the suggested measures for minimizing impacts on wetlands are unclear because the DEIS does not define the terms “necessary” and “non-essential” equipment and does not identify who decides what is “necessary” and “non-essential” equipment.

Response 8: Only a minimal amount of disturbance to aquatic resources may occur under the CWA 404 programs. The necessary and essential equipment is that needed to accomplish the permitted tasks with minimal impact. For example, the construction process will avoid the use of large equipment which is necessary at one site but may be oversized at another site. The wetlands mitigation measure has been changed in the FEIS (Section 4.17) to “All equipment should use upland access roads to the maximum extent practicable.

Comment 9: A comment expressed a general concern over the numerous wetlands in the vicinity of the proposed refinery.

Response 9: As described in the DEIS, the Missouri Coteau is characterized as a rolling, hilly area with numerous prairie potholes and lakes. The Tribes initial review for the selection of sites for this proposed facility considered impacts to wetlands, as described in Appendix B of the DEIS. In Alternatives 1 and 3, there will be a loss of 0.5 acres of jurisdictional wetlands and 0.3 acres of isolated wetlands. In Alternative 4, there would be a loss of 0.1 acres of jurisdictional wetland, and a loss of 0.3 acres of isolated wetland. A site-specific wetlands mitigation plan would need to be developed and approved by the USACE for any wetlands impacts as specified in a CWA 404 permit. The mitigation plan would include the specific location, acres of wetlands and uplands that would mitigate wetland impacts.

Comment 10: A comment expressed concern that routes of the proposed pipeline “have not been surveyed for wetlands…” DEIS at 4-64, and that instead of analyzing the effects based on the actual wetland acreage, the DEIS uses an estimate to determine the impacts. The comment further stated that this approach is inadequate and that additional information must be included in the analysis. Simply concluding that numerous wetlands may potentially be impacted is not a satisfactory analysis.

Response 10: Potential wetland impacts of several approaches were considered for the linear infrastructure (transmission lines and pipelines) needed to support the project. While selection of the final pipeline route will be determined when the refinery selects its supply carrier, the wetland impacts presented in the DEIS were estimated using the standard width of the construction corridor through the wetlands without any consideration for minimization. Through route selection, final design criteria and avoidance of all possible impacts during construction, the final impacts should be much less than those presented in the FEIS in accordance with an applicable CWA 404 permit.

D.6. WILDLIFE

Comment 1: Comments asked how the discharged wastewater will affect the buffalo that will consume the forage grown at the site and on fish species, including the pallid sturgeon.

Response 1: Only effluent discharge Alternative B allows surplus treated wastewater to be disposed of through both NPDES permitted outfalls and irrigation. The irrigation management plan would establish treated wastewater application rates and practices for the crops being grown, and to meet the requirements for solid waste disposal. [Under the RCRA regulations, land applied, treated wastewater would be considered a "solid waste”.] As stated in Section 4.8.3.1 of the FEIS, a risk assessment should be performed to establish treatment levels for any wastewaters used to irrigate forage or other crops that may be potentially consumed by livestock or wildlife. Such a risk assessment would also consider potential risks from human consumption of livestock or wildlife that have eaten forage crops irrigated with treated wastewater. Page 4-60 of the DEIS (Section 4.17 FEIS) recommends standard mitigation measures to reduce the potential adverse effects of effluents on vegetation and soil resources.

For wastewater discharges to the wetland complex and the tributary to the East Fork of Shell Creek, discharge limitations in the NPDES permit will require that wastewater discharges be protective of aquatic life, drinking water, agriculture, and wildlife uses. Please see the “Statement of Basis” for the proposed discharge limits, which is in Appendix C of the DEIS and FEIS. For example, the wastewater discharged under the NPDES permit will be required to meet water quality standards which are protective of aquatic life, wildlife and drinking water use. The proposed refinery site is more than 20 miles from the Missouri River; neither the discharge quality nor quantity is anticipated to be discernable by the time the discharge reaches the Missouri River. Therefore, no impacts are anticipated on pallid sturgeon that may reside in the Missouri River.

Comment 2: Comment stated that with regard to the effect that stream flows and water temperatures have on aquatic life, the DEIS compares changes in stream flows to flood and drought periods, which is an invalid comparison because flood and drought are seasonal and somewhat cyclic, whereas a change in flows as a result of discharge is not cyclic.

Response 2: The potential impacts from changes in flow are discussed on pages 4-68, 4-69 and 4-79 in the DEIS. The analysis includes impacts to fish in the East Fork of Shell Creek which under existing conditions experience both drought and flood. Existing fish species can survive some fluctuating flow conditions, and dry and wet conditions in the riparian zone. With extensive recycling of water under Alternatives 1 and A and 3 and A, the seasonal fluctuations will be largely unchanged by the proposed refinery. For Alternative 4 and A, and 1 and A, and 3 and A without recycling, more continuous flow conditions would cause a shift in fish and macro-invertebrates species to those species that prefer continuous flow. Discharge Alternatives B and C would further reduce average discharge flows.

Comment 3: Comment stated that while the DEIS mentions that artificial increase to the stream flow could have both positive and negative effects on aquatic life, the DEIS only discussed one positive effect and no negative effects are mentioned.

Response 3: In the DEIS (page 4-80), most of the impacts caused by changes in flow conditions are a mix of adverse and beneficial impacts with the exception of changes in the wetlands system downstream of the refinery. The alternatives and operational options (discussed in the above comment) with continuous discharge or nearly continuous discharge would change the downstream wetlands from a prairie pothole type habitat to a more permanently ponded wetland.

Comment 4: Comment stated that the last sentence of the "Species Diversity" narrative on page 4-81 of the DEIS should say. . . "therefore, <u>have</u> the greatest <u>adverse</u> impact on aquatic ecosystems" to be factually more clear in its meaning.

Response 4: The language on Page 4-81 of the DEIS (FEIS Section 4.8.1.3) has been revised to "Potential changes in species diversity would be the greatest under Alternative 4 because this alternative would have the most continuous flow of all the Alternatives."

Comment 5: Comment stated that the "Aquatic Species" narrative on pages 4-78 to 4-80 should include a real water quality analysis so that the effect of wastewater discharges on aquatic organisms can be more accurately depicted.

Response 5: The refinery is in preliminary design, so it is not possible to have water quality data from this refinery. However, EPA has analyzed effluent quality from many existing refineries and that information was used in developing the NPDES permit. The discharge limits in the proposed NPDES permit have been developed to be protective of aquatic life. The permit also includes monitoring and reporting to ensure that aquatic life, wildlife, birds, agriculture and drinking water are protected. These limits are presented on page 4-19 of the DEIS. Appendix C to the EIS provides additional information.

Comment 6: Comment stated that the DEIS fails to consider the cumulative impacts of an overall loss in available land for the whooping crane to use during migration.

Response 6: The loss of 190 acres of agricultural land will not have an impact on whooping cranes. The collision risk with transmission lines were identified as potential impacts to whooping cranes and the conservation measures to minimize this risk are documented on page 4-84 of the DEIS (FEIS Section 4).

Comment 7: Comment stated that the bald eagle would be threatened by this proposal to build the refinery and that the DEIS fails to consider the cumulative effects of altering forage areas for bald eagles within the project site.

Response 7: Based on its unique habitat needs and affinity for fish as a primary food source, the occurrence of a bald eagle in proximity to the project area would be a rare and random incident. No suitable roosting/nesting habitat or concentrated prey/carrion foraging sources are present on the proposed project site. The use of low voltage power lines, designed to avoid electrocution of raptors, would also be installed during construction of the refinery. The proposed NPDES-permitted discharge of effluent from the refinery would result in tributary and mainstream water quality that would have no effect on any bald eagle that might ingest the water, or on prey species residing in the discharged water. In addition, the location of this discharge is not within the general habitat of the bald eagle. There would be no effect to this species or its habitat from the construction or operation of the proposed refinery, or from the implementation of any of the discharge alternatives.

Comment 8: Comment stated that an analysis to assess impacts of failing to net oily ponds and maintaining them should be conducted.

Response 8: Netting of contaminated water ponds is a mitigation measure that has been well-proven to effectively decrease wildlife use of bodies of water. Maintenance requirements are not typically significant for these barriers. The potential health impacts to an animal coming in contact with oily contaminants floating on water is already understood, particularly in the context of petroleum industry oil spills and oily pits or oil-covered surface impoundments.

Comment 9: Comment stated the DEIS minimizes the true effect of habitat loss for birds by saying birds are highly mobile and it is important to analyze habitat alternatives before making this claim. The document does not analyze the cumulative effects of habitat loss with respect to waterfowl habitat and loss of wetlands. Comment stated the DEIS lists and analyzes birds individually which minimizes the true synergistic relationship the effects have with one another and the impacts caused by these effects as a whole.

Response 9: The refinery is proposed to be sited on agricultural land which presently provides limited wildlife habitat value, and the reduction in wetland habitat is considered inconsequential relative to abundant similar habitat in the area surrounding the proposed refinery location. It is beyond the scope of this project to analyze overall waterfowl habitat loss in North Dakota. This area has not had substantial development and there are no other large construction projects proposed in the vicinity of the project in the reasonably foreseeable future.

Comment 10: Comment stated there is only one specific measure for reducing the number of raptor collisions with power lines, which is to avoid areas of high avian use and according to the DEIS, these measures will only be implemented where feasible and there is no way of enforcing them.

Response 10: There are no known areas of high raptor use where transmission lines are proposed nor are there ravines were raptors would use thermals. The electrocution of raptors is an impact that can be minimized through the use of perching devices on transmission lines and other measures described in the FEIS.

Comment 11: Comment stated that with respect to the effects of vehicle collisions on birds, the DEIS mentions the use of speed limits as a mitigation measure on project roads but there is nothing regarding the enforcement of such limits so this measure may be ineffective.

Response 11: As discussed on page 4-74 of the DEIS, the majority of bird/vehicle collisions will be on highways and non-project roads. Therefore, lowering the highway speed limit in the area of the refinery to reduce impacts to birds was <u>not</u> suggested to mitigate impacts to birds. Also the vehicle traffic increase of 30% will not have a significant increase in bird-vehicle collisions.

Comment 12: Comment stated that the use of the term “big game mammals” is insufficiently specific and overly broad and that species should be analyzed individually.

Response 12: The term “big game mammals” is described in the Wildlife section of Chapter 3 of the FEIS. The overall impact to these species is predicted to be minor resulting from displacement of common species occurring on agricultural land. As these species encounter disturbances from agricultural activities presently occurring on the property, additional impacts are not predicted to be more than minor. The analysis of individual species is unnecessary for the decision making process due to the minor impacts predicted and the similarity of anticipated impacts.

Comment 13: Comment stated the DEIS fails to consider how the project will contribute to the continuous destruction of the gray wolf's habitat and make it harder for the gray wolf population to return to safe numbers.

Response 13: The Wildlife section of Chapter 4 discusses the lack of anticipated impacts to the gray wolf and its prey relative to the proposed project. It is beyond the scope of this FEIS to analyze overall habitat loss for gray wolves.

D.7. CULTURAL RESOURCES

Comment 1: Comments stated concern about the cultural change that comes with relying on industry for their well-being and that life is based on protection of resources. Polluting the environment, as the refinery will do, is inconsistent with traditional Tribal values.

Response 1: The MHA Nation replied that tribal cultures have adapted from time immemorial to changes without impairing their cultural values. The evidence to support this statement is the current language, practices and legends that are passed on to new generations. Tribal traditions continue through the Tribe's medicine, burial, naming and other traditional ceremonies.

Comment 2: Comment questioned the adequacy of analysis of impacts to areas of Tribal cultural and spiritual significance.

Response 2: The proposed refinery will be located on land that has been farmed and worked since 1910. As explained in the Cultural Resources section 4.9 of the EIS, the Three Affiliated Tribes Cultural Preservation Office (CPO) and the North Dakota State Historic Preservation Officer (SHPO) were consulted regarding potential cultural impacts from the proposed refinery. The CPO made a "No Historic Properties Effected" determination for the proposed refinery site. The CPO further indicated that no sites or previously-identified cultural resources were located during the course of its evaluation. The SHPO reported that there were no recorded historic or cultural sites. While the SHPO noted that there has not been a cultural resource inventory of the proposed refinery site, the SHPO indicated that the location appeared to have a low probability for cultural resources. The SHPO concluded that it would recommend a no historic properties affected determination for the refinery site. The Agencies also consulted directly with Tribal leadership regarding whether the refinery site had any known cultural or spiritual significance to Tribal members. The Tribes represented that the refinery site held no cultural or historical significance for Tribal members.

D.8. AIR QUALITY

D.8.(a). Air Quality Impacts

Comment 1: Several comments stated that the DEIS did not explain the statement that there would be negligible environmental impacts from the proposed refinery. Comments also requested review of toxic air pollutants.

Response 1 - NAAQS: Existing ambient air monitoring data was used to establish current levels of exposure to "criteria pollutants" for which there are a national ambient air quality standard or NAAQS. [NAAQS are the federal health based standards for: nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter (dust, soot) ($PM_{2.5}$ and PM_{10}) and sulfur dioxide (SO_2).] These standards were developed to protect public health and welfare with an adequate margin of safety. The NAAQS pollutants are measured based on various time frames in order to address impacts from short-term and long-term exposures: NO_2 is measured annually; CO is measured over 1 hour and 8 hour periods; $PM_{2.5}$ is measured at 24 hours and annually; PM_{10} is measured at 24 hours; SO_2 is measured at 3 hours, 24 hours and annually. The monitoring location where existing ambient monitoring data was gathered would include any emissions that may have drifted from power plant sources.

The criteria pollutant emissions from the proposed refinery were modeled together with the monitored current background levels to estimate total pollutant exposures for Tribal members and the public. (Air Quality Technical Reports, May 2006 and December 2007). The modeled results are detailed in the DEIS (Table 4-15) and show that the potential emissions of criteria pollutants from the proposed refinery, together with existing background levels of the pollutants, which include emissions that may have drifted from power plant sources, <u>are below all NAAQS</u>. The term "negligible" was used in the DEIS to disclose that the proposed air emissions from the refinery would not cause exceedances of the NAAQS. The FEIS and *Air Quality Technical Report* have been revised to clarify this. {FEIS changes in Section 4.13}

HAPS: The DEIS describes hazardous air pollutant (HAP) ambient concentrations in the project area for 1 hour, 24 hour and annual periods (DEIS in Table 4-16). The document also describes the site-specific hazardous emissions modeling for the proposed refinery to determine human health impacts for the following HAP parameters: benzene, cyclohexane, formaldehyde, hexane, polycyclic aromatic hydrocarbons, toluene, and xylene (DEIS on page 4-132). The hazardous emissions are correlated to chronic health effects (i.e., long-term exposure). The analysis is related to lifetime exposure to a hazardous emission; thus, assessing a one-year average concentration against the criteria is a conservative estimate of exposure over a lifetime. The DEIS describes that the estimated ambient impacts from the proposed refinery are below the federal risk based concentrations and that the proposed refinery would not have measurable adverse effects on the human health of the local area communities (DEIS pages 4-125 through 4-135 and in the FEIS in section 4.16.1.3).

While power plants are large emitters of many criteria pollutants and mercury, HAPS concentrations from these facilities at the project area would be expected to be very low given the amount of dilution that would occur in the distance between these facilities and the MHA Nation.

Comment 2: There were several comments stating that the proposed site for the refinery is only two miles upwind from the Town of Makoti and that the impacts to Makoti were not fully analyzed.

Response 2: The modeling analysis used four full years of hourly surface meteorology data from Minot, North Dakota observed during 1984, 1985, 1987, and 1988. Minot, located about 30 miles northeast of the project site, is the nearest location with multiple years of processed meteorological data suitable for modeling. The data is considered representative of the project site given the relatively flat terrain in the area. The model calculates concentrations for a network of locations (receptors), including Makoti, in the area around the refinery for each of the 35,000 hours of meteorology data. The model then reports the highest concentrations predicted anywhere on the array of receptors. This methodology assures that the impacts associated with the prevailing northwest winds and impacts in Makoti were fully considered in the modeling analysis.

Comment 3: Comments requested information on air emissions dispersion distance for worse case emergency scenarios.

Response 3: The safe setback distance in any emergency scenario depends on the nature and quantity of emissions and the meteorological conditions at the time of the emergency. These conditions cannot be predicted in advance of such an event. However, emergency response personnel are trained to consider these factors in establishing safe setback distances. For more information, see Section E. - Emergencies, Spills and Safety, of the Response to Comments.

Comment 4: Several comments stated the DEIS analysis of air impacts was not clear or easily understood by the public at large.

Response 4: This RTC and the FEIS includes clarification of DEIS air impacts analysis. In addition, EPA has summarized relevant portions of the revised *Air Quality Technical Report* (December 2007) and included the summary in the Air Quality section of Chapter 4 in the FEIS. {FEIS changes in Section 4.13}

D.8.(b). Cumulative Air Impacts

Comment 1: Several comments stated concerns that the DEIS failed to address cumulative impacts to air quality and disregarded potential new sources of air pollution, including an ethanol plant and a new power plant. Comment stated that there is a conflict between stating that no other projects are planned in the area yet the refinery will stimulate local development.

Response 1: The analysis in the DEIS considered the cumulative impacts of the project. The most recent available ambient air quality monitoring data was used to establish baseline conditions in the Class II project area. This data reflects the impacts from existing regional sources such as power plants and mobile sources as well as transported pollutants from neighboring States. The modeled incremental impact from the proposed project was added to these monitored values to estimate total cumulative air quality impacts in the project area, for comparison with the NAAQS. Use of these monitored data to establish existing baseline conditions in the project area may, in fact overestimate future concentrations because several of the largest power plants in the region are subject to EPA regulations that will require them to install Best Available Retrofit Technology (BART) over the next five years. These mitigations are projected to reduce SO_2 and NO_2 emissions from the affected facilities by up to 95 percent. Cumulative impacts for the types of emissions from power plants will decrease in the area over time even with the new proposed power plant.

The cumulative impact analysis did not specifically include the proposed ethanol plant, because emissions from the ethanol plant combined with the refinery and other sources are not expected to be significant in the airshed surrounding the proposed site. Volatile organic compounds (VOCs) are the main air emissions of concern from ethanol plants.

Potential air emissions from future, local developments in the area are very minor. Increases in vehicle and rail traffic and new commercial/residential air emissions induced by the proposed refinery are too minor to cumulatively affect air quality.

Comment 2: Comments raised concern about lack of analysis of long-term air impacts on Regional air quality, as the refinery ages.

Response 2: The analysis of potential air quality impacts were based on conservative estimates (maximum potential) of the proposed refinery's emissions. Emissions are not expected to increase as the project ages. Any significant increase in the proposed refinery's emissions due to modifications made at the refinery would trigger additional permitting reviews of both the additional impacts to air quality due to the modification and a technical review of emission control equipment (to minimize emissions) applicable to the modification.

Comment 3: Comment questioned why 1990-1994 meteorology data was used in the modeling analysis and not more recent data.

Response 3: The 1990-1994 meteorology data were used because they were the most complete data sets available at the time of EPA's PSD increment analyses. The 1990-1994 data is sufficiently long and contains enough observations that it is still considered representative of conditions in the project area and is acceptable for use in regulatory modeling analyses.

Comment 4: Several comments expressed concern that the current controversy between EPA and North Dakota over SO_2 increment levels, which are established in the Prevention of Significant Deterioration (PSD) permitting program, in Class I areas in North Dakota has not been resolved. Comments stated that the EIS should assess cumulative impacts from the proposed refinery in conjunction with existing emissions from North Dakota power plants on the Class I airsheds. Comment also indicated concern that the DEIS did not provide the same impact data for both the Theodore Roosevelt National Park (TRNP) and Lostwood Wilderness (LW) Class I areas.

Response 4: The DEIS includes an air quality analysis of impacts from the proposed project at two Class I areas: Theodore Roosevelt National Park (TRNP) and Lostwood Wilderness (LW). It is not necessary to address or resolve issues regarding EPA and North Dakota modeling protocols in the EIS, because the modeling demonstrated that the refinery would have a minimal impact on the Class I SO_2, NO_2 and PM_{10} increments for the Class I areas. As described on page 4-107 of the DEIS, the Class I SO_2 increment consumption analysis was evaluated using the same methods as were used in the EPA Region 8 North Dakota increment modeling analysis (U.S. EPA 2003).

The DEIS shows in Table 4-18 the potential impacts from the proposed refinery project on the SO_2 increment at TRNP are minimal, as demonstrated by the 3-hour project impact of 0.0000 to 0.0060 μg/m3; 24-hour impact of .0000 to .0050 μg/m3; and annual impact of 0.0005 to 0.0024 μg/m3. In addition, the DEIS presents in Table 4-19 the maximum estimated increment consumption from the project's emissions and concludes that the project would consume a minimal amount of the NO_2 (0.10% to 0.14%) and PM_{10} 24-Hour (0.21% to 0.47%) increments. The estimated maximum visual range extinctions resulting from the project emissions are below the 5% threshold that EPA's BART guideline establishes as a threshold for defining a "contribution" to visibility impairment. The maximum estimated visual range extinctions are also well below the 10% or 1.0 deciview general level of concern for Federal Land Managers.

The impact of the proposed project emissions on the increment consumption in the TRNP and LW is minimal for two primary reasons. First, the refinery SO_2 and NO_2 emissions are small as compared to existing sources in the Class I airshed. For example, the refinery is projected to emit 51.2 tons per year of sulfur dioxide, as compared to the existing power plant 2004 SO_2 emissions of 148,726 tons per year. The refinery is projected to emit 35.7 tons per year of NO_2, as compared to the existing power plant 2004 NO_2 emissions of 77,589 tons per year. Second, the proposed facility is located 73 miles from the TRNP and 55 miles from LW. The DEIS modeling shows the air emissions from the proposed plant would disperse to minimal amounts by the time they reach the Class I airsheds. Consequently, the relatively low emissions of SO_2, NO_2 and PM_{10} from the proposed project, combined with the dispersion of those emissions, would result in minimal impacts from this project on the Class I airsheds. The proposed project's contribution to cumulative air impacts at the Class I areas would likewise be minimal.

Comment 5: Comment requested that information be added on the criteria used to decide that refinery impacts on the Class I SO_2 increment for Teddy Roosevelt National Park (TRNP), suggested that significant impact levels (SILs) defined in the ND State Implementation Plan (SIP) be used as criteria, and concluded that impacts would be minimal if this were done. Comment questioned the dates of the data used and noted that comparable information is not provided on TRNP and Lostwood Wilderness (LW), making the DEIS incomplete

Response 5: Information has been added to the FEIS to further explain and support the conclusion that impacts on TRNP SO_2 levels would be minimal. {FEIS changes in Section 4.13.1.4}

Comment 6: Comment stated that in 2004, over 140,000 tons of SO_2, 75 tons of NO_x, and over 2,200 tons of mercury were emitted by the 7 power plants in North Dakota and that the October 2004 Dakota Resource Council publication, Dakota Council, stated that the North Dakota power plants emitted over 3 tons of arsenic and 3 tons of lead and over 4 million pounds of chromium were released on or near Fort Berthold.

Response 6: The emissions data referenced for North Dakota power plants are not consistent with EPA data. EPA's acid rain database shows 2004 North Dakota power plant emissions of 148,726 tons of sulfur dioxide and 77,589 tons of nitrogen dioxide. Similarly, our records also show that air emissions of mercury and chromium from ND power plants were 1.24 tons and 3.00 tons, respectively, in 1999.

Comment 7: Comment stated concern that Table 3-21 in the DEIS shows an increase in the Standard Visual Range (SRV) for years 2001-2004 for the Lostwood Wilderness and Teddy Roosevelt National Park, but does not show the impacts that the refinery emissions would have on these two Class I areas when the refinery is operating for its twenty year lifetime at 10,000 or 15,000 barrels per day.

Response 7: The estimated change in Class I visibility from the operation of the refinery was modeled using five years of historical meteorology data. The highest impacts occurred at the Lostwood Wilderness area with visual range reductions of between 1.59 percent and 4.14 percent depending on the weather data used in the modeling. Similar impacts on visibility would be expected over the 20 year lifetime of the facility while operating at its 10,000 barrel per day capacity. These impacts are below the 5 percent threshold (0.5 deciview) considered to be perceptible and well below the 10% or 1.0 deciview general that is the general level of concern for Federal Land Managers. Potential impacts to visibility were not analyzed at higher operating capacities in the DEIS, because the refinery that was proposed by the MHA Nation would process 10,000 barrels per stream day (BPSD) of synthetic crude oil, not 15,000 BPSD or more.

Comment 8: Comment stated that the EIS does not address broad environmental impacts of the refinery, specifically climate change concerns.

Response 8: Climate change sections have been added to Chapters 3 and 4 of the FEIS describing the environmental consequences of climate change and estimating greenhouse gas emissions from the proposed refinery.

D.8.(c). Permitting and Emissions

Comment 1: There were several comments raising a concern about the lack of federally enforceable Clean Air Act (CAA) permits for the proposed oil refinery and stating that lack of any air permit would allow unlimited and unmonitored air emissions. Comments questioned why there are no CAA permits, stated the facility is a major source requiring permits and Best Available Control Technology (BACT) and requested that EPA initiate the PSD process, set detailed and enforceable BACT limits and monitoring requirement for all refinery sources.

Response 1: In an April 2005 letter to the MHA Nation, EPA made a non-applicability determination for federal air permits for the proposed refinery. Based on the proposed equipment, emissions projections, and feedstocks, EPA determined that the proposed refinery was not subject to the permitting requirements of a pre-construction Prevention of Significant Deterioration (PSD) permit or a Title V (40 CFR part 71) operating permit. The "potential to emit" or potential maximum emissions estimated for the refinery were based on the refinery operating 24 hours per day, 365 days a year. Since the estimated "potential to emit" is below 100 tons per year (TPY) of any regulated pollutant and below 10 TPY of any one hazardous air pollutant or 25 TPY of a combination of hazardous pollutants, the proposed refinery would not be considered a major stationary source as defined in the PSD regulations at 40 CFR 52.21(b)(1)(i) and in the Title V operating permit regulations at 40 CFR 71.2. The proposed refinery is not a major source subject to the PSD permitting requirements, so the facility is also not subject to Best Available Control Technology (BACT), which is a requirement under the PSD regulations.

EPA is promulgating new regulations to establish a preconstruction air permitting program for minor stationary sources throughout Indian country. The rule was proposed in the August 21, 2006 *Federal Register*. The effective date for implementing the new regulations is anticipated to be at least 60 days after the final regulations are published. These regulations may apply to the refinery depending upon when construction on the refinery commences relative to the effective date of these regulations.

The proposed refinery will be subject to several Clean Air Act New Source Performance Standards (NSPS) (40 CFR part 60), which will impose emission limits, fuel gas specifications, or design requirements and require testing, monitoring, recording keeping, and reporting of emissions for many units. However, not all emissions will be monitored under these regulations. Applicable NSPS requirements are explained in more detail in Response 5 in this section.

On November 7, 2006, EPA proposed new regulations under a New Source Performance Standard for equipment leaks of VOC in petroleum refineries and promulgated the proposal on November 16, 2007. These revised standards are codified at 40 CFR, part 60, subpart GGGa and were effective on the date of promulgation. NSPS subpart GGGa is applicable to the proposed refinery since construction of the regulated refinery units will commence after November 7, 2006 [see 72 FR 64896, November 16, 2007] Finalization of NSPS, subpart GGGa triggered the requirement for the refinery to apply for a 40 CFR Part 71 operating permit within 12 months of commencing operation.

On May 14, 2007, EPA proposed New Source Performance Standards for new, modified, or reconstructed process units at petroleum refineries. Once finalized, these standards will be codified at 40 CFR part 60, subpart Ja and will be effective as of the date of proposal. [See 72 FR 27177, May 14, 2007.] These proposed standards include emissions limits and associated testing, monitoring, recordkeeping, and reporting for the process heaters, other fuel gas combustion devices, and the sulfur recovery unit, which the proposed refinery is not currently subject to under the existing applicable New Source Performance Standard (40 CFR part 60, subpart J). Finalization of NSPS, subpart J will also trigger the requirement for the refinery to apply for a 40 CFR part 71 operating permit within 12 months of commencing operation.

EPA has authority under Clean Air Act sections 301(a) and 301(d)(4) to promulgate "Federal Implementation Plans" (FIPs) as necessary or appropriate to protect air quality (40 CFR 49.11). EPA may develop a FIP for the refinery which could include additional monitoring, testing, recordkeeping, and reporting for the refinery units as needed to ensure protection of air quality.

Comment 2: Comment stated that without enforceable air permit limits; the project proponent could use highly sulfurous crude inputs, which would greatly increase SO_2 emissions.

Response 2: EPA's initial determination that the proposed refinery will not need a PSD or Title V operating permit is based on the refinery feedstock being a synthetic crude oil from Canada that is low in sulfur. The commenter is correct that if the refinery were to process highly sulfurous crude, then the SO_2 emissions would greatly increase. However, if the project proponent decides to use a feedstock different than the low sulfur synthetic Canadian crude oil, then EPA's determination that the refinery is not a "major source" would need to be revisited. EPA would have to reevaluate refinery emissions information based on the new feedstock. The use of highly sulfurous crude as a refinery feedstock would most likely trigger PSD permitting requirements for at least SO_2 emissions. As noted in Response 1 above, promulgation of NSPS subpart GGGa triggered the requirement for the refinery to apply for a federal operating permit within 12 months of commencing operation.

Comment 3: Comment questioned whether a statement on page 1-2 of the DEIS meant that EPA had incomplete information on the proposed refinery, because the statement was prefaced by saying “However, at this time EPA has determined that the facility does not require a CAA PSD permit for construction of a new major source . . .”

Response 3: The emissions information provided to EPA was not incomplete. EPA’s determination that the proposed refinery does not need a Prevention of Significant Deterioration (PSD) construction permit was based on the most recent emissions information and projections submitted by the project proponent. The phrase “[H]owever, at this time” indicates that if potential emissions estimates increase or if actual emissions exceed the current emissions, EPA will, at that time, reevaluate the need for a PSD construction permit.

Comment 4: Comments expressed concern about possible emissions from the new refinery.

Response 4: DEIS Chapter 4, Human Health - Air Analysis Conclusions (pages 4-133 and 4-134) contains a discussion of potential air impacts from the proposed refinery and Mitigation of Impacts, beginning on page 4-135 in the DEIS and Section 4.16 in the FEIS. See also responses to comments in the Air and Human Health sections of this document.

Comment 5: Comment that there are no air permit conditions limiting emissions from heaters, boilers, flares, and devised the flares are purported to control (such as the wastewater system, loading operations, pressure relief devices, storage tanks, or some fugitive sources), nor for the Sulfur Recovery Unit, Emergency Generator, Fire Pumps, Storage Tanks, or Soybean Oil extrusion or refinery processes. Consequently, the emissions and controls above are effectively allowed to be unlimited. Additional comments regarding no permit conditions include: ensuring tank seals have no gaps, that there would be no tears or holes in seal fabric, that floating roof tanks rest on liquid surfaces, that approved emission control systems be gas tight or meet a specific control efficiency, that fittings and sampling or gauging wells have tight, engineered fittings, that pressure-vacuum valves be kept leak tight and inspected, that vapor pressure of materials in tanks be tested or that any conditions at all are set. Comment that without a permit, there are no limitations for the project such as those required in the San Francisco, California area for sulfur recovery plants, sour water strippers and other activities generating SO_x emissions, including requirements for measuring sulfur content in crude inputs, requirements for ground level monitors of deadly H_2S gas generated by such processes, limits on sulfur content in particular gas streams, etc.

Response 5: The proposed refinery will be subject to several Clean Air Act NSPS (40 CFR part 60) requirements, which will impose emission limits, fuel gas specifications, or design requirements and require testing, monitoring, recording keeping, and reporting for many units. Therefore, not all emissions will be unmonitored. Appendix A in the *Air Quality Technical Report* (May 2006) for the DEIS does list the refinery units that are subject to a NSPS requirement. This list has been updated in Appendix A (Table A-1) of the revised *Air Quality Technical Report* (December 2007) for the FEIS and Table A-2 has been added to listing the specific NSPS requirement for each applicable refinery unit.

Storage tanks with fixed roofs in combination with an internal floating roof will have to meet specific design requirements, such as primary and secondary seals, vents equipped with gaskets, openings equipped with covers, etc. under NSPS, subpart Kb. Storage tanks with fixed roofs will be equipped with a closed vent system for capturing VOCs, with no detectable emissions greater than 500 ppm above background. The VOC emissions will be vented back to the processes and sometimes sent to the flare. Tanks will have to be inspected; and seals, gaskets, etc. repaired as needed.

To reduce fugitive VOC emissions, leakless valves will be used for valves in gas, light liquid, and heavy liquid service, double seals will be used for the pump seals, open ended valves will be plugged, the compressed seals will be recycled to the process units, and the sample connections will be enclosed. NSPS subpart GGGa, requires a leak detection and repair program for valves, flanges, pump seals, etc. for the refinery. Subpart GGGa defines a leak as 500 ppm or more for valves in gas/vapor service or light liquid service and as 2,000 ppm or more for pumps in light liquid service. Promulgation of NSPS subpart GGGa on November 16, 2007 triggered the requirement for the refinery to apply for a 40 CFR part 71 operating permit within 12 months of commencing operations.

NSPS, subpart QQQ also requires that the closed vent system and flare be operated at all times when emissions may be vented to units. The closed vent system is also subject to the leak detection and repair program. A leak is indicated by an instrument reading greater than 500 ppm above background. The flare must be designed and operated with no visible emissions.

Subpart Ja would require that the sulfur recovery unit meet a 99% sulfur removal efficiency, a hydrogen sulfide (H_2S) limit of less than 10 ppm determined on a 12-hour rolling average, and continuously monitor for compliance. Process heaters with a capacity greater than 20,000,000 Btu/hr would have to meet a NOx limit of 80 ppm on a 24-hour rolling average and continuously monitor for compliance. All process heaters and fuel gas combustion devices would have to comply with an SO_2 limit of 20 ppm on a 3-hour rolling average, an SO_2 limit of 8 ppm determined daily on a 365 successive day rolling average, and monitor continuously. The refinery combustion units will all have "Low NOx" burners. Finalization of NSPS subpart Ja will also trigger the requirement for the refinery to apply for a 40 CFR part 71 federal operating permit within 12 months of commencing operation.

The comment references San Francisco area regulations for sulfur recovery plants, etc. BAAQMD is the acronym for the Bay Area Air Quality Management District in California. EPA has approved various air quality regulations for the majority of state and/or local governments throughout the country. The state and local air quality regulations EPA has approved apply to the sources located in each respective state or local district. The BAAQMD regulations would not apply to the proposed refinery. Since the refinery is in Indian country, it is subject to federal air regulations, not state regulations.

Comment 6: Comment that the proposed refinery is not being required to meet regulatory limits that old refineries are meeting, let alone meeting BACT limits required for new sources.

Response 6: The proposed refinery will be required to meet limits for many units under the NSPS regulations as stated in Response 1 in this section, which will be much more stringent than "old refineries" are meeting. As stated in Response 2 in this section, the proposed refinery is not subject to BACT requirements because it is not subject to PSD permitting requirements.

Comment 7: Comment that without CAA permits requiring BACT and proper equipment maintenance, there is nothing within project requirements stopping refinery proponents from purchasing old equipment phased out from use at other refineries which could be old and rusted.

Response 7: For more information about project equipment see Comment 5 in section C.1.(c). Many of the refinery units will be required to meet NSPS requirements. Old and rusted equipment would not be able to meet these requirements, as the requirements are technology based or design requirements (i.e. seal requirements for fixed or floating roof tanks). In addition, EPA's determination that the refinery will not need a PSD permit is based on the equipment proposed for the refining process. If different equipment is used than what was proposed (i.e. old heaters without low NO_x burners), then EPA's determination that no PSD air permit is required would be revisited. Refinery emissions would have to be reevaluated to determine if the potential emissions would exceed major source thresholds and thus trigger PSD permitting requirements.

Comment 8: Comments requested that the DEIS provide a more in depth, accurate analysis of the refinery emission projections, and list the technologies that the projections are based upon. Comments claimed that the DEIS underestimated all emissions from the proposed refinery and requested that all the potential polluting emission sources posed by the proposed refinery be reevaluated. Comments also stated there are inconsistencies in whether the refinery would include a fluidized catalytic cracking unit.

Response 8: The control equipment by unit is listed in Appendix A of the *Air Quality Technical Report* (May 2006). EPA has included in the Air Quality section of Chapter 4 in the FEIS a summary of the technologies proposed for the refinery to limit emissions and references to tables in the revised *Air Quality Technical Report* (December 2007) that show the air pollutant emissions from each refinery unit. {FEIS changes in Section 4.13.1.1}

The only emissions that were underestimated for the proposed refinery were VOC emissions due to equipment leaks. Fugitive VOC emissions have been calculated and are included in the revised *Air Quality Technical Report* (December 2007) and in the overall VOC emissions reported in the FEIS. {FEIS changes in Section 4.13}

The design for the proposed refinery does not include a fluidized catalytic cracking unit, which nearly all existing refineries utilize to process crude oils into gasoline, diesel, and other fuels. A fluidized catalytic cracking unit is one of the most significant sources of air pollutants at a refinery, because of regeneration of the catalyst. The proposed refinery is designed to use several Hydrocracker Units to accomplish the same refining as the fluidized catalytic cracking unit. Air emissions are much lower using the hydrocracking technology as compared to the fluidized catalytic cracking technology because regeneration of the catalysts are done off site.

Comment 9: Comment that the DEIS neglects to consider and calculate variability in the rate of air emissions and assumes the facility would operate perfectly, which paints an inaccurate picture and fails to take into account any resulting adverse environmental impacts.

Response 9: The air emissions listed in Table 4-14 of the DEIS represent the "potential to emit" of the proposed refinery based on the project proponent's proposed equipment and feedstocks. "Potential to emit" is defined in the PSD regulations (40 CFR 52.21(b) as the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. This maximum capacity is based on a source operating for 24 hours per day, 365 days per year. Maximum environmental impacts were accounted for based on maximum or potential emissions.

Comment 10: Comment stated that the DEIS has no basis for implying that because of the relatively smaller feedstock capacity of the refinery, that the emissions would be lower.

Response 10: The feedstock capacity of a refinery is related to the amount of air pollution that will be emitted from the refinery. The smaller amount of feedstock into a refinery the lower the emissions out of the refinery. The amount of feedstock (synthetic crude oil) that is processed in the Crude Processing Unit determines the amount of heavy hydrocarbons and light hydrocarbons that are sent on as feed streams to other refinery units for processing into the final products of diesel fuel, gasoline, propane, etc. However, there are sources of emissions from a refinery not related to the feedstock capacity. One example would be the type of fuel burned in the boilers, heaters, etc. If natural gas or fuel gas were burned, then air emissions for several pollutants would be lower than if fuel oil was burned.

Comment 11: Comments stated that since the composition of hydrocarbons and impurities of crude oil can vary substantially (as detailed in the *Air Quality Technical Report*), this can lead to uncertainty and variability in estimating annual emissions.

Response 11: The intent of the discussion about the variability in the composition of hydrocarbons and impurities of crude oil in the *Air Quality Technical Report* (May 2006, page 3-2) was to clarify that the equipment and operations of a refinery are designed and operated to process specific crude oils and produce specific products. Therefore, no two refineries are operated exactly the same because of the different compositions of crude oil used as feedstocks. The proposed refinery was designed to process the synthetic crude oil from Canada. The composition of the synthetic crude was accounted for in calculating potential annual air emissions for the refinery.

Comment 12: Several comments stated there is a lack of emissions data for startup, shutdown, and equipment malfunctions at the proposed refinery in the DEIS; that PSD regulations require that these emissions be included in the total project emissions and this data should be included in the DEIS. Comments stated when processing units are shutdown in smaller refineries with no redundant equipment, either unexpectedly or as planned, there may be nowhere to route excess gases, causing increased air pollution during refinery equipment shutdown, which occurs frequently at refineries. Comment requested that the EIS include an assessment of the average frequency of shutdowns, startups, maintenance and malfunctions at oil refineries, based on actual data from facilities around the country.

Response 12: As described in Chapter 2 of the DEIS, the proposed refinery would have a detailed maintenance plan in place for commencement of operation. The plan would include defining the requirements for equipment inspections, shutdowns, and startups. Scheduled turnarounds (shutdowns and startups) for individual process units would occur approximately every three to five years to allow for cleaning out accumulated undesirable residues, replacing catalysts, replacing absorbents, conducting repairs, etc. The plan would include a shutdown of a portion of the plant each year on a rotational basis utilizing tankage to store intermediate products, so there would not be a total outage for any of the individual units every year and flaring of emissions would be minimized. Unscheduled shutdowns result from upset plant conditions usually related to power failure, loss of cooling water, or a fire. To minimize unscheduled shutdowns and startups and associated flaring emissions, the refinery design includes two independent sources of supply to mitigate the risk of power failure, an Emergency Generator, and a UPS (Uninterruptible Power Supply) for critical equipment. In addition, the proposed refinery does not have a Cooling Tower and the process units have liberal spacing for isolation and segregation in the event of a fire.

As detailed in the *Air Quality Technical Report* (May 2006) on page 4-1, normal operation for the flare was designed for a loading rate of 15 lbs/hour (65.7 tons/year). However, to account for potential process upsets and startup/shutdown activities that could increase emissions releases a loading rate of 500 lbs/hour (2,190 tons/year) was used to calculate potential air emissions from the flare. The loading rate of 500 lbs/hour is over 30 times the normal operation loading rate of 15 lbs/hour. The potential flare emissions were also calculated based on operating the flare 24 hours a day, 365 days a year [See Flare Example NO_x calculation in Appendix C of the *Air Quality Technical Report* (May 2006)]. Therefore, potential emissions from startups, shutdowns and equipment malfunctions, were conservatively estimated for the proposed refinery.

The Air section in Chapter 4 of the FEIS includes a discussion and table of actual emissions from upsets (including malfunctions, startups, shutdowns and maintenance) from several large refineries operating in Texas and Louisiana.

Comment 13: Comments stated that fugitive VOC emissions were not accounted for in the emissions calculations. The comments stated the *Air Quality Technical Report* referenced information in the EPA document Protocol for Equipment Leak Emissions Estimates (U.S. EPA, 1995) in which various listed control measures should provide 100 percent control of fugitive VOC emissions. Comments stated that 100 percent control of fugitive emissions was unrealistic and that even subparts GGG and QQQ of 40 CFR 60 allow leakage rates of VOCs of 500 to 10,000 parts per million (ppm) above background levels. Comments requested that fugitive VOC emissions from all potential sources be estimated using a more realistic approach.

Response 13: Fugitive VOC emissions have been calculated and are now included in the revised *Air Quality Technical Report* (December 2007) and in the overall VOC emissions reported in the FEIS. {FEIS changes in Section 4.13.1.6}

Comment 14: Comments stated the DEIS incorrectly assumes that fugitive air emissions would be zero and were concerned that fugitive emissions were not calculated in the *Air Quality Technical Report* for other pollutants, such as NO_x, CO, SO_2, PM_{10} and $PM_{2.5}$.

Response 14: Fugitive particulate matter (PM_{10} and $PM_{2.5}$) emissions for a refinery would be primarily generated by truck traffic. Fugitive emissions for PM_{10}/ $PM_{2.5}$ were calculated for the proposed refinery and included in the total potential PM_{10} and $PM_{2.5}$ annual emissions. [See Appendix C of the May 2006 *Air Quality Technical Report* for calculations and 4-6 for discussion.] The only other fugitive air emissions from a refinery would be VOCs that would leak from valves, flanges, and other operating equipment. A refinery does not emit fugitive emissions of NO_x, CO, or SO_2 as evidenced by the lack of emission factors for NO_x, CO, and SO_2 fugitives in AP-42. (See, EPA publication Compilation of Air Pollution Emission Factors, Vol. I: Stationary Point and Area Sources).

Comment 15: Comment stated that the flare emissions were grossly underestimated and the proposed refinery flare system is designed for routine/daily flaring, which would cause the SO_2 and VOC emissions to be in the hundreds of tons per year.

Response 15: As detailed in the *Air Quality Technical Report* (May 2006) on page 4-1, normal operation for the flare was designed for a loading rate of 15 pounds/hour (65.7 tons/year). However, to account for potential process upsets and other activities that could increase emissions releases, a loading rate of 500 pounds/hour (2,190 tons/year) was used to calculate potential air emissions from the flare. Potential flare emissions were calculated based on operating the flare 24 hours a day, 365 days a year [See Flare Example NO_x calculation in Appendix C of the *Air Quality Technical Report* (May 2006).] Therefore, calculated potential flare emissions were conservatively estimated for the proposed refinery.

Comment 16: Comment that the DEIS fails to identify the methods and equipment discussed by EPA such as flaring prevention investigations and methods, sufficient sulfur gas treatment capacity to meet the 230 mg/dscm hydrogen sulfide limit within the flare (which limits SOx emissions from the flare) and other NSPS requirements for flares. Additional comments that the DEIS must be corrected to reflect large emissions from flaring currently designed into the proposed refinery, require an air permit for large emissions from flaring, require that BACT and NSPS standards be applied to flares, including sufficient compressor and treatment capacity to prevent routing flaring, with sufficient monitoring.

Response 16: Appendix A of the *Air Quality Technical Report* (May 2006) listed the refinery flare as not subject to NSPS. This determination was incorrect. The flare for the proposed refinery will be subject to NSPS, subparts A and Ja. The *Air Quality Technical Report* (December 2007) has been revised and now includes the specific NSPS requirements for the flare, as well as, the other refinery units.

Comment 17: Comment that the emissions from the storage tanks were underestimated, because an inspection program for tank seals and vents was not required and evaporation of VOCs caused by tank cleaning was also omitted.

Response 17: Most of the storage tanks will have to meet specific design requirements or have a closed vent system for recovering volatile organic compounds under NSPS, subpart Kb. These tanks will have to be inspected and seals repaired as needed. Leak detection and repair for valves, flanges, pump seals, etc. is a requirement for the proposed refinery under NSPS, subpart GGGa.

As stated on page 2-56 of the DEIS, it was estimated that tank cleanings would be required every 6-9 years. Emissions of VOCs from degassing and cleaning of tanks are minimal (i.e., less than 1.0 tons per tank cleaning event for all tanks combined).

Comment 18: Comment stated that releases from refinery accidents and malfunctions can be huge, can dwarf emissions from regular operations and must be assessed in the EIS.

Response 18: Refinery accidents and major malfunctions are rare events. There is a potential for ruptures, fires, etc., at the proposed refinery just like any industrial facility. As noted on page 2-50 of the DEIS, the operation of equipment and the various processes would be closely monitored with an extensive, computerized plant information network to provide early warnings of developing problems, such as a unit failure. This system will help prevent accidents and malfunctions and minimize emissions. A leak detection and repair program is required under NSPS for the proposed refinery, to minimize and eliminate leaks. In addition, as described in the DEIS (page 2-51), the refinery will be required to prepare several types of emergency response plans and prepare for spills. These plans will require planning, coordination, facility design, and training that will need to be implemented at the proposed refinery to address emergency situations, such as spills, leaks, and in the rare event a fire or explosion. [See Response 1 under section E. Emergencies, Spills and Safety of this Response to Comments document for more specifics on the required plans and FEIS Table "Selected Environmental Permits, Plans and Mitigation Measures."

Comment 19: Comments stated additional emissions would result from expansion of the refinery and asked how these additional emissions would be handled by the air permit. One commenter requested that the EIS be amended to include a re-evaluation of air emissions in light of the maximum capacity of the refinery and then reissued as draft. If this is not done, the commenter stated that the capacity of the refinery should be limited to the permitted capacity. Comment asked if refinery expands in the future and increases emissions, what permits will be required.

Response 19: The need for a PSD was evaluated by EPA based on the maximum proposed capacity of the refinery and the potential emissions based on this capacity. Therefore, a re-evaluation of all air emissions is not necessary (some additional VOC emissions were calculated as discussed above). If the project proponent proposes to expand the refinery, then EPA's determination that no "major source" PSD air permit is needed would be revisited. The project proponent would have to resubmit a new air analysis (emissions and air quality impact) for EPA's evaluation and determination of applicability of a PSD permit.

Comment 20: Comment asked what facilities are using this same state-of-the-art technology. DEIS refers to the Turbo refinery but it was shut down in 1992. Since the DEIS compares this refinery to the Turbo refinery, is there any data about the actual emissions from Turbo?

Response 20: The FEIS has been revised to reflect closure of the Turbo refinery. Emissions data from the Turbo refinery were not used to calculate potential or maximum emissions from the proposed refinery. Potential emissions from the proposed refinery were calculated using manufacturer's data and EPA's publication <u>Compilation of Air Pollution Emission Factors, Volume I: Stationary Point and Area Sources</u>, (commonly known as "AP-42"). The design of the proposed refinery will be comparable to other refineries that are retrofitted to refine the synthetic crude or other refineries that have added on units to refine the synthetic crude.

D.8.(d). <u>Air Quality Monitoring</u>

Comment 1: Comments expressed concern about the location of the White Shield ambient air monitoring station, stated the monitoring stations are not in the correct locations to provide accurate data for facility emissions given that the prevailing winds blow away from MHA Nation air monitoring stations, and questioned the integrity of the ambient air quality data being monitored and retrieved by the environmental staff from the Three Affiliated Tribes from the Tribal air monitoring stations.

Response 1: The intent of siting Ambient Air monitoring stations is not to characterize individual sources of pollutants, but rather to get a general idea of the concentrations of pollutants for a representative parcel of air surrounding the placed monitor. For purposes of determining existing air quality for the project area, it is appropriate to rely on both the White Shield and Beulah monitors because they provide a conservative assessment of existing ambient conditions for the project area. While prevailing winds will generally not transport facility emissions directly toward the White Shield and Beulah monitors, winds from the appropriate transport direction (north) are not unusual in western North Dakota. In addition, EPA provided comments to the MHA Nation Environmental Division on September 11, 2006 concerning the current location of the White Shield monitor and the parameters being monitored. EPA's comments suggested that the monitor be moved to a new location to better characterize the ambient air in populated areas, one being near the Town of White Shield. Additional changes to the monitoring network that EPA suggested are the re-siting of the Dragswolf monitor to better characterize the air in New Town, changing the pollutant parameters being monitored at both sites (shut down PM_{10}, and the commencement of $PM_{2.5}$ monitoring), adding monitoring near the proposed refinery location (near Makoti), and the addition of one more monitoring station near the town of Twin Buttes. The Tribes' Environmental Division is currently in the process of locating and commencing operation of a monitoring station near the proposed refinery site to monitor for SO_2, NO_2, and $PM_{2.5}$.

EPA Region 8 has annually granted the MHA Nation a Clean Air Act §105 grant for monitoring and other air program activities. Stipulations within the MHA Nation workplan require Quality Assurance and oversight of the MHA Nation monitoring network, and adherence to EPA monitoring requirements and guidelines. Within these guidelines are certain measures which ensure the validity and integrity of the data gathered by MHA Nation such as comparing monitoring methods to reference standards, and having external audits of monitoring equipment conducted by independent organizations (contracted and EPA). EPA Region 8 also conducts audits on all of its air monitoring grantees every 3 years to meet a requirement of the Code of Federal Regulations (40 CFR Part 58 Appendix A). Based on EPA's monitoring data requirements, there is no compelling reason to distrust the data that have historically been gathered at MHA Nation monitoring locations.

Comment 2: Comments stated concerns of inadequate information on air emission controls and/or monitoring. Comment that inspection and maintenance programs are essential for ensuring that fugitive source emissions are minimized, and are not discussed in the DEIS.

Response 2: Appendix A of the *Air Quality Technical Report* (May 2006) lists the emission controls for each proposed refinery unit. As stated in several responses in Section D.8(c) of this Response to Comments document, the proposed refinery will be subject to several NSPS (40 CFR part 60) requirements, which will impose emission limits, fuel gas specifications, or design requirements and require testing, monitoring, recording keeping, and reporting for many units. Tanks will have to be inspected and seals repaired as needed. Leak detection and repair for valves, flanges, pump seals, etc. is a requirement for the proposed refinery under NSPS, subpart GGGa. The fuel gas burned will have to be monitored for sulfur dioxide content.

The *Air Quality Technical Report* (December 2007) has been revised and now includes the specific NSPS requirements for each applicable refinery unit. The Air section in Chapter 4 of the FEIS has been revised and summarizes emission controls and the applicable NSPS requirements. {FEIS changes in Section 4.13.1.1}

Comment 3: Comment asked how the refinery will monitor hydrogen sulfide gas.

Response 3: The refinery will monitor for hydrogen sulfide (H_2S) from the sulfur recovery plant under NSPS subpart Ja through the use of a continuous monitor. The sulfur recovery plant must not discharge any gases containing H_2S in excess of 10 parts per million by volume (ppmv) determined hourly on a 12-hour rolling average. The refinery will also monitor indirectly for hydrogen sulfide by monitoring continuously for sulfur dioxide (SO_2) from the refinery combustion units. NSPS subpart Ja requires that the fuel gas burned in the refinery combustion units (i.e. crude heater, reformer heaters, boilers, hydrocrackers, flare, etc.) meet a SO_2 limit of 20 ppmv on a 3-hour rolling average and a limit of 8 ppmv determined daily on a 365 successive day rolling average.

Comment 4: Comment stated the Tribes are proposing to establish an air monitoring station near Makoti to obtain PSD data and baseline data, before the start up of the refinery.

Response 4: In 2007, EPA worked with the MHA Nation Environmental Division on revisions to their Annual Network Review, which is a review of the Tribes' current monitoring network to determine if monitoring needs for the Reservation are being met. As detailed in Response 1 in this section, one of EPA's initial comments on the Annual Network Review suggested siting an air monitoring station near Makoti and the proposed refinery location prior to construction of the refinery. This monitoring station would be used to monitor for compliance with the National Ambient Air Quality Standards (NAAQS) and for determining preconstruction ambient pollutant concentrations (baseline data). EPA will not require the project proponent to conduct PSD monitoring prior to construction, since the proposed refinery does not require a PSD permit.

Comment 5: Comment asked how many real time air pollution monitoring systems the refinery will install to monitor on a real time, instantaneous basis, the air emissions from all process units and stacks.

Response 5: NSPS, subpart Ja requires that the fuel gas burned in the refinery combustion units (i.e. crude heater, reformer heaters, boilers, hydrocrackers, flare, etc.) meet an SO_2 limit of 20 ppmv on a 3-hour rolling average and a limit of 8 ppmv determined daily on a 365 successive day rolling average. Compliance with these limits must be determined using a continuous monitoring system. NO_x emissions from the process heaters will require continuous monitoring, as well as, H_2S emissions from the sulfur recovery plant.

Comment 6: Comment asked if the refinery's flares and pollution rates will be monitored, if so, by what means, what the expected combustion efficiency rate or percentage is, and whether flare gases vented into each flare will be continuously monitored and by whom.

Response 6: The proposed refinery is designed with only one flare. The flare systems operations are described in Section 2 of the EIS as described in Response 5 above, subpart Ja requires that the fuel gas burned in the flare not exceed an SO_2 limit of 20 ppmv on a 3-hour rolling average and a limit of 8 ppmv determined daily on a 365 successive day rolling average. Compliance with this concentration limit will be continuously monitored.

The proposed refinery's VOC emissions will be controlled with both a vapor recovery system and a flare. Under NSPS, subpart QQQ the vapor recovery system must meet an efficiency of at least 95 percent. The general provisions of the NSPS, subpart A (40 CFR 60.18) and subpart QQQ require that the flare be designed and operated: 1) with no visible emissions, except for periods not to exceed a total of 5 minutes during any two consecutive hours; 2) with a flame present at all times; and 3) to meet a specific exit velocity, depending on the flare type. The presence of a flame shall be monitored using a thermocouple, visible emissions shall be monitored with opacity readings done by a certified observer, and the exit velocity will be calculated using the measured volumetric flowrate and the area of the flare tip. Performance tests and data for the flare must be submitted to EPA for review.

D.8.(e). Climate Change

Comment 1 - Refinery Greenhouse Gas Emissions: Several comments expressed concern that emissions from the refinery would contribute to climate change.

Response 1: In response to comments on the DEIS, EPA has collected additional information regarding estimated emissions of greenhouse gases from the refinery and the potential for those emissions to contribute to climate change. This information is available in Section 4.13 of the FEIS.

Comment 2: One comment stated that carbon dioxide emissions from the proposed refinery could exceed limits set by the North Dakota Health Department.

Response 2: The State of North Dakota has not set any limits on carbon dioxide emissions.

Comment 3: Several comments expressed concern that the DEIS did not address the contribution of the proposed refinery to the cumulative impacts of greenhouse gas emissions globally and locally.

Response 3: In response to comments on the DEIS, the Agencies have collected additional information regarding the contribution of the proposed refinery to the cumulative effects of greenhouse gas emissions. This information is available in Section 4.13 of the FEIS.

Comment 4: Several comments objecting to the proposed refinery stated that climate change and global warming have a severe and disproportionate effect on indigenous peoples, including American Indians and Alaska Natives. One commenter noted that unpredictable weather patterns within the homelands of the MHA Nation have created drought conditions, crop and livestock loss, creating economic hardships.

Response 4: While it is possible that indigenous and local communities could bear a greater portion of the impacts from global climate change because of their close association with their traditional lands and water, attempting to make linkages of specific climatological changes or other environmental effects to a single emissions source is not useful because such linkages are difficult to isolate and understand. Information included in Section 4.13 of the FEIS addresses the magnitude of the proposed refinery's greenhouse gas (GHG) emissions compared with other emission sources, the proposed refinery's GHG emissions in the context of total GHG emissions at a national and global scale, and the impacts of climate change generally.

Comment 5 : One comment stated the emissions of greenhouse gases within the United States was the subject of international court action related to the United State's obligations pursuant to international environmental and human rights laws. The comment further stated that these obligations were not consistent with development of the proposed refinery because global climate change would be exacerbated by emissions from the refinery.

Response 5: Regarding the commenter's statement that the United States is in violation of international human rights law as set forth in the Inuit Circumpolar Commission's petition brought before the Inter-American Commission on Human Rights, having reviewed the petition, the Commission, in January 2007, determined it to be "inadmissible". This means that the Commission considered that the petition filed against the United States failed to meet the basic requirements for a human rights case to be considered in the Inter-American human rights system.

Any related international law assertions with regard to this proposed project are beyond the purview of this NEPA analysis. The Final EIS appropriately analyzes and describes the proposed refinery project's potential environmental impacts. Section 4.13 of the Final EIS estimates the GHG emissions from the proposed refinery, evaluates the proposed refinery's greenhouse gas emissions in the context of total annual U.S. and global CO2-equivalent emissions, provides information on the magnitude of the refinery's greenhouse gas emissions as compared to other emission sources, and describes the impacts of climate change generally, including impacts within the United States.

Comment 6: Several comments expressed concern about the potential for global climate change to adversely impact the State of North Dakota, including temperature increases, water shortages and drought.

Response 6: A complete analysis of the impacts of global climate change on North Dakota is beyond the scope of this EIS. The amount of greenhouse gas emissions relative to this project has been discussed in Section 4.13 of the FEIS.

D.9. SOCIOECONOMICS

Comment 1: Several comments expressed concern about the Tribes' financial status and past Tribal enterprises, including comments expressing concern for the financing of the construction and operation of the refinery when the Tribes are experiencing financial difficulties presently and concern with paying land taxes and inability to get land back for economic development as a Tribal member.

Response 1: 25 CFR Part 151 does not require BIA to conduct an analysis of the Tribes' financial status for acquisitions of land in trust that are on-reservation. It is possible that the Tribes may enter into business lease arrangements under which the BIA might review certain aspects of the Tribes' financial status.

Comment 2: Several comments expressed concern about the economic viability of the project and wondered why it would go forward when it is not cost-effective. Comment questions how this small refinery could compete with the current market and be a viable economic investment.

Response 2: The economic viability for the project is not part of the Federal Agency decision making process. The BIA reviews business plans for economic benefits associated with the proposed business purpose for Off-Reservation acquisitions or business lease agreements. This is part of the well established Federal policy of respect for tribal self government.

Comment 3: Comments stated that the Tribes intend to sell the refinery to investors instead of owning and operating the facility as proposed.

Response 3: The Federal Agencies have not received any indication from the Tribes that the project will not be owned and operated by them. The EIS analysis assumes that the Tribes will be owner and operator of the facility.

If there is to be an outside investor for the operation of the refinery on land held in trust status, a business lease pursuant to 25 CFR Part 162 will be required. Additional compliance with NEPA and other Federal regulations will be required prior to the BIA's action on a business lease.

Comment 4: Various comments were made about the economic benefits of the proposed refinery and how the refinery supports Tribal sovereignty and the Reservation economy. Several comments asked about the use of profits from the refinery, including whether Tribal members would receive dividends from the project and concern that the Tribes would only make a small fraction of the income made by the refinery.

Response 4: These comments have been referred to the Tribes for consideration as the issues are not part of the Federal Agency decision making process.

Comment 5: Several comments concerned employment of Tribal members at the facility stating a variety of concerns, including: the numbers of jobs that will be available at the refinery, the refinery will only create technical jobs, past projects promised employment to Native Americans but never came through, lack of technical jobs in the area so Tribal members need to go to other states, the need for employment to combat illness and health complications, only employment available is at the casino which has health hazards, as well as statements that surrounding area power plants and coal mines pay the same as the refinery and there is no need for the additional job opportunities the refinery may bring, newly unemployed people could find employment at the refinery, the project could have a positive impact on the Reservation economy and increase Reservation jobs so members will not have to move off the Reservation to find work.

Response 5: Please refer to the DEIS, page 4-111, Economy and Employment. According to the DEIS (page 4-111), the majority of the construction and operation workforce would be local hires. The labor pool is anticipated to be hired through the MHA Nation and through private contractors. The MHA Nation has a set hiring practice in accordance with the Tribal Employment Rights Office (TERO). Therefore, qualified Tribal members will have a hiring preference.

The statements on employment opportunities or lack thereof have been noted.

Comment 6: Several comments discussed local oil usage and mineral revenues for landowners.

Response 6: The project as presented to the Federal Agencies by the Tribes is to use synthetic crude oil from Alberta Canada. The facility is designed to process synthetic crude oil only. It is not designed to process local crude oils which would require additional desalting and other refining outside the capacity of this facility. Therefore, there would be no benefits for mineral owners.

Comment 7: Comments stated concern about a decrease in property values around the refinery, asked whether there would be negotiated buyouts or other compensation if property values decrease, and stated that property value impacts are not discussed in EIS.

Response 7: The construction and operation of the refinery is not anticipated to cause changes in adjacent agricultural land values. Changes in residential land values may occur from employees moving closer to the refinery instead of commuting 60 miles or more. However, this is entirely speculative as an analysis of the potential work force conducted as part of the feasibility for the project indicated that most individuals were willing to commute 60 miles to their workplace. In fact, many Tribal employees currently commute more than 60 miles to work in New Town, ND.

Comment 8: Comments expressed concern regarding increased demand on surrounding infrastructure including roads, water, health services, fire protection, and ambulance services, including the increased costs of covering these services.

Response 8: During construction and operation of the refinery, there is the potential to affect community facilities and infrastructure. There will be increased road use and demands on emergency services. The Agencies are unaware of any plans to improve or pay for improvements of roads between Makoti and the refinery or other surrounding communities. There will be a new turnout on Highway 23 into the refinery.

Fire protection, emergency health care services, ambulance service, and site security would be provided by the refinery as construction begins and operations continue. The details of fire and other emergency services will be developed as the emergency response plans are developed. The refinery will have its own fire response team and equipment on site. Emergency planning will need to be coordinated with other emergency services in the surrounding areas in accordance with Local Emergency Response Planning.

Comment 9: Comments discussed the adequacy of consideration given to cumulative impacts, including an increase in environmental impacts as the refinery ages and stating that there is a conflict between noting that no other projects are planned in the area yet the refinery will stimulate local development.

Response 9: The environmental impacts from the facility projected throughout the life of the refinery have been analyzed under the direct and indirect impacts sections for each resource in the EIS. For example see the information in Chapter 4 regarding Ground Water, Spills and potential impacts during reclamation and closure of the refinery in the Solid and Hazardous Waste Section.

The cumulative impacts analyses included existing activities and reasonably foreseeable development in the area which could affect the same resources as the refinery. For most resources, the majority of impacts were from historic and existing agricultural activities. The cumulative impacts analysis anticipated that the area surrounding the refinery would continue to be used for agriculture. See the cumulative impacts discussion in Chapter 4 in the Land Use and other sections. The minor development that could occur in order to provide services to the refinery or refinery workers is not anticipated to be significant (e.g. small in scale and likely to occur in the surrounding small towns which have unused capacity). Transportation (an increase in traffic) is the main resource that would be affected by growth induced by the refinery (indirect impact). For more information about the cumulative impacts of specific resources, please see that section in the response to comments. For example the air cumulative effects comments are discussed in section E.8(b) of this Response to Comments.

Comment 10: Comment stated concern that if the land becomes contaminated, relocation is not an option for Tribal members who are not welcome off the Reservation.

Response 10: Adverse impacts to properties or residences immediately adjacent to the project site are not anticipated. The existing farm house on the refinery site would not be suitable for habitation while the refinery is operating. There are no other residences in the immediate area. The closest home, other than the existing farm house, is about 500 yards from the edge of the site. It is not anticipated that any of the residences within the 1-mile radius would become contaminated.

Comment 11: Comment asked if there are any grants available from the Tribes or whether the refinery will qualify for State funds from North Dakota to support the Town of Makoti's water, roads and other infrastructure needs.

Response 11: The MHA Nation does not anticipate having funds available to help pay for infrastructure improvement projects in the surrounding communities. The State of North Dakota, Energy Development Impact Office does have some funding available to local governments to cope with increased populations and infrastructure needs associated with energy projects. We do not know if Makoti and other communities would qualify for state funding. More information is available on the internet at: http://www.land.state.nd.us/.

D.10. ENVIRONMENTAL JUSTICE

Comment 1: Several comments expressed concerned about putting the refinery in an EJ community.

Response 1: EPA evaluated the potential for adverse human health or environmental effects on communities with EJ indicators surrounding the reservation as part of the NEPA process. EPA concluded that there would be no disproportionately high and adverse effects on these communities. These results are described in the Environmental Justice Tier One Analysis, which is appended to the FEIS.

Comment 2: Comments stated that the DEIS is not in compliance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." (EO 12898)

Response 2: The purpose of EO 12898 is to define the approaches by which EPA will ensure that disproportionately high and adverse human health or environmental effects to minority communities and low-income communities are identified and addressed. The EJ analysis in the EIS evaluates whether there are any disproportionately high and adverse human health or environmental effects on any communities, including minority and low-income communities. It is EPA's policy that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Both the Draft and Final EISs have analyzed potential impacts to human health (pages 4-116 through 4-138 DEIS and Section 4.16 FEIS), economic and social effects of this action, including the effects on minority and low-income populations (pages 4-110 through 4-116 in the DEIS and Sections 4.14 and 4.15 in the FEIS). Further, as part of its NPDES permitting process, EPA prepared an Environmental Justice Tier 1 Analysis which evaluated existing data for indicators of Environmental Justice concerns.

In response to comments on the DEIS, the Environmental Justice analysis was revised to include an expanded geographic area and improve data availability in the area surrounding the refinery. See section 4.15 of the FEIS. The Environmental Justice Tier 1 Analysis for the NPDES permit has also been revised (December 21, 2007) and is available as a technical report. Some modifications have been made in the FEIS to section 4.14 – Socioeconomics. Additional human health analysis has also been prepared evaluating the availability of existing health information for the MHA Nation and potential food chain impacts. The revised information is available in Section 4.16 of the FEIS,

Appendix D and the technical report - *Qualitative and Quantitative Human Health Risk Assessment: TAT Refinery EIS*, December 2007.

Comment 3: Several comments stated that the Environmental Justice analysis failed to adequately address health and environmental impacts.

Response 3: As part of the NEPA process, the Agencies analyzed potential impacts to human health in the Health and Safety section starting on page 4-116 of the DEIS. Since the DEIS was issued, EPA collected additional health information, and that information has been incorporated into the FEIS, Appendix D and the technical report - *Qualitative and Quantitative Human Health Risk Assessment: TAT Refinery EIS*, December 2007. {FEIS changes in Section 4.16}

Comment 4: Several comments asked how EPA developed the 10-mile “affected area” for analyzing Environmental Justice impacts and expressed concern that this area was not large enough to adequately represent the potentially impacted area. It was suggested that the EJ analysis should consider at least an area that is within a 60-mile radius from the project site, or more accurately, the entire radius considered within EPA’s own risk assessment guidelines. A comment noted the fact that existing air monitoring is done 15 to 40 miles from pollution sources.

Response 4: Determination of the “affected area” for purposes of environmental justice assessments is made on a case-by-case basis after assessing the potential impacts of a project. In determining the affected area for the proposed refinery, EPA’s evaluation included the potential extent of impacts to air, water and the surrounding community. EPA reviewed the air dispersion modeling results for the project and compared these results to the National Ambient Air Quality Standards (NAAQS). The NAAQS are health-based standards, set at a level sufficient to protect public health with an adequate margin of safety. As discussed in the air impacts section of the EIS and the accompanying air quality technical report, the predicted air quality impacts from the proposed refinery would occur within a one-mile radius of the refinery site and that air quality impacts would diminish rapidly with distance from the refinery site. The air quality impact modeling fully complied with EPA’s guidance for conducting these types of analyses. The NPDES permit limits require discharges from the proposed refinery to be protective of aquatic life, drinking water, agriculture and wildlife uses at the point of discharge which is within the refinery site. Thus, no increased area beyond the one-mile radius was needed to evaluate these impacts from air emissions and wastewater discharges. Regarding socioeconomic impacts, the nearest communities to the refinery site would be Makoti, located two miles east of the site, and Plaza, located four miles northwest of the site.

As discussed above in Response 2 of this section, the environmental justice analysis has been revised, expanding the geographic scope of the analysis. The analysis now includes data from the four zip code areas which surround the refinery. The switch from a simple 10-mile radius to an area defined by surrounding zip codes improved the availability of census data and improved the analysis for communities in the vicinity of the proposed refinery site.

Using EPA’s criteria for evaluating environmental justice concerns, the Agencies concluded that there would be no disproportionately high and adverse effects on the communities within 10 miles of the proposed refinery and the four zip code areas surrounding the refinery. By ensuring that there would be no disproportionately high and adverse effects on communities that are located near the proposed refinery, the Agencies have also ensured that communities located further away from the proposed refinery would not be subjected to any disparate adverse impact from the refinery.

Comment 5: Several comments expressed concern that refinery emissions, either individually or in combination with existing sources of air pollution, will increase the amount of pollution within a 30-

mile radius of the proposed refinery, causing an increase in disproportionate effects of toxics (immediate and bio-accumulative) to the community.

Response 5: The *Air Quality Technical Reports* (May 2006 and December 2007) and EIS provide the results of air modeling to assess the potential adverse health effects of criteria pollutant emissions and hazardous air pollutants. The air modeling input parameters consider not only potential refinery emissions, but also ambient air monitoring data, long-term exposures, and potential chronic adverse health effects of these pollutants. The results indicate that refinery emissions would have no significant adverse impacts on the health of local area communities. See also responses under sections D.8, Air Quality, and E.2., Cumulative Air Impacts for more information. The FEIS Air Quality analysis, Section 4.13 and *Air Quality Technical Report* (December 2007) have been rewritten to include recent and future regulatory changes and address comments on the DEIS. Refinery emissions are expected to have no measurable adverse impacts on the health of local residents.

Comment 6: A few comments were concerned that the EJ analysis did not address the possibility of disproportionate impacts on Tribal members resulting from their consumption of fish, buffalo meat, wildlife and plants.

Response 6: The two primary exposure pathways from refinery operations are from air emissions and effluent discharges. As stated in the Air Quality Analysis and Human Health sections of the EIS, no measurable adverse human health effects from refinery air emissions are anticipated. Table 4-21 in the DEIS shows the results of a comparison of estimated ambient concentrations of hazardous air pollutants (HAPs) resulting from refinery emissions with National Ambient Air Quality Standards (NAAQS). This comparison showed that HAP concentrations from the proposed refinery would be 18 to 40 times below EPA's health-based levels. As a result, adverse health effects due to inhalation of HAPs from the refinery by human receptors are not expected. To more completely document the consideration of other exposure pathways, EPA has added text to Chapter 4 of the FEIS. The additional text provides a qualitative comparison of modeled emitted concentrations of contaminants from the proposed refinery with actual emitted concentrations of similar contaminants from existing refineries that are processing synthetic crude or the precursor material to synthetic crude, bitumen, or a combination of these feedstocks. These refineries include: Petro-Canada, Scotford, Heartland, and North West refineries located in Alberta, Canada. Canadian environmental studies conducted for these refineries included an evaluation of the effects of air emissions on the surrounding environment. Bioaccumulative effects of the potentially emitted HAPs, as well as other contaminants that may adversely effect the environment, such as benzene, polycyclic aromatic hydrocarbons (PAH), and formaldehyde, were considered to be insignificant for each of the refineries, which are many times larger than the proposed refinery. Finally, EPA conducted a quantitative analysis of refinery emissions, which included an evaluation of toxic air emissions potentially entering the food chain through various pathways including bison, wildlife and plants. The results of this analysis indicate that there would be no adverse impacts to humans consuming these foods grown or raised in proximity to the refinery.

The NPDES permit would require that wastewater discharges from the proposed refinery are protective of multiple uses including: aquatic life, drinking water, agriculture and wildlife uses. The discharge limits take into account indirect pathways of exposure, such as humans eating fish, cattle or bison and wildlife eating fish or other wildlife. The Agencies expect no direct impacts to fish as a result of refinery construction and operations, given that no fisheries are located in proximity to the proposed refinery site. The State of North Dakota Historical Preservation Office and the MHA Nation Cultural Preservation Office have indicated that there are no known historical or cultural resources at the site. The MHA Nation Tribal Government has further indicated that there are no cultural or ceremonial uses of the proposed refinery site and that no hunting of wildlife or gathering of plants occurs there. Text has been added to Chapter 4 of the FEIS to evaluate and discuss the potential for bioaccumulation and uptake of refinery emissions and discharges through the food chain. See also the responses to comments regarding impacts to wildlife and human health in section D. {FEIS changes in Section 4.16.1.2}

Comment 7: A few comments expressed concern that the DEIS did not address potential impacts to traditional Indigenous lands or communities of the Cree and Dene in Canada.

Response 7: The DEIS identified and analyzed the reasonably foreseeable impacts associated with the proposed project. Development of the tar sands in Canada is not anticipated to expand as a result of this project, which is designed to use 10,000 barrels per day of synthetic crude. According to the Government of Alberta's web site, Alberta exported about 1.34 million barrels per day (mbpd) of crude oil to the U.S. in 2007. The MHA Nation refinery would be a very small customer of Alberta refinery feedstock at 0.01 mbpd (<1%). Also as with other commodities, products of the same type are generally interchangeable, there is no specific mine associated with the synthetic crude that will be delivered via pipeline from Canada.

D.11. HUMAN HEALTH

Comment 1: Several comments expressed interest in health impacts associated with other refineries. There was specific interest in epidemiological study results about birth defects and mortality in human populations living near other refineries and whether health statistics were available for communities surrounding the Tesoro refinery in Bismarck, North Dakota, in particular.

Response 1: Chapter 4 of the DEIS included epidemiological results from a study of cancer incidence surrounding a large refinery in Ponca City, Oklahoma performed by the Air Quality Division of the Oklahoma Department of Environmental Quality (ODEQ) in 2002 (ODEQ, 2004). As discussed on page 4-128 of the DEIS, the study concluded that there was no significant increased lifetime cancer risk from volatile organic air toxics in the Ponca City area. The Ponca City oil refinery has a production capacity about ten times larger than the proposed refinery. A 20-kilometer square area was selected for analysis, which included all the major sources of air pollution in the immediate area. Modeling was conducted as per the Regional Air Impact Modeling Initiative developed by EPA Region 6. The conclusion of the risk modeling was that there was no significant increased lifetime cancer risk from the volatile organic air toxics in the Ponca City area. The model predicted increased lifetime cancer risks in the range of $1X10^{-5}$ (one in one-hundred-thousand) to $1X10^{-6}$ (one in one-million) immediately next to the refinery, which is within the EPA's target risk range.

During preparation of the DEIS, EPA initiated additional studies to evaluate potential human health impacts of the proposed refinery. These studies included an April 2006 request to the Agency for Toxic Substances and Disease Registry (ATSDR) for assistance in resolving public health concerns associated with the proposed refinery. ATSDR organized and worked closely with an interagency team to prepare a report addressing these concerns, which they submitted to EPA on February 28, 2007 (ATSDR, 2007). The report comprises multiple components including a literature review and summary of studies of health outcomes of residents living near refineries in the United States. Since the last major refinery built in the United States was completed in 1976, the literature review revealed that health outcome studies conducted of conventional refineries using old technology did not adequately represent potential exposures that might result from the proposed refinery using new and cleaner technological processes. The interagency team contacted experts in air quality and adverse health outcomes associated with refineries and identified additional relevant industry-specific reports for refineries built or significantly modified in western Canada during the years 2001-2006. The health assessments conducted for the Canadian refineries concluded that there were no significant adverse health effects on nearby populations resulting from refinery operations. The *Qualitative and*

Quantitative Human Health Risk Assessment Technical Report, December 2007 included with the FEIS provides more information on these health assessments.

The refineries evaluated in the epidemiological studies referenced above likely represent a worst case scenario when compared with the proposed refinery, because their operating capacity is many times that of the proposed refinery and their primary feedstock materials contain significantly higher concentrations of contaminants capable of eliciting adverse health impacts than synthetic crude, the feedstock for the proposed refinery. Given that no significant adverse health risks were determined for the Ponca City and Canadian refineries, it is very unlikely that emissions from the proposed refinery will result in a measurable increase in adverse health effects to populations in the surrounding area.

The ATSDR report also examined the issue of cancer incidence (for selected cancers) and asthma across all North Dakota counties, although the report did not analyze the incidence data relative to the Tesoro refinery, which is located in Mandan (Morton County). Chapter 4 of the FEIS includes a summary of the results of this report, and further details are included in responses to other comments in this section.

Comment 2: Several comments expressed concern about health impacts to people who eat the Tribes' buffalo, or eat fish, plants and berries collected near the proposed refinery due to the potential for toxicants from the refinery to bioaccumulate in these plants and animals.

Response 2 See D.10, Response 6.

Comment 3: Several comments expressed concern regarding the adequacy of the assessment of the health risks posed by the refinery and objected to an allowance for any increased cancer incidence, asthma, or other health risks. Some comments expressed concern about chronic, lifetime exposures to contaminants emitted by the proposed refinery and the potential increase in cancer, disease, birth defects, and genetic mutations that may result in the surrounding population. Many comments expressed concern about adverse health effects to sensitive receptors such as children, pregnant women and their unborn children.

Response 3: In Chapter 4 of the DEIS, the evaluation of risks from refinery NAAQS pollutant and HAP toxic emissions was based on comparisons with health-based screening levels and included conservative assumptions designed to overestimate risks. EPA performed air modeling to estimate worst-case concentrations of chemicals in emissions from the proposed refinery. These estimated concentrations were compared with health-based screening levels including the NAAQS and the PSD increments. The NAAQS and PSD levels are calculated using conservative exposure assumptions that are designed to be protective of sensitive sub-populations of human beings such as children, pregnant women, and the elderly. These health-based screening levels represent concentrations below which unacceptable increases in cancer are not expected to occur. For example, these health-based screening levels are derived by assuming that a lifetime exposure (i.e., 70 years) to specific levels of air toxicants will produce an increased cancer incidence of only one in one million. The current national average of cancer incidence is one in three; therefore, EPA's benchmark for increased cancer incidence due to environmental exposures increases this incidence rate to 1.000001 in 3. As shown in Table 4-21 of the DEIS, the predicted emissions from the proposed refinery are well below (i.e., 18 to 40 times below) EPA's conservative health-based levels for benzene, formaldehyde and PAHs, which are the primary cancer causing chemicals in emissions from refineries. Because the predicted concentrations of chemicals in emissions from the proposed refinery are substantially less than the levels that have conservatively been established as being protective of human health, adverse health effects for receptors, even sensitive subpopulations, exposed to emissions from the refinery are unlikely.

The ATSDR report (February 2007) included a summary of data on asthma prevalence in adults and children who reside throughout North Dakota collected by the North Dakota Department of Health's Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a state-based system of telephone health surveys of adults that collects timely information primarily related to chronic disease and injury. Each month throughout the year, telephone calls are made to randomly selected households, and a single adult respondent is asked if he or she will participate. North Dakota has one of the highest response rates in the nation for collection of this health data. The BRFSS data will provide a means to evaluate changes in asthma incidence in the populations in the area potentially impacted by the refinery relative to baseline (i.e., pre-refinery) conditions.

Similarly, the ATSDR report included a summary of cancer incidence for selected cancers in North Dakota. All cancers are reportable in North Dakota. All medical diagnostic laboratories, physicians, and other health care providers who administer screening, diagnostic or therapeutic services are required to report cancer to the state. Hospitals and other health care facilities that provide inpatient and/or outpatient services and mobile units that provide screening, diagnostic or therapeutic services also are required to report newly diagnosed (incident) cancer cases. Since 2001, the North Dakota Department of Health's Cancer Registry has received the Gold Standard Certification award from the North American Association of Central Cancer Registries (NAACCR). These data will provide a means to evaluate changes in cancer incidence in the populations in the area potentially impacted by the refinery relative to baseline (i.e., pre-refinery) conditions.

Comment 4: A few comments stated that the toxicology used in the DEIS looks at pollution effects one chemical at a time and this is not accurate because exposure will be to a mixture of chemicals.

Response 4: EPA's risk assessment methodology allows for evaluation of mixtures of environmental contaminants. Specifically, the Agency calculates risk estimates for cancer causing chemicals using an additive approach, and systemic toxicants (i.e., non-cancer disease causing chemicals) are often evaluated in aggregate based on the target organ or system affected. When developing air emission, wastewater, and other types of discharge limits, EPA considers the nature and complexity of the contaminant mixture in order to establish levels protective of human health and the environment.

Comment 5: Several comments stated that additional data should be collected to allow for a complete analysis of health effects and to perform a baseline health study as part of the NEPA process.

Response 5: ATSDR has researched the status of adverse health effects in communities near refineries and conducted a baseline health assessment for residents of the Fort Berthold Indian Reservation, with an emphasis on asthma and cancer (ATSDR report February 2007). The report summarized information from a number of sources including the Aberdeen Area Indian Health Service (AAIHS), which provides healthcare to American Indian residents on or near the Fort Berthold, North Dakota reservation. ATSDR used the data from the study of potential adverse health effects associated with refineries to focus the baseline health assessment of cancer and asthma in North Dakota and in the three counties surrounding the proposed refinery site in particular. The results of this assessment indicate that currently there is no known increased incidence of specific cancers (i.e., kidney and non-Hodgkin's lymphoma) in North Dakota, nor in McLean, Mountrail, and Ward counties. Similarly, the prevalence rates of lifetime asthma in adults in North Dakota were similar to the U.S. and American Indian prevalence rates during the reporting period studied. Because these data have been collected in the past and are expected to be collected in the future, they provide a baseline of the current health status of the population and provide a possible mechanism for monitoring the actual effects of the proposed refinery on cancer incidence and asthma prevalence in the future.

The health effects associated with potential air emissions from the proposed refinery were carefully evaluated in the EIS, and adverse health effects caused by exposures to emissions via the inhalation and food chain pathways were specifically considered in the risk analyses performed. While there may be potential uncertainties associated with these analyses of impacts to human health and the environment due to a lack of specific data, the conservative assumptions built into the process of evaluating impacts to human health and the environment typically result in an overestimation of adverse effects and should more than account for these uncertainties and ensure protectiveness of human health and the environment.

Comment 6: Several comments expressed concern that the proposed refinery would add to the burden on the existing healthcare system, which currently cannot meet their healthcare needs. Many expressed concern that there is already too much cancer and other health problems in the surrounding communities.

Response 6: The health impacts of all chemicals released as emissions from the proposed refinery, including those chemicals that cause cancer, asthma and other chronic adverse health outcomes, have been evaluated based on a comparison with conservative health-based screening levels. The results of this evaluation indicate that no adverse health effects are likely to occur as a result of the emissions from the proposed refinery. Because adverse health risks associated with the proposed refinery are expected to be negligible, no additional burden should be placed on the local health care system.

The baseline health assessment data compiled in the ATSDR report do not support the conclusion that there are elevated incidence rates of cancer or asthma in the communities surrounding the site of the proposed refinery, although the small populations somewhat limit the statistical analysis of the data.

Comment 7: A few comments expressed concern about potential adverse affects to workers exposed to hazardous substances while working at the refinery.

Response 7: The maximum 1-hour, 8-hour, and 24-hour modeled ambient air impacts for the proposed refinery were compared with health-based screening levels including the NAAQS and the PSD increments. These shorter duration air concentrations are designed to estimate worst-case exposures for refinery workers. In addition, the NAAQS and PSD levels are calculated using conservative exposure assumptions. These levels represent concentrations of chemicals below which adverse health effects are highly unlikely if exposure were to occur.

As shown in Tables 30 and 31 of the *Air Quality Technical Report* (EPA, 2006) and Tables 31 and 32 of the *Air Quality Technical Report* (December 2007), the predicted emissions from the proposed refinery are well below (i.e., 18 to 40 times below) EPA's conservative health based levels for ambient air contaminants and for various hazardous air pollutants. Because the predicted concentrations of chemicals in emissions from the proposed refinery are substantially less than the levels that have conservatively been established as being protective of human health, adverse health effects for workers exposed to air emissions from the proposed refinery are likely to be insignificant.

The survey of the literature related to occupational exposures of refinery workers, included in the, ATSDR report, identified an increased incidence of two specific types cancers in this worker population, cancers of the kidney and non-Hodgkin's lymphoma. Chapter 4 of the DEIS, *Refinery Employees Health Risk*, summarizes six toxicological studies of refinery worker health. As stated on page 4-129, there are limitations to the use of these studies for a direct comparison to the likely health effects on workers at the proposed refinery, due to differences in technology, feedstock materials, and employee population demographics between studied facilities and the proposed refinery.

Comment 8: One comment questioned the conclusion in the DEIS on page 4-138, that no cumulative impacts were identified for health and safety, noting that many different pathways of exposure may result from refinery emissions. A related comment noted that refinery air emissions would result in deposition of contaminants into surface water, which could be used for drinking water and could lead to ill health effects.

Response 8: The analysis of cumulative impacts that is included in the Air Quality section of Chapter 4 of the DEIS evaluated the potential effects of refinery emissions on local and regional air quality. The conclusions of the analyses were that the refinery emissions would have negligible impacts on local and regional air quality. The *Air Quality Technical Reports* (May 2006 and December 2007) provide a detailed discussion of the analysis, including the basis for modeling inputs and corresponding outputs.

Consideration of other exposure pathways was added to Chapter 4 of the FEIS. The additional text provides a comparison of modeled emitted concentrations of contaminants from the proposed refinery with actual emitted concentrations of similar contaminants from existing refineries that are processing synthetic crude or the precursor material to synthetic crude, bitumen, or a combination of these feedstocks. These refineries include: Petro-Canada, Scotford, Heartland, and North West refineries located in Alberta, Canada.

The scale of operation of the individual Canadian refineries is approximately ten times greater than the proposed refinery; and the feedstock material, bitumen, contains much higher levels of contaminants than synthetic crude. Consequently the Canadian refineries would be expected to yield higher concentrations of contaminants in refinery emissions. Canadian environmental studies conducted for the Petro-Canada, Scotford, Heartland, and North West refineries included an evaluation of the effects of air emissions on the surrounding environment. Bioaccumulative effects of the potentially emitted HAPs, as well as other contaminants that may adversely effect the environment, such as benzene, PAHs, and formaldehyde, were considered to be insignificant for each of the refineries. These results further support the conclusion that it is reasonable to assume that the proposed refinery emissions will pose no significant human health impacts, because the scale of operation is substantially smaller than the comparison refineries, it will utilize a cleaner feedstock material, and it will incorporate the latest available pollution control technology. {FEIS changes in Section 4.16.1}

Finally, EPA conducted a quantitative analysis of refinery emissions, which included an evaluation of projected refinery toxic air emissions entering the human food chain through various pathways including ingestion of potentially contaminated soil, drinking water, livestock, and plants. The results of this analysis indicate that there would be no adverse impacts to humans consuming the drinking water or these foods grown or raised in proximity to the refinery.

Comment 9: One comment asked if random biological monitoring would be conducted on wildlife, livestock, aquatic life, Tribal buffalo, and humans to assess potential effects of pollution.

Response 9: EPA's statutory and regulatory requirements will require testing and monitoring of wastewater and some air emissions from the refinery, but do not include biological monitoring of humans, wildlife, livestock, aquatic life or buffalo. The Tribal Environmental Division may consider this on a voluntary basis. In addition, as stated elsewhere in the responses to these Human Health comments, ATSDR has collected baseline health data on cancer and asthma that may be used for comparison to future health data that the Tribe may collect.

Comment 10: A comment noted that the DEIS makes the disclaimer that "limited data are available" when discussing potential impacts to human health. The comment was that this limitation resulted in an incomplete analysis.

Response 10: Although there is somewhat limited information available regarding the potential adverse health impacts resulting from refinery operations, particularly clean-fuels refineries, there are ongoing studies of health impacts from petroleum handling and processing activities. EPA, with support from ATSDR, has researched and evaluated all available data including reports from clean fuels refineries currently operating in Canada (ATSDR 2007). This analysis of refinery health impact data is adequate for purposes of this EIS.

E. EMERGENCIES, SPILLS AND SAFETY

Comment 1 – Major Accident at Refinery: Several comments expressed concerns regarding impacts from a major accident, fire, upset, explosion or chemical release at the refinery. Comments included the following questions: how many people in the area surrounding refinery could be killed or injured if there was a large chemical spill, accident, fire, or explosion; what is the worst-case chemical spill assessed under the refinery's Risk Management Plan; has the potential for a combination of catastrophic events been considered; what chemicals are involved, and what is the radius of death or injury from this spill; and how long will it take for a toxic cloud to reach neighboring houses, schools and health clinics; How long will it take toxic gases to filter into the places where people shelter in place; and how big is the zone where neither sheltering or evacuation will work?

Response 1: As described in the DEIS, the refinery will be required to prepare for spills and other emergency events. There will be specific requirements for planning, coordination, facility design (e.g. containment around tanks), and training that will need to be implemented at the proposed refinery to address emergency situations such as spills and leaks and in the rare event a fire or explosion. There are three main areas of regulation for emergencies and spills.

- Spill Prevention, Control, and Countermeasures (SPCC) Plan and Facility Response Plan (FRP), — Planning and design requirements to contain and respond to spills of oily substances such as synthetic crude, distillates, soybean oil, oily sludges, gasoline, and diesel.
- OSHA Process Safety Management Plan (PSM) and EPA Risk Management Plan (RMP) — Covers facilities with highly hazardous chemicals and establishes a comprehensive management program that integrates technologies, procedures, and management practices. For the refinery, the emphasis will be on flammable materials. For more information about health and safety concerns at petroleum refinery see the OSHA Technical Manual, Section IV: Chapter 2, Petroleum Refining Processes at http://www.osha.gov/dts/osta/otm/otm_iv/otm_iv_2.html.
- Fire prevention and fire suppression — Includes: the design of refinery systems and infrastructure reduce the chance of fire and limit the impacts of potential fires; fire control and extinguishing systems for this refinery; fire protection practices that will be followed in operating and maintaining the refinery. The facility will also have to develop a fire response team for the refinery in coordination with the local fire departments, the Tribes' fire department, and county and state emergency planning committees to coordinate responses and develop mutual aid agreements.

These emergency response and safety plans have not been developed yet. The plans must be in place prior to operation of the refinery. There are several other plans which will also need to be developed and followed during emergency situations such as release reporting requirements. See page 4-33 of the DEIS, for more information.

Details regarding the potential severity of a hypothetical incident, information regarding the speed of response expected by various personnel and agencies under emergency circumstances and specific procedures for notifying people in the area surrounding the refinery about a spill, fire, or explosion will be provided in the documents identified above.

EPA's Risk Management Plan (RMP) program requires that a worst-case scenario be developed for highly flammable or toxic chemicals. Based on preliminary design information in the EIS, the most likely worst-case scenario that would be examined in the RMP would the rupture of one of the propane tanks. Explosions of this type are extremely rare and are unlikely to occur during the life of the refinery. Assuming the tank was full and the contents vaporized, the areal extent of the explosion has been estimated to be one kilometer (km) or .6 miles from the refinery. Currently, there are no residences within 1 km (.6 mile) of the proposed location of the propane tanks. The farmhouse on the site would not be occupied as a residence during refinery operations.

There were also concerns regarding whether residents would be asked to shelter in place. The emergency response planning efforts will identify of the types of responses appropriate for different situations. In most cases the recommendations for area residents will be to avoid the area, allowing emergency response personnel to address the situation. There may be a few rare situations, such as the propane explosion mentioned above, where it could be recommended for residents in the immediate area to shelter in place.

Comment 2: Comments asked questions related to the amount and type of chemicals to be used and stored on site (particularly chlorine), and the toxic chemicals that could be released during processing crude oil (particularly hydrogen sulfide gas).

Response 2: Based on the preliminary design of the refinery and chemicals typical found at petroleum refineries, chlorine is the only highly toxic chemical under the Risk Management Plan (RMP) regulations which is likely to be present on-site in sufficient quantities to be of concern. Chlorine could be used at the proposed refinery site for water and wastewater treatment. Depending on the amount of chlorine and chemical state of the chlorine, the OSHA Process Safety Management Plan (PMS) and EPA RMP plans may need to include processes associated with chlorine. The procedures would be the same as those developed for drinking and wastewater treatment plants that use chlorine for disinfection. Any chlorine gas would be transported to the refinery under Department of Transportation regulations.

Hydrogen sulfide is not anticipated to be present at the refinery in significant quantities. The proposed refinery would have a closed process containing hydrogen sulfide, however the system would be closed to the atmosphere and quantities of hydrogen sulfide gas would not accumulate as the process would be used to remove sulfur from the synthetic crude and convert the sulfur to elemental form. In addition, the refinery will not be refining any sour crude which has higher levels of sulfur.

Comment 3: Several comments asked what steps were being taken to prevent terrorism and other sabotage. The comments also asked how many victims can the local fire fighters, emergency medical services, and hospitals accommodate if a worst-case scenario occurred.

Response 3: These issues will be addressed in the refinery's emergency response plans and the Emergency Response Plans (ERP) for the Tribes, State, and other responders as required under the Homeland Security Act. The refinery will have on site emergency response and will coordinate with additional emergency management systems along with specialized emergency responders as part of its ERP. The refinery will also have security present on site.

Comment 4: Several comments were received that asked questions regarding refinery operations and power failures or power surges. Specifically, the comments wanted to know the following:

- What equipment would shut down during a power failure or power surge?
- Would the air pollution control and monitoring equipment continue to function during a power surge/upset?
- Were higher emission rates resulting from power failures, power surges, or other upsets considered in the DEIS?
- How long will it take the refinery to return to routine operations after a power failure?
- How long will any backup power systems run the refinery systems?
- How long will it take the refinery equipment to freeze up during winter power failures?
- What types of upsets, other than power failures, can occur at a refinery?

Response 4: Power failures are discussed in general on page 2-17 (Plant 45, Emergency Power) and page 2-18 (Plant 47, Power Supply) of the DEIS. An emergency generator will be used to supply power during a power outage. The other questions regarding specific details of refinery operations during a power failure cannot be answered at the preliminary design phase. The answers would be dependent on the type and duration of the power failure, the backup power capacity, etc. The OSHA regulations and safety codes include provisions for emergency shutdowns including power failure. These measures will be included as part of the safety systems and planning for the refinery. For more information on other potential upsets at refineries see the OSHA Technical Manual, Section IV: Chapter 2, Petroleum Refining Processes at http://www.osha.gov/dts/osta/otm/otm_iv/otm_iv_2.html.

Comment 5: Comments asked what type of safety features will be in place at the proposed refinery and also recommended various safety features.

Response 5: All tanks storing petroleum or oily material such as the synthetic crude, gasoline and diesel fuels are required to have containment for the entire contents of the tank plus precipitation. The refinery site process areas will be paved and curbed to the refinery wastewater plant preventing almost all spills from leaving the site.

During the environmental review of a project such as this EIS, the design is in the preliminary design phase. Specific design details would not be developed until after the federal agencies have made their decisions about the project. The information in the EIS has been developed to follow standard refinery practices and regulations. There are many fire and safety codes that will need to be implemented at the proposed refinery including the OSHA regulations and other codes which are incorporated into the OSHA regulations at 29 CFR 1910.6 including the American Petroleum Institute (API), American Society for Testing and Materials (ASTM), and National Fire Protection Association (NFPA).

Comment 6: Comment addressed the discussion of the average annual number of spills reported between 1984 and 1996, as described on page 4-27 in the DEIS. The commenter does not understand why a spill of less than ten gallons is attributed to human error or mechanical failure and what other causes for a spill are likely, if not human error or mechanical failure.

Response 6: Spills can also occur as a result of an act of nature (e.g., tornado, hail) damaging refinery equipment or tanks, a train derailment at the refinery, or a failure of a large tank caused by a manufacturing defect. This information was included in the DEIS to illustrate that that most spills are quite small (70 percent involved less than 10 gallons) and are the result of a minor error, such as not tightening a hose, or a mechanical failure.

F. CLOSURE

F.1. CLEANUP

Comment 1: Several comments raised concerns regarding cleanup of the refinery once operations cease. Specifically, commenters wanted to know how contamination would be cleaned up, how much the cleanup would cost, who would pay for the cleanup, and what office would regulate the cleanup. Comments inquired as to whether a cleanup bond could be required and whether BIA would assume liability for cleanup costs.

Response 1: Generally, all owners and operators would share liability for a cleanup. Since the Tribes propose to own and operate this facility, they would be responsible for all clean-up. There are certain regulatory requirements for clean-up and closure plans.

Under Alternatives 1 and 3 with Alternative A, B, or C, and Alternative 4 with Alternative B or C, (All refinery construction alternatives except Alternative 4 and A), the proposed refinery would be required to obtain a RCRA Treatment, Storage, and Disposal (TSD) permit under 40 CFR Part 264. EPA would issue and maintain regulatory authority over a TSD permit at the facility. A TSD permit would require the facility to conduct adequate corrective action, closure, and post-closure activities for all hazardous waste management units. It would not address other portions of the refinery not covered by the TSD permit, except for corrective action, as appropriate. The Tribes would be responsible for all of the cleanup costs as owner and operator of the facility. Page 4-48 of the DEIS describes the types of activities that would be conducted during RCRA closure and cleanup, including certification by the owner/operator that the requirements of the approved plan were met, and appropriate remediation of all contaminated soil and ground water. A post-closure RCRA TSD permit could be required for all remaining hazardous waste management units that are not clean-closed.

Under Alternative 4 and A, where the facility would be a RCRA generator under 40 CFR Part 262, the refinery is not required to obtain a RCRA TSD permit. However, EPA would maintain regulatory authority over the facility. Generators must meet closure performance standards contained in 40 CFR 265.111, and 265.114. Those requirements include steps to remove contamination from units and equipment to prevent releases and mitigate impacts. A RCRA TSD permit could be required if RCRA generator requirements are violated. That could include storing hazardous wastes onsite for greater than 90-days or routine and systematic releases of hazardous waste or hazardous waste constituents to the environment. It could also include failure to clean-close a hazardous waste management unit(s) at the time of closure. In that case, a post-closure RCRA TSD permit could be required for all remaining hazardous waste management units.

If a RCRA TSD permit is needed, EPA will require financial assurance for corrective action. If the facility is a RCRA generator only and does not require a RCRA permit, there are no formal requirements for financial assurance for corrective action. However, EPA and BIA have recommended to the Tribes that they establish a special fund to cover potential cleanup costs. The Tribes have committed to providing financial assurance, as evidenced by their letter provided in Appendix D.

A number of comments expressed concern about potential cleanup costs of contaminated soil and ground water at the proposed facility. Cleanup costs could be significant if monitoring and corrective action plans are not followed.

F.2. FINANCIAL ASSURANCE

Comment 1: Comment that steps should be taken to ensure that the public would not have to pay for clean up.

Response 1: If a RCRA permit is needed, EPA will require financial assurance for cleanup. If the facility is a RCRA generator only (Alternative 4 and A) and does not obtain a RCRA permit, there are no formal requirements to provide financial assurance to pay for cleanup/ corrective action. However, EPA and BIA have recommended to the Tribes that they establish a special fund to cover potential cleanup costs. For more information, see the Tribes' April 19, 2007, letter to EPA Region 8 regarding the Tribes commitment to develop some type of financial assurance for cleanup costs (in Appendix D of the FEIS).

A number of comments expressed concern about potential cleanup costs of contaminated soil and ground water at the proposed facility. Cleanup costs could be significant if the facility is not operated correctly, and if monitoring and follow-up actions are not implemented promptly.

Comment 2: Comment stated if a RCRA permit is not required, cleanup could be delayed at the time of final refinery closure.

Response 2: EPA agrees that adequate cleanup could be delayed if a RCRA permit is not required. However, this could be mitigated if the project proponents agree to establish a clean up fund.