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U.S. EPA REGION 7
HEARING CLERK

**U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 RENNER BOULEVARD
LENEXA, KANSAS 66219**

BEFORE THE ADMINISTRATOR

In the Matter of)
)
Roquette America, Inc.) **Docket No. CAA-07-2024-0073**
 Respondent.)
)

CONSENT AGREEMENT AND FINAL ORDER

Preliminary Statement

The U.S. Environmental Protection Agency, Region 7 (EPA or Complainant), and Roquette America, Inc. (Respondent) have agreed to a settlement of this action before the filing of a complaint, and thus this action is simultaneously commenced and concluded pursuant to Rules 22.13(b) and 22.18(b)(2) of the Consolidated Rules of Practice Governing the Administrative Assessment of Civil Penalties and the Revocation/Termination or Suspension of Permits, 40 C.F.R. §§ 22.13(b) and 22.18(b)(2).

Jurisdiction

1. This proceeding is an administrative action for the assessment of civil penalties initiated pursuant to Section 113(d) of the Clean Air Act (CAA), 42 U.S.C. § 7413(d). Pursuant to Section 113(d) of the CAA, 42 U.S.C. § 7413(d), the Administrator and the Attorney General jointly determined that this matter, in which the first date of alleged violation occurred more than twelve months prior to the initiation of the administrative action and/or the penalty amount is greater than the statutory limitation, was appropriate for administrative penalty action.

2. This Consent Agreement and Final Order serves as notice that the EPA has reason to believe that Respondent has violated the Chemical Accident Prevention Provisions in 40 C.F.R. Part 68, promulgated pursuant to Section 112(r) of the CAA, 42 U.S.C. § 7412(r), and that Respondent is therefore in violation of Section 112(r) of the CAA, 42 U.S.C. § 7412(r). Furthermore, this Consent Agreement and Final Order serves as notice pursuant to Section 113(d)(2)(A) of the CAA, 42 U.S.C. § 7413(d)(2)(A), of the EPA’s intent to issue an order assessing penalties for these violations.

Parties

3. Complainant is the Director of the Enforcement and Compliance Assurance Division, Region 7, as duly delegated by the Administrator of EPA.

4. Respondent is Roquette America, Inc., a corporation in good standing under the laws of the state of Delaware, which owns and operates the Roquette Keokuk Facility located at 1003 S. 5th Street in Keokuk, Iowa (Respondent's Facility).

Statutory and Regulatory Background

5. On November 15, 1990, the President signed into law the CAA Amendments of 1990. The Amendments added Section 112(r) to Title I of the CAA, 42 U.S.C. § 7412(r), which requires the Administrator of the EPA to, among other things, promulgate regulations in order to prevent accidental releases of certain regulated substances. Section 112(r)(3), 42 U.S.C. § 7412(r)(3), mandates that the Administrator promulgate a list of regulated substances, with threshold quantities, and defines the stationary sources that will be subject to the chemical accident prevention regulations mandated by Section 112(r)(7). Specifically, Section 112(r)(7), 42 U.S.C. § 7412(r)(7), requires the Administrator to promulgate regulations that address release prevention, detection, and correction requirements for these listed regulated substances.

6. On June 20, 1996, the EPA promulgated a final rule known as the Risk Management Program, 40 C.F.R. Part 68, which implements Section 112(r)(7) of the CAA, 42 U.S.C. § 7412(r)(7). This rule requires owners and operators of stationary sources to develop and implement a risk management program that includes a hazard assessment, a prevention program, and coordination of emergency response activities.

7. The regulations at 40 C.F.R. Part 68, titled Chemical Accident Prevention Provisions, set forth the requirements of a risk management program that must be established at each stationary source. The risk management program is described in a Risk Management Plan ("RMP") that must be submitted to the EPA.

8. Pursuant to Section 112(r)(7) of the CAA, 42 U.S.C. § 7412(r)(7), and 40 C.F.R. § 68.150, an RMP must be submitted for all covered processes by the owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process no later than the latter of June 21, 1999, or the date on which a regulated substance is first present above the threshold quantity in a process.

9. The regulations at 40 C.F.R. § 68.10 set forth how the Chemical Accident Prevention Provisions apply to covered processes. Pursuant to 40 C.F.R. § 68.10(i), a covered process is subject to Program 3 requirements if the process does not meet the eligibility requirements of Program 1, as described in 40 C.F.R. § 68.10(g), and it either falls under a specified North American Industry Classification System code or is subject to the OSHA process safety management standard, 29 C.F.R. § 1910.119.

10. Section 113(d) of the CAA, 42 U.S.C. § 7413(d), states that the Administrator may issue an administrative order against any person assessing a civil administrative penalty of up to \$25,000 per day of violation whenever, on the basis of any available information, the Administrator finds that such person has violated or is violating any requirement or prohibition of Section 112(r) of the CAA, 42 U.S.C. § 7412(r), and its implementing regulations. The Debt Collection Improvement Act of 1996, 31 U.S.C. § 3701, as amended, and the Federal Civil

Penalties Inflation Adjustment Act Improvements Act of 2015, 28 U.S.C. § 2461, and implementing regulations at 40 C.F.R. Part 19, increased these statutory maximum penalties to \$57,617 for violations that occur after November 2, 2015, and for which penalties are assessed on or after December 27, 2023.

11. Section 113(d)(2)(B) of the CAA, 42 U.S.C. § 7413(d)(2)(B), provides that the EPA Administrator may compromise, modify, or remit, with or without conditions, any administrative penalty which may be imposed under Section 113(d) of the CAA.

Definitions

12. Section 302(e) of the CAA, 42 U.S.C. § 7602(e), defines “person” to include any individual, corporation, partnership, association, State, municipality, political subdivision of a State, and any agency department, or instrumentality of the United States and any officer, agent, or employee thereof.

13. Section 112(r)(2)(A) of the CAA, 42 U.S.C. § 7412(r)(2)(A), defines “accidental release” as an unanticipated emission of a regulated substance or other extremely hazardous substance into the ambient air from a stationary source.

14. Section 112(r)(2)(C) of the CAA, 42 U.S.C. § 7412(r)(2)(C), and the regulations at 40 C.F.R. § 68.3 define “stationary source,” in part, as any buildings, structures, equipment, installations or substance-emitting stationary activities which belong to the same industrial group, which are located on one or more contiguous properties, which are under the control of the same person (or persons under common control), and from which an accidental release may occur.

15. The regulations at 40 C.F.R. § 68.3 define “regulated substance” as any substance listed pursuant to Section 112(r)(3) of the CAA, as amended, in 40 C.F.R. § 68.130.

16. The regulations at 40 C.F.R. § 68.3 define “threshold quantity” as the quantity specified for regulated substances pursuant to Section 112(r)(5) of the CAA, as amended, listed in 40 C.F.R. § 68.130 and determined to be present at a stationary source as specified in 40 C.F.R. § 68.115.

17. The regulations at 40 C.F.R. § 68.3 define “process” as any activity involving a regulated substance including any use, storage, manufacturing, handling or on-site movement of such substances, or combination of these activities. For the purposes of this definition, any group of vessels that are interconnected, or separate vessels that are located such that a regulated substance could be involved in a potential release, shall be considered a single process.

General Factual Allegations

18. Respondent is, and at all times referred to herein was, a “person” as defined by Section 302(e) of the CAA, 42 U.S.C. § 7602(e).

19. Respondent is the owner and operator of a facility that is a “stationary source” pursuant to 40 C.F.R. § 68.3.

20. Anhydrous ammonia is a “regulated substance” pursuant to 40 C.F.R. § 68.3. The threshold quantity for anhydrous ammonia, as listed in 40 C.F.R. § 68.130, is 10,000 pounds.

21. Hydrogen is a “regulated substance” pursuant to 40 C.F.R. § 68.3. The threshold quantity for hydrogen, as listed in 40 C.F.R. § 68.130, is 10,000 pounds.

22. On or about March 22 and 23, 2022, representatives of the EPA conducted an inspection of Respondent’s Facility to determine compliance with Section 112(r) of the CAA and 40 C.F.R. Part 68.

23. Information gathered during the EPA inspection revealed that Respondent had greater than 10,000 pounds of anhydrous ammonia in a process at its facility.

24. Information gathered during the EPA inspection revealed that Respondent may exceed the 10,000 pound threshold for hydrogen in a process at its facility.

25. Information gathered during the EPA inspection revealed that Respondent uses anhydrous ammonia at its facility in its production of food ingredients, and produces and stores hydrogen, and therefore is engaged in a process at its facility.

26. From the time Respondent first had onsite greater than 10,000 pounds of anhydrous ammonia or hydrogen in a process, Respondent was subject to the requirements of Section 112(r) of the CAA, 42 U.S.C. § 7412(r), and 40 C.F.R. Part 68 because it was an owner and operator of a stationary source that had more than a threshold quantity of a regulated substance in a process.

27. From the time Respondent first had onsite greater than 10,000 pounds of anhydrous ammonia or hydrogen in a process, Respondent was subject Program 3 prevention program requirements because pursuant to 40 C.F.R. § 68.10(i), the covered process at its facility did not meet the eligibility requirements of Program 1 and was subject to the OSHA process safety management standard, 29 C.F.R. § 1910.119.

28. From the time Respondent first had onsite greater than 10,000 pounds of anhydrous ammonia or hydrogen in a process, Respondent was required under Section 112(r)(7) of the CAA, 42 U.S.C. § 7412(r)(7), to submit an RMP pursuant to 40 C.F.R. § 68.12(a) and comply with the Program 3 requirements provided at 40 C.F.R. § 68.12(d) and detailed in Subpart D.

Allegations of Violation

29. Complainant hereby states and alleges that Respondent has violated the CAA and federal regulations promulgated thereunder as follows:

COUNT 1

30. The facts stated in Paragraphs 18 through 28 above are herein incorporated.

31. The regulation at 40 C.F.R. § 68.12(d)(3) requires the owner or operator of a stationary source with a process subject to Program 3 to implement the Program 3 prevention requirements of 40 C.F.R. §§ 68.65 through 68.87.

32. The EPA inspection revealed that Respondent failed to implement the Program 3 prevention requirements of 40 C.F.R. §§ 68.65 through 68.87, as required by 40 C.F.R. § 68.12(d)(3). Specifically:

- a. Respondent failed to compile written process safety information pertaining to the technology of the covered process, specifically a block flow diagram or simplified process flow diagram, as required by 40 C.F.R. § 68.65(c)(1)(i);
- b. Respondent failed to establish a system to promptly address process hazard analysis findings and recommendations in a timely manner and update the process hazard analysis, as required by 40 C.F.R. § 68.67(e);
- c. Respondent failed to update and revalidate the process hazard analysis at least every 5 years after completion of the initial process hazard analysis, as required by 40 C.F.R. § 68.67(f);
- d. Respondent failed to perform and certify appropriate compliance audits at least every three years, as required by 40 C.F.R. § 68.79(a); and
- e. Respondent failed to promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected, as required by 40 C.F.R. § 68.79(d).

33. Respondent's failures to comply with Program 3 prevention requirements of 40 C.F.R. §§ 68.65 through 68.87, as required by 40 C.F.R. § 68.12(d)(3), violate Section 112(r)(7) of the CAA, 42 U.S.C. § 7412(r)(7).

COUNT 2

34. The facts stated in Paragraphs 18 through 28 above are herein incorporated.

35. The regulation at 40 C.F.R. § 68.12(a) requires the owner or operator of a stationary source with a process subject to the Chemical Accident Prevention Provisions of 40 C.F.R. Part 68 to submit a single Risk Management Plan. The owner or operator shall correct the Risk Management Plan within one month of any change in the emergency contact information required under 40 C.F.R. § 68.160(b)(6).

36. The EPA inspection revealed that Respondent failed to correct the Risk Management Plan within one month of any change in the emergency contact information required under 40 C.F.R. § 68.160(b)(6). Specifically, the emergency contact listed in the Risk Management Plan was no longer accurate as of April 2020.

37. Failure to correct the Risk Management Plan within one month of a change in the emergency contact information, as required by 40 C.F.R. § 68.195(b).

38. Respondent's failure to correct the Risk Management Plan within one month of any change in the emergency contact information required under 40 C.F.R. § 68.160(b)(6), violates Section 112(r)(7) of the CAA, 42 U.S.C. § 7412(r)(7).

CONSENT AGREEMENT

39. For the purposes of this proceeding, as required by 40 C.F.R. § 22.18(b)(2), Respondent:

- a. admits the jurisdictional allegations set forth herein;
- b. neither admits nor denies the specific factual allegations stated herein;
- c. consents to the assessment of a civil penalty, as stated herein;
- d. consents to the issuance of any specified compliance or corrective action order;
- e. consents to any conditions specified herein;
- f. consents to any stated Permit Action;
- g. waives any right to contest the allegations set forth herein; and
- h. waives its rights to appeal the Final Order accompanying this Consent Agreement.

40. Respondent consents to the issuance of this Consent Agreement and Final Order and consents for the purposes of settlement to the payment of the civil penalty specified herein.

41. Respondent and EPA agree to conciliate this matter without the necessity of a formal hearing and to bear their respective costs and attorneys' fees.

42. The parties consent to service of this Consent Agreement and Final Order electronically at the following e-mail addresses: *meyer.jonathan@epa.gov* (for Complainant) and *jennie.rose@roquette.com* (for Respondent). Respondent understands that the Consent Agreement and Final Order will become publicly available upon filing.

Penalty Payment

43. Respondent agrees that, in settlement of the claims alleged herein, Respondent shall pay a compromised civil penalty of two hundred seven thousand four hundred and eighty-eight dollars \$207,488 within thirty (30) days after the date the Final Order ratifying this Agreement is filed with the Regional Hearing Clerk.

44. Respondent shall pay the Assessed Penalty and any interest, fees, and other charges due using any method, or combination of appropriate methods, as provided on the EPA website: <https://www.epa.gov/financial/makepayment>. If payment is to be made by check, check should be made payable to "Treasurer, United States of America." For additional instructions see: <https://www.epa.gov/financial/additional-instructions-making-payments-epa>.

45. When making a payment, Respondent shall:

- a. Identify every payment with Respondent's name and the docket number of this Agreement, CAA-07-2024-0073.
- b. Concurrently with any payment or within 24 hours of any payment, Respondent shall serve proof of such payment to the following persons:

Regional Hearing Clerk
R7_Hearing_Clerk_Filings@epa.gov

Jonathan Meyer, Attorney
meyer.jonathan@epa.gov

and

U.S. Environmental Protection Agency
Cincinnati Finance Center
Via electronic mail to:
CINWD_AcctsReceivable@epa.gov

"Proof of payment" means, as applicable, a copy of the check, confirmation of credit card or debit card payment, or confirmation of wire or automated clearinghouse transfer, and any other information required to demonstrate that payment has been made according to EPA requirements, in the amount due, and identified with the appropriate docket number and Respondent's name.

46. Respondent understands that its failure to timely pay any portion of the civil penalty or any portion of a stipulated penalty as stated in Paragraph 64 may result in the commencement of a civil action in Federal District Court to recover the full remaining balance, along with penalties and accumulated interest. In such case, interest shall begin to accrue on a civil or stipulated penalty from the date of delinquency until such civil or stipulated penalty and any accrued interest are paid in full. 31 C.F.R. § 901.9(b)(1). Interest will be assessed at a rate of the United States Treasury Tax and loan rates in accordance with 31 U.S.C. § 3717.

Additionally, a charge will be assessed to cover the costs of debt collection including processing and handling costs, and a non-payment penalty charge of six (6) percent per year compounded annually will be assessed on any portion of the debt which remains delinquent more than ninety (90) days after payment is due. 31 U.S.C. § 3717(e)(2).

Pursuant to 26 U.S.C. § 6050X and 26 C.F.R. § 1.6050X-1, EPA is required to send to the Internal Revenue Service (“IRS”) annually, a completed IRS Form 1098-F (“Fines, Penalties, and Other Amounts”) with respect to any court order or settlement agreement (including administrative settlements) that require a payor to pay an aggregate amount that EPA reasonably believes will be equal to, or in excess of, \$50,000 for the payor’s violation of any law or the investigation or inquiry into the payor’s potential violation of any law, including amounts paid for “restitution or remediation of property” or to come “into compliance with a law.” EPA is further required to furnish a written statement, which provides the same information provided to the IRS, to each payor (i.e., a copy of IRS Form 1098-F). Failure to comply with providing IRS Form W-9 or Tax Identification Number (“TIN”), as described below, may subject Respondent to a penalty, per 26 U.S.C. § 6723, 26 U.S.C. § 6724(d)(3), and 26 C.F.R. § 301.6723-1. To provide EPA with sufficient information to enable it to fulfill these obligations, EPA herein requires, and Respondent herein agrees, that:

- a. Respondent shall complete an IRS Form W-9 (“Request for Taxpayer Identification Number and Certification”), which is available at <https://www.irs.gov/pub/irs-pdf/fw9.pdf>;
- b. Respondent shall certify that its completed IRS Form W-9 includes Respondent’s correct TIN or that Respondent has applied and is waiting for issuance of a TIN;
- c. Respondent shall email its completed Form W-9 to EPA’s Cincinnati Finance Center at weidner.lori@epa.gov within 30 days after the Final Order ratifying this Agreement is filed, and EPA recommends encrypting IRS Form W-9 email correspondence; and
- d. In the event that Respondent has certified in its completed IRS Form W-9 that it has applied for a TIN and that TIN has not been issued to Respondent within 30 days after the Effective Date, then Respondent, using the same email address identified in the preceding sub-paragraph, shall notify EPA of this fact within 30 days after the Effective Date of this Consent Agreement and Final Order, and email EPA with Respondent’s TIN within 5 days of Respondent’s issuance and receipt of the TIN.

Conditions

47. As a condition of settlement and in compromise of the civil penalty that EPA could otherwise impose herein, Respondent agrees to perform the following at the Facility:

- a. Resolve Open Compliance Audit and PHA Findings: Within twelve (12) months of the effective date of this Consent Agreement and Final Order, resolve all

compliance audit and PHA findings listed in Attachment 2 of this Consent Agreement and Final Order.

- b. **Monthly Reports:** Within thirty (30) days of the effective date of this Consent Agreement and Final Order, Respondent shall submit a report to EPA that summarizes all actions undertaken by Respondent to address the compliance audit and PHA findings in Attachments 2A and 2B, including information indicating the date that the compliance audit or PHA finding was resolved, if applicable. Respondent shall submit subsequent monthly reports no later than the fifth day of each successive full calendar month.
- c. **Compliance Report:** Within thirteen (13) months of the effective date of this Consent Agreement and Final Order, Respondent shall submit a final report demonstrating that all compliance audit and PHA findings listed in Attachment 2 of this Consent Agreement and Final Order have been resolved.

Certification and Submittals

48. All documents required to be submitted to EPA by Paragraph 47 and subparagraphs thereto shall contain the following certification, signed by an officer of Roquette:

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

49. The submissions required by Paragraph 47 and subparagraphs thereto shall be made in electronic format to:

Diana Chaney
Email: *Chaney.Diana@epa.gov*.

50. Respondent may assert a business confidentiality claim covering part or all of the information required to be submitted to EPA by Paragraph 47 and subparagraphs thereto, but only to the extent and only in the manner described in 40 C.F.R. Part 2, Subpart B. The EPA will disclose information submitted under a confidentiality claim only as provided in 40 C.F.R. Part 2, Subpart B. If Respondent does not assert a confidentiality claim, the EPA may make the submitted information available to the public without further notice to Respondent.

Supplemental Environmental Project

51. In response to the violations of the CAA alleged in this Consent Agreement and Final Order and in settlement of this matter, although not required by the CAA or any other federal, state, or local law, Respondent shall complete the SEP described in this Consent

Agreement and Final Order, which the parties agree is intended to secure significant environmental or public health protection and improvement.

52. Respondent shall complete the following SEP: Purchase two pickup trucks and outfit the trucks for purposes of emergency response equipment and then donate the vehicles to the Keokuk, Iowa Fire Department as detailed in the SEP Proposal attached to this Consent Agreement and Final Order. Respondent shall spend no less than one hundred and twenty-two thousand, eight hundred and fifty-two dollars (\$122,852) on implementing the SEP. Respondent agrees that the SEP shall be completed within six (6) months of the Effective Date of this Consent Agreement and Final Order.

53. The SEP is consistent with applicable EPA policy and guidelines, specifically EPA's 2015 Update to the 1998 Supplemental Environmental Projects Policy (March 10, 2015).

54. The SEP advances at least one of the objectives of Section 112(r) of the CAA by helping communities improve their emergency preparedness and response to chemical accidents. The SEP is not inconsistent with any provision of Section 112(r) of the CAA. The SEP relates to the alleged violations, and the SEP benefits the community potentially impacted by the alleged violations by providing emergency response vehicles to the Keokuk fire department.

55. Respondent selected this SEP and identified the Keokuk Fire Department to receive the emergency response vehicles identified in this Consent Agreement and Final Order and attached SEP proposal. This Consent Agreement and Final Order shall not be construed to constitute EPA approval or endorsement of the equipment or technology purchased or donated by Respondent in connection with the SEP.

56. This SEP shall be performed in accordance with the requirements of this Consent Agreement and Final Order.

57. Within seven (7) months of the Effective Date of this Consent Agreement and Final Order, Respondent shall submit a SEP Completion Report to the EPA contact identified in Paragraph 60 below. The SEP Completion Report shall be subject to EPA review and approval as provided in Paragraph 61 below. The SEP Completion Report shall contain the following information:

- a. Detailed description of the SEP as implemented, including documentation of costs and copies of all purchase and delivery orders;
- b. Description of any problems encountered in implementation of the projects and the solution thereto;
- c. Description of the specific environmental and/or public health benefits resulting from implementation of the SEP; and
- d. Certification that the SEP has been fully implemented pursuant to the provisions of this Consent Agreement and Final Order.

58. In itemizing its costs in the SEP Completion Report, Respondent shall clearly identify and provide acceptable documentation for all SEP costs. For purposes of this paragraph, “acceptable documentation” includes invoices, purchase orders, or other documentation that specifically identifies and itemizes the individual costs of the goods and/or services for which payment is being made. Cancelled drafts do not constitute acceptable documentation unless such drafts specifically identify and itemize the individual costs of the goods and/or services for which payment is being made.

59. The SEP Completion Report shall include the statement of Respondent, through an officer, signed and certifying under penalty of law the following:

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

60. The SEP Completion Report shall be submitted on or before the due date specified above to Diana Chaney, Compliance Officer, via email at *chaney.diana@epa.gov*.

61. SEP Completion Report Approval: The SEP Completion Report shall be reviewed in accordance with the procedures outlined in this paragraph. EPA will review the SEP Completion Report and may approve, approve with modifications, or disapprove and provide comments to Respondent. If the SEP Completion Report is disapproved with comments, Respondent shall incorporate EPA’s comments and resubmit the SEP Completion Report within thirty (30) days of receipt of EPA’s comments. If Respondent fails to revise the SEP Completion Report in accordance with EPA’s comments, Respondent shall be subject to the stipulated penalties as set forth below.

62. Any public statement, oral or written, in print, film, internet, or other media, made by Respondent making reference to the SEP under this Consent Agreement and Final Order from the date of its execution of this Consent Agreement and Final Order shall include the following language:

This project was undertaken in connection with the settlement of an enforcement action taken by the U.S. Environmental Protection Agency to enforce federal laws.

63. With regard to the SEP, Respondent certifies the truth and accuracy of each of the following:

- a. That all cost information provided to the EPA in connection with the EPA’s approval of the SEP is complete and accurate and that Respondent in good faith estimates that the cost to implement the SEP is \$122,852;

- b. That, as of the date of executing this Consent Agreement and Final Order, Respondent is not required to perform or develop the SEP by any federal, state, or local law or regulation and is not required to perform or develop the SEP by agreement, grant, or as injunctive relief awarded in any other action in any forum;
- c. That the SEP is not a project that Respondent was planning or intending to construct, perform, or implement other than in settlement of the claims resolved in this Consent Agreement and Final Order;
- d. That Respondent has not received and will not receive credit for the SEP in any other enforcement action;
- e. That Respondent will not receive reimbursement for any portion of the SEP from another person or entity;
- f. That for federal income tax purposes, Respondent agrees that it will neither capitalize into inventory or basis nor deduct any costs or expenditures incurred in performing the SEP;
- g. Respondent is not a party to any open federal financial assistance transaction that is funding or could fund the same activity as the SEP described in Paragraph 52; and
- h. Respondent has inquired of the Keokuk Fire Department whether it is a party to an open federal financial assistance transaction that is funding or could fund the same activity as the SEP and has been informed by the recipient that it is not a party to such a transaction.

Stipulated Penalties

64. Respondent shall be liable for stipulated penalties in the amounts set forth below:

- a. For failure to comply with any requirement of Paragraph 47.a:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$500	1st through 15th day
\$1000	15th day and beyond

65. For Failure to submit any report or documentation as required by paragraphs 47.b or 47.c:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$250	1st through 15th day

\$500

15th day and beyond

66. Stipulated penalties for failure to complete the SEP.
- a. In the event Respondent fails to comply with any of the terms or provisions of this Agreement relating to the performance of the SEP, including to the extent that the actual expenditures for the SEP do not equal or exceed the cost of the SEP, Respondent shall be liable for stipulated penalties according to the provisions set forth below:
 - i. If a SEP has not been completed satisfactorily and timely pursuant to this Consent Agreement and Final Order, Respondent shall pay a stipulated penalty to the EPA in the amount of \$153,565.
 - ii. For failure to submit the SEP Completion Report, Respondent shall pay a stipulated penalty in the amount of \$250 for each day after the report was originally due until the report is submitted.
 - b. The determinations of whether the SEP has been satisfactorily completed and whether the Respondent has made a good faith, timely effort to implement the SEP shall be in the sole discretion of EPA.

67. Stipulated penalties shall begin to accrue on the day after performance is due, and shall continue to accrue through the final day of the completion of the activity or other resolution under this Consent Agreement and Final Order.

68. Respondent shall pay stipulated penalties not more than fifteen (15) days after receipt of written demand by EPA for such penalties. Method of payment shall be in accordance with the provisions of the Penalty Payment section above. Interest and late charges shall be paid as stated in Paragraph 46 herein.

69. The stipulated penalties provided for in this Consent Agreement shall be in addition to any other rights, remedies, or sanctions available to the EPA for Respondent's violation of this Consent Agreement or applicable law. Where a violation of this Consent Agreement is also a violation of statutory or regulatory requirements, Respondent shall be allowed a credit, for any stipulated penalties paid, against any statutory penalties imposed for such violation.

70. The EPA may, in the unreviewable exercise of its discretion, reduce or waive stipulated penalties otherwise due under this Consent Agreement and Final Order.

Effect of Settlement and Reservation of Rights

71. In accordance with 40 C.F.R. § 22.18(c), completion of the terms of this Consent Agreement and Final Order resolves Respondent's liability for federal civil penalties for the violations and facts specifically alleged above.

72. Complainant covenants not to sue Respondent for injunctive or other equitable relief for the violations and facts alleged in this matter, but such covenant automatically terminates if and when Respondent fails to timely and satisfactorily complete every condition stated in Paragraph 47 and subparagraphs thereto (including payment of any stipulated penalties owed). If and when such covenant terminates, the EPA at its election may seek to compel performance of the conditions stated in Paragraph 47 and subparagraphs thereto in a civil judicial action under the CAA or as a matter of contract. The covenant not to sue becomes permanent upon satisfactory performance of the conditions stated in Paragraph 47 and subparagraphs thereto.

73. Respondent agrees that the time period from the Effective Date of this Agreement until all of the conditions specified in Paragraph 47 and subparagraphs thereto are completed (the "Tolling Period") shall not be included in computing the running of any statute of limitations potentially applicable to any action brought by Complainant on any claims (the "Tolled Claims") set forth in Paragraph 32 of this Agreement. Respondent shall not assert, plead, or raise in any fashion, whether by answer, motion or otherwise, any defense of laches, estoppel, or waiver, or other similar equitable defense based on the running of any statute of limitations or the passage of time during the Tolling Period in any action brought on the Tolled Claims.

74. The provisions of this Agreement shall apply to and be binding upon Respondent and its officers, directors, employees, agents, trustees, servants, authorized representatives, successors, and assigns. From the Effective Date of this Agreement until the end of the Tolling Period, as set out in Paragraph 73, Respondent must give written notice and a copy of this Agreement to any successors in interest prior to any transfer of ownership or control of any portion of or interest in the facility. Simultaneously with such notice, Respondent shall provide written notice of such transfer, assignment, or delegation to the EPA. In the event of any such transfer, assignment, or delegation, Respondent shall not be released from the obligations or liabilities of this Agreement unless the EPA has provided written approval of the release of said obligations or liabilities.

75. By signing this Agreement, Respondent acknowledges that this Agreement and Order will be available to the public and agrees that this Agreement does not contain any confidential business information or personally identifiable information.

76. By signing this Agreement, the undersigned representative of Complainant and the undersigned representative of Respondent each certify that they are fully authorized to execute and enter into the terms and conditions of this Agreement and have the legal capacity to bind the party they represent to this Agreement.

77. By signing this Agreement, Respondent certifies that the information it has supplied concerning this matter was at the time of submission true, accurate, and complete for each such submission, response, and statement. Respondent acknowledges that there are significant penalties for submitting false or misleading information, including the possibility of fines and imprisonment for knowing submission of such information, under 18 U.S.C. § 1001.

78. Nothing in this agreement shall be construed as prohibiting, altering or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of Respondent's violation of this agreement or of the statutes and regulations upon which this agreement is based, or for Respondent's violation of any applicable provision of law.

79. For the purpose of the identification requirement in Section 162 (f)(2)(A)(ii) of the Internal Revenue Service Code, 26 U.S.C. § 162(f)(2)(A)(ii) and 26 C.F.R. § 1.162-21-(b)(2), performance of Paragraph 47 and subparagraphs thereto are "restitution, remediation, or required to come into compliance with the law."

80. This Agreement constitutes the entire agreement and understanding of the parties and supersedes any prior agreements or understandings, whether written or oral, among the parties with respect to the subject matter hereof.

81. The terms, conditions and compliance requirements of this Agreement may not be modified or amended except upon the written agreement of both parties, and approval of the Regional Judicial Officer.

82. Complainant reserves the right enforce the terms and conditions of this Consent Agreement and Final Order. Any violation of this Order may result in a civil judicial action for an injunction or civil penalties of up to \$121,275 per day per violation, or both, as provided in Section 113(b)(2) of the CAA, 42 U.S.C. § 7413(b)(2) and adjusted for inflation pursuant to 40 C.F.R. Part 19, as well as criminal sanctions as provided in Section 113(c) of the CAA, 42 U.S.C. § 7413(c). The EPA may use any information submitted under this Order in an administrative, civil judicial, or criminal action.

83. This Consent Agreement and Final Order constitutes an "enforcement response" as that term is used in EPA's *Clean Air Act Combined Enforcement Response Policy for Clean Air Act Sections 112(r)(1), 112(r)(7) and 40 C.F.R. Part 68* to determine Respondent's "full compliance history" under Section 113(e) of the CAA, 42 U.S.C. § 7413(e).

84. Nothing herein shall be construed to limit the power of the EPA to undertake any action against Respondent or any person in response to conditions that may present an imminent and substantial endangerment to the public health, welfare, or the environment.

General Provisions

85. By signing this Consent Agreement, the undersigned representative of Respondent certifies that they are fully authorized to execute and enter into the terms and

conditions of this Consent Agreement and have the legal capacity to bind the party they represent to this Consent Agreement.

86. This Consent Agreement shall not dispose of the proceeding without a final order from the Regional Judicial Officer or Regional Administrator ratifying the terms of this Consent Agreement. This Consent Agreement and Final Order shall be effective upon the filing of the Final Order by the Regional Hearing Clerk for EPA, Region 7. Unless otherwise stated, all time periods stated herein shall be calculated in calendar days from such date.

87. The penalty specified herein shall represent civil penalties assessed by EPA and shall not be deductible for purposes of Federal, State, or local taxes.

RESPONDENT:
ROQUETTE AMERICA, INC.

Date: 07/12/2024



Signature

Jennie Rose
Name

Plant Manager
Title

COMPLAINANT:
U.S. ENVIRONMENTAL PROTECTION AGENCY

Date: _____

David Cozad
Director
Enforcement and Compliance Assurance Division

Date: _____

Jonathan Meyer
Assistant Regional Counsel
U.S. Environmental Protection Agency, Region 7

FINAL ORDER

Pursuant to Section 113(d) of the CAA, 42 U.S.C. § 7413(d), and the Consolidated Rules of Practice Governing the Administrative Assessment of Civil Penalties and the Revocation/Termination or Suspension of Permits, 40 C.F.R. Part 22, the foregoing Consent Agreement resolving this matter is hereby ratified and incorporated by reference into this Final Order.

Respondent is ORDERED to comply with all of the terms of the Consent Agreement. In accordance with 40 C.F.R. § 22.31(b), the effective date of the foregoing Consent Agreement and this Final Order is the date on which this Final Order is filed with the Regional Hearing Clerk.

IT IS SO ORDERED.

Karina Borromeo
Regional Judicial Officer

Date

CERTIFICATE OF SERVICE

(to be completed by EPA)

I certify that that a true and correct copy of the foregoing Consent Agreement and Final Order in the matter of Roquette America, Inc., EPA Docket No. CAA-07-2024-0073, was sent this day in the following manner to the addressees:

Copy via E-mail to Complainant:

Jonathan Meyer
Office of Regional Counsel
meyer.jonathan@epa.gov

Diana Chaney
Enforcement and Compliance Assurance Division
chaney.diana@epa.gov

Milady Peters
EPA Region 7
peters.milady@epa.gov

Copy via E-mail to Respondent:

Jennie Rose
Roquette Keokuk Plant Manager
jennie.rose@roquette.com

Signed

ATTACHMENT 1

SEP PROPOSAL

SUPPLEMENTAL ENVIRONMENTAL PROJECT PROPOSAL ROQUETTE

I. Description of Proposed Supplemental Environmental Project

Roquette proposes to purchase two pickup trucks from a local dealership and cover the cost of outfitting those trucks for purposes of emergency response equipment and then donate them to the Keokuk, Iowa fire department for use as emergency response vehicles. These emergency response vehicles will play a pivotal role in ensuring the safety and well-being of the community during crises. These specialized vehicles will be equipped to handle a wide range of emergencies, from fires to medical incidents and natural disasters.

These vehicles will serve as rapid deployment units, providing swift assistance to those in distress. They are often the first to arrive at the scene of an emergency, equipped with essential tools and resources to assess and mitigate the situation effectively.

In the case of fire emergencies, these vehicles will carry basic firefighting equipment such as extinguishers and basic hand tools, *e.g.*, axes and shovels enabling firefighters to expeditiously contain and extinguish fires before they escalate. Moreover, these trucks are to be outfitted with specialized equipment for technical rescues, such as hydraulic tools for extricating individuals trapped in vehicles or collapsed structures.

In medical emergencies, these vehicles are to function as advanced life support units, staffed with paramedics and equipped with medical supplies and equipment to administer critical care on-site. They provide immediate medical attention to individuals experiencing trauma, cardiac arrest, or other life-threatening conditions, stabilizing patients before their transport, in another vehicle, to medical facilities.

During natural disasters or large-scale emergencies, these vehicles will serve as command centers, coordinating rescue and relief efforts. Equipped with communication systems and mapping tools, they enable emergency responders to coordinate operations efficiently and allocate resources effectively.

Beyond their operational role, emergency response vehicles also serve as symbols of reassurance and safety within the community. Their presence signifies the readiness and commitment of the fire department to protect and serve the public, fostering trust and confidence among residents.

In essence, these emergency response vehicles owned by the city of Keokuk, for use by the Keokuk fire department will be a vital asset in safeguarding the community during times of crisis, providing rapid and effective response to emergencies while upholding the mission of protecting life and property.

II. Nexus

Pursuant to EPA's Policy titled *Issuance of the 2015 Update to the 1998 Environmental Protection Agency Supplemental Environmental Projects Policy* dated March 10, 2015, it is alleged that Roquette failed to comply with Chemical Accident Prevention Provisions and



specifically the three allegations set forth below in a letter from David Cozad, Director of the Enforcement and Compliance Assurance Division, dated September 7, 2023.

- (1) Roquette failed to establish a system to promptly address process hazard analysis findings and recommendations in a timely manner and update the process hazard analysis at least every 5 years, as required by 40 C.F.R. § 68.67(e) and (f). This violation affects the facility's knowledge of existing and emerging process hazards. Delays in addressing process hazard analysis findings increases the likelihood of an accidental release.
- (2) Roquette failed to perform and certify appropriate compliance audits at least every three years, as required by 40 C.F.R. § 68.79(a) and (d). Compliance audits are a critical component of the chemical accident prevention requirements that require a facility to identify and correct areas of concern that impact the facility's ability to prevent accidental releases.
- (3) Roquette failed to correct the Risk Management Plan within one month of a change in the emergency contact information, as required by 40 C.F.R. § 68.195(b). Failing to update the facility's emergency contact information impairs the ability of local responders to contact the facility in the event of a release and could increase the magnitude of a release.

The two pick up trucks that Roquette proposes to purchase and outfit for use by the Keokuk, Iowa fire department are to be used for emergency response purposes. The purchase of the two pickup trucks is directly related to the three violations that are set forth immediately above. The purchase of these two trucks is fully consistent with the underlying statute at issue here and such purchase will advance the objectives of the Chemical Accident Prevention Provisions of the Clean Air Act – helping communities to improve their emergency preparedness. These trucks will unquestionably reduce the adverse impacts to public health and/or the environment to which such types of violations contribute.

III. Augmentation

Roquette intends to purchase two pickup trucks (identified in the table below) from a local automobile dealership for delivery to the Keokuk fire department. The trucks will then be sent to a first vendor for outfitting to include full lights and siren package, digital communications package, and basic EMS response equipment. Next the trucks will be sent to a second vendor for stenciling with emergency response lettering. Once those two vendors have completed their specific tasks, the trucks will be placed in service upon stocking the vehicle with needed supplies from the fire station and following all necessary training with the vehicle by Keokuk fire department personnel.

Vehicle Description	Additional Details	Costs	VIN	
2022 Chevrolet Silverado 2500 HD LT Crew Cab Short Bed 1LT	White, 4 WD, 6.6L 8 Cyl Turbo Diesel 	Truck Purchase Price: \$55,000 Stenciling: \$600 Lights, siren, and digital communication systems plus install cost: \$10,113.29	1GC1YNEY7NF271487	This vehicle will be used to tow the fire department's support trailers (Hazmat, confined space, trench rescue, <i>etc.</i>). It will also be utilized as a support vehicle at larger incidents, such as carrying hose, SCBA, and technical rescue equipment to and from the station as needed. Secondary use – when not engaged in emergency response - will be for inspections, investigations, and community outreach programs.
2023 RAM 1500 Big Horn Crew Cab Short Bed	White, 4WD, 5.7 L 8 Cyl Gasoline 	Truck Purchase Price: \$47,000 Stenciling: \$600 Lights, siren, and digital communication systems plus install cost: \$9,538.71	1C6SRFMT3PN518873	This vehicle will be used to tow fire department support trailers (Hazmat, confined space, trench rescue, <i>etc.</i>). It will also be utilized as a support vehicle after larger incidents, such as carrying hose, SCBA, and technical rescue equipment to and from the station as needed. Secondary use – when not engaged in emergency response -- will be for inspections, investigations, and community outreach programs. Equipment on the vehicle would consist of full lights and siren package, digital communications package, and basic EMS response equipment. Once the vehicles are secured, they would be sent to a vendor to receive emergency lighting, siren, and digital communication systems. They would then be sent to a second vendor to receive Fire Department vinyl badging and striping. Once all the work has been completed, the trucks will be placed in service immediately.
Total Expenditure by Roquette:		\$122,852		

IV. Evaluation Criteria

The EPA has identified several critical factors on which to evaluate proposed projects. SEP proposals should demonstrate that the project will effectively achieve or promote one or more of these overarching goals. The better the performance of the SEP under each of these factors, the higher the appropriate mitigation credit should be. Appropriate mitigation of the civil penalty for implementation of a SEP will be determined by the EPA based on these factors and other case-specific considerations.

The acquisition and outfitting of two trucks for use by the Keokuk fire department as emergency response vehicles satisfies all three of the overarching goals of the Evaluation Criteria of the March 10, 2015, EPA SEP Policy document.

Specifically, the purchase of these two vehicles and outfitting them to assist with emergency response equipment as designated by the Keokuk fire department will provide the following benefits.

A. Significant, Quantifiable Benefits to Public Health and/or the Environment

With two fully outfitted emergency response pickup trucks, the community's capacity to respond to emergencies is significantly enhanced. Two vehicle redundancy allows for strategic allocation of equipment between the two vehicles should one vehicle be undergoing regular maintenance or repairs the second vehicle will remain at the ready, ensuring rapid response times regardless of the location of the incident. This distributed approach enhances coverage and reduces the time it takes for emergency responders to reach the scene, thereby increasing the likelihood of successful outcomes, particularly in critical situations such as medical emergencies or fires.

These pickup trucks offer versatility and flexibility in responding to a wide range of emergencies. Equipped with essential tools and equipment, such as firefighting gear, medical supplies, and extraction tools, these trucks can adapt to various scenarios, including fires, medical emergencies, natural disasters, and search and rescue operations. Their off-road capabilities enable access to remote or challenging terrain, where larger emergency vehicles may struggle to reach. This versatility ensures that the community is prepared to address diverse emergency situations effectively, regardless of the circumstances.

Additionally, having two fully outfitted emergency response pickup trucks not only enhances Keokuk's ability to respond to emergencies but also promotes community engagement and preparedness. These trucks when not engaged in emergency response can be utilized for public education and outreach initiatives, such as disaster preparedness workshops, CPR training sessions, or neighborhood safety events. By actively involving residents in emergency preparedness efforts and familiarizing them with the capabilities of the trucks, the community becomes more resilient and better equipped to respond effectively to emergencies, thereby fostering a sense of collective responsibility and empowerment.

Compared to larger emergency vehicles, pickup trucks typically have lower operational and maintenance costs. Additionally, their smaller size and maneuverability enable efficient deployment and navigation through narrow streets and streets that are covered in mud and snow.

As a result, the receipt of these two fully outfitted emergency response pickup trucks can offer cost-effective solutions for enhancing emergency preparedness within the community without compromising on effectiveness or response capabilities.

B. Environmental Justice

Keokuk, Iowa like many communities, may face environmental hazards such as chemical spills, air pollution incidents, or natural disasters that disproportionately affect marginalized or low-income neighborhoods. Equipping pickup trucks for emergency response allows for quicker deployment to these incidents, facilitating prompt containment and mitigation efforts. By reducing response times, these trucks can help minimize the environmental impact on vulnerable communities, promoting environmental justice.

Additionally, access to emergency response vehicles fosters community resilience by empowering residents to prepare for and respond to environmental emergencies effectively. Training programs and workshops can be organized to educate community members on how to use the trucks' equipment in case of environmental hazards. This proactive approach ensures that marginalized communities are better equipped to protect themselves and their environment, thereby promoting environmental justice.

The donation of these trucks for emergency response ensures equitable access to essential services, regardless of socioeconomic status or geographic location within Keokuk. This helps address disparities in emergency response resources that may exist in marginalized neighborhoods. By prioritizing the needs of underserved communities, the donation of emergency response vehicles contributes to environmental justice by ensuring that all residents have access to timely assistance during environmental emergencies.

The presence of these two fully outfitted trucks can serve as a visible symbol of the commitment of Roquette and the city management to environmental justice within Keokuk. By mobilizing resources and support, these trucks can amplify the voices of those advocating for environmental justice and encourage collective action to address environmental challenges in Keokuk.

C. Community Input

Keokuk's fire chief and the entire department of 19 personnel have been actively involved in the selection of these two pickup trucks and will be dictating the scope of the outfitting of these vehicles with emergency response equipment.

D. Innovation

The delivery of two emergency response pickup trucks as a component of an environmental non-compliance penalty has the potential to generate multiple environmental and social benefits beyond traditional mitigation measures. Not only does it enhance the community's ability to respond to environmental emergencies, but as noted above it also promotes environmental justice by ensuring equitable access to emergency services and resources. Additionally, the project can contribute to environmental education and awareness, fostering a culture of environmental stewardship within the community.

The donation of emergency response pickup trucks can serve as a model for other communities facing similar environmental justice concerns. The project's scalability and replicability make it an innovative solution that has the potential to be adopted and adapted in different contexts across the country. By sharing lessons learned and best practices, the SEP project can inspire U.S. EPA and other communities to implement similar SEP penalty options, thereby amplifying its impact on environmental justice.

The delivery of these two emergency response vehicles has involved extensive collaboration between Roquette, the Keokuk fire department and Keokuk city government. This collaborative approach reflects the spirit of the SEP policy, which encourages partnerships and innovative solutions to environmental challenges. By leveraging the expertise and resources of multiple stakeholders, this vehicle delivery will maximize its impact and sustainability.

E. Multimedia Impacts

With quicker response times enabled by these two trucks, the duration and severity of environmental incidents can be minimized. For example, in the case of chemical spills or hazardous material releases, rapid deployment of emergency response teams equipped with the necessary tools and equipment can prevent the spread of contaminants to air, soil, and water, thereby reducing overall environmental impact.

Prompt response to environmental emergencies can prevent or mitigate secondary environmental damage. For instance, in the event of an industrial fire, the use of these two quick and maneuverable pickup trucks outfitted with emergency response equipment can help contain the blaze before it spreads to adjacent residential neighborhoods, minimizing air pollution, habitat destruction, and property damage.

These emergency response pickup trucks can improve the efficiency of resource allocation during environmental incidents. By providing on-site access to essential tools and supplies, these trucks enable responders to address multiple aspects of an incident simultaneously, such as containment, cleanup, and decontamination. This coordinated approach minimizes resource wastage and reduces the overall environmental footprint of emergency response operations.

F. Pollution Prevention

Equipping pickup trucks with spill response kits enables rapid containment and cleanup of hazardous material spills, such as oil, chemicals, or fuel. By deploying these trucks quickly to spill incidents, responders can prevent pollutants from contaminating soil, groundwater, or surface water bodies, thereby minimizing the environmental impact and potential harm to ecosystems and public health.

The presence of emergency response pickup trucks can also support pollution prevention through community education and outreach initiatives. By engaging residents in environmental awareness campaigns, workshops, and training sessions, the trucks serve as visible symbols of the community's commitment to environmental stewardship. They can also facilitate the dissemination of information on pollution prevention best practices, such as proper waste

disposal, recycling, and sustainable transportation options, empowering residents to take proactive steps to reduce their environmental footprint.

V. Requirements for Settlements that Include a SEP

A. SEP Completion Deadline

The two pickup trucks purchased by Roquette will be available for service by the Keokuk Fire Department once the lights, sirens and telecommunications equipment are installed and stenciling is complete. The vendor of the telecommunications equipment, lights and sirens has indicated to Keltec (the installer of the equipment) that there is roughly an eight (8) week delay in delivery of the components to Keltec. Additionally, once the components are received by Keltec there **may be** another delay by Keltec fitting the two vehicles into their schedule due to outfitting demands by other first responder agencies. Lastly, stenciling of both vehicles with emergency signage will also be required following the installation of the equipment by Keltec.

B. Proposed Schedule for completion of the SEP / Interim Milestones

Roquette will purchase the two pickup trucks from Derr Motor Company based in Keokuk, Iowa after the effective date of the consent agreement and final order. Once the two trucks are purchased, Roquette would authorize Keltec to place the order for the lights, sirens, and telecommunications equipment. As noted above in Section A., there is roughly an eight-week lag in the delivery of these items to Keltec from the equipment vendor. Once the equipment is received, Roquette and Keltec will expeditiously coordinate the scheduling of the equipment installation which may be delayed by weeks or possibly even months depending upon how heavily booked Keltec's installation team is at that time. Once the equipment installation is complete, the trucks will be routed to Darkside Tint and Graphix of Keokuk, Iowa for stenciling (reflective emergency signage). The vehicle stenciling will require roughly one week for each vehicle. In summary, once the consent agreement and final order is effective, delivery of the two fully outfitted vehicles to the Keokuk Fire Department will require a roughly estimated three to four months.

C. Detailed Cost Estimate Along with Itemized List of Equipment

The cost to purchase the two pickup trucks is \$55,000 (Silverado) plus \$47,000 (RAM) for a total of \$102,000. Those costs are all-in costs including taxes, fees, etc. The cost of the telecommunications equipment, lights and sirens is \$10,113.29 (Silverado) and \$9,538.71 (RAM) for a total of \$19,652. Stenciling with emergency details, etc., will cost \$600 per vehicle. The total for the vehicles, equipment and installation services and stenciling is \$122,852. The estimates for the telecommunications equipment along with lights and sirens packages are included as Exhibits to this SEP proposal.

D. How Completion of the Project is to be Verified and Submitted to EPA

The Roquette plant manager or Environmental Manager will provide a final SEP completion report which will include photos, vendor receipts and invoices clearly detailing all SEP expenditures.

ATTACHMENT 2A

COMPLIANCE AUDIT AND PHA FINDINGS
ROQUETTE UTILITIES DEPARTMENT

March 31, 2021 Refinery C PSM/RMP Audit Findings

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
3.3	Block flow diagrams or simplified Process Flow diagrams?	Refinery C has a Block Flow Diagram of Syrup Flow, which doesn't include the Ammonia tank and inline mixer.	Update Syrup Flow Block Flow Diagram to include the Ammonia tank and inline mixer.	Completed	Block flow diagram exists, currently in process of expanding.
3.15	Safety systems (e.g. interlocks, detection or suppression systems)?	The site has documented instrumentation and safety systems with their functions in the PSI; however, it appears that the Safety systems table is incomplete, as no tag numbers or setpoint have been listed and detection systems are not	Develop a complete list of all critical safety systems for the covered process to include their functions, tag numbers, and setpoints.	In progress	Map has been developed identifying location of sensors - needs updated with correct tag numbers following Foxboro migration.
4.16	Have recommendations been resolved in a timely manner?	Based on conversations with the audit team, none of the PHA recommendations were completed (with the exception of Rec #47 Ammonia Truck Unloading Piping Repaint) and will therefore be carried over as 2020 PHA recommendations.	Ensure recommendations have been documented and resolved in a timely manner and use the risk rank from the PHA scenarios for prioritization of recommendations.	Completed	Established weekly (now bi-weekly) meeting to ensure that actions are being corrected, documented, and communicated. Invitees are owners of the corrective actions.
4.17	Has the resolution of the recommendations been documented, the actions that were taken been documented, and the actions been completed as soon as possible?				
4.18	Has a written schedule been developed for when actions are to be completed?		Ensure a written schedule has been developed for when actions are to be completed.	Completed	Team review, completion dates set.
4.19	Have the actions been communicated to those employees whose work assignments are in the process and who might be affected by the recommendations or actions? RMP Note: Affected employees include operators,		Ensure actions have been communicated to affected personnel in the covered process area and those who may be affected by the recommendations.	In progress	MOCs/TOC have been and will continue to be used to communicate changes made.
5.3	Has the employer developed and implemented written operating procedures . . . consistent with the process safety information?	The site appears to have documented SOL's for the ammonia system in the PSI (Technical Operating Specifications); however, it is difficult to confirm if the PSI matches since the SOLs have not been documented in the SOPs.	Ensure the SOPs are consistent with what is documented in the Process Safety Information and incorporate and clearly specify that the max/min operating parameters represent Safe Upper and Lower Operating Limits and Normal Operating Limits within the SOPs and PSI.	Completed	SOPs have been updated, operators trained.
5.11	Do the operating procedures address . . . operating limits?	The operating procedures make reference to operating limits for the ammonia tank; however, they do not match the Technical Operating Specifications noted in the PSI.			
5.12	Do the operating procedures address . . . consequence of deviations?	The operating procedures do not address consequence of deviation.	Ensure operating procedures incorporate all applicable consequences of deviation or make reference to consequences of deviation in the operating procedures.	Completed	SOPs have been updated, operators trained.
5.13	Do the operating procedures address . . . steps required to correct or avoid deviation?	The operating procedures do not address steps to correct or avoid of deviation.	Ensure operating procedures incorporate all applicable steps to correct or avoid of deviation or make reference to the steps to correct or avoid of deviation in the operating procedures.	Completed	SOPs have been updated, operators trained.
5.14	Do the operating procedures address . . . safety and health considerations: properties of, and hazards presented by, the chemicals used in the process?	The operating procedures do not address safety and health considerations, specifically properties of, and hazards presented by, the chemicals used in the process.			

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
5.15	Do the operating procedures address . . . safety and health considerations: precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment?	The operating procedures do not address safety and health considerations, specifically precautions necessary to prevent exposure, including engineering controls and administrative controls. This finding could be addressed by referencing SDS in the operating procedures. The PPE required was documented in the operating procedures.	Ensure operating procedures address all applicable safety and health considerations.	Completed	SOPs have been updated, operators trained.
5.16	Do the operating procedures address . . . safety and health considerations: control measures to be taken if physical contact or airborne exposure occurs?	The operating procedures do not address safety and health considerations, specifically control measures to be taken if physical contact or airborne exposure occurs. This finding could be addressed by referencing SDS in the operating procedures.			
5.18	Do the operating procedures address . . . safety and health considerations: any special or unique hazards?	The operating procedures do not address special or unique hazards (Hydrostatic expansion of liquid in tank if overfilled beyond administrative control).			
5.19	Do the operating procedures address . . . safety and health considerations: safety systems and their functions?	The operating procedures do not address safety and health considerations, specifically safety systems and their functions.			
5.21	Are the operating procedures reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to facilities?	The operating procedures do not have review and revision history section, making it difficult to confirm if operating procedures are actually reviewed and reflect current operating practices. The site also confirmed the SOPs are not reviewed on an annual basis, only when revisions are required.	Ensure the annual review, revision (if required), and certification process for operating procedures.	In progress	Procedures have been revised and re-formatted into ONEdoc template. To be uploaded into ONEdoc, where review and certification interval will be set to recur each January.
5.22	Does the employer certify annually that these operating procedures are current and accurate?	The site doesn't certify annually that the operating procedures are current and accurate.			
7.6	Has the employer periodically evaluated the performance of contract employers in fulfilling their responsibilities under the contractor management requirements of the PSM/RMP Standard?	The site doesn't have a formal process to periodically evaluate the performance of contractors, but did mention the following efforts: <ul style="list-style-type: none"> •ISN monitors contractor compliance to our expectations in terms of required safety training, that their safety metrics are within an acceptable range, that their insurance coverage is acceptable given their level of risk, etc... •Area management personnel and operations-level employees review permits and other documentation filled-out by contractors for completeness and accuracy, and address any issues prior to work being performed. •Walkthroughs of work areas are conducted prior to jobs for higher-risk tasks, including those with LT3, confined space work, hot work, and line breaking. Walkthroughs while work is on-going are conducted as-needed. 	Conduct periodic evaluations of the performance of contract employers in fulfilling their responsibilities under the contractor management requirements of the PSM/RMP Standard.	In progress	Discussion with Trinity on requirements/expectations surrounding these evaluations. Form is in process of being developed to capture these evaluations. Overall site procedure to be revised to incorporate requirements. Managers to be trained following.

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
14.1	Are PSM/RMP audits certified at least every three years to verify that the procedures and practices developed under the standards are adequate and are being followed?	The 2017 PSM RMP audit was certified; however, the 2014 PSM RMP audit was not certified (no certification page with signature of Certifying Employer).	Ensure PSM/RMP audits are certified at least every three years to verify that the procedures and practices developed under the standards are adequate and are being followed.	Completed	Previous audits have been certified upon review, future audits to be certified upon receipt and review. Provision to be added to overall site program/procedure documents.
14.4	Was an appropriate response to each of the findings of the audit promptly determined and documented?	An appropriate response to each of the findings of the audit were not promptly determined and documented. None of the 2017 audited recommendations were completed by the site.	For future compliance audits, develop a system to promptly determine and document an appropriate response to each of the findings of the compliance audit and document that deficiencies have been corrected.	Completed	Weekly/bi-weekly meetings are occurring for current findings and actions in order to ensure action items are being addressed and closed.
14.5	Have the correction of the deficiencies been documented?	The correction of the deficiencies have not been documented by the site.			
BP-2.2	Does the plan include consultation with employees and their representatives on the conduct and development of process hazards analyses?	The PHA reports indicate that a multi-functional group of nonmanagement and management personnel participated in the study, but it is difficult to confirm actual employee participation in the absence of a PHA attendance sheet (specifically for 2015 PHA). Note: The 2020 PHA is in the process of being finalized and was conducted virtually due to Covid-19 so attendance sheets with signatures/dates were not possible.	Consider requiring all PHA attendees to document presence via signature and date on a PHA attendance sheet for future PHAs.	Completed	Attendance rosters are captured and included on all PHA and Compliance Audit Reports from 2018 to present.
BP-2.3	Does the plan include consultation with employees and their representatives on the development and implementation of other elements of the PSM standard?	The site includes consultation with employees and their representatives on the development and implementation of other elements of the PSM standard to include Training, Incident Investigation and Compliance Audits.	Consider incorporating PSM RMP- related topics as a part of the area's scheduled safety meetings.	Not Started	Include PSM/RPM topics as Safety Shares in daily production and weekly tactical meetings as well as place on information monitors throughout the facility. Area management/employees to determine frequency of department-specific PSM/RMP meetings.
BP-5.6	Do the operating procedures address . . . temporary operations?	The site has operating procedures that address temporary operations; however, after further discussion with the audit it was confirmed that Ref C doesn't operate under temporary operations.	Consider updating the Temporary Operations SOP to state that Refinery C doesn't operate under temporary operations.	Completed	SOP has been updated with more concise wording, operators trained.
BP-5.8	Do the operating procedures address . . . emergency operations?	The site has operating procedures that address emergency operations; however, after further discussion with the audit it was confirmed that Ref C doesn't operate under emergency operations.	Consider updating the Emergency Operations SOP to state that Refinery C doesn't operate under emergency operations.	Completed	SOP has been updated with more concise wording, operators trained.

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
BP - 6.8	Has refresher training been provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process?	Refresher training is not due for the site as of yet since the site has had all new operators in the last 1.5 years, but should be conducted at the 3-year mark.	Conduct Refresher training every 3 years. Note: This is a PSM/RMP compliance requirement, but Trinity has listed as a Best Practice to give visibility to the recommendation since refresher training is not due until 2023.	Completed	Training is up to date, reviewing interval & content to determine further action
BP - 6.9	Has the employer, in consultation with the employees involved in operating the process, determined the appropriate frequency of refresher training?	Refresher training is not due for the site as of yet since the site has had all new operators in the last 1.5 years, but the site should ensure that they have consulted with employees on the appropriate frequency of refresher training. This can be addressed via minutes of safety meetings, written surveys, e-mail surveys of the operators, or questions/statement added at the end of a training session quiz or signature sheet as an example.	Develop method for consulting with employees on the appropriate frequency of refresher training. Note: This is a PSM/RMP compliance requirement, but Trinity has listed as a Best Practice to give visibility to the recommendation since refresher training is not due until 2023.	In progress	Need to determine how to work this into training element (plantwide), discuss with HR & Department Managers
BP - 10.3	Do the hot work permits document that the fire prevention and protection requirements in 29 CFR §1910.252(a) have been implemented prior to beginning the hot work operations?	The Safe and Hot Work Permit procedure documents that the fire prevention and protection requirements in 29 CFR §1910.252(a) have been implemented prior to beginning the hot work operations. However, the procedure doesn't specify under what circumstances Hot work should be suspended and it doesn't provide a clear indication on who has the authority for hot work suspension (i.e. Stop the Job Authority for personnel).	Consider updating the procedure to specify under what circumstances Hot work should be suspended and provide a clear indication on who has the authority for hot work suspension (i.e. Stop the Job Authority for personnel).	In progress	Include verbiage in the SOP to discuss Stop Work Authority - HSE to review/update plantwide procedure.

	A	B	C	D	J	K	L
1	February 11, 2020 Refinery C PHA Recommendations						
2							
3	Item	Deviation	Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken	
4							
5	1.1	Deviation during truck movement and truck spotting	1.1.1. Inadvertent truck movement while connected, breaking hoses and/or piping 1.1.2. Truck hit by vehicular traffic to/from Refinery C operations. (see incident #FENA-2015-05-26- C_D) 1.1.3. Truck hit by railroad traffic conducted on active track	Rec 1. Consider revising RAI standard ammonia truck unloading operating procedure to include the use of truck chocks.	Completed	Truck chock received and in place, SOP updated, operators trained.	
6	1.1	Deviation during truck movement and truck spotting	1.1.1. Inadvertent truck movement while connected, breaking hoses and/or piping 1.1.2. Truck hit by vehicular traffic to/from Refinery C operations. (see incident #FENA-2015-05-26- C_D) 1.1.3. Truck hit by railroad traffic conducted on active track	Rec 2. Consider verified/documented truck equipment (i.e. hoses and truck emergency stop system) inspection, test, and preventive maintenance schedule(s) are in place and current.	In progress	Initial information requested, meeting to be set with CG Transport to gather more information.	
7	1.1	Deviation during truck movement and truck spotting	1.1.1. Inadvertent truck movement while connected, breaking hoses and/or piping 1.1.2. Truck hit by vehicular traffic to/from Refinery C operations. (see incident #FENA-2015-05-26- C_D) 1.1.3. Truck hit by railroad traffic conducted on active track	Rec 3. Consider "blue flag" and/or traffic warning signage to post during ammonia truck unloading	Completed	Road barricade received and in place, SOP updated, Operators trained.	

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
8	1.1	Deviation during truck movement and truck spotting		1.1.1. Inadvertent truck movement while connected, breaking hoses and/or piping 1.1.2. Truck hit by vehicular traffic to/from Refinery C operations. (see incident #FENA-2015-05-26- C_D) 1.1.3. Truck hit by railroad traffic conducted on active track	Rec 4. Consider verified/documentated ammonia truck driver DOT training and certification as part of trucking purchase order process. (Todd to follow up with Logistics dept)	In progress	Initial information requested, meeting to be set with CG Transport to gather more information.
9	1.1	Deviation during truck movement and truck spotting		1.1.1. Inadvertent truck movement while connected, breaking hoses and/or piping 1.1.2. Truck hit by vehicular traffic to/from Refinery C operations. (see incident #FENA-2015-05-26- C_D) 1.1.3. Truck hit by railroad traffic conducted on active track	Rec 5. Consider general awareness training for RAI operators responsible for supporting ammonia truck unloading.	Complete	Training is conducted on and has been completed for this.
10	1.1	Deviation during truck movement and truck spotting		1.1.1. Inadvertent truck movement while connected, breaking hoses and/or piping 1.1.2. Truck hit by vehicular traffic to/from Refinery C operations. (see incident #FENA-2015-05-26- C_D) 1.1.3. Truck hit by railroad traffic conducted on active track	Rec 6. Consider security and job specific DOT training for RAI operators responsible for supporting ammonia truck unloading.	Complete	Group decision: Will not make a requirement due to limited operator interaction with unloading process. Checklist is in place on RAI end. Chock is in place to prevent truck movement & sign in place to bring notice to road closure while truck is offloading, which reduces likelihood of vehicle-related incident.

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
11	1.2	Deviation during startup		1.2.1. Truck driver start unloading process with RAI manual valve(s) inadvertently closed	<p>Rec 7. Consider verifying truck unloading equipment process safety systems capabilities and communicate to (share with) RAI operations personnel.</p>	In progress	Initial information requested, meeting to be set with CG Transport to gather more information.
12			1.2.3. Over fill during truck unloading operation				
13							
14	2.1	High level		2.1.1. Over fill during truck unloading operation 2.1.2. Instrumentation malfunction (PI/LI failure)			
15							

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
16	1.2	Deviation during startup		1.2.1. Truck driver start unloading process with RAI manual valve(s) inadvertently closed	<p>Rec 8. Consider engineering/operational review of Emergency Shut Off valves 76106 and 76105 to ensure effective safety function. Currently cable activation for these valves is inoperable.</p>	Completed	Annual PM to test operation of valves is currently in place. Cable was replaced week of 5/6/24.
17			1.2.3. Over fill during truck unloading operation				
18							
19	2.1	High level		2.1.1. Over fill during truck unloading operation 2.1.2. Instrumentation malfunction (PI/LI failure)			

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
20							
21	1.2	Deviation during startup		1.2.1. Truck driver start unloading process with RAI manual valve(s) inadvertently closed	<p>Rec 9. Consider remote activated valves to isolate ammonia storage tank during an emergency (process and/or truck unloading).</p>	<p>Not started</p>	<p>Group decision: Upon review of scenarios (causes/consequences), a different modification would be more fitting to address potential consequences (deluge system). Foxboro already has E-Stop built into it.</p>
22			1.2.2. RAI Operator closes two valves trapping liquid ammonia between closed valves				
23			1.2.3. Over fill during truck unloading operation				
24							

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
25	2.1	High level	2.1.1. Over fill during truck unloading operation 2.1.2. Instrumentation malfunction (PI/LI failure)				
26							
27	1.2	Deviation during startup	1.2.2. RAI Operator closes two valves trapping liquid ammonia between closed valves	Rec 10. Consider installing hydrostatic valves for piping where ammonia can be trapped between closed valves. Verify new and existing hydrostatic valves are on an inspection, test, and preventive maintenance schedule and up to date. Also, verify hydrostatic valves are shown on P&ID C-8919-2A.	In progress	Verified that valves are on P&ID. Need to obtain a copy of PM that is in place.	
28	1.9	High pressure	1.9.2. Trapped ammonia between closed valves				
29							

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
30	1.3	Deviation during shutdown		1.3.1. Residual ammonia in truck unloading hoses and/or piping	Rec 11. Consider validating inspection, test, and preventive maintenance schedules for storage tank excess flow valves	Completed	Validated, PM in place.
31			1.3.2. Truck driver inadvertently leaves unloading valve open and/or cap loose (reference Incident #FENA-2015-04- 22T06 dated 4/22/2015)				
32	1.3	Deviation during shutdown		1.3.1. Residual ammonia in truck unloading hoses and/or piping			
33			1.3.2. Truck driver inadvertently leaves unloading valve open and/or cap loose (reference Incident #FENA-2015-04- 22T06 dated 4/22/2015)				
34	1.7	High temperature		1.7.1. Ambient temperature, radiant heat			
35							

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
36	1.9	High pressure	1.9.1. Ambient temperature, radiant heat	Rec 12. Consider including the relief pressure setting on the P&IDs.	Complete	P&IDs have been updated.	
37							
38	2.3	High temperature	2.3.1. Ambient temperature, radiant heat 2.3.2. External fire 2.3.3. Fuel fire from ammonia truck during unloading				
39							

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
40	1.3	Deviation during shutdown		1.3.1. Residual ammonia in truck unloading hoses and/or piping	<p>Rec 13. Consider implementing recognized and generally accepted good engineering practices; and inspection, test, and preventive maintenance schedule for vent hose (rubber) to water tote.</p>	In progress	<p>Develop quarterly PM for general inspection of hose, ensure hose specifications are documented in SAP. Annual inspection has been completed - need to document.</p>
41			1.3.2. Truck driver inadvertently leaves unloading valve open and/or cap loose (reference Incident #FENA-2015-04- 22T06 dated 4/22/2015)				
42	1.3	Deviation during shutdown		1.3.1. Residual ammonia in truck unloading hoses and/or piping	<p>Rec 14. Consider implementing field unloading checklists for truck driver and RAI operator to ensure that key operating steps are completed (i.e. sufficient tank volume available to unload truck, valves closed and caps replaced after unloading). The new checklist should include a notation that the operator has reviewed truck actual load, and then verify sufficient space (outage) in ammonia storage tank before unloading.</p>	In progress	<p>RAI has truck unloading procedure in place. Meeting with CG Transport to review their checklist and ensure both parties are educated on expectations/procedures.</p>
43			1.3.2. Truck driver inadvertently leaves unloading valve open and/or cap loose (reference Incident #FENA-2015-04- 22T06 dated 4/22/2015)				
44	1.3	Deviation during shutdown		1.3.1. Residual ammonia in truck unloading hoses and/or piping	<p>Rec 15. Consider evaluating engineering controls to prevent hose disconnection while the valve (76107 & 76108) is in open position</p>	In progress	<p>Meeting with CG Transport to review their checklist & discuss equipment responsibilities (who provides pins in ears on hose connectors).</p>

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
45	1.3	Deviation during shutdown		1.3.1. Residual ammonia in truck unloading hoses and/or piping	Rec 16. Consider night lighting at ammonia storage tank area for truck unloading and emergency response purposes	Completed	Lighting is in place and working properly.
46	5.6	Loss of nighttime lighting		5.6.1. Loss of electric power (momentary or longer)			
47	1.4	High flow		1.4.1. Unloading valve open to wide (high unloading rate)	Rec 17. Consider specifying truck unloading equipment maximum pressure and flow capabilities as part of ammonia vendor/trucking purchase order, and include this information in the truck driver's unloading instructions.	In progress	Initial information requested, meeting to be set with CG Transport to gather more information.
48	1.7	High temperature		1.7.1. Ambient temperature, radiant heat			

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
49					Rec 18. Consider confirming/implementing ignition source control.	In progress	In addition to operator daily rounds and presence in area for receiving ammonia, a camera has been installed to allow for live monitoring of the area from control room. Need to validate CG Transport procedures regarding emergency response.
50	1.9	High pressure	1.9.1. Ambient temperature, radiant heat				
51							
52	2.3	High temperature	2.3.1. Ambient temperature, radiant heat 2.3.2. External fire 2.3.3. Fuel fire from ammonia truck during unloading				

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
53							
54	1.7	High temperature	1.7.1. Ambient temperature, radiant heat	Rec 19. Consider evaluating/implementing a deluge and ammonia water curtain system.	Not started	Need to contact vendors for quotes on installation, submit project.	
55							
56	2.3	High temperature	2.3.1. Ambient temperature, radiant heat 2.3.2. External fire 2.3.3. Fuel fire from ammonia truck during unloading				

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
57							
58	1.9	High pressure	1.9.1. Ambient temperature, radiant heat	<p>Rec 20. Consider repair or replacement of corroded anhydrous ammonia piping sections, particularly for threaded connections, and section subject external moisture and/or other process chemicals.</p>	Completed	<p>Piping is on PM schedule and is inspected every 5 years (is current). Previous inspection states that line is suitable for continued service until 2025 inspection. Line to be painted in 2024, PM to paint line annually will be created.</p>	
59							
60			1.9.2. Trapped ammonia between closed valves				
61							

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
62	1.11	High concentration of contaminants		1.11.1. Caustic and cooling tower chemicals unloading in adjacent areas, truck unloading mix-up (led by truck driver)	Rec 21. Consider developing a new chemical compatibility chart format to expand operator knowledge and expertise for ammonia operations, including the hazards of mixing bleach and ammonia water.	In progress	Have reached out to Quality group for information. Evaluate risks/hazards in area, revise operator training if necessary.
63			1.11.2. Improper vent solution (instead of water) in tote inadvertently mixes ammonia gas/liquid with incompatible chemical (i.e. hypochlorite)				
64	1.11	High concentration of contaminants		1.11.1. Caustic and cooling tower chemicals unloading in adjacent areas, truck unloading mix-up (led by truck driver)	Rec 22. Consider expanding operator awareness and training regarding mixing of incompatible chemicals with ammonia and the explosive nature of ammonia gas in a confined building.	Not started	Have reached out to Quality group for information. Evaluate risks/hazards in area, revise operator training if necessary.
65			1.11.2. Improper vent solution (instead of water) in tote inadvertently mixes ammonia gas/liquid with incompatible chemical (i.e. hypochlorite)				
66	1.12	Leak/rupture		1.12.1. Storage tank pressure gauge failure (unthreaded due to small diameter piping/inadequate support)	Rec 23. Consider developing a formal specific pre-emergency response plan for possible ammonia leaks during truck unloading operation.	In progress	Meeting with CG Transport to validate procedures regarding emergency response.

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
67	1.12	Leak/rupture		1.12.1. Storage tank pressure gauge failure (unthreaded due to small diameter piping/inadequate support)	<p>Rec 24. Consider an engineering study addressing adequate support of small diameter piping and attachments (i.e. ammonia tank pressure gauges) to ensure proper support from mechanical impact during normal operation and maintenance.</p> <p>Rec 25. Consider expanding RAI maintenance personnel experience and expertise with ammonia system equipment, piping specifications and Maintenance work methods/procedures.</p>	Not started	Reviewing design documents, determining if study is necessary.
68	1.13	Deviation during maintenance work and/or lack of maintenance work		1.13.1. RAI maintenance personnel have limited experience with ammonia systems including piping and equipment specifications		In progress	<p>RAI Maintenance & Contractors receive awareness training. RAI maintenance has limited interaction with regulated ammonia system, specialized contractors utilized. Discuss with Maint Manager and TL to determine what else may be required.</p>
69	2.14	Leak/rupture		2.14.2. Ammonia valve failure/leak			
70				2.14.3. Ammonia piping support failure (result in line damage/failure)			
71	2.17	Deviation during maintenance		2.17.1. Maintenance (contractor at Airgas) failure to follow safe work practices - Ammonia routed to mixing station while aqueous ammonia tank being inspected/maintenance			

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
72	1.13	Deviation during maintenance work and/or lack of maintenance work		1.13.1. RAI maintenance personnel have limited experience with ammonia systems including piping and equipment specifications	Rec 26. Consider an engineering evaluation of threaded piping and fittings currently used for 250 psig rated ammonia system, taking into consideration RAI maintenance and operations personnel limited experience inspecting and maintaining ammonia systems.	In progress	RAI Maintenance & Contractors receive awareness training. RAI maintenance has limited interaction with regulated ammonia system, specialized contractors utilized. Discuss with Maint Manager. Area Maint TL, and Reliability to determine what else may be required.
73				1.13.2. Failure to preform required maintenance task			
74	1.13	Deviation during maintenance work and/or lack of maintenance work		1.13.1. RAI maintenance personnel have limited experience with ammonia systems including piping and equipment specifications	Rec 27. Consider an engineering evaluation of RAI's current ammonia truck unloading hose and piping configuration versus recognized and generally accepted good engineering practice. Reference OSHA special bulletin (SHIB) addressing ammonia unloading systems dated 12/05/05.	In progress	Reviewing design documents/SHIB, determining if study is necessary. Transport company provides unloading hose, validate practices and equipment with CG Transport.

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
75	2.5	High pressure		See the following scenarios on high pressure: 2.5.1. High level (see 2.1) 2.5.2. Deviation during startup - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage Tank TK-417605 (see 1.2) 2.5.3. High flow - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage Tank TK-417605 (see 1.4) 2.5.4. High temperature - see 2.3 2.5.5. High pressure - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage	Rec 28. Consider a review of the Refinery C ammonia storage system with other ammonia storage tank installations at CFB and Cogen to identify potential system improvements based on recognized and generally accepted good engineering practices.	Not started	Need to determine applicable RAGAGEPs, set meeting to review.
76	2.5	High pressure		See the following scenarios on high pressure: 2.5.1. High level (see 2.1) 2.5.2. Deviation during startup - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage Tank TK-417605 (see 1.2) 2.5.3. High flow - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage Tank TK-417605 (see 1.4) 2.5.4. High temperature - see 2.3 2.5.5. High pressure - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage	Rec 29. Consider updating the Refinery C "Relief Valve Design and Design Criteria Worksheet for the Ammonia Storage and Use System" document to include installed ammonia tank relief valve(s) specifications (i.e. pressure setting, capacity).	Not started	Review design documentation, validate regulatory requirements.

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
77	2.5	High pressure		See the following scenarios on high pressure: 2.5.1. High level (see 2.1) 2.5.2. Deviation during startup - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage Tank TK-417605 (see 1.2) 2.5.3. High flow - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage Tank TK-417605 (see 1.4) 2.5.4. High temperature - see 2.3 2.5.5. High pressure - Ammonia Truck unloading through hoses and piping to/from (liquid/vent) Ammonia Storage	Rec 30. Consider updating the Refinery C "Relief Valve Design and Design Criteria Worksheet for the Ammonia Storage and Use System" document to include/reflect the impact of 3 way diverter valves and piping on specified ammonia tank relief valve(s) capacity.	Not started	Review design documentation, validate regulatory requirements.
78	2.8	Low/no flow		2.8.1. Water valve failure or inadvertently closed	Rec 31. Consider verifying that ammonia valve permissive control requires verified water flow to the mixing station, also verify that a minimum water flow reading is established before ammonia flow allowed	Not started	Review programming conditions to determine if action is necessary.
79	2.15	Deviation during startup	2.15.1. Valve misalignment, manual water block valves left closed. 2.15.2. Ammonia feed to inline mixer without water flow				
80	2.8	Low/no flow		2.8.1. Water valve failure or inadvertently closed	Rec 32. Consider adding the water flow meter for the mixing station to the P&ID.	Completed	P&ID has been updated
81	2.10	Misdirected flow		2.10.1. Wrong installation of temporary piping and hose installed to vent piping 2.10.2. Temporary connection to vent piping left in service attached to active ammonia transfer piping system	Rec 33. Consider implementing a temporary MOC for each special/interim piping modification (i.e. piping vented to tote while ammonia system is active) to insure the temporary installation is removed prior to restarting the ammonia system.	Not started	Evaluate regulatory requirements

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
82	2.14	Leak/rupture		2.14.1. Corrosion from leaks (i.e. acid) located above ammonia piping system to the ammonia make up station. Ammonia.	Rec 34. Consider updating or implementing inspection, test, and preventive maintenance schedules for area monitors that detect ammonia in Building 66 as critical process instrumentation.	Completed	Verified that ammonia sensors are on an annual PM schedule.
83			2.14.2. Ammonia valve failure/leak (see Incident 6/15/2018 - 1517)				
84	2.14	Leak/rupture		2.14.1. Corrosion from leaks (i.e. acid) located above ammonia piping system to the ammonia make up station. Ammonia.	Rec 35. Consider an updated engineering study to review potential explosive mixtures inside Building 66 resulting from an anhydrous ammonia leak. Based on this study, evaluate electrical classification of equipment in potentially vulnerable areas. Consider updating the "Ventilation System Design Calculations" for RAI Refinery C to reflect worst case leak scenario distributed over limited Building 66 volume (versus whole building volume).	In progress	Review regulatory requirements based of off design and safeguards in place.
85	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?	Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes				

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
86	2.14	Outside Impacts/Other		2.14.4. River floods floating storage tank	Rec 36. Consider expanding the existing flood plan to address the potential for lifting buoyant ammonia storage tank.	Not started	Review current flood plan with Facilities Manager, develop plan with tank.
87				2.14.5. Storage tank and/or piping struck by road traffic	Rec 37. Consider an engineering study to validate the ammonia storage tank location so that adequate distance from active railway and siding traffic is provided.	Not started	Review tank placement, possible concerns with BNSF.
88				2.14.6. Railway traffic impact			

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3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
89	2.14	Outside Impacts/Other		2.14.7. Earthquake	Rec 38. Consider regulatory requirements for seismic design for the ammonia storage tank and foundations and validate current ammonia tank foundation design.	Not started	Review any applicable regulatory guidance.
90	2.15	Deviation during startup		2.15.1. Valve misalignment, manual water block valves left closed. 2.15.2. Ammonia feed to inline mixer without water flow See 2.8 low/no flow	Rec 39. Consider adding the water flow meter for the mixing station to the P&ID.	Completed	P&ID Updated
91	2.17	Deviation during maintenance		2.17.1. Maintenance (contractor at Airgas) failure to follow safe work practices - Ammonia routed to mixing station while aqueous ammonia tank being inspected/maintenance	Rec 40. Consider replacing bolts on anhydrous ammonia remote on/off valve 7813A (observed as too short during field tour).	Not started	Maintenance to review, determine if replacement is needed.

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3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
92	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?		Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes	Rec 41. Consider reformatting the standard operating procedures to include operating steps and cautions and safety warnings for the operating task being performed. Policy statements, MSDS information and other non-operating instructions should be included in a separate document. Operating limits and how to correct deviations from these operating limits should be referenced or included in the procedure in the appropriate operation task.	Completed	SOPs have been updated
93	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?		Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes	Rec 42. Consider reviewing all operating procedures and consult with operators how to improve the procedure format by eliminating any non-operating information, better define operating steps in the appropriate procedures (startup, normal shutdown, normal startup, startup after emergency shutdown, emergency shutdown, etc.).	Completed	SOPs have been updated, reviewed by operators.

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
94	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?		Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes	Rec 43. Consider implementing a standard operating procedure revalidation schedule that fulfills OSHA and Iowa OSHA PSM procedural requirements. The new procedures should be analyzed for accuracy and completeness utilizing the procedure HAZOP techniques with caution statements added where appropriate.	In progress	Procedures have been revised and re-formatted into ONEdoc template. To be uploaded into ONEdoc, where review and certification interval will be set to recur each January.
95	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?		Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes	Rec 44. Consider updating the Refinery C operator initial training and the refresher training agendas to communicate ammonia system PHA information generated during this review.	Not started	SOPs and on-boarding training will be revised to reflect any changes made as a result of a PHA recommendation.

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
96	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?		Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes	Rec 45. Consider revising the Refinery C operator refresher training schedule to satisfy OSHA and Iowa OSHA requirements.	In progress	Operators are currently trained initially and on required 3-year basis. Will revise overall plant SOP to ensure training requirements are stated.
97	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?		Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes	Rec 46. Consider revising Refinery C operating procedures to include comments collected during the Refinery C Ammonia System PHA November 2015 (comments issued as separate document).	Not started	Review previous recommendations, revise SOPs if necessary.

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
98	2.19	What If Ammonia Storage Tank SOP approach for Operating Phases (Initial Startup Normal Operations, Temporary Operations, Emergency Operations, Normal Shutdown, Normal Startup, Emergency Shutdown, and Startup after Emergency Shutdown - What if SOPs are not up to date?		Process steps out of order Process steps incomplete Procedure not up to date Operator training incomplete or out of date Procedures are hard to follow because of detail safety information that should be in a separate document Operators are having problem identifying specific operating steps because of the non-operating information such as safety information (MSDS). general guidance, general precautions, and notes	<p>Rec 47. Consider a separate/independent e-stop system to shutdown ammonia mixing station and isolate ammonia storage tank system operations during emergency situations.</p>	In progress	System e-stop is already in place. Document programming conditions.
99	5.2	Loss of control system (e.g., DCS, PLC)		5.2.1. Computer failure 5.2.2. Module/board failure 5.2.3. Loss of electric power (momentary or longer) 5.2.4. Loss of HVAC			
100	2.20	External/Internal Corrosion		External/Internal Corrosion of Ammonia Storage Tank (2210-006- 066437605)	<p>Rec 48. Consider verifying that surface corrosion has been removed from Building 66 ammonia piping (observed on ~95 of pipe) and the entire line repainted</p>	Completed	Validated. Piping is on PM schedule and is inspected every 5 years (is current). Previous inspection states that line is suitable for continued

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
101				External/Internal Corrosion of Building 66 HPL Ammonia Piping (2210-006-066437605)	by 7/25/2014 as recommended in 4/24/2014 UT inspection report.		service until 2025 inspection. Line to be painted in 2024, PM to paint line annually will be created.
102	2.20	External/Internal Corrosion		External/Internal Corrosion of Refinery C HPL Ammonia Supply Chemical Piping (2210- 006- Chemical Piping 00064, tank outlet to underground piping section) (See MOC 2/15/2019)	Rec 49. Consider verifying that identified section of pipe needing replacement inside Building 66 (reference Building 66 ammonia piping 4/24/2014 UT inspection report) has been repaired and painting completed.	Completed	Validated. Piping is on PM schedule and is inspected every 5 years (is current). Previous inspection states that line is suitable for continued service until 2025 inspection. Line to be painted in 2024, PM to paint line annually will be created.
103			External/Internal Corrosion of Building 66 HPL Ammonia Piping (2210-006-066437605)				
104	2.20	External/Internal Corrosion		External/Internal Corrosion of Building 66 HPL Ammonia Piping (2210-006-066437605)	Rec 50. Verify that the Emergency Response Plan (ERP) for large ammonia release scenarios include communication of release, areas potentially impacted, and actions to be taken. Develop specific pre-emergency response plans for possible scenarios of a large ammonia release off site and a large to medium release in building #66.	Not started	Meet with CG Transport to review emergency reponse actions during offloading. Review other possible scenarios and develop pre-plans as necessary.

	A	B	C	D	J	K	L	
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken	
4								
105	5.7	Other		5.7.1. Monitoring camera during unloading and/or monitor is not operational, currently monitor hardware not operating	Rec 51. Verify that remote visual monitoring equipment (i.e. camera, monitor) is maintained so that storage tank area monitoring from control room is active.	Completed	Camera is in place and functional, allowing for live monitoring from control room at all times.	
106	FACILITY SITING & HUMAN FACTORS RECOMMENDATIONS							
107	Item	Topic		Questions/Issues	Recommendations			
108	6.8	Location of the Unit Relative to Onsite and Offsite Surroundings		6.8.15. Are workers in this unit protected from the effects of impacts (e.g., airplane crashes, derailments) at adjacent units or facilities, and vice versa? Are environmental receptors and the public also protected from	REPEAT FROM ABOVE - Rec 3. Consider "blue flag" and/or traffic warning signage to post during ammonia truck unloading.	DUPLICATE	DUPLICATE	
109	6.10	Location and Adequacy of Drains, Spill Basins, Dikes, and Sewers	6.10.5. Are vehicle barriers installed to prevent impact to critical equipment adjacent to high traffic areas?					
110	7.1	Housekeeping and General Work Environment	7.1.2. Are adequate barriers erected to limit access to maintenance, cleanup, or staging areas?					

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
111	7.3	Labeling		7.3.5. Are signs that warn workers of hazardous materials or conditions adequately			
112	7.8	Training (Employees and Contractors)		7.8.1. Are new employees trained in the hazards of the processes?	REPEAT FROM ABOVE - Rec 4. Consider verified/documented ammonia truck driver DOT training and certification as part of trucking purchase order process.	DUPLICATE	DUPLICATE
113				7.8.3. Does operator and maintenance worker training include training in appropriate			
114	7.8	Training (Employees and Contractors)		7.8.1. Are new employees trained in the hazards of the processes?			
115				7.8.2. Do operators and maintenance workers receive adequate training in safely	REPEAT FROM ABOVE - Rec 5. Consider general awareness, security and job specific DOT training for RAI operators responsible for supporting ammonia truck unloading.	DUPLICATE	DUPLICATE
116				7.8.3. Does operator and maintenance worker training include training in appropriate			
117	7.2	Accessibility/Availability of Controls and Equipment		7.2.10. Are valves that require urgent manual adjustments (e.g., emergency shutdown) easily identifiable and readily accessible?	REPEAT FROM ABOVE - Rec 8. Consider engineering/operational review of Emergency Shut Off valves 76106 and 76105 to insure effective safety function. Currently cable activation for these valves is inoperable.	DUPLICATE	DUPLICATE
118	7.2	Accessibility/Availability of Controls and Equipment		7.2.3. Is emergency equipment accessible without presenting further hazards to personnel?	REPEAT FROM ABOVE - Rec 9. Consider remote activated valves to isolate ammonia storage tank during an emergency (process and/or truck unloading).		
119				7.2.8. Is access to all controls adequate?			
120				7.2.9. Can operators/maintenance workers safely perform all required routine/emergency actions, considering the physical arrangement of equipment (e.g.,			
121				7.2.10. Are valves that require urgent manual adjustments (e.g., emergency shutdown)			
122	7.4	Feedback/Displays		7.4.5. Are automatic safety features provided when a process upset requires rapid			

	A	B	C	D	J	K	L
3	Item		Deviation	Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
123				7.4.6. Are automatic safety features provided when a process upset may be difficult to			
124	7.5	Controls	7.5.6. Can operators safely intervene in computer- controlled processes?				
125			7.5.8. Do operators believe that the control logic and interlocks are adequate?				
126			7.5.9. Does a dedicated emergency shutdown panel exist? If so, is it in an appropriate				
127	6.13	Contingency Planning	6.13.12. Is adequate emergency lighting provided? Is there adequate redundant	REPEAT FROM ABOVE - Rec 16. Consider night lighting at ammonia storage tank area for truck unloading and emergency response purposes.	DUPLICATE	DUPLICATE	
128	7.1	Housekeeping and General Work Environment	7.1.7. Are normal and emergency lighting sufficient for all area operations?				
129	7.8	Training (Employees and Contractors)	7.8.1. Are new employees trained in the hazards of the processes?	REPEAT FROM ABOVE - Rec 22. Consider expanding operator awareness and training regarding mixing of incompatible chemicals with ammonia and the explosive nature of ammonia gas in a confined building.	DUPLICATE	DUPLICATE	
130			7.8.2. Do operators and maintenance workers receive adequate training in safely performing their assigned tasks before they are allowed to work without direct				
131			7.8.3. Does operator and maintenance worker training include training in appropriate emergency response?				
132	6.5	Location of Machine Shops, Welding Shops, Electrical Substations, Roads, Rail Spurs, and Other Likely Ignition Sources	6.5.1. Are likely ignition sources (e.g., maintenance shops, roads, rail spurs) located away from release points for volatile substances (both liquid and vapor)?	REPEAT FROM ABOVE - Rec 35. Consider an updated engineering study to review potential explosive mixtures inside Building 66 resulting from an			
133	6.10	Location and Adequacy of Drains, Spill Basins, Dikes, and Sewers	6.10.2. Have precautions been taken to avoid open ditches, pits, sumps, or pockets where inert, toxic, or flammable vapors could collect?				
134	6.12	Electrical Classification	6.12.1. Is there an electrical classification document?				

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3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
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135				6.12.2. Does the electrical classification appear correct and complete?	anhydrous ammonia leak. Based on this study, evaluate electrical classification of equipment in potentially vulnerable areas. Consider updating the "Ventilation System Design Calculations" for RAI Refinery C to reflect worst case leak scenario distributed over limited Building 66 volume (versus whole building volume).	DUPLICATE	DUPLICATE
136			6.12.3. Has the electrical classification document been recently revised?				
137			6.12.5. Are the design and maintenance of ventilation systems adequate?				
138			6.12.9. Are there technical bases for design changes to the ventilation systems?				
139			6.12.10. Are ventilation systems verified to be adequate for new gas or vapor loads?				
140			6.12.13. Are Division 1 areas necessary (if there are any)?				
141			6.12.15. Does the electrical classification adequately reflect the effects of different modes of operation (e.g., normal operation, maintenance, and startup, infrequent				
142	6.7	Unit Layout	6.7.2. Could specific siting hazards be posed to the site from credible external forces such as high winds, earth movement, floods, utility	REPEAT FROM ABOVE - Rec 36. Consider expanding the existing flood plan to address the potential for lifting buoyant ammonia storage tank.	DUPLICATE	DUPLICATE	
143	6.8	Location of the Unit Relative to Onsite and Offsite Surroundings	6.8.16. Are workers in this unit protected from the effects of flooding (e.g., ruptured storage tank) at adjacent units or facilities, and vice versa? Are environmental receptors				
144	6.7	Unit Layout	6.7.1. Are large inventories or release points for highly hazardous chemicals located away	REPEAT FROM ABOVE - Rec 37. Consider an engineering study to validate the ammonia storage tank location so that adequate distance from active	DUPLICATE	DUPLICATE	
145			6.7.4. Are access roads well engineered to avoid sharp curves? Are traffic signs				
146	6.8	Location of the Unit Relative to Onsite and Offsite Surroundings	6.8.15. Are workers in this unit protected from the effects of impacts (e.g., airplane crashes, derailments) at adjacent units or facilities, and vice versa? Are environmental				

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
147	6.10	Location and Adequacy of Drains, Spill Basins, Dikes, and Sewers		6.10.5. Are vehicle barriers installed to prevent impact to critical equipment adjacent to high traffic areas?	tank location so that adequate distance from active railway and siding traffic is provided.		
148	7.1	Housekeeping and General Work Environment		7.1.2. Are adequate barriers erected to limit access to maintenance, cleanup, or staging areas?			
149	6.7	Unit Layout		6.7.2. Could specific siting hazards be posed to the site from credible external forces such as high winds, earth movement, floods, utility failure from outside sources, flooding, natural fires, and fog?	REPEAT FROM ABOVE - Rec 38. Consider regulatory requirements for seismic design for the ammonia storage tank and foundations and validate current ammonia tank foundation design.	DUPLICATE	DUPLICATE
150	7.7	Procedures		7.7.1. Do written procedures exist for all operating phases (i.e., normal operations, temporary operations, emergency shutdown, emergency operation, normal shutdown, and	REPEAT FROM ABOVE - Rec 41. Consider reformatting the standard operating procedures to include operating steps and cautions and safety warnings for the operating task being performed. Policy statements, MSDS information and other non-operating instructions should be included in a separate document. Operating limits and how to correct deviations from these operating limits should be referenced or included in the procedure in the appropriate operation task.	DUPLICATE	DUPLICATE
151			7.7.2. Are safe operating limits documented, providing consequences of deviating from				
152			7.7.4. Do operators believe that the procedure format and language are easy to follow and understand?				
153	7.7	Procedures		7.7.1. Do written procedures exist for all operating phases (i.e., normal operations, temporary operations, emergency shutdown,	REPEAT FROM ABOVE - Rec 42. Consider reviewing all operating procedures and consult with operators how to improve the procedure format by eliminating any non-operating information, better define operating steps in the appropriate procedures (startup, normal shutdown, normal startup, startup after emergency shutdown, emergency shutdown, etc.).	DUPLICATE	DUPLICATE
154			7.7.4. Do operators believe that the procedure format and language are easy to follow and understand?				
155	7.7	Procedures		7.7.3. Are procedures current (i.e., are they revised when changes occur)?	REPEAT FROM ABOVE - Rec 43. Consider implementing a standard operating procedure revalidation schedule that fulfills OSHA and Iowa OSHA PSM procedural requirements. The new procedures should be analyzed for accuracy and completeness utilizing the procedure HAZOP techniques with caution	DUPLICATE	DUPLICATE
156			7.7.5. Are the procedures accurate (i.e., do they reflect the way in which the work is				
157			7.7.6. Is responsibility assigned for updating the procedures, distributing revisions of the procedures, and ensuring that workers are				

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
158				7.7.7. Are temporary notes or instructions incorporated into revisions of written	statements added where appropriate.		
159	7.7	Procedures		7.7.6. Is responsibility assigned for updating the procedures, distributing revisions of the procedures, and ensuring that workers are	REPEAT FROM ABOVE - Rec 44. Consider updating the Refinery C operator initial training and the refresher training agendas to communicate ammonia system PHA information generated during this review.	DUPLICATE	DUPLICATE
160	7.8	Training (Employees and Contractors)	7.8.1. Are new employees trained in the hazards of the processes?				
161			7.8.4. Do operators practice emergency response while wearing emergency protective				
162			7.8.8. Does a periodic refresher training program exist?				
163			7.8.9. Is special or refresher training provided in preparation for an infrequently performed				
164			7.8.10. When changes are made, are workers trained in the new operation, including an explanation of why the change was made and				
165	7.7	Procedures		7.7.6. Is responsibility assigned for updating the procedures, distributing revisions of the procedures, and ensuring that workers are	REPEAT FROM ABOVE - Rec 45. Consider revising the Refinery C operator refresher training schedule to satisfy OSHA and Iowa OSHA requirements.	DUPLICATE	DUPLICATE
166	7.8	Training (Employees and Contractors)	7.8.8. Does a periodic refresher training program exist?				
167			7.8.9. Is special or refresher training provided in preparation for an infrequently performed				
168			7.8.10. When changes are made, are workers trained in the new operation, including an explanation of why the change was made and				
169	7.7	Procedures		7.7.1. Do written procedures exist for all operating phases (i.e., normal operations, temporary operations, emergency shutdown, emergency operation, normal shutdown, and	REPEAT FROM ABOVE - Rec 46. Consider revising Refinery C operating procedures to include comments collected during the Refinery C Ammonia System PHA November 2015 (comments issued as separate document).	DUPLICATE	DUPLICATE
170			7.7.2. Are safe operating limits documented, providing consequences of deviating from				
171			7.7.3. Are procedures current (i.e., are they revised when changes occur)?				
172			7.7.5. Are the procedures accurate (i.e., do they reflect the way in which the work is actually performed)?				
173			7.7.7. Are temporary notes or instructions incorporated into revisions of written				

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
174	7.5	Controls		7.5.6. Can operators safely intervene in computer- controlled processes?	REPEAT FROM ABOVE - Rec 47. Consider a separate/independent e-stop system to shutdown ammonia mixing station and isolate ammonia storage tank system operations during emergency situations.	DUPLICATE	DUPLICATE
175			7.5.9. Does a dedicated emergency shutdown panel exist? If so, is it in an appropriate location?				
176	6.8	Location of the Unit Relative to Onsite and Offsite Surroundings		6.8.1. Is a system in place to notify neighboring units, facilities, and residents if a release occurs?	REPEAT FROM ABOVE - Rec 50. Verify that the Emergency Response Plan (ERP) for large ammonia release scenarios include communication of release, areas potentially impacted, and actions to be taken. Develop specific pre- emergency response plans for possible scenarios of a large ammonia release off site and a large to medium release in building #66.	DUPLICATE	DUPLICATE
177			6.8.2. Are there detection systems and/or alarms in place to assist in warning neighboring units, facilities, and residents if a				
178			6.8.3. Do neighbors (including units, facilities, and residents) know how to respond when notified of a release? Do they know how to				
179			6.8.6. Are workers in this unit protected from the effects of highly hazardous chemicals from adjacent units or facilities, and vice				
180	7.2	Accessibility/Availability of Controls and Equipment		7.2.4. Is communications equipment adequate and easily accessible?			
181	7.8	Training (Employees and Contractors)		7.8.6. Are periodic emergency drills conducted?			
182				7.8.7. Are emergency drills witnessed by observers and critiqued?			
183				7.8.8. Does a periodic refresher training program exist?			
184	6.1	Spacing Between Process Components		6.1.7. Can adjacent equipment and facilities (e.g., support structures) withstand flame impingement?			Facility siting and impacts are

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
185	6.4	Location and Construction of Control Room(s)		6.4.2. Does the construction basis for the control room satisfy acceptable criteria (e.g., the Factory Mutual recommendations)?	Rec 52. Consider conducting or reevaluating facility siting study and its impacts to adjacent equipment and facilities	Not started	Facility siting and impacts are evaluated during PHA. Reviewing requirements to determine whether further actions are needed.
186			6.4.5. Are workers in the control room (or escape routes from the control room) protected from contamination of utilities				
187	6.4	Location and Construction of Control Room(s)		6.4.8. Are workers in the control room (or escape routes from the control room) protected from contamination of utilities (e.g., breathing air)?	Rec 53. Consider installing a reliable leak detection system around the ammonia storage tank and truck unloading area	Not started	This would be rolled into deluge system project. Need to contact vendors for quotes on installation, submit project.
188	6.8	Location of the Unit Relative to Onsite and Offsite Surroundings		6.8.1. Is a system in place to notify neighboring units, facilities, and residents if a release occurs?			
189				6.8.2. Are there detection systems and/or alarms in place to assist in warning neighboring units, facilities, and residents if a			
190				6.8.3. Do neighbors (including units, facilities, and residents) know how to respond when notified of a release? Do they know how to			
191				6.8.6. Are workers in this unit protected from the effects of highly hazardous chemicals from adjacent units or facilities, and vice			
192	7.4	Feedback/Displays		7.4.1. Is adequate information about normal and upset process conditions clearly displayed			
193				7.4.5. Are automatic safety features provided when a process upset requires rapid			
194				7.4.6. Are automatic safety features provided when a process upset may be difficult to			
195	6.7	Unit Layout		6.7.4. Are access roads well engineered to avoid sharp curves? Are traffic signs provided?			
196				6.7.5. Is vehicular traffic appropriately restricted from areas where pedestrians could			

	A	B	C	D	J	K	L
3	Item	Deviation		Causes	Recommendations	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4							
197	6.8	Location of the Unit Relative to Onsite and Offsite Surroundings		6.8.15. Are workers in this unit protected from the effects of impacts (e.g., airplane crashes, derailments) at adjacent units or facilities, and vice versa? Are environmental receptors and the public also protected from	Rec 54. Consider traffic barrier/protection for the anhydrous ammonia valve station in Building 66 located near aqueous ammonia make up tank TK-416702. Traffic impact observed near this ammonia valve station.	Not started	Review area, evaluate barrier needs.
198	6.11	Location of Emergency Stations (Showers, Respirators, Personal Protective Equipment,		6.11.3. Are safety showers heated/freeze protected/wind protected?			
199				6.11.4. Is there a control room alarm for water flow from a safety shower and eyewash			
200	7.1	Housekeeping and General Work Environment		7.1.2. Are adequate barriers erected to limit access to maintenance, cleanup, or staging areas?			
201	7.4	Feedback/Displays		7.4.8. Are critical safety alarms easily			
202	7.2	Accessibility/Availability of Controls and Equipment		7.2.5. Would others quickly know if a worker is incapacitated in a process area?	Rec 55. Consider a tempered water source for ammonia system outdoors safety shower location and an alarm for incident notification when this safety shower is activated (or tested)	Not started	Review current setup, determine programming needs for alarm/alert when system activated.
203	7.2	Accessibility/Availability of Controls and Equipment		7.2.5. Would others quickly know if a worker is incapacitated in a process area?	Rec 56. Consider implementing a buddy system	Completed	Buddy system would be infeasible due to current area staffing. However, camera placement on tank allows for live monitoring of area at all times from control room. Areas also utilize radios for communication purposes and if a person down alert would need to be activated.
204	7.4	Feedback/Displays		7.4.2. Are the controls and displays arranged logically to match operators' expectations?	Rec 57. Consider rearranging controls and displays to match operators' expectations	Not started	Document consultation with operators.
205	7.4	Feedback/Displays		7.4.8. Are critical safety alarms easily distinguishable from control alarms?	Rec 58. Consider distinguishing between critical safety alarms and control alarms	Not started	Document consultation with operators - is already captured through training.
206	7.4	Feedback/Displays		7.4.15. Do the displays give adequate feedback for all operational actions?	Rec 59. Consider wiring local field equipment to DCS	Not started	Refinery C management to review needs, make necessary changes

ATTACHMENT 2B

COMPLIANCE AUDIT AND PHA FINDINGS
ROQUETTE REFINERY C

May 5th, 2021 Utilities PSM/RMP Audit Findings

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
3.4	Process chemistry?	Chemistry for the CFB process was not located.	Develop process chemistry documentation for the CFB process.	Complete	Process chemistry documentation has been located.
3.6	Safe upper and lower limits for such items as temperatures, pressures, flows or compositions?	Not located for Molten Sulfur	Document safe upper and lower limits for the Molten Sulfur process.	Complete	Safe Limits Table for the Molten Sulfur process has been located
3.8	Materials of construction?	Need H2 materials of construction.	Locate or develop documentation for the materials of construction for the H2 process.	Completed	Have located documents outlining materials of construction for facility.
3.11	Relief system design and design basis?	Need relief calculation for CoGen.	Locate or develop documentation for relief valve calculations for the CoGen process.	Completed	Relief design basis has been developed, to be added to PSI library.
3.16	Has the employer documented that equipment complies with recognized and generally accepted good engineering practices?	Need RAGAGEP statement.	Document compliance with RAGAGEP for all covered processes. This is typically accomplished within a central PSM/RMP management policy document.	Completed	Mechanical Integrity procedure includes RAGAGEPS for PSM-covered processes.
4.15	Has a system been established to promptly address the team's findings and recommendations?	Records of recommendation tracking, closure or assignment were mostly incomplete for PHAs completed prior to 2020.	Review recommendations from PHAs prior to 2020 and develop documentation detailing if and how the recommendations were addressed.	In Progress	Utilizing spreadsheets to address for now, evaluating implementation of management system
4.20	At least every five years after the completion of the initial PHA(s), have the PHA(s) been updated and revalidated to assure that the PHA(s) is consistent with the current process? Have the PHA(s) been updated and revalidated based on their completion date?	Revalidations have been performed as required. However, some were not completed on time (e.g. Co Gen, CFB).	Ensure future PHAs are revalidated on time at an interval of every five years (e.g. CoGen, CFB).	Complete	Currently on target. Schedule received from Trinity. Co-Gen/CFB PHAs to be completed by Sept 2025, H2 by October 2025

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4.22	PHA(s) and updates or revalidations for each process, as well as the documented resolution of recommendations have been retained for the life of the process.	PHA reports have been retained, but not records of recommendation closure.	See 4.15.	In Progress	Utilizing spreadsheet to address for now, continuing to work on open PHA actions.
5.11	Do the operating procedures address . . . operating limits?	Not located for Molten Sulfur	See 3.6	Completed	Operational limits added to operator procedure book, link also added to digital Utilities Operations manual in drive files
5.14	Do the operating procedures address . . . safety and health considerations: properties of, and hazards presented by, the chemicals used in the process?	This was not located in the Molten Sulfur procedures.	Update Molten Sulfur operating procedures to include safety and health considerations: properties of, and hazards presented by, the chemicals used in the process; control measures to be taken if physical contact or airborne exposure occurs; and any special or unique hazards.	Completed	Added Safety and Health considerations as well as control measures for reaction to each procedure.
5.16	Do the operating procedures address . . . safety and health considerations: control measures to be taken if physical contact or airborne exposure occurs?	This was not located in the Molten Sulfur procedures.	See 5.14	Completed	Added Safety and Health considerations as well as control measures for reaction to each procedure
5.18	Do the operating procedures address . . . safety and health considerations: any special or unique hazards?	This was not located in the Molten Sulfur procedures.	See 5.14	Completed	Added Safety and Health considerations to each procedure.
5.21	Are the operating procedures reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to facilities?	Currently, the site is conducting annual training sessions which do not document a review of the procedures for accuracy.	Document reviews of operating procedures currently conducted parallel to annual training.	Completed	Procedures have been reviewed in 2024 along with additions made.
5.22	Does the employer certify annually that these operating procedures are current and accurate?	The annual training sessions do not certify the procedures a current or accurate. Additionally, some of the operating procedures (e.g. Molten Sulfur) include a certification statement and requirement. However, it is not being done.	Ensure the employer representative (e.g. plant manager) certifies the operating procedures are current and accurate.	Completed	Procedures have been reviewed/updated in 2024. To be added to ONEdoc for consistent certification moving forward.

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
6.1	Initial training. Has each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, been trained?	Annual training records were complete for 2020. Training records were not located for Molten Sulfur employees.	Locate Molten Sulfur operator training records or ensure the operators are trained at least every three years.	Completed	Training binder has been created including updated procedures, operators have reviewed.
7.7	Has the employer maintained a contract employee injury and illness log related to the contractor's work in process areas?	Records were not located relating to contractor injury and illness logs.	Maintain injury and illness logs for contract employees.	Completed	HSE to maintain
9.3	Are piping systems including piping system components included in the MI program?	The Molten Sulfur process and part of the Hydrogen system (e.g. process steam piping, feed water piping, cooling water piping and condensate piping) are not currently included in the Piping Inspection Program. Additionally, inspections on CoGen piping after the ammonia vapor fans have not been completed, but is scheduled.	Update the Piping Inspection Program to include Molten Sulfur, all Hydrogen systems including utilities and CoGen piping downstream of the vapor fans.	In Progress	Email Sent to Branden Engel, Branden will add the Molten Sulfur Process and Hydrogen System Utilities at H2(process steam piping, feed water piping, cooling water piping and condensate piping) to our Mechanical Integrity inspection schedule. As for the CoGen piping downstream of the Ammonia Vapor Fans we are currently in the process of hiring a full time onsite inspector that will greatly increase the speed and completion rate of these MI inspections.

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
9.7	Are pumps included in the MI program?	There are PMs performed on pumps. However, there were not records made available from the vibration analysis program which was said to exist.	Locate vibration analysis data and ensure the data is documented and used properly in maintaining pumps.	Complete	Current Program does not include pumps in MI Program; this is not needed and does not benefit the mechanical integrity/safety aspect of MI program. Failure of a pump does not create a safety issue, it will just take the systems down until replacement.
9.10	Have the maintenance personnel received training in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner?	Discussions indicated that maintenance personnel were trained in the procedures applicable to their work. However, training records were not located.	Ensure training of maintenance personnel relating to the employee's job tasks is documented.	In Progress	Maintenance personnel receives site and specific awareness training through LMS platform and through written test. Meet with Maintenance to review whether additional training is necessary.
11.3	Do the written MOC procedures assure that the impact of the change on safety and health is addressed prior to any change?	The audit team was not able to locate the MOC and PHA performed for oilers project on the H2 process.	Ensure that MOCs are completed when changes are made to process equipment and PHAs are conducted or updated when safety and health hazards may be impacted.	In Progress	MOC and PHA located, MOC form used at present does evaluate for these criteria. Revise site procedure to outline/reinforce MOC requirements.
11.6	Do the written MOC procedures assure that the authorization requirements for the proposed change are addressed prior to any change?	While authorization is required in the procedure and on the form, there were MOC records that were incomplete and missing authorizations.	Ensure MOC forms when approved, receive an authorization signature.	Completed	Review previous MOCs to ensure they are closed out. Provided clarification on form to use moving forward until
11.7	Have employees involved in operating a process and maintenance and contract employees whose job tasks are affected by a change in the process been informed of, and trained in, the change prior to start-up the process or affected part of	Training was not completed for the MOC dated 09/18/2020 (sensor replacement).	Ensure training is documented when retraining on operating procedures is a required MOC action.	In Progress	Revise site procedure to outline/reinforce MOC requirements.
14.1	Are PSM/RMP audits certified at least every three years to verify that the procedures and practices developed under the standards are adequate and are being followed?	Neither the 2014 or 2017 reports included a certification by the employer.	Ensure PSM/RMP audits are certified at least every three years to verify that the procedures and practices developed under the standards are adequate and are being followed.	Completed - late	Previous audits are certified. Audits going forward will be certified upon receipt and review.

Rec. No.	Question	Findings	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
14.4	Was an appropriate response to each of the findings of the audit promptly determined and documented?	There was no documentation available including responses to compliance audit findings, correction or deficiencies.	For future compliance audits, develop a system to promptly determine and document an appropriate response to each of the findings of the compliance audit and document that deficiencies have been corrected.	In Progress	Utilizing spreadsheets to address for now, evaluating implementation of management system
14.5	Have the correction of the deficiencies been documented?	Correction of deficiencies was not documented.	See 14.4	In Progress	Utilizing spreadsheets to address for now, evaluating implementation of management system

Rec. No.	Question	Comments	Recommended Actions	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
3.12	Ventilation system design?	Ventilation is documented for H2.	Consider formalizing the ventilation design documentation.	Not started	Review documentation, evaluate revision needs.
6.11	Has the employer prepared a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training?	This is included on the training roster records.	Consider adding a process to evaluate comprehension of training content to annual training process.	In progress	Make H2 awareness training live on LMS and reassign annually
10.3	Do the hot work permits document that the fire prevention and protection requirements in 29 CFR §1910.252(a) have been implemented prior to beginning the hot work operations?	The Safe and Hot Work Permit procedure documents that the fire prevention and protection requirements in 29 CFR §1910.252(a) have been implemented prior to beginning the hot work operations. However, the procedure doesn't specify under what circumstances hot work should be suspended and it doesn't provide a clear indication on who has the authority for hot work suspension (i.e. Stop the Job Authority for personnel).	Consider updating the procedure to specify under what circumstances hot work should be suspended and provide a clear indication on who has the authority for hot work suspension (i.e. Stop the Job Authority for personnel).	In progress	Include verbiage in the SOP to discuss Stop Work Authority - HSE to review/update plantwide procedure.

October 6th, 2020 H2 Plant PHA Recommendations

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
1.1	No or Low Flow - Natural Gas	1) Source point up stream fails close or pipe break (i.e. GB-190, outside boundary), 2) Closed valves (GB-106, GB-175, GB-176, , GB-200, GB-202, GB-203, GB-205, GB-110) or failed check valve (GB-111), 3) Failed upstream pressure regulator (GB105, GB179), 4) Maint repair by outside Natural Gas source provider or curtailment, 5) LOTO safety blind in no flow position (GB-109), 6) GB107 strainer plugged, 7)PSV GB-112 relieves and does not reset			
1.14	Flow / No flow: For H2 bleeder gas line (H30CS) from H2 storage tanks into natural gas feed to GB100	Operator doesn't open H2 bleeder manual valve (series of manual valves to include GB167) to enrich natural gas with H2 when starting up unit; Valve Misalignment; Line pluggage			
1.47	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training; See 1.18 "as well as flow" for missed step during nitrogen purge			
2.53	Reaction / No reaction	Same as flow imbalances as described above or poison reformer catalyst; Operator doesn't know to bleed H2 to feed gas stream upon startup			
2.60'	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;			
3.57	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4.61	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;	<p>Rec. 1 - Consider review of current operating procedures, updating as necessary especially 1) Shutdown procedures to include purge procedures, 2) Startup, startup after turnaround or e-stop, and initial startup procedures to add step to sniff plant with handheld sensors before restarting plant, and 3) initial and normal startup procedures to include steps to use a hydrogen spike in feed gas upon startup; and retraining utility operators on these updated procedures (2014 PHA Rec. P.6).</p>	<p>In Progress</p>	<p>Reformatting procedures, then must review and make necessary changes. Completion contingent upon MOC closure; operators will review with sign off. ONEdoc official upload TBD.</p>
4.79	Special / Startup, Shutdown, Maintenance				
5.1	<p>Major hydrogen Leak (11/3/2018 Incident: PSA valve leaking due to cooling temperature; 6/19/2019 Incident: valve leaking; 7/23/2019 Incident: leaking packing glands of PSA valves; 10/31/2019 Incident: valve leaking with cooling temperature)</p>	<p>Open a drain, valve failure or inadvertent position, packing gland leak; piping/vessel/gasket failure</p>			
5.45	Timing or Procedure / Skipped or missing step	<p>Operator error: Unclear or inaccurate procedure, operator inattention or inadequate training; See above for DCS programming sequence error</p>			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
5.63	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
6.48	Timing or Procedure / Skipped or missing step	See above for skipping Crude H2 spike to vent gas drum during startup; Otherwise - Unclear or inaccurate procedure, operator inattention or inadequate training;			
6.66	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
7.51	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
7.69	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
8.43	Timing or Procedure / Skipped or missing step (Incident from 5/7/2018)	Unclear or inaccurate procedure, operator inattention or inadequate training; See high concentration for consequences of High O2 from insufficient purge			
1.2	High Natural Gas Flow, or	1) Pressure control regulator fails complete open (GB105, GB179) 2) Excessive pressure from source point (Cogen) 3) Atmos (supplier) regulator system failure - supplier controlled	Rec. 2 - Correct PM GB99 to be PT GB99 (center left on drawing # 50043- 01 (Process Overview for H2 Gen) on NG feed from Cogen) (2014 PHA Rec. D.10)	In Progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
			Rec. 3 - Ensure GB100 and GC100 are included in site Mechanical Integrity inspections (2014 PHA Rec. MI.13)	Not Started	Need access to W drive to view current plan, meeting to be held with Maint/Reliability Group
			Rec. 4 - Consider updating 50043-01 drawing to reflect critical equipment information (PSV, regulator ranges, and equipment specification information) from Hydrochem drawings and use just 50043-01 drawing as the controlled document (2014 PHA Rec. D.7).	In Progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
	pressure	4) Let Down Station didn't operate correctly - 2014 PHA team determined this was not a viable cause because the high pressure gas stream to GB100 does not pass through the Let Down Station at Cogen. That Let Down Station controls to 3.5 bar and NG is received at H2 Gen at 18 bar.	<p>Rec. 5 - Consider creating "layout zoom" drawings from master controlled drawing (50043-01) to show closer views of equipment sections that are readable on 11x17 format (2014 PHA Rec. D.6).</p>	COMPLETED	<p>Layout Zoom drawings are completed More readable on 11x17 print out now.</p>
			<p>Rec. 6 - Consider archiving the Hydrochem design drawings after information is transferred to RAI drawing if the Hydrochem drawings will not be updated (2014 PHA Rec. D.4).</p>	In Progress	<p>Drawing Markups are completed, R. Martindale is working on corrections/updates THEN the Hydrochem drawings can be archived</p>
1.5	More Pressure	Tube leak - leaks natural gas to process gas (natural gas is at higher pressure than reformer gas in this HX)	<p>Rec. 7 - Consider verifying if reformer process gas exit temperature low will shut down H2 Gen plant (to prevent thermoset of Shift Converter) (2014 PHA Rec. 37).</p>	Completed	<p>Confirmed will alarm, but not shut down</p>
1.7	Loss of Containment	Possible Manual Opening of Valve, Vents (during maintenance)			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
1.8	Loss of Containment	Core Vessel Rupture; high pressure natural gas from GB100 shell exhaust			
1.65	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
2.78	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
3.75	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown	<p>Rec. 8 - Consider better equipment and valve labeling for easy recognition of equipment in the field (2014 PHA Rec. 8).</p>	Not Started	Make labels and apply.
4.79	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
5.63	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
6.66	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
7.69	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
1.10'	High pressure	See 1.3 High Pressure Natural Gas Scenario; GC112 (G43P)valve closed (manual valve on natural gas discharge from GC100) - evaluate here; Upstream instrumentation failures (Control valve GC72 (FV200), pressure regulators) -	<p>Rec. 9 - Ensure interlocks in DCS will prevent overpressure of hydrodesulfurizer - 2014 PHA Team could not identify DCS interlocks for this scenario and determined that this recommendation should be modified to Consider locking manual valve GC112 (G43P) open except when in shutdown and update drawing to reflect valve is Car Sealed Open (CSO) in normal operation (2014 PHA Rec. 47).</p>	Not started	Question on recommendation, is it necessary? Team to make a decision.

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
1.14	Flow / No flow: For H2 bleeder gas line (H30CS) from H2 storage tanks into natural gas feed to GB100	Operator doesn't open H2 bleeder manual valve (series of manual valves to include GB167) to enrich natural gas with H2 when starting up unit; Valve Misalignment; Line pluggage	Rec. 10 - Consider evaluating if DCS screen prompt will help remind operators to open the bleeder gas valve at appropriate startup step (2014 PHA Rec. 19).	Not started	In start-up procedure for reference, is prompt necessary?
1.65	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
2.60'	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;			
2.78	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
3.57	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
3.75	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown	<p>Rec. 11 - Consider implementing maintenance work procedure, especially regarding use of non-sparking tools if not all processes have been purged and ensure electrical classification areas have been designated and</p>	In Progress	<p>Parking signs already posted, area has gated access, training is in place, badge access is restricted if training has not</p>
4.61	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;			
4.79	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
5.45	Timing or Procedure / Skipped or missing step	Operator error: Unclear or inaccurate procedure, operator inattention or inadequate training; See above for DCS programming sequence error			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
5.63	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown	that there are no allowed vehicles in the designated area unless the plant has been purged (2014 PHA Rec. P.5).		been completed for the area or escorted. More tools needed?
6.3	Fire near V-105 (GH500)	External Fire near vent gas drum			
6.48	Timing or Procedure / Skipped or missing step	See above for skipping Crude H2 spike to vent gas drum during startup; Otherwise - Unclear or inaccurate procedure, operator inattention or inadequate training;			
6.66	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
7.2	Internal Pack Leak	Permanant Leak from packing rings around cylinders, Defect in Packing	<p>Rec. 12 - Consider establishing PM to check orifice plate on Flow Meters during shutdown to verify that orifice plates are not worn from steam or debris impingement</p>		
7.51	Timing or Procedure / Skipped or missing step	Unclear or inaccurate procedure, operator inattention or inadequate training;			
7.69	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
8.43	Timing or Procedure / Skipped or missing step (Incident from 5/7/2018)	Unclear or inaccurate procedure, operator inattention or inadequate training; See high concentration for consequences of High O2 from insufficient purge			
2.1	High Process Gas or Steam Flow to Reformer	<p>1) Control Valve Failure (Feed Gas FV GC72, Steam FV GE77),</p> <p>2) Process Gas spike if tube rupture at GB100</p>	<p>Rec. 12 - Consider establishing PM to check orifice plate on Flow Meters during shutdown to verify that orifice plates are not worn from steam or debris impingement</p>	In progress	Need PM Written, D. McDowell will touch base with Tim Thomas to get this written

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
2.2	Low Process Gas or Steam Flow to Reformer	Upstream process upset, loss of natural gas supply or steam pressure	(2014 PHA Rec. MI.7)		
2.5	Contamination / Pass Through Natural Gas Flow (Roquette Supply)	Solid material in Natural Gas, Typically Rust from Carbon Steel in Pipeline	Rec. 13 - Review the need to inspect strainer on an annual basis for failure and cleanliness (2014 PHA Rec. 60).	Not Started	Need PM Written, D. McDowell will touch base with Tim Thomas to get this written.
2.7	High Fuel, Low Air (NG 105, pipe CBA 706)	Fan VFD failure, FT failure, FD fan shaft breaks but motor continues to run. Can have partial operations where the control system recognizes air flow (however low) and adds more fuel into system	Rec. 14 - DCS programming is in place for this condition. Review the need for annual training of operators on this condition. 2014 PHA team agreed that this scenario should be included in annual training of operators and maintenance in this area (2014 PHA Rec. T.5).	Not started	Create dangerous or upset conditions training for H2 to include this Scenerio
2.8	Low Natural Gas (NG 104, 105)	1) Natural Gas Supply Pressure Low, 2) Regulators Could Fail (GB117, GB180), 3) GB107 strainer plugged	Rec. 15 - Cover this scenario in annual operator and maintenance (2014 PHA Rec. T.4).	Not started	Create dangerous or upset conditions training for H2 to include this Scenerio
2.12	High Combustion Air (pipe CBA 706)	Overspeed on fan GE50, flow meter failure FT GE50; manual furnace damper fails open	Rec. 16 - Consider adding manual furnace damper to RAI drawing 50043- 01 (main schematic) (2014 PHA Rec. D.3).	In Progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
2.13	GE130 (WH-106) Combustion Air Preheater Unit failure	Improper operating conditions or lack of maintenance	Rec. 17 - Consider verifying GE130 is in Mechanical Integrity files and that appropriate MI inspections have been established for the unit (2014 PHA Rec. MI.8).	Not started	Need access to W drive to view current plan, meeting to be held with Maint/Reliability Group

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
2.15	Low Pressure in Fire Box	1) ID Fan (GE52) too Hi and FD Fan (GE50) is Off or Blocked, 2) block GE130 combustion air heat exchanger on air intake side	Rec. 18 - Consider verifying minimum pressure rating of GE130 tubes from nameplate and add to MI files (2014 PHA Rec. MI.9)	Completed	Completed
2.17	High Temperature (1850F)	Low process gas flow resulting reformer overheating	Rec. 19 - Design documents listed GE71 (TT 322) as having a TAHH shutoff at 1400 F, but DCS logic has this TAHH at 1900 F. Evaluate if GE71 TAHH should be returned to 1400 F to match design info (2014 PHA Rec. 45).	Not started	Discuss as utilities group, if everyone agrees we can have programming change this.
3.18		High Flow into Process: GE77 Steam Drum discharge valve or GE342 bypass around this valve fails open; Flow control GE77 has bad reading; High Flow into Steam Header: PSV fail to reset GE301/302 or manual valve GE303 is left open; continuous blowdown valve GE02 or intermittent blowdown valves left open or fails; GE78 pressure control loop fails open or bypass/check valve fails from import steam header; GG73 pressure control loop to DA fails	Rec. 20 - Consider additional ASTL/STL training on process operations especially startup/shutdown steps (2014 PHA Rec. P.1).	Not started	Create dangerous or upset conditions training for H2 to include this Scenerio
			Rec. 21 - Consider replacing GE77 every 5 years.	Not Started	
4.16	Low or no water flow	Valve(s) failed or inadvertently closed; Pump Failure; blocked suction line; plugged strainers	Rec. 22 - Consider adding flow transmitter GG78 on the boiler feed water line downstream of GG100 on the P&ID 50043-01.	In Progress	Drawing Markups are completed, R. Martindale is working on corrections/updates
4.17	Leak or Loss of containment	Seal, packing or fitting failure	Rec. 23 - Consider changing the direct of check valve (GG551) downstream of pump GG50 and GG51 to reflect the current operation.	In Progress	Drawing Markups are completed, R. Martindale is working on corrections/updates
4.22	High level	LC GG71 Level Control Valve Failure; LC GG75 Level Control Valve Failure (5/15/2020 incident)	Rec. 24 - Consider adding the pressure regulating valves to the PM schedule.	Not Started	Need PM Written, D. McDowell will touch base with Tim Thomas to get this written.

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4.24	Low or no pressure	Mechanical PRV GG501 and Electrical for GG73 Pressure control loop Fail	Rec. 25 - Consider redesigning stack to minimize noise and replacing PC GG73 Pressure control valve so that loop can be run in automatic (2014 PHA Rec. 29).	Not Started	The pressure on the DA maintains >.80 bar with the condensate returning.
4.27	Water hammer, can't isolate DA while plant on line	Previous piping setup caused water hammer	Rec. 26 - Ensure the drawing markups attached to MOC 2012-05-08 are incorporated into drawing DE36-MF-5 or into 50043-01 and that any additional necessary documents (procedures) are updated with this change (2014 PHA Rec. D.11).	In progress	Drawing Markups are completed, R. Martindale is working on corrections/updates
4.74	Special / Utility failure	Loss of power to plant, etc.	Rec. 27 - Consider verifying the frequency and completion of UPS PMs, including H2 Gen DCS UPS (2014 PHA Rec. 44).	Completed	There is no UPS system on the DCS or IO room at the H2 generation facility.
5.58	Special / Utility failure	Loss of power to plant, etc.			
6.61	Special / Utility failure	Loss of power to plant, etc.			
7.64	Special / Utility failure	Loss of power to plant, etc.			
4.74	Special / Utility failure	Loss of power to plant, etc.			
5.58	Special / Utility failure	Loss of power to plant, etc.			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
6.61	Special / Utility failure	Loss of power to plant, etc.	<p>Rec. 28 - Consider investigating low voltage power supply issues to H2 Generation plant to prevent power outage (2014 PHA Rec. 28).</p>	<p>Completed</p>	<p>The Power to the Hydrogen Plant comes from Ref F. Building 105 Mezzanine. Transformer 106-1. It normally is backed up by a second transformer, but it is not in service at the moment.</p>
7.64	Special / Utility failure	Loss of power to plant, etc.			
7.69	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
4.79	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
5.63	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown	<p>Rec. 29 - Consider developing layup procedure before taking area down for extended outage and incorporate into existing procedures (2014 PHA Rec. P.4).</p>	Completed	This is covered in our purge procedure after a normal shut down.
6.66	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
7.69	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
4.79	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown	<p>Rec. 30 - Consider formalizing the maintenance scheduling, communication, and shutdown planning practices in the PSM areas to provide sufficient time and resources to plan, execute and communicate routine maintenance, mechanical integrity inspections and shutdown repairs (2014 PHA Rec. 3).</p>	Completed	Global procedure in place for maint. planning and MI programs.
5.63	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
6.66	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
7.69	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
4.79	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
5.63	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			
6.48	Timing or Procedure / Skipped or missing step	See above for skipping Crude H2 spike to vent gas drum during startup; Otherwise - Unclear or inaccurate procedure, operator inattention or inadequate training;			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
6.66	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown	Rec. 31 - Consider evaluating supply of non-sparking tools and purchasing additional non-sparking tools if needed (2014 PHA Rec. 23).	Not started.	Donnie will order tools and look into the best place/ way to store these tools so that they do not wander off.
7.2	Internal Pack Leak	Permanant Leak from packing rings around cylinders, Defect in Packing			
7.69	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown			

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
5.1	Major hydrogen Leak (11/3/2018 Incident: PSA valve leaking due to cooling temperature; 6/19/2019 Incident: valve leaking; 7/23/2019 Incident: leaking packing glands of PSA valves; 10/31/2019 Incident: valve leaking with cooling temperature)	Open a drain, valve failure or inadvertent position, packing gland leak; piping/vessel/gasket failure	Rec. 32 - Consider enforcing formal access control procedure and maintenance work procedures for this plant, especially regarding use of non-sparking tools if not all processes have been purged and that running vehicles are not allowed in the fenced area unless the plant has been purged. (2014 PHA Rec. P.5)	In progress	Need to look at what we currently do for training on work in PSM areas Donnie will schedule a meeting with Ref F and try to mirror their program.
6.7	Release from vent gas drum	Planned Safe shutdown procedure requires venting of vent gas drum; Other scenarios: operator error, incorrect shutdown procedure, insufficient purge, valve error or misalignment	Rec. 33 - Consider replacing manual vent gas drum valve GH503 with a KV valve and directing discharge to vent to stack or pipe to discharge above reformer skid enclosure wall. The 2020 PHA team changed the recommendation to "consider adding a KV valve next to manual vent gas drum valve GH503 and directing the flow to the discharge vent stack" (2014 PHA Rec. 31).	Not started	To set project meeting with upper management.
6.7	Release from vent gas drum	Planned Safe shutdown procedure requires venting of vent gas drum; Other scenarios: operator error, incorrect shutdown procedure, insufficient purge, valve error or misalignment	Rec. 34 - Consider updating maintenance shutdown procedure to include any changes to the vent gas drum valve (2014 PHA Rec. P.7).	Not started	Verify Issue with current procedure and update as needed,
6.9	No Flow	Ice Plugs. Other material plugs	Rec. 35 - Consider verifying that the rain caps and bird screens are in place and clear and that process drain is checked (2014 PHA Rec. 41).	In progress	Need PM Written, D. McDowell will touch base with Tim Thomas to get this written.
6.10'	Low pressure or Reverse Flow	Air diffusion possible (high winds/tornado at stack discharge); cross connection between higher pressure gas stream (hydrogen, steam) and lower pressure vent gas stream	Rec. 36 - Consider establishing maintenance check or replacement of check valve GB131 on 11 bar nitrogen line into process vent header (2014 PHA Rec. 16).	Not started	Need access to the W drive to review our current plan, set meeting with Maint/Reliability
6.12	High Pressure	Ice Plugs. Other material plugs	Rec. 37 - Consider adding a PM to pipe header drain valve GH510 in the vent header. 2020 PHA team recommends this recommendation be completed (2014 PHA Rec. 2).	Not started	Need access to the W drive to review our current plan, to set meeting with Maint/Reliability
6.13	Lose Nitrogen pressure	Nitrogen supply failure or interruption to the purge header, equipment or piping failure; operator error; manual valve shut (GB125, GB126 and GB130) or check valve failure (GB131)	Rec. 38 - Consider conducting annual PMs on GH80	Not started	Need access to the W drive to review our current plan, to set meeting with

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
6.14	Natural gas Venting	Process deviations, normal maintenance purging	nitrogen flow switch.	Not started	our current plan, to set meeting with Maint/Reliability
6.62	Special / External leak	See service failure on vent gas drum; For pipe header, material corrosion	Rec. 39 - Consider confirming that the 11 bar nitrogen purge system to vent gas header is currently online (2014 PHA Rec. 13).	Not Started	Need to discuss this further with Utilities team.
			Rec. 40 - Consider verifying if Utilities/H2 plant would be notified if the 11 bar nitrogen system was not at pressure (2014 PHA Rec. 37).	In progress	DCS alarm is set at 6.5 bar and will alarm in the control room if this pressure is lost.
6.66	Special / Startup, Shutdown, Maintenance	Planned & unplanned shutdowns, required maintenance, Startup after shutdown	Rec. 41 - Consider evaluating options to allow PSA vessels to be isolated while plant is online (concern now is that PSVs piped to common header and can't isolated from live H2 header while plant is online) (2014 PHA Rec. 21).	Not started	Discuss with Utilities team on what this would look like.
7.1	Low Pressure Inlet Side (less than 12 bar)	Massive leak in supply pipe line; insufficient supply/H2 plant down; H2 supply line PSV GJ/GK135 failure vents H2; Valve failure where N2 hose is connected during startup	Rec. 42 - Update RAI drawing 50043-01 to include pressure switch PL GK64/GJ64 located upstream of the H2 compressors.	In Progress	Drawing Markups are completed, R. Martindale is working on corrections/updates
			Rec. 43 - Implement 4 eye procedure which requires two person to verify that N2 hose connection is capped after purging the system during startup.	In progress	Update current start up procedure to implement this.
7.4	High Temperature	Loss of or low Cooling Water, cooling water high temp, Low Cooling Oil; H2 recirculating flow rate is too high	Rec. 44 - Consider adding the new lube oil systems including LL on the drawing 50043-01.	In progress	Drawing Markups are completed, R. Martindale is working on corrections/updates

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
7.6	Low Pressure, Nitrogen Flush	N2 Supply Failure or inadvertent valve position in N2 supply	Rec. 45 - Consider updating drawing 50043-01 to remove 110 bar nitrogen system and updating to show 7-10 bar (instead of 11 bar) N2 system services the compressors.	In progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
7.8	High pressure - compressor discharge side	Recirc valve or check valve fails in H2 discharge line to storage; Manual valves closed GK01, GK242, GKJ277, GJ297, GK297; Automatic valves GJ02, GK02 fails closed	Rec. 46 - Consider updating drawing 50043-01 to reflect PSV settings in the compressor area (2014 PHA Rec. D.9).	In progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
			Rec. 47 - Consider updating drawing 50043-01 to include PT GJ63/GK63 at the outlet of the compressor.	In progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
7.11	Mechanical Failure - Loss of Oil Lube	Not enough oil in the lube system	Rec. 48 - Consider updating drawing 50043-01 to remove references of distributor for the compressors and add the Sloan system.	In progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
8.1	No flow, low flow	Massive leak in supply pipe line; insufficient supply / H2 plant down; GK01 valve failure where N2 hose is connected	Rec. 49 - Evaluate the need for perimeter sensors around the tank farms. 2014 PHA team agreed this recommendation should be evaluated and that this H2 sensor be tied into the compressor recycle or shutdown to prevent additional H2 from being pumped to a leaking system (2014 PHA Rec. 52).	Not started	Schedule with safety on whether or not this is necessary budgetary constraints may hinder the ability to get this completed by November 2024
8.3	Weather	Lightning Strike	Rec. 50 - Verify that hard copy documentation of email from FM is on file (2014 PHA Rec. 64).	Not started	Who would have this email and where should we file it so that it continues to be accessible?

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
8.3	Weather	Lightning strike	Rec. 51 - Consider verifying that the storage tubes are sufficiently tied into the H2 Gen building grounding system (2014 PHA Rec. 42).	Not started	Who needs to verify this Electrical group ? I can create a notification for this if necessary.
8.4	Disgruntled employee or outsider shoots/fireworks at storage vessel and ignites released material	Disgruntled employee or neighbor, sabotage; no buffer zone between RAI property and neighboring public park; driver lost control on public road above bluff	Rec. 52 - Evaluate additional security measures to protect storage tubes from bluff side of property (2014 PHA Rec. 49).	In Progress	Notifications written for Security camera repairs, notification # 13706489 (facilities notification) Tim is working with a company to get a quote for this.
8.9	Maintenance Activities (storage tubes & piping)	Hot Work or Spark Producing machinery in vicinity of H2 gas; improper purging, damage from mobile equipment/cranes; insufficient or rushed communication between operations and maintenance	Rec. 53 - Consider asking maintenance and operations personnel what additional information would be helpful to feel more comfortable working in H2 Gen plant and provide this training for H2 Gen area (ex. provide training to Maintenance on the safety checks they must complete before starting work in the H2 plant) (2014 PHA Rec. T.2).	Not started	Set up a survey to administer to operations and maintenance personnel
9.3	Low, No Flow, Low water pressure	Poor water supply from site water supply source, weak pump, partially closed valve, partially plugged line; Feed water supply source stopped.	Rec. 54 - Consider confirming location of GG97 and updating drawing 50043-01 accordingly (2014 PHA Rec. D.5).	Completed	OKGG97 and OKGG40, two outputs landed on the same point, was confirmed to have no wires landed on this point. They have been removed from the graphic and logic - OKGG97
9.4	High flow from source Feed Water system	Ruptured line and pump controls fail to stop feed water pumps, Feed water valve to steam drum (GE82) or DA flow control orifice (GG536) failure with failure of DCS system	Rec. 55 - Consider updating drawing 50043-01 for check valve GG551 to show proper direction of flow (2014 PHA Rec. D.8).	In progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
9.10	MOC for sample valve location change	MOC initiated to provide better sampling data - valve moved to return line from DA	Rec. 56 - Verify updates to drawing 50043-01 from MOC dated 5/11/12 are completed (2014 PHA Rec. D.12).	In progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
9.15	High pressure	Small Leakage on GG300 Tube and return valve closed, GG300 Tube rupture in process cooler	Rec. 57 - Consider additional review and training so that operations is more familiar with DP GG74 function (2014 PHA Rec. T.1).	Not started.	I am not sure how else to train operations on a DP switch further discussion with Utilities team may be needed.

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9.20'	Corrosion	Undesirable water chemistry	Rec. 58 - Consider installing new set of coupons on CT corrosion rack and monitor corrosion (2014 PHA Rec. 26).	Completed	Veolia has installed a standard coupon rack to be changed out and analyzed after 90 days a frequency program will then be established going forward.
9.22	No/Low Flow - Water or chemical	Chemical pump leak or failure, low chemical inventory, improper valve alignment			
9.25	Corrosion/Erosion	Undesirable water chemistry			
9.27	High Flow	Valve open and/or leak - significant release of N2 into area	Rec. 59 - Consider redundant O2 monitors in each compressor room in a new location - perhaps on back wall and away from panel that won't have nuisance alarms from panel and will be closer to sources of N2 (2014 PHA Rec. 30).	Not started	Further discussion on necessity with the Utilities team needed.
9.29	High Pressure	High pressure from supply source from Praxair			
FACILITY SITING & HUMAN FACTORS RECOMMENDATIONS					
Node	Guideword / Deviation	Cause	Recommendation		
10.1.1	Establish training programs to ensure that the hydrogen system is operated and maintained by knowledgeable personnel.	Improper operation or maintenance of H2 plant due to lack of training	REPEAT FROM ABOVE - Rec. 1 - Consider review of current operating procedures, updating as necessary especially 1) Shutdown procedures to include purge procedures, 2) Startup, startup after turnaround or e-stop, and initial startup procedures to add step to sniff plant with handheld sensors before restarting plant, and 3) initial and normal startup procedures to include steps to use a hydrogen spike in feed gas upon startup; and retraining utility operators on these updated procedures (2014 PHA Rec. P.6).	In progress	Reformatting procedures, then must review and make necessary changes. Completion contingent upon MOC closure; operators will review with sign off. ONEdoc official upload TBD.
10.7.2	Procedures				

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
10.13.6	Electrical power fail	Weather conditions, Local utility service provider failure, Breaker failure	REPEAT FROM ABOVE - Rec. 27 - Consider verifying the frequency and completion of UPS PMs, including H2 Gen DCS UPS (2014 PHA Rec. 44).	Completed	Discussed with Bill Ryland, there is not a UPS system in place there for no UPS PM's
10.13.9	Electrical - UPS fails	Poor system design; Equipment or device failure; poor battery / generator maintenance			
10.4.6	Landslide from bluff next to H2 storage tanks	Rock falling, or rock slide impact to tank farm	REPEAT FROM ABOVE - Rec. 52 - Evaluate additional security measures to protect storage tubes from bluff side of property (2014 PHA Rec. 49).	Not started	Determine available options.
10.11.2	Placement of Storage Tanks				
10.11.7	Hydrogen monitors and alarms	improper calibration of sensors; Sampling regulators not properly set - too high	REPEAT FROM ABOVE - Rec. 59 - Consider redundant O2 monitors in each compressor room in a new location - perhaps on back wall and away from panel that won't have nuisance alarms from panel and will be closer to sources of N2 (2014 PHA Rec. 30).	Not Started	Further discussion on necessity with the Utilities team needed.
10.12.3	O2 Sensors or H2 Sensors Fail				
10.2.8	Identify the king valve and other emergency isolation valves with a large placard so that they can easily be identified by emergency responders, in case of an emergency. These valves should be clearly indicated on the piping and instrumentation diagrams (P&IDs) and/or process flow diagrams.		Rec. 60 - Consider labeling the main plant shutoff (VL17) so that it is easy for emergency responders to close (2014 PHA Rec. 70).	Not Started	Create Labels and apply
10.3.1	Establish written emergency procedures and instructions on what to do in the event of a major hydrogen release.		Rec. 61 - Consider updating the emergency shutdown procedure or Emergency Response Plan to provide instructions on what to do in the event of a major hydrogen release.	Not started	Meet with Safety on ERP plans

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
10.3.2	Regularly conduct emergency response drills. Emergency response personnel should "suit- up" as part of the drill process. As needed, members of the hazmat team should regularly suit-up to sharpen their emergency response skills.		Rec. 62 - Consider conducting emergency response drills for a major H2 release with representatives from the onsite HAZMAT team and local fire department HAZMAT team.	Not started	Contact on sit HAZMAT director to assist with this
10.3.6	Earthquake		Rec. 63 - Consider reviewing the emergency response plan to determine if an earthquake scenario is addressed (2014 PHA Rec. 73).	Not started	Who does the ERP - HSE
10.4.3	Toxic Cloud	Chemical release from other RAI facility	Rec. 64 - Consider reviewing the emergency response plan to determine if potential reactions with H2 from other RAI facility releases are addressed (2014 PHA Rec. 75).	Not started	Who does the ERP - HSE
10.4.7	Freezing/Icy condition		Rec. 65 - Consider paving inside the fenced area. Loose gravel causing employee injury during icy conditions.	In progress	Is concrete less slippery during icy conditions than loose rock? Aking for clarification on how this will help?
10.5.8	Delivery vehicle driver drives off with loading hoses still connected		Rec. 66 - Develop formal test procedure and address appropriate truck unloading controls there (chock wheels, verify truck is disconnected before driver leaves, etc.) (2014 PHA Rec. 76).	Not started	Verify with Steve Forbes as it has been said that this is already a procedure that we have also this is only done every 5 years.
10.11.9	Disconnect policy: storage tanks and delivery vehicles	Incorrect connecting procedure due to verbal instruction			
10.7.4	Maintenance workspace		Rec. 67 - Consider evaluating replacement of round ladder rungs with non slip rungs to reduce chance of slip/fall. 2020 PHA team revised the recommendation to "Rec #: Consider evaluating adding non-slip tapes on round ladder rungs to reduce chance of slip/fall" (2014 PHA Rec. 79).	Not started	HSE/Utilities evaluation

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
10.7.6	Facility layout	Poorly designed facility makes emergency response difficult	Rec. 68 - Consider reviewing H2 plant layout and hazards with local emergency response coordinating appropriate response drills with local fire response (2014 PHA Rec. 72).	In progress	Contact on sit HAZMAT director to assist with this
10.12.2	Joint training with emergency responders	ineffective relations or chaotic communications			
10.7.8	Unit Layout		Rec. 69 - Consider adding a "crash gate" (one way egress from H2 fenced perimeter) so that personnel don't have to badge out during emergency egress from area. 2020 PHA team revised the recommendation to "Rec #: Consider disabling stops on turnstile during emergency egress from the area" (2014 PHA Rec. 81).	Not started	Discussion with Security/Facilities to evaluate options here; can it free-wheel one way all of the time? Do we want it to free-wheel one way all of the time?
10.9.7	Signage	Improper or lack of signage	Rec. 70 - Place signage around H2 building and storage areas stating flammability hazards of H2 including gate access to plant. Michael Ward status update: Work Order 810000797335 has been written to purchase and install signage. 2014 PHA update: This work order was not completed. Merged with 2014 Recommendation: Consider large sign in entrance to area with H2 plant restrictions and a locker outside the fenced area to temporarily store items that aren't allowed in H2 Gen plant (phones, key fobs, etc.) (2014 PHA Rec. 68).	Not started	Design and order signage do we have a contact in the plant to help with this?

Node	Guideword / Deviation	Cause	Recommendation	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
10.11.3	Enclosures for Critical Equipment	Unauthorized access to process equipment or lack of containment during emergency	<p>Rec. 71 - Evaluate the distance of a H2 tank impacted and released at 2000 psi. Consider installing containment to reduce the distance of an impacted cylinder. 2014 PHA update: Review the modeled worst case and alternative release from the H2 Gen plant to determine if it they evaluated blast radius from loss of H2 storage tanks. Consider evaluating maximum distance equipment could be launched. 2018 OCA is based on a release from the Praxair H2 storage tank and the radius of impact for the worst case release scenario is 0.25 miles. Impact from the release of a hydrogen cylinder will be smaller. Rec #: Consider conducting the offsite consequence analysis based on release from a hydrogen cylinder to evaluate the impact of a release from the H2 storage cylinder (2014 PHA Rec. 83).</p>	In progress	What would this containment look like and how do we evaluate which is the lesser hazard?
10.14.1	Electrical - MCC failure	Equipment, device failure or breaker failure Over heating, overloading Fire in MCC	<p>Rec. 72 - Consider verifying fire protection for MCC room and where this alarm would annunciate (2014 PHA Rec. 85).</p>	Not started	Contact Todd Droege for system design questions.

September 30, 2020 CFB PHA Recommendations					
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
TECHNICAL RECOMMENDATIONS					
1.1	What if an additional supply of ammonia is brought on site and Emergency Response Crews are unaware of the increased HAZARD?	Purchasing or inventory error leads to full tank(s) and additional tank wagons on site; Tank wagon is sent to the wrong ammonia system (CFB Boiler vs. CoGen vs. Refinery C)	Rec. 1 - Clarify PSM training requirements for ammonia delivery drivers and verify that appropriate level of awareness training is completed for ammonia delivery drivers by either contractor employer or by RAI (2013 PHA Rec #6.1)	In progress	Meet with CG Transport to review current training and potential needs.
1.5	What If the Delivery Vehicle comes on site and the driver is not aware of potential hazards that exist at the unloading site?	Delivery Driver brings ammonia on site and unintentionally enters a hazardous work area or area under construction or other hazardous area with a load of Ammonia.			
1.6	What if the delivery driver enters the plant with a load of ammonia and plant personnel are unaware of his presence?	A driver On-Site without Roquette knowledge or assistance may hook up to the wrong storage tank; or, fail to follow proper plant procedures, or, cause unrecognized and/or unreported equipment damage.			
1.7	What If a Delivery Driver comes on-site with a load of ammonia and is not experienced in handling ammonia and has not been trained to unload ammonia into the Ammonia Storage Tank?	An inexperienced and untrained ammonia delivery driver may fail to perform necessary unloading operations, or commit an unsafe act that may cause an ammonia release or allow a small release to increase in size.			

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
1.2	What if the Ammonia Unloading Station or the associated ammonia piping is struck by a forklift, a moving vehicle, or an overhead crane?	A Forklift, moving vehicle or crane could strike and puncture or break an ammonia line under pressure.	Rec. 2 - Consider labeling ammonia lines outside by tank farm (2013 PHA Rec #6.5)	Not started	Create labels and apply to system.
1.4	What if there is confusion between the unloading procedure that the operators expect to follow and the unloading procedure the Delivery Driver expects to follow?	Miscommunication between drivers and operators; Unclear procedures	Rec. 3 - Consider providing operators training on the unloading procedure to communicate safety systems to the delivery drivers (2013 PHA Rec #6.7)	In progress	Confer with CG Transport, review procedure to determine whether action is necessary.
1.5	What If the Delivery Vehicle comes on site and the driver is not aware of potential hazards that exist at the unloading site?	Delivery Driver brings ammonia on site and unintentionally enters a hazardous work area or area under construction or other hazardous area with a load of Ammonia.	Rec. 4 - Due to infrequent deliveries, consider requiring shipping entrance to provide a map to all ammonia delivery drivers and formalizing this in the procedures (2013 PHA Rec #6.10)	In progress	Current procedure is have the operator that is assisting with unload meet the driver near the security center and have the driver follow them down to the ammonia tank. This reduces the chances of misunderstanding a map/direction. Upload procedure to ONEdoc.
1.6	What if the delivery driver enters the plant with a load of ammonia and plant personnel are unaware of his presence?	A driver On-Site without Roquette knowledge or assistance may hook up to the wrong storage tank; or, fail to follow proper plant procedures, or, cause unrecognized and/or unreported equipment damage.	Rec. 5 - Due to infrequent deliveries, consider requiring that utilities operator escort ammonia delivery trucks (not pursued based on 2020 PHA team discussion due to company policy) or that shipping entrance provides a map to all ammonia delivery drivers and formalizing this in the procedures (2013 PHA Rec #6.10).	In progress	Current procedure is have the operator that is assisting with unload meet the driver near the security center and have the driver follow them down to the ammonia tank. This reduces the chances of misunderstanding a map/direction. Upload procedure to ONEdoc.
1.13	What if a Delivery Driver comes On-Site and hooks up to a NON-Ammonia Storage Tank to unload?	Ammonia liquid entering a non-ammonia tank could cause a serious increase in ammonia and/or product pressure and perhaps a chemical reaction with the evolution of heat. An ammonia release would occur.			

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
1.8	What If a delivery driver comes in with defective ammonia delivery equipment?	A defective tank wagon Emergency Shutoff Valve; or, defective Ammonia Loading Hose; or, defective vehicle Ammonia Handling Equipment	Rec. 6 - Consider requesting information from ammonia supplier regarding the type and frequency of inspections that are completed on the driver's equipment, including hoses, tank wagon emergency shutoff valve, tankwagon relief valve and truck pump. (2013 PHA Rec #5.2)	In progress	To meet with CG Transport to discuss.
1.18	What If the loading hose ruptures during the unloading Procedure?	A defective ammonia loading hose ruptures or 'begins to leak during the Roquette Fill Procedure. Liquid ammonia is released to the atmosphere.			
1.11	What If a driver comes On-Site with unauthorized unloading connections to the Ammonia Unloading Station?	Mismatched Ammonia loading connections may leak resulting in an ammonia release, Unauthorized NH3 fitting may corrode and cause an ammonia release.	Rec. 7 - Consider clarifying in purchasing contract or instructions to NH3 delivery contractor the type of fittings required for RAI Keokuk ammonia deliveries. (2013 PHA Rec #6.14)	In progress	Current procedure is while writing the PR include the supplies necessary for the delivery. Ensure process is documented.
1.12	What If a Delivery Driver came on Site and the Emergency Shower/Eye Wash was not working?	An ammonia delivery driver or a Roquette Operator may experience serious eye injury if a safety shower/eye wash was not available and functioning during an unloading operation where an unintentional ammonia release occurred.	Rec. 8 - Consider verifying the temperature setting for tepid water system at CFB NH3 eyewash/shower station (2013 PHA Rec #6.15)	Completed	W/O completed, settings confirmed.
1.15	What if plugs, caps, or blind flanges are missing on fill, drain, or purge valves?	An ammonia drain, fill or purge valve that is open to the atmosphere is unintentionally (or maliciously) left or knocked open resulting in ammonia under pressure being discharged into the atmosphere.	Rec. 9 - Consider evaluating method to ensure bleed valve on liquid unloading line valve will be closed when not unloading (after depressurize the unloading line when unloading is complete). (2013 PHA Rec #6.17)	In progress	In the Procedure for unloading, could add this on the check list for cleanup activities.

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
1.15	What if plugs, caps, or blind flanges are missing on fill, drain, or purge valves?	An ammonia drain, fill or purge valve that is open to the atmosphere is unintentionally (or maliciously) left or knocked open resulting in ammonia under pressure being discharged into the atmosphere.	Rec. 10 - Consider adding water drum in area and hard pipe bleed valve discharge to the water drum (2013 PHA Rec # 6.18)	Not started	How will we keep this from freezing? Further discussion needed with Utilities Team to determine whether this is necessary considering deluge system is in place to reduce hazards.
1.15	What if plugs, caps, or blind flanges are missing on fill, drain, or purge valves?	An ammonia drain, fill or purge valve that is open to the atmosphere is unintentionally (or maliciously) left or knocked open resulting in ammonia under pressure being discharged into the atmosphere.	Rec. 11 - Consider developing more robust 4-eyes procedure with sign-off authorization for confirming proper plug, cap, or blind flange installations.	In progress	Normal start-up captures this. Blind flanges used in LT3 scenarios are on the LT3 form and at a minimum tagged during this process to identify them. Further discussion needed.
1.25	What if plugs, caps, or blind flanges are not installed or are missing from ammonia drain or purge valves?	An ammonia drain or purge valve could be unintentionally opened or knocked open and ammonia would be released to the atmosphere, perhaps in the immediate vicinity of the ammonia operator.			
4.8	What If plugs, caps, or blind flanges are missing on drain or purge valves?	An Operator may strike, knock open, or unintentionally open the wrong valve without a cap, plug or blind flange and release ammonia into the atmosphere in the area			
1.16	What if the ammonia sensors or fogging system was not working and there is ammonia in the system?	Air valve frozen or inoperational; water lines frozen; water supply shut off; ammonia sensors failed; power failure; loss of compressed air	Rec. 12 - Consider method (procedure, checklist, etc.) to ensure that fogging system water valve is reopened after power or compressed air is restored to CFB NH3 tank area (2013 PHA Rec #6.19)	In progress	This is included in the start up procedure after emergency stop. Provide documentation.
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		

NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS	Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
TECHNICAL RECOMMENDATIONS					
2.1	What if the Inlet (FCV-04/VX-178 -liquid loading) and Outlet (FCV-01/VX-175 -vapor outlet) stop valves are closed on a full (or nearly full) tank of liquid ammonia?	Power or compressed air failure, inadvertent valve position during operation or repairs; inexperienced operator, human error	Rec. 13 - Consider updating IFAK9107 SOP (Truck Unloading) to clearly address the %15 threshold requirement for the ammonia tank orders.	In progress	Procedure contains this information. Complete but need documentation.
2.2	What if water from the fogging system mixed with ammonia?	Fogging system activated by ammonia sensors, power outage or by testing	Rec. 14 - Consider reviewing the site Storm Water Pollution Prevention Plan and ensure that it lists the ammonia tank and control measures in place to minimize potential for a release to stormwater (2013 PHA Rec. #7.1)	Not started	Meeting with Brian??
2.2	What if water from the fogging system mixed with ammonia?	Fogging system activated by ammonia sensors, power outage or by testing			
2.4	What if the Ammonia Storage Tank or the associated ammonia piping is struck by a forklift, a moving vehicle, or an overhead crane?	A moving Forklift, moving vehicle or crane could strike and puncture or rupture the ammonia storage tank or its associated valves or other associated piping.	Rec. 15 - Consider establishing secondary containment for fogging water to prevent stormwater contamination and ensure barrier protection.	Not started	Meeting with Brian??

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
3.6	What if the Ammonia Vaporizer Skid or the associated ammonia Piping is struck by a forklift, a moving vehicle, or an overhead crane?	Forklift, moving vehicle or overhead crane strikes the Ammonia Vaporizer skid and punctures or ruptures an ammonia line under pressure.			
2.7	What if additional external heat, Fire, Steam Hose, Torch or other heat source is applied to the ammonia storage tank or associated piping?	If external heat is applied to an ammonia storage tank or associated piping the heat would vaporize additional ammonia within the storage tank and raise the Pressure.	Rec. 16 - Confirm high alarm setpoint for the ammonia storage tank in DCS (currently indicates 247 psig) and ensure alignment with P&IDs (currently indicates 200 psig).	In progress	Confirmed, PTVX77 is set to alarm at 174psi. Provide documentation.
2.8	What if plugs, caps, or blind flanges are not installed or are missing from ammonia drain or purge valves?	An ammonia drain or purge valve could be unintentionally opened or knocked open and ammonia would be released to the atmosphere, perhaps in the immediate vicinity of the ammonia operator.	Rec. 17 - Consider evaluating if current liquid loading line to tank provides required hydrostatic relief from pressure increase due to blocked in liquid in this line and modify piping if required (2013 PHA Rec #7.2).	Not started	Who Can Verify this?
2.12	What if the Ammonia Storage Tank and/or critical valves are not labeled or identified?	Operator may turn the wrong valve while performing a routine or an emergency operation. There is the potential for an ammonia release.	Rec. 18 - Consider verifying valve identification numbers included in critical steps match the RAI P&IDs in procedural steps (2013 PHA Rec #7.3).	Not started	Walk in the field and create proper labels to match the SOP's
2.12	What if the Ammonia Storage Tank and/or critical valves are not labeled or identified?	Operator may turn the wrong valve while performing a routine or an emergency operation. There is the potential for an ammonia release.	Rec. 19 - Ensure components in the ammonia covered process are labeled in field to match RAI P&IDs.	Not started	Walk this down with Utilities Operators to verify.
2.12	What if the Ammonia Storage Tank and/or critical valves are not labeled or identified?	Operator may turn the wrong valve while performing a routine or an emergency operation. There is the potential for an ammonia release.	Rec. 20 - Ensure RAI P&IDs reference vendor numbers.	In Progress	Richard M will complete after the markup corrections are completed at H2 and we get the relief valve design basis back from Paul Olsen at Affiliated engineers

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
2.14	What are the heater controls fail on the Ammonia Vaporizer Skid?	The Ammonia Vaporizer could continue adding heat and vaporizing liquid ammonia to an over pressure condition in the storage tank and possible release of ammonia.	Rec. 21 - Consider updating P&ID to reflect SRV - VX-137 and VX-138 setpoints.	In progress	VX137 & VX138 are found not to exist in real life although they are called out on several of the P&ID's Affiliated Engineering has been contacted to provide us the engineering study necessary for next steps.
3.1	What If the Ammonia Storage Tank goes empty with no liquid going to the Ammonia Vaporizers?	A no Flow liquid ammonia to the heater would cause the Ammonia Vaporizer overheat and destroy the heater element.	Rec. 22 - Consider verifying work maintenance plan tasks are completed for ammonia system items, including thermal overloads (2013 PHA Rec #8.1)	Not started	What is a work maintenance plan task? - May need to check with Maint/Reliability
3.1	What If the Ammonia Storage Tank goes empty with no liquid going to the Ammonia Vaporizers?	A no Flow liquid ammonia to the heater would cause the Ammonia Vaporizer overheat and destroy the heater element.	Rec. 23 - Consider updating P&ID to reflect vaporizer SRV setpoints.	In Progress	VX137 & VX138 are found not to exist in real life although they are called out on several of the P&ID's Affiliated Engineering has been contacted to provide us the engineering study necessary for next steps.
3.2	What If the ammonia vapor discharge valve is closed with the vaporizer heaters in the on position?	A closed Ammonia vaporizer discharge valve with the heater on would "back" ammonia liquid out of the vaporizer, the vaporizer would overheat and the vaporizer unit could fail.			
3.1	What If the Ammonia Storage Tank goes empty with no liquid going to the Ammonia Vaporizers?	A no Flow liquid ammonia to the heater would cause the Ammonia Vaporizer overheat and destroy the heater element.	Rec. 24 - Confirm updating P&ID to reflect thermal overload on vaporizer	Not started	Contact R. Martindale

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
3.2	What If the ammonia vapor discharge valve is closed with the vaporizer heaters in the on position?	A closed Ammonia vaporizer discharge valve with the heater on would "back" ammonia liquid out of the vaporizer, the vaporizer would overheat and the vaporizer unit could fail.	setpoint.		
3.8	What if the Ammonia Vaporizer and associated piping experienced external corrosion?	A slow progressive corrosion of ammonia piping could occur, pin hole leaks in the area of pipe threads or other areas where moisture collects.	Rec. 25 - Consider verifying non-destructive thickness testing on the vaporizer housing and piping.	Not started	Need access to W drive, to confirm current plan. Any additions will have to be taken up with Mike Karre and Jake Wilcox
4.1	What If an Ammonia line experiences external corrosion?	A slow progressive corrosion of ammonia piping could occur, pin hole leaks in the area of pipe threads or other areas where moisture collects.	Rec. 26 - Consider verifying regular PM on ammonia piping.	Not started	Need access to W drive, to confirm current plan. Any additions will have to be taken up with Mike Karre and Jake Wilcox
4.4	What If Ammonia Piping has inadequate support; Or, does not accommodate thermal expansion?	Ammonia piping has inadequate support, or has a piping design that does not properly consider thermal expansion distorts during operation and releasing ammonia to the atmosphere.			
4.1	What If an Ammonia line experiences external corrosion?	A slow progressive corrosion of ammonia piping could occur, pin hole leaks in the area of pipe threads or other areas where moisture collects.	Rec. 27 - Consider verifying Non destructive (thickness) testing on ammonia piping sections every 5 years.	Not started	Need access to W drive, to confirm current plan. Any additions will have to be taken up with Mike Karre and Jake Wilcox
4.4	What If Ammonia Piping has inadequate support; Or, does not accommodate thermal expansion?	Ammonia piping has inadequate support, or has a piping design that does not properly consider thermal expansion distorts during operation and releasing ammonia to the atmosphere.			
4.2	What If flange gaskets, valve packings, or mechanical seals fail?	A flange gasket, or an ammonia valve packing, or a mechanical seal fails and ammonia is released to the atmosphere	Rec. 28 - Consider PM plan for flange gaskets, valve packings, and mechanical seals	Not started	Need access to W drive, to confirm current plan. Any additions will have to be taken up with Mike Karre and

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
4.5	What If valve packings or other sealing components fail?	If a valve packing becomes loose or otherwise fails, a small ammonia release will occur.	seals.		Jake Wilcox
4.6	What If a valve is over tightened causing the valve bonnet to lift?	An operator severely over tightens an ammonia valve slightly lifting the valve bonnet.	Rec. 29 - Consider formalizing procedure to avoid valve overseating.	Not started	Discuss with Utilities team may look into creating a training on this for LMS administration.
GLOBAL NODE RECOMMENDATIONS					
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
1.16	What if Emergency Response Personnel responding to an ammonia release were unaware that ammonia is a hazardous material?	Emergency Response Crews react incorrectly to an ammonia release hazard or fail to react appropriately to an ammonia hazard.	Rec. 30 - Once ERP updates are complete, consider providing copy of updated emergency response plan to fire department, LEPC and local hospitals and coordinating an emergency response drill with responding agencies (2013 PHA Rec #1.8).	In progress	Who Handles ERPS? - HSE
1.24	What if the Roquette Emergency Response Team and the Local Fire Department did not coordinate Emergency Response Procedures?	Miscommunication			
1.22	What if Ammonia Operators did not follow uniform emergency response procedures during an ammonia release situation?	Improper training	Rec. 31 - Review Emergency Response Plan instructions for communicating an evacuation due to an ammonia release, update these steps and update communication equipment as needed to ensure a safe evacuation from an ammonia release, taking into account occupied areas near the NH3 system (2013 PHA Rec #1.13).	Not started	Who Handles ERPS? - HSE

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
2.1	What if an operator inadvertently closes blocking valves that trap ammonia liquid between closed blocking valves?	Closed Blocking valves with trapped liquid ammonia will rupture a pipe or associated equipment with small increases in temperature. a liquid ammonia release will occur.	Rec. 32 - Evaluate all the areas where there are no hydrostatic relief valves to explore the need for further measures and/or potential liquid traps. Code check for heat exchange (2013 PHA Rec #5.1).	Not started	May need to verify this with Airgas.
2.4	What if the number and type of activities performed by Ammonia System operators during normal and emergency operations means that operators are distracted by too many tasks or bored by lack of variety of tasks?	Type and variety of tasks is based on operational and maintenance requirements	Rec. 33 - Consider establishing protocol or hierarchy to assist operators in determining task priorities through STL as appropriate (2013 PHA Rec #5.4).	Not started	Discuss with team
FACILITY SITING & HUMAN FACTORS RECOMMENDATIONS					
1.B.1	Are there hazards caused by: where the process is located in relation to where the people (non-workers) are? And the likelihood of them being there?		Rec. 34 - Consider developing signage or brochure on ammonia response procedures for grain delivery drivers.	Not started	Will order a sign to be placed on the fence around the tank - need to outline our expectations in the event of an emergency
1.E.1	Are there occupied buildings in or near the process?		Rec. 35 - Consider locating past facility siting evaluation for CFB ammonia process or conducting one to reflect the current design.	Not started	DO we have a contact for who does these siting evaluations
1.E.2	Are occupied buildings located inside of blast zones or within the footprint of a toxic release from the process?				
1.E.3	If in a blast zone, is the building adequately constructed to withstand blast effects? Have potential risks been determined? Are windows protected?		Rec. 36 - Consider if the boiler addition affects the previous site assessment with respect to blast radius calculations. (2013 PHA Rec #1E-1)	Not started	DO we have a contact for who does these siting evaluations

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
1.E.4	If in a toxic zone, is the building under positive pressure with elevated air intakes? Are there toxic gas detectors? Do the building inhabitants have adequate personal protective equipment and training to be able to make a safe escape?		Rec. 37 - Consider providing air packs and supplied air to control room operators for escape.	Not started	Discussion with Utilities group
2.B.3	Would others know that a worker is incapacitated in the process area?		Rec. 38 - Consider implementing a buddy system or similar program to address incapacitated worker in the process area (2013 PHA Rec #3.8).	In progress	Use of buddy while unloading and alert the On shift STL when entering/exiting ammonia storage facility is current practice. (Have to get key from control room anyway)
2.C.1	Is all important equipment (vessels, pipes, valves, instruments, controls, and so on) clearly and unambiguously labeled?		Rec. 39 - Ensure components in the ammonia covered process are labeled in field to match RAI P&IDs.	Not started	Locate Drawing walk down with operations team
2.C.2	Does the labeling program include components (e.g. small valves) that are mentioned in the procedures even if they are not assigned an equipment number?		Rec. 40 - Consider a labeling program for the components (e.g. small valves) that are mentioned in the procedures as appropriate.	Not started	Evaluate current labeling, compare with what is mentioned in procedures.
2.F.2	Must a worker perform many manual adjustments during normal and emergency operations?		Rec. 41 - Consider implementing an apply no force initiative to minimize manual adjustments during normal and emergency operations.	Not started	Discussion with Utilities group
3.B.2	Is there possibility of hazardous materials release due to impact of wind-borne debris on process equipment due to high winds?		Rec. 42 - Consider addressing external events in the Emergency Response Plan.	Not started	Who handles ERP? - HSE
3.F.1	Is there a possibility of hazardous materials release from a neighboring process that could cause damage which results in a release of hazardous material in your process?		Rec. 43 - Consider conducting ERP		Who handles ERP? Do we have a

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NODE NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
TECHNICAL RECOMMENDATIONS					
3.F.2	Is there a possibility of explosion or blast from a neighboring process that could cause damage which results in a release of hazardous material in your process?		tabletop exercises to simulate releases from neighboring facilities.	In progress	contact for the table top exercise doers?

September 21, 2020 Co-Gen PHA Recommendations

September 21, 2020 Co-Gen PHA Recommendations				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
1.1	What if an additional supply of ammonia is brought on site and Emergency Response Crews are unaware of the increased HAZARD?	Purchasing or inventory error leads to full tank(s) and additional tank wagons on site; Tank wagon is sent to the wrong ammonia system (CFB Boiler vs. CoGen vs. Refinery C)			
1.5	What If the Delivery Vehicle comes on site and the driver is not aware of potential hazards that exist at the unloading site?	Delivery Driver brings ammonia on site and unintentionally enters a hazardous work area or area under construction or other hazardous area with a load of Ammonia.	<p>Rec. 1 - Clarify PSM training requirements for ammonia delivery drivers and verify that appropriate level of awareness training is completed for ammonia delivery drivers by either contractor employer or by RAI.</p>	In progress	Contact Purchasing for communications with the Supplier
1.6	What if the delivery driver enters the plant with a load of ammonia and plant personnel are unaware of his presence ?	A driver On-Site without Roquette knowledge or assistance may hook up to the wrong storage tank; or, fail to follow proper plant procedures, or, cause unrecognized and/or unreported equipment damage.			

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
1.7	What If a Delivery Driver comes on- site with a load of ammonia and is not experienced in handling ammonia and has not been trained to unload ammonia into the Ammonia Storage Tank.	An inexperienced and untrained ammonia delivery driver may fail to perform necessary unloading operations, or commit an unsafe act that may cause an ammonia release or allow a small release to increase in size.			
1.2	What if the Ammonia Unloading Station or the associated ammonia piping is struck by a forklift, a moving vehicle, or an overhead crane.	A Forklift, moving vehicle or crane could strike and puncture or break an ammonia line under pressure.	<p>Rec. 2 - Establish secondary containment for fogging water to prevent stormwater contamination and ensure barrier protection.</p>	In Progress	Emailed Brian Johnson will set meeting to discuss further plan in more detail at a later date.
2.2	What if water from the fogging system mixed with ammonia?	Fogging system activated by ammonia sensors, power outage or by testing			
2.4	What if the Ammonia Storage Tank or the associated ammonia piping is struck by a forklift, a moving vehicle, or an overhead crane.	A moving Forklift, moving vehicle or crane could strike and puncture or rupture the ammonia storage tank or its associated valves or other associated piping.			
3.6	What if the Ammonia Vaporizer Skid or the associated ammonia Piping is struck by a forklift, a moving vehicle, or an overhead crane.	Forklift, moving vehicle or overhead crane strikes the Ammonia Vaporizer skid and punctures or ruptures an ammonia line under pressure.			

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
1.4	What if there is confusion between the unloading procedure that the operators expect to follow and the unloading procedure the Delivery Driver expects to follow?	Miscommunication between drivers and operators; Unclear procedures	Rec. 3 - Consider providing operators training on the unloading procedure to communicate safety systems to the delivery drivers.	In progress	Checklist and procedure in place currently. Complete but need documentation.
1.5	What If the Delivery Vehicle comes on site and the driver is not aware of potential hazards that exist at the unloading site?	Delivery Driver brings ammonia on site and unintentionally enters a hazardous work area or area under construction or other hazardous area with a load of Ammonia.	Rec. 4 - Due to infrequent deliveries, consider requiring that utilities operator escort ammonia delivery trucks (not pursued based on 2020 PHA team discussion due to company policy) or that shipping entrance provides a map to all ammonia delivery drivers and formalizing this in the procedures.	In progress	Current procedure is have the operator that is assisting with unload meet the driver near the security center and have the driver follow them down to the ammonia tank.
1.8	What If a delivery driver comes in with defective ammonia delivery equipment?	A defective tank wagon Emergency Shutoff Valve; or, defective Ammonia Loading Hose; or, defective vehicle Ammonia Handling Equipment	Rec. 5 - Consider requesting information from ammonia supplier regarding the type and frequency of inspections that are completed on the driver's equipment, including hoses, tank wagon emergency shutoff valve, tank wagon relief valve and truck pump.	In progress	Contact Purchising to communicate with supplier.
1.18	What If the loading hose ruptures during the unloading Procedure?	A defective ammonia loading hose ruptures or 'begins to leak during the Roquette Fill Procedure. Liquid ammonia is released to the atmosphere.			
1.9	What if a Delivery Driver comes On- Site with a load of ammonia and does not understand all of the plant PPE Safety and Driving rules?	A driver not aware of and following Roquette PPE, Safety and Driving may be injured by or may cause the release of ammonia.	Rec. 6 - Consider posting PPE requirements for NH3 unloading by CoGen tank farm.	In Progress	Generic signs are ordered, awaiting reply from darkside for some more specific signage.

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
1.11	What If a driver comes On-Site with unauthorized unloading connections to the Ammonia Unloading Station?	Mismatched Ammonia loading connections may leak resulting in an ammonia release, Unauthorized NH3 fitting may corrode and cause an ammonia release.	Rec. 7 - Consider clarifying in purchasing contract or instructions to NH3 delivery contractor the type of fittings required for RAI Keokuk ammonia deliveries.	In progress	We list this in the PR when ordering trucks.
1.12	What If a Delivery Driver came on Site and the Emergency Shower/Eye Wash was not working ?	An ammonia delivery driver or a Roquette Operator may experience serious eye injury if a safety shower/eye wash was not available and functioning during an unloading operation where an unintentional ammonia release occurred.	Rec. 8 - Consider verifying the temperature setting for tepid water system at CoGen NH3 eyewash/shower station.	Completed	Notification Written #13635506
1.15	What if plugs, caps, or blind flanges are missing on fill, drain, or purge valves?	An ammonia drain, fill or purge valve that is open to the atmosphere is unintentionally (or maliciously) left or knocked open resulting in ammonia under pressure being discharged into the atmosphere.	Rec. 9 - Consider adding water drum in area and hard pipe bleed valve discharge to the water drum.	Not started	How do we keep this from Freezing? Further discussion necessary with Utilities Team
1.15	What if plugs, caps, or blind flanges are missing on fill, drain, or purge valves?	An ammonia drain, fill or purge valve that is open to the atmosphere is unintentionally (or maliciously) left or knocked open resulting in ammonia under pressure being discharged into the atmosphere.			

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
2.8	What if plugs, caps, or blind flanges are not installed or are missing from ammonia drain or purge valves?	An ammonia drain or purge valve could be unintentionally opened or knocked open and ammonia would be released to the atmosphere, perhaps in the immediate vicinity of the ammonia operator.	Rec. 10 - Consider developing more robust 4-eyes procedure with sign-off authorization for confirming proper plug, cap, or blind flange installations.	In progress	Update Procedures to include a 4eye check
4.8	What If plugs, caps, or blind flanges are missing on drain or purge valves?	An Operator may strike, knock open, or unintentionally open the wrong valve without a cap, plug or blind flange and release ammonia into the atmosphere in the area			
1.16	What if the ammonia sensors or fogging system was not working and there is ammonia in the system?	Air valve frozen or inoperational; water lines frozen; water supply shut off; ammonia sensors failed; power failure; loss of compressed air	Rec. 11 - Consider method (procedure, checklist, etc.) to ensure that fogging system water valve is reopened after power or compressed air is restored to CoGen NH3 tank area.	In progress	Currently covered in startup procedure afte emergency stop or upset conditions
2.1	What if the Inlet (DB-04, liquid loading) and Outlet (DB -01, vapor outlet) stop valves are closed on a full (or nearly full) tank of liquid ammonia?	Power or compressed air failure, inadvertent valve position during operation or repairs; inexperienced operator, human error	Rec. 12 - Consider updating IFAK9107 SOP (Truck Unloading) to clearly address the %15 threshold requirement for the ammonia tank orders.	In progress	Current procedure includes these numbers
2.2	What if water from the fogging system mixed with ammonia?	Fogging system activated by ammonia sensors, power outage or by testing	Rec. 13 - Consider reviewing the site Storm Water Pollution Prevention Plan and ensure that it lists the ammonia tank and control measures in place to minimize potential for a release to stormwater.	Not started	Meeting with Brian Johnson?

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
2.12	What if the Ammonia Storage Tank and/or critical valves are not labeled or identified?	Operator may turn the wrong valve while performing a routine or an emergency operation. There is the potential for an ammonia release.	Rec. 14 - Consider verifying valve identification numbers included in critical steps match the RAI P&IDs in procedural steps.	Not started	walk down with utilities operators
2.12	What if the Ammonia Storage Tank and/or critical valves are not labeled or identified?	Operator may turn the wrong valve while performing a routine or an emergency operation. There is the potential for an ammonia release.	Rec. 15 - Ensure components in the ammonia covered process are labeled in field to match RAI P&IDs.	Not started	walk down with utilities operators
4.9	What if a critical valve is not labeled or tagged with a unique valve number?	An operator may mis-identify isolation ammonia valve causing a potential process upset or a direct ammonia release to atmosphere. Scenario applies to maintenance work.			
2.12	What if the Ammonia Storage Tank and/or critical valves are not labeled or identified?	Operator may turn the wrong valve while performing a routine or an emergency operation. There is the potential for an ammonia release.	Rec. 16 - Ensure RAI P&IDs reference vendor numbers.	In progress	Archive Laroche (PID-000) Drawing and make RAI (50066-01) the Controlled Drawing for the system. Drawing Markups are completed, R. Martindale is working on corrections/
3.2	What If the ammonia vapor discharge valve is closed with the vaporizer heaters in the on position.	A closed Ammonia vaporizer discharge valve with the heater on would "back" ammonia liquid out of the vaporizer, the vaporizer would overheat and the vaporizer unit could fail.			

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
4.9	What If a critical valve is not labeled or tagged with a unique valve number?	An operator may mis-identify isolation ammonia valve causing a potential process upset or a direct ammonia release to atmosphere. Scenario applies to maintenance work.			updates
2.14	What are the heater controls fail on the Ammonia Vaporizer Skid?	The Ammonia Vaporizer could continue adding heat and vaporizing liquid ammonia to an over pressure condition in the storage tank and possible release of ammonia.	Rec. 17 - Consider updating P&ID to reflect vaporizer SRV setpoints (DB-123 and DB- 128).	In progress	Drawing Markups are completed, R. Martindale is working on corrections/ updates
3.1	What If the Ammonia Storage Tank goes empty with no liquid going to the Ammonia Vaporizers.	A no Flow liquid ammonia to the heater would cause the Ammonia Vaporizer overheat and destroy the heater element.			
3.2	What If the ammonia vapor discharge valve is closed with the vaporizer heaters in the on position.	A closed Ammonia vaporizer discharge valve with the heater on would "back" ammonia liquid out of the vaporizer, the vaporizer would overheat and the vaporizer unit could fail.			
3.4	What If an Ammonia Vaporizer PRV fails and opens below the set pressure (265 psig)?	A PRV that opened below its set point would release ammonia to the atmosphere, no damage to the vaporizer or related ammonia equipment.			

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
3.5	What If an Ammonia Vaporizer PRV fails and does not open at the set pressure (265 psig)?	If the ammonia vaporizer were isolated from the Ammonia Storage tank a failed PRV would likely cause leaks at gaskets on the system. Vaporizers are pressure vessels at 265 psi. The ammonia release would be limited.			
2.14	What are the heater controls fail on the Ammonia Vaporizer Skid?	The Ammonia Vaporizer could continue adding heat and vaporizing liquid ammonia to an over pressure condition in the storage tank and possible release of ammonia.	Rec. 18 - Confirm updating P&ID to reflect thermal overload on vaporizer setpoint.	Not started	Drawing Markups are completed, R. Martindale is working on corrections/ updates
3.1	What If the Ammonia Storage Tank goes empty with no liquid going to the Ammonia Vaporizers.	A no Flow liquid ammonia to the heater would cause the Ammonia Vaporizer overheat and destroy the heater element.			
3.1	What If the Ammonia Storage Tank goes empty with no liquid going to the Ammonia Vaporizers?	A no Flow liquid ammonia to the heater would cause the Ammonia Vaporizer overheat and destroy the heater element.	Rec. 19 - Consider verifying work maintenance plan tasks are completed for ammonia system items, including temperature switch	Not started	What is a work maintenance plan task? - May need to check with Reliability
3.8	What if the Ammonia Vaporizer and associated piping experienced external corrosion?	A slow progressive corrosion of ammonia piping could occur, pin hole leaks in the area of pipe threads or other areas where moisture collects.	Rec. 20 - Consider verifying non-destructive thickness testing on the vaporizer housing and piping.	Not started	Need access to W drive, to confirm current plan. Any additions will have to be taken up with Mike Karre and Jake Wilcox
4.1	What If an Ammonia line experiences external corrosion?	A slow progressive corrosion of ammonia piping could occur, pin hole leaks in the area of pipe threads or other areas where moisture collects.			Need access to W drive, to confirm current plan. Any

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
4.4	What If Ammonia Piping has inadequate support; Or, does not accommodate thermal expansion?	Ammonia piping has inadequate support, or has a piping design that does not properly consider thermal expansion distorts during operation and releasing ammonia to the atmosphere.	Rec. 21 - Consider verifying regular PM on ammonia piping	Not started	Confirm current plan. Any additions will have to be taken up with Mike Karre and Jake Wilcox
4.1	What If an Ammonia line experiences external corrosion?	A slow progressive corrosion of ammonia piping could occur, pin hole leaks in the area of pipe threads or other areas where moisture collects.	Rec. 22 - Consider verifying Non destructive (thickness) testing on ammonia piping sections every 5 years	Not started	Need access to W drive, to confirm current plan. Any additions will have to be taken up with Mike Karre and Jake Wilcox
4.4	What If Ammonia Piping has inadequate support; Or, does not accommodate thermal expansion?	Ammonia piping has inadequate support, or has a piping design that does not properly consider thermal expansion distorts during operation and releasing ammonia to the atmosphere.			
4.2	What If flange gaskets, valve packings, or mechanical seals fail?	A flange gasket, or an ammonia valve packing, or a mechanical seal fails and ammonia is released to the atmosphere	Rec. 23 - Consider PM plan for flange gaskets, valve packings, and mechanical seals.	Not started	Need access to W drive, to confirm current plan. Any additions will have to be taken up with Mike Karre and Jake Wilcox
4.5	What If valve packings or other sealing components fail?	If a valve packing becomes loose or otherwise fails, a small ammonia release will occur.			
4.6	What If a valve is over tightened causing the valve bonnet to lift.	An operator severely over tightens an ammonia valve slightly lifting the valve bonnet.	Rec. 24 - Consider formalizing procedure to avoid valve overseating.	Not started	Discuss with Utilities team may look into creating a training on this for LMS administration.
4.10	What If ammonia piping is impacted by a vehicle, Overhead Crane or other moving equipment?	A moving vehicle, Crane or other equipment strikes and ruptures or damages an unprotected ammonia line.	Rec. 25 - Consider extending tank		

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
5.3	What if the Ammonia Dilution Skid or its associated ammonia piping is struck by a forklift, a moving vehicle, or an overhead crane.	Moving forklift, vehicle or overhead crane punctures or ruptures the Ammonia Dilution Skid equipment or piping	farm fencing to Building 203 wall to prevent potential vehicle or other moving equipment impact.	Not started	Financial Impact How do we Pay for this? (Jake Wilcox)
GLOBAL NODE RECOMMENDATIONS					
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
1.16	What if Emergency Response Personnel responding to an ammonia release were unaware that ammonia is a hazardous material?	Emergency Response Crews react incorrectly to an ammonia release hazard or fail to react appropriately to an ammonia hazard.	Rec. 26 - Once ERP updates are complete, consider providing copy of updated emergency response plan to fire department, LEPC and local hospitals and coordinating an emergency response drill with responding agencies.	In progress	Who Does ERP? - HSE
1.24	What if the Roquette Emergency Response Team and the Local Fire Department did not coordinate Emergency Response Procedures.	Miscommunication			
1.22	What if Ammonia Operators did not follow uniform emergency response procedures during an ammonia release situation?	Improper training	Rec. 27 - Review Emergency Response Plan instructions for communicating an evacuation due to an ammonia release, update these steps and update communication equipment as needed to ensure a safe evacuation from an ammonia release, taking into account occupied areas near the NH3 system.	Not started	Who Does ERP? - HSE
2012 PHA Recommendation 4.1.23	What if Ammonia Operators did not follow uniform emergency response procedures during an ammonia release situation ?	Employees could enter a hazardous ammonia atmosphere, fail to recognize the hazard created by ammonia, or act unsafely to control the release of ammonia.	Rec. 28 - Ensure evacuation routes are posted in all buildings at Roquette, including the Cogen facility. Verify that all employees at RAI have received ammonia awareness training. (2012 PHA Item #4.1.23)	Not started	Who Does ERP? - HSE
FACILITY SITING & HUMAN FACTORS RECOMMENDATIONS					

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
1.B.1	Are there hazards caused by: where the process is located in relation to where the people (non- workers) are? And the likelihood of them being there?		Rec. 29 - Consider Emergency Response Plan to communicate ammonia response procedures to neighboring community for Co-gen process.	Not started	Who Does ERP? - HSE
1.B.2	Are there hazards caused by where the process is located in relation to where the people have to be?		Rec. 30 - Consider providing ERP training specific to ammonia release and response procedures.	Not started	Who Does ERP? - HSE
1.E.1	Are there occupied buildings in or near the process?		Rec. 31 - Consider locating past facility siting evaluation for CoGen ammonia process or conducting one to reflect the current design.	Completed	Who Does ERP? - HSE
1.E.4	If in a toxic zone, is the building under positive pressure with elevated air intakes? Are there toxic gas detectors? Do the building inhabitants have adequate personal protective equipment and training to be able to make a safe escape?		Rec. 32 - Consider providing air packs and supplied air to control room operators for escape.	Not started	Discussion with Utilities Group
2.B.3	Would others know that a worker is incapacitated in the process area?		Rec. 33 - Consider implementing a buddy system or similar program to address incapacitated worker in the process area.	In progress	Use of buddy while unloading and alert the On shift STL when entering/ exiting ammonia storage facility is current practice. (Have to get key from control room anyway)
2.C.1	Is all important equipment (vessels, pipes, valves, instruments, controls, and so on) clearly and unambiguously labeled?		REPEAT FROM ABOVE - Rec. 15 - Ensure components in the ammonia covered process are labeled in field to match RAI P&IDs.	Not started	Locate P&ID and walk down with utilities operators.

				Status of Action (Not Started, In Progress, Completed)	Action Taken/To Be Taken
NUMBER	DEVIATION	CAUSE	RECOMMENDATIONS		
2.C.2	Does the labeling program include components (e.g. small valves) that are mentioned in the procedures even if they are not assigned an equipment number?		Rec. 34 - Consider a labeling program for the components (e.g. small valves) that are mentioned in the procedures as appropriate.	Not started	Evaluate current labeling, compare with what is mentioned in procedures.
2.F.2	Must a worker perform many manual adjustments during normal and emergency operations?		Rec. 35 - Consider implementing an apply no force initiative to minimize manual adjustments during normal and emergency operations.	Not started	Discussion with Utilities Group
3.B.2	Is there possibility of hazardous materials release due to impact of wind-borne debris on process equipment due to high winds?		Rec. 36 - Consider addressing external events in the Emergency Response Plan.	Not started	Who Handles ERP? - HSE
3.F.1	Is there a possibility of hazardous materials release from a neighboring process that could cause damage which results in a release of hazardous material in your process?		Rec. 37 - Consider conducting ERP tabletop exercises to simulate releases from neighboring facilities.	In progress	Who handles ERP? Do we have a contact for the table top exercise doers? - HSE/DeAnn
3.F.2	Is there a possibility of explosion or blast from a neighboring process that could cause damage which results in a release of hazardous material in your process?				

COST OF CORRECTIVE ACTIONS
(to be completed by Roquette America, Inc.)

Cost of corrective actions:

The approximate cost to correct the violations alleged in the Consent Agreement and

Final Order (\$): _____

Compliance staff name: _____

Signed: _____ Date: _____