

UNITED STATES  
DEPARTMENT OF LABOR  
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface  
(Lignite)

Fatal Falling, Rolling, or Sliding Rock or Material of Any Kind Accident  
May 16, 2023

San Miguel Lignite Mine  
NACG Texas, Inc.  
Christine, Atascosa County, Texas  
ID No. 41-02840

Accident Investigators

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Mine Safety and Health Specialist

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Civil Engineer

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## OVERVIEW

Between the night of May 16, 2023, and the early morning of May 17, 2023, Able Calvillo, a 64 year-old heavy equipment operator with 16 years of mining experience, died after the bulldozer he was operating became engulfed in spoil material from a slope failure.

The accident occurred because the mine operator did not: 1) follow its established ground control plan for the safe control of spoil banks, and 2) perform an adequate on-shift examination after a rain event and before miners were assigned to work in the area.

## GENERAL INFORMATION

NACG Texas, Inc. operates the San Miguel Lignite Mine, a surface coal mine located in Christine, Atascosa County, Texas. The mine employs 286 miners and operates two 12-hour shifts, seven days a week. The mine extracts lignite coal from the pit by removing overburden with a dragline and mining the coal with a continuous surface mining machine. Haul trucks transport the lignite to the power plant.

NACG Texas, Inc.'s principal management officials at the San Miguel Lignite Mine at the time of the accident were:

Thomas Shaw  
Brian Young

Mine Manager  
Safety Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine on April 27, 2023. The 2022 non-fatal day's lost incident rate for San Miguel Lignite Mine was zero, compared to the national average of 0.67 for mines of this type.

#### DESCRIPTION OF THE ACCIDENT

On May 16, 2023, at 6:00 p.m., Calvillo started his shift and participated in a safety instruction meeting given by David Riley, Operations Supervisor. According to interviews, the mine began experiencing rain. Tom Escalera and Kevin Camarillo, Equipment Operators, were given instructions to fuel the water pumps at pit designated as B89. Escalera and Camarillo are designated pumpers who are assigned water management throughout the mine. Escalera and Camarillo drove towards the 1B ramp, but the access road was inaccessible due to water and mud on the road. Escalera and Camarillo reported to Riley that they were not able to access the pumps using the 1B ramp and decided to use the 1BX ramp to access another set of pumps.

At 7:45 p.m., Riley transported Escalera and Camarillo to the top of the 1B ramp area to begin bulldozing work and assigned Calvillo to clear a pathway down the pit's ramp 1B with a Caterpillar D5K bulldozer. Riley instructed Calvillo to work at the BBX area after completing work on the 1B ramp. Riley advised Escalera and Camarillo to wait at the top of the 1B ramp while Calvillo cleared the ramp.

Riley traveled to a different pit location to check on other mining activities and then traveled back to the pit area and met with Escalera and Camarillo to see what progress had been made on the 1B ramp. Riley then sent Escalera and Camarillo home.

At approximately 9:30 p.m., Riley observed Calvillo working down the 1B ramp. Riley traveled to the B89 pit's highwall area to check on other miners who were clearing a road near the dragline.

On May 17, 2023, at approximately 12:30 a.m., Carlos Cervantes and Jevon Santos, Pumpers, arrived at the 1B ramp to fuel the pumps in the pit. Cervantes and Santos radioed for a bulldozer to knock down the water diversion berm so they could access the 1B ramp. Riley instructed Cervantes and Santos to contact Calvillo because he was already working on the ramp. Multiple night crew members tried to contact Calvillo using two-way radios on multiple channels with no success.

During interviews, the investigators learned that at approximately 12:40 a.m., Cervantes and Santos removed a portion of the water diversion berm at the top of the 1B ramp with a shovel and proceeded down the ramp. During the travel, Cervantes and Santos encountered a large

amount of material on the ramp that prevented further access, Riley was notified of the condition. Riley traveled down the ramp and observed the material blocking the access. Unable to see the bulldozer, Riley traveled to the BBX pit area in an effort to locate Calvillo with no success. Riley stopped all active operations in order to locate Calvillo. At 1:06 a.m., Riley called Augustine Gonzales, Production Coordinator, and Young, to inform them of the situation. Riley was able to account for all employees at the mine except for Calvillo. Riley contacted Samuel Hilburn, Maintenance Supervisor, to issue a mayday in accordance with the mine's emergency action plan. At approximately 3:12 a.m., Hilburn identified Calvillo's personal vehicle in the parking lot as part of the accountable follow-up. At approximately 3:56 a.m., Young called 911 to request assistance with search efforts.

At approximately 4:50 a.m., first responders from the Jourdanton and Christine Fire Departments, the Atascosa Sheriff's Office, and the Jourdanton Emergency Medical Services (EMS) arrived and began to search the area. At approximately 5:32 a.m., members of the Jourdanton Fire Department spotted the bulldozer blade sticking out of the mud near the bottom of the 1B pit's ramp. The bulldozer was observed lying over on its left side with the bulldozer blade facing the northwest direction. EMS broke the bulldozer's side window to remove Calvillo and transport him to an ambulance. EMS personnel found no signs of life. Calvillo was taken to the main road where Russell Prasifka, Justice of the Peace, pronounced Calvillo deceased at 7:00 a.m.

## INVESTIGATION OF THE ACCIDENT

On May 17, 2023, at 4:31 a.m., Young called the Department of Labor National Contact Center (DOLNCC). The DOLNCC contacted Homer Pricer, Supervisory Mine Safety and Health Inspector. Pricer contacted Nickolas Gutierrez, Assistant District Manager, and sent Armando Moreno, Mine Safety and Health Inspector, to the mine. At 7:10 a.m., Moreno arrived at the mine and issued an order under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners and preservation of evidence. Gutierrez contacted William Clark, Supervisory Mine Safety and Health Specialist, who sent Tommy Fitzgerald, Mine Safety and Health Specialist, and assigned him as the lead accident investigator.

On May 17, 2023, at 6:20 p.m., Fitzgerald arrived at the mine site to begin the investigation. Fitzgerald conducted an examination of the accident scene, interviewed mine management and miners, reviewed conditions, policies, and work procedures relevant to the accident. Rodi Murad, Civil Engineer from MSHA Technical Support arrived on site on May 23, 2023, and joined in the investigation. See Appendix A for a list of persons who participated in the investigation.

## DISCUSSION

### Location of the Accident

The accident occurred near the bottom of the 1B ramp into the B89 pit. The B89 pit is advanced from West to East. Mine personnel design the dragline cuts for minimum and maximum widths of 100 feet and 160 feet, respectively. The overburden stripping depth varies depending on the location within the pit. Typical depths range from 25 and 160 feet (see Appendices B and C).

The overburden of the mine consists of clayey strata. Underneath the immediate overburden (surface layer material) lies a series of alternating sand and clayey strata. The spoil bank on the west side of the 1B ramp consists of field spoil materials placed at the angle of repose, which is typically between 36 and 38 degrees. However, some locations had slopes as steep as 40 degrees.

Mine personnel constructed continuous berms on the top surface of the spoil bank to delineate topsoil, haul-back, and pre-strip material layers. The pre-strip berm is furthest east, near the windrows of bottom dragline spoil. The haul-back berm is west of the pre-strip berm further back from the pit and the westernmost berm is the topsoil berm. The berms are identified on a photo in Appendix D. The topsoil and haul-back berms were primarily oriented north-south on top of the spoil bank, but the pre-strip berm had an east-west orientation and created a roughly triangular-shaped zone at the southeast corner of the spoil bank. They also dumped material piles along the southern edge of the spoil bank to form a berm. The continuous berms prevented surface runoff from draining and allowed water to impound (pond) along the top of the spoil bank.

The mine operator's drone images captured on May 1, 2023, revealed a large volume of water impounded between the haul-back and pre-strip berms on the top of the spoil bank. This same pond of water impounded up against the edge berm, which is directly above the slope of the spoil bank, west of where the pre-strip berm intersects with the edge berm. A drone photo (see Appendix C photo two) taken on May 16, 2023, just hours prior to the accident, revealed a large volume of water ponded directly above where the large slope failure occurred. Other drone photographs show similar concerns (see Appendices B and C).

#### Weather

Rainfall of varying intensity occurred during five of the eight days prior to the accident. The mine operator's site-specific rainfall data indicates that a total of 5.11 inches of rain fell in the Ramp 5B area over the eight days prior to the accident, and 1.61 inches of rain fell over the two days prior to the accident. The investigators considered the rainfall to be a factor in the accident.

#### Equipment Involved

The equipment involved in the accident was a Caterpillar D5K bulldozer. Due to the severe damage caused by the accident, the investigators were unable to determine if the bulldozer had any safety defects prior to the accident.

#### Examinations

Riley, who is a Surface Certified Forman, did not do a complete daily examination of the 1B ramp and spoil bank side area after the rain events that would affect the working condition of the 1B ramp and the B89 pit before miners went to work in the area. According to interviews, Riley did not examine the top of the spoil bank area on the northeast side of the 1B ramp. The northeast side of the 1B ramp was wet and muddy, preventing Riley from accessing the top of the spoil area to complete a thorough examination after the rain event on his shift. Riley performed the examination from the southwest highwall access road from inside his truck. During the examination, a large earthen berm with an average height of ten feet prevented Riley

from seeing the northeast side, which was not examined due to muddy conditions. The investigators traveled the same route as Riley on the southwest highwall access road and confirmed that the northeast side could not be seen for a thorough examination. The investigators reviewed the approved book where the examination is recorded and found that Riley had not noted any hazardous conditions. The spoil area that was not examined contained impounded water and unstable ground conditions. The investigators determined that the inadequate examination contributed to the accident.

### Spoil Slope Failure

The slope failure appeared to occur in two phases. The first phase of the failure consisted of a large slide of the spoil slope face material that ran out onto the 1B ramp and completely covered the bulldozer. Due to the saturation of the slope material and the potential energy due to the slope geometry, the failed mass flowed like a fluid. The second phase of the failure, consisting of the erosion and retreat of the material at the top of the spoil bank, then occurred. The shape of the wedge behind the initial slope failure is consistent with this progression. The observance of erosion from the sediment-laden water extending from the failed area down to the active area of the pit is further evidence of the secondary mudflow caused by the significant volume of water impounded at the top of the slope at the time of the failure. A photo taken hours prior to the failure shows the pre-failure conditions of the slope. There is a large volume of water ponded inside (east side) of the pre-strip berm at the left edge of the photo (see Appendix D).

The investigators determined that the failure occurred due to a combination of the steepness of the slope and material saturation. The material infilling the windrow valleys consisted of sandy-clayey soil placed by tracked bulldozers. The exposed slope appeared to be loosely placed material at the angle of repose. As such, the slope was only marginally stable in a dry condition. The infill material appeared to be saturated from the frequent rain events, while water ponded at the top of the spoil bank helped maintain its saturation. Moisture increases the water content and the weight of the spoil, and it reduces the effective strength of the material, which results in instability.

The mine operator did not take measures to divert the surface runoff away from the spoil bank slope. The only method of water removal was the utilization of pumps to remove the already ponded water at the berms. Several drone videos and photos showing ponded water between the berms prior to the accident indicate that the mine operator did not use the pumps to remove the ponded water prior to the failure. Additionally, mine personnel revealed that even when they pumped the water, at least six inches of surface water remained, which is sufficient to maintain high saturation conditions in the spoil slope contributing to instability.

### Ground Control Plan

According to the mine's ground control plan, "water will always be an important element of the stability of the spoil bench." Furthermore, the plan states "Spoil material will be placed at its natural angle of repose, which in general is between 36 to 38 degrees. Once the lignite has been removed, a parting berm and/or buffer will be maintained ensuring equipment traffic stays away from spoil toe. Spoil piles that are observed to be unstable or unsafe will be posted in the pit. The spoil area will be examined after every rain, freeze, or thaw before miners work in the area."

Investigators determined the mine operator did not follow the water management elements for the stability of the spoil bench, as outlined in their ground control plan. The mine operator allowed water to accumulate above the spoil piles, contributing to the material slide. The mine operator was aware of the excessive water conditions present at the top of the pit, but did not take the necessary actions to prevent or manage the water accumulation.

#### MSHA Post-Failure Inspection of B Pit and Spoil Bank

MSHA personnel observed the spoil bank from various angles; however, the investigation team (team) had restricted access to the failure area because tension cracks indicated that the spoil slope might be unstable.

The team measured the topsoil berms located on top of the spoil bank at several points and found heights between 10 to 15 feet. While safety concerns restricted access further east on top of the spoil bank, the same equipment constructed the haul-back and pre-strip berms as the topsoil berm, and they all appeared to have similar heights. The team observed a six-inch-diameter pipe, which extended the entire top surface width of the spoil bank. Mine personnel told the team that the pipe is a permanent fixture used to remove ponded water that accumulates behind the staged berms. Mine personnel connect pumps at points along the pipe where water is ponded, and they pump water on an “as needed” basis. However, they reported that about 6 inches of water would remain after pumping. Mine personnel stated that during a normal rainfall event, water on the surface of the spoil bank would infiltrate into the spoil, but during heavy or multiple rainfall events, water would impound against the berms. The team did not observe surface runoff diversion structures (temporary or permanent) on the spoil bank. The mine operator’s ground control plan states, “Surface runoff from disturbed areas will be intercepted, collected, and diverted (by temporary diversion ditch system) around the pit perimeter. Collection systems will be constructed to control surface runoff from the disturbed areas. This water will be held in settling ponds and used for mining, reclamation, and dust control. The pit drainage will be collected in sumps located at the base of the backfill toe or highwall, then pumped or diverted to settling ponds. All water control structures will be constructed to meet existing standards.”

The permanent pit highwall bounded the 1B pit’s ramp to the south and the slope of the spoil bank bounded it to the north. Two distinct zones of material exist along the slope of the spoil bank. The mining process fills the valleys formed by the successive windrows of dragline spoil with finer-grained (sandy clay), brown-colored pre-strip, haul-back material, and this repeating pattern extends to the west along the ramp. The team measured the slopes of the bottom dragline spoil material to be between 36 and 38 degrees, and the slopes of the material in-filling the windrow valleys to be between 38 and 40 degrees.

The team observed two slope failures adjacent to the access ramp in the immediate area of the accident. A small, localized slope failure occurred west of the large slide that engulfed the bulldozer and the victim. The size of the slope failure appeared limited due to the presence of the bottom dragline spoil buttressing the infill material and the relatively small volume of impounded water immediately above it. The failure extended from the top of the pile to approximately 30 feet below the crest and appeared to be primarily caused by erosion from water flowing over the crest and down the slope. The buttressing pile diverted the flow of material to the east as the slope failed.



The slope failure that engulfed the bulldozer and the victim was located approximately 600 feet west of the east end of the spoil bank. The team measured the height of the spoil bank on the east side and west side of the failure to be 110 feet and 90 feet, respectively. This failure left a wedge-shaped cavity in the front of the spoil bank that was approximately 90 feet high and 105 feet wide at its top. The failure and subsequent erosion extended back approximately 180 feet into the spoil bank and through the pre-strip berm at the top of the spoil bank. A significant amount of material displaced from this zone appeared to have been the result of erosion from the water impounded on top of the spoil bank flowing through the failure area. The failure appeared primarily confined to the brown-colored infill material between the windrows of the bottom dragline spoil.

The slope failure displaced approximately 351,000 cubic feet of spoil. The team could not obtain exact measurements of the slope failure because the immediate failure area was unstable and hazardous. The team estimated and extrapolated dimensions from photos and measurements that they took in adjacent areas to calculate the approximate failure volume.

#### Training and Experience

Calvillo started working for the mine operator on June 15, 2020. The investigators reviewed the training records and found that Calvillo received all training in accordance with MSHA Part 48 training regulations, which included 3 years of operating a CAT D5K bulldozer with a total of ten years of experience operating bulldozers at this mine.

### ROOT CAUSE ANALYSIS

The accident investigation team conducted an analysis to identify the underlying causes of the accident. The team identified the following root causes, and the mine operator implemented the corresponding corrective actions to prevent a recurrence.

1. Root Cause: The operator did not follow the established ground control plan for the safe control of spoil banks which is consistent with prudent engineering design that will ensure safe working conditions.

Corrective Action: The mine operator has retrained mine management and miners on their ground control plan and will conduct regular training on the plan. The mine operator will conduct periodic audits and inspections to ensure compliance with the ground control plan. The mine operator has designed and will maintain effective water diversion away from the pit to avoid the accumulation of water in the spoil area.

2. Root Cause: The mine operator did not perform an adequate on-shift examination after a rain event and before miners were assigned to work in the area.

Corrective Action: The mine operator retrained all surface-certified persons on hazard recognition, how to properly conduct an examination, and how to properly record the identified hazards in the approved book.

## CONCLUSION

Between the night of May 16, 2023, and the early morning of May 17, 2023, Able Calvillo, a 64 year-old heavy equipment operator with 16 years of mining experience, died after the bulldozer he was operating became engulfed in spoil material from a slope failure.

The accident occurred because the mine operator did not: 1) follow its established ground control plan for the safe control of spoil banks, and 2) perform an adequate on-shift examination after a rain event and before miners were assigned to work in the area.

Approved by:

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William O'Dell  
District Manager

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Date

## ENFORCEMENT ACTIONS

1. A 103(k) order was issued to NACG Texas, Inc.

A fatal accident occurred on May 17, 2023, at approximately 4:31 a.m. This order is being issued under the authority of the Federal Mine Safety and Health Act of 1977, under Section 103(k) to insure the safety of all persons at the mine, and requires the operator to obtain the approval of an authorized representative of MSHA of any plan to recover any person in the mine or to recover the mine or affected area. This order prohibits any activity in the affected area. The operator is reminded of the obligation to preserve all evidence that would aid in investigating the cause or causes of the accident in accordance with 30 CFR 50.12.

2. A 104(d)(1) citation was issued to NACG Texas, Inc. for violation of 30 CFR 77.1000.

A fatal accident occurred on this mine site between the night of May 16, 2023, and the early morning of May 17, 2023, when accumulated rainwater saturated the top of the 1B ramp, causing the spoil pile material to slide onto the 1B ramp and engulf a Caterpillar D5K bulldozer tasked with clearing the pit roadway. The operator did not follow the water management elements for the stability of the spoil bench, as outlined in their ground control plan. The operator allowed water to accumulate above the spoil piles, contributing to the material slide. The operator engaged in aggravated conduct constituting more than ordinary negligence in that management was aware of the water management elements of its ground control plan, and aware of the excessive water conditions present at the top of the pit, but did not take the necessary actions to prevent or manage the water accumulation. This is an unwarrantable failure to comply with a mandatory standard.

3. A 104(d)(1) order was issued to NACG Texas, Inc. for violation of 30 CFR 77.1004.

A fatal accident occurred on this mine site between the night of May 16, 2023, and the early morning of May 17, 2023, when accumulated rainwater saturated the top of the 1B ramp, causing the spoil pile material to slide onto the 1B ramp and engulf a Caterpillar D5K bulldozer tasked with clearing the pit roadway. The B crew lead supervisor did not perform a complete and thorough on-shift examination of the 1B ramp area and spoils after a rain event. The operator engaged in aggravated conduct constituting more than ordinary negligence in that the supervisor did not examine the top of the spoil area on the northeast side of the 1B ramp and knowingly assigned the bulldozer operator to work inside of the pit to clear the roadway for access. This is an unwarrantable failure to comply with a mandatory standard.

APPENDIX A – Persons Participating in the Investigation

NACG Texas, Inc.

Thomas Shaw	Mine Manager
Mario Resendez	Production Manager
Samuel Hilburn	Maintenance Supervisor
Thomas Jordan	Safety Trainer
Oscar Gomez	Safety Coordinator
Brian Young	Safety Manager
Bernaldo Pena	Operations Supervisor
David Riley	Operations Supervisor
Augustine Gonzales	Production Coordinator
Justin Lopez	Production Coordinator
Curtis Weittenhiller	Engineer Manager
John Seifert	Lead Engineer
Joshua Villalobos	Pumper Supervisor
Carlos Cervantes	Pumper
Jevon Santos	Pumper
Rockie Camacho	Equipment Operator
Kevin Camarillo	Equipment Operator
Carlos DeLeon	Equipment Operator
Luis Eiquileue	Equipment Operator
Brandon Esquivel	Equipment Operator
Tom Escalera	Equipment Operator
Jose Guerra	Equipment Operator
Jason Martinez	Equipment Operator
Allan Richardson	Equipment Operator
Michael Sabina	Equipment Operator
Anthony Salazar	Equipment Operator
Thomas Vega	Equipment Operator
Dusty Wallace	Equipment Operator

Mine Safety and Health Administration

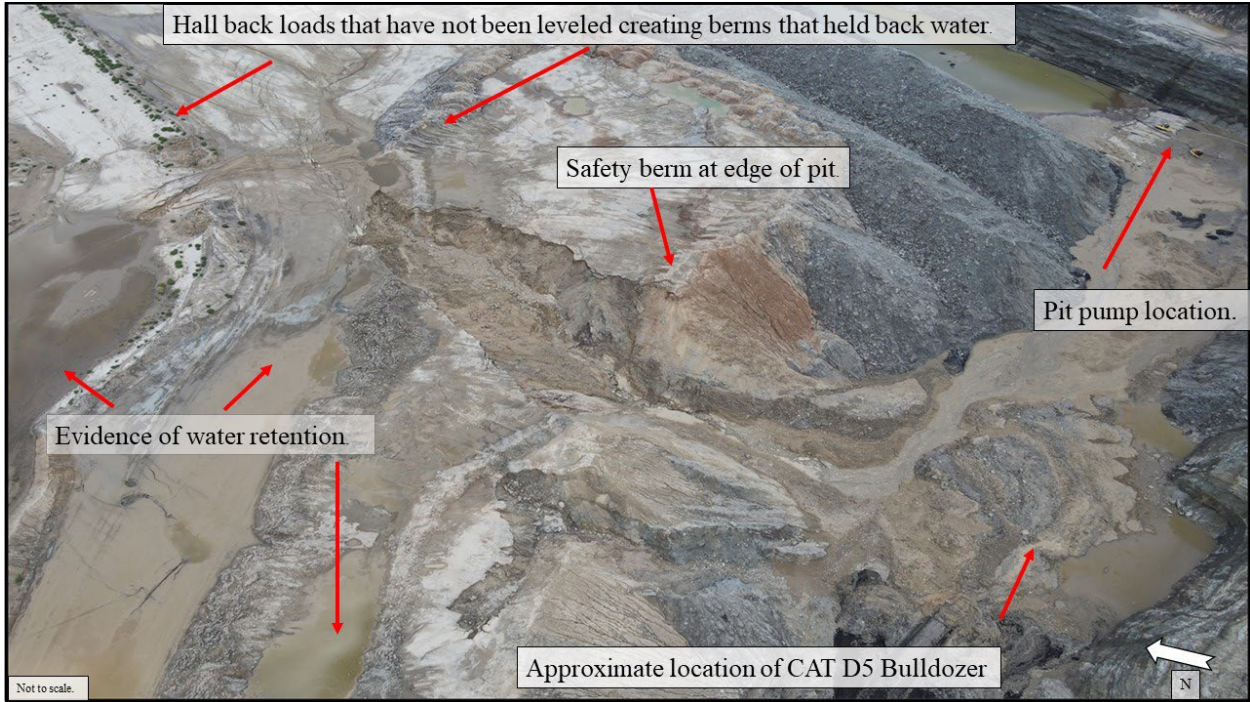
Steven Oates	Staff Assistant
Homer Pricer	Supervisory Mine Safety and Health Inspector
Tommy Fitzgerald	Mine Safety and Health Specialist
Armondo Moreno	Mine Safety and Health Inspector
Jerry Anguiano	Mine Safety and Health Training Specialist
Darren Blank	Supervisory Civil Engineer, Technical Support
Rodi Murad	Civil Engineer, Technical Support

APPENDIX B – View along the South Slope of Spoil Bank

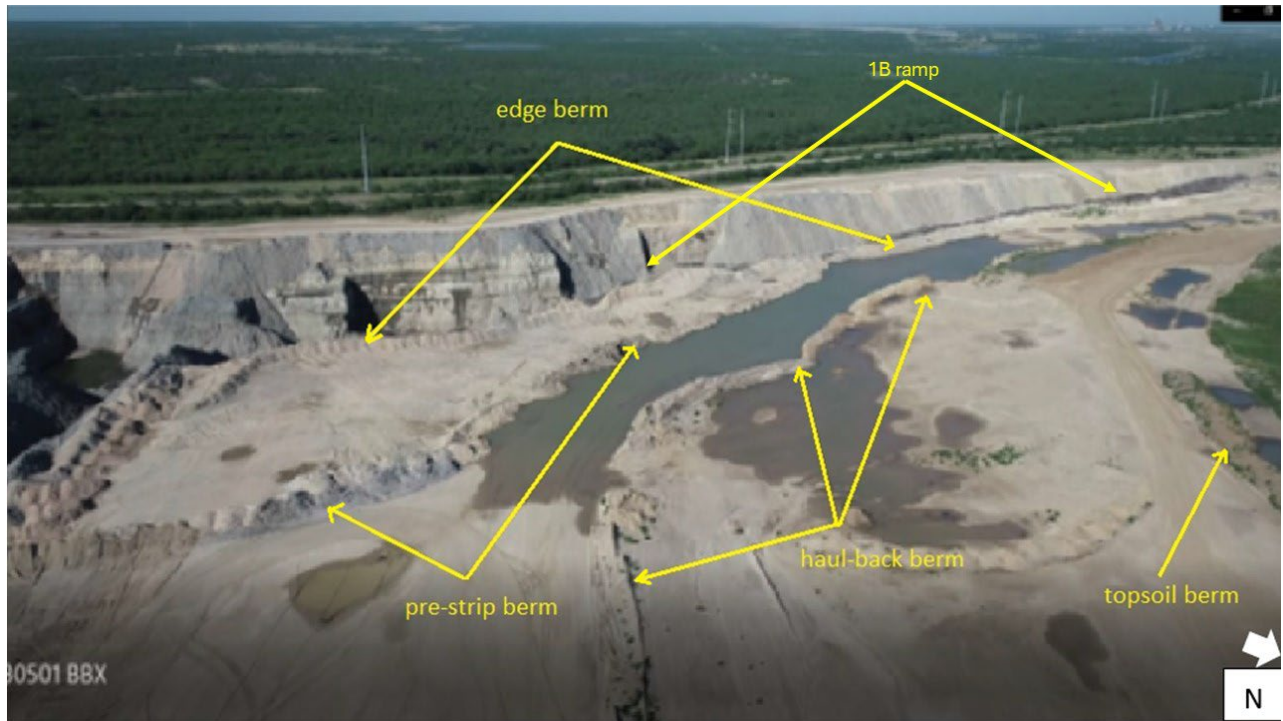


The 1B ramp spans from the top of the pit (top of photo) down to the pit floor (bottom of photo)

APPENDIX C – Aerial Views of the Accident Site



APPENDIX D – Top of the Spoil Bank with Impounded Water



The 1B ramp is located between the spoil bank and highwall (south of the spoil bank).