### UNITED STATES DEPARTMENT OF LABOR MINE SAFETY AND HEALTH ADMINISTRATION

#### **REPORT OF INVESTIGATION**

Surface Dredge Coal (Bituminous)

Fatal Drowning Accident December 29, 2018

Coalview Centralia LLC (A5961) Centralia, Washington

at

Trans Alta Centralia Mining LLC Centralia Coal Mine Centralia, Lewis County, Washington Mine ID No. 45-00416

Investigators

Randy Cardwell Supervisory Inspector

Benjamin C. Burns Mine Safety and Health Inspector

Mathew S. Johnson Mine Safety and Health Inspector

Originating Office Mine Safety and Health Administration Western District 991 Nut Tree Road Vacaville, CA 95687 Donald R. Vickers, Acting District Manager

Table of Contents

OVERVIEW
GENERAL INFORMATION
DESCRIPTION OF THE ACCIDENT
INVESTIGATION OF THE ACCIDENT
DISCUSSION
Location of the Accident
Suction Dredge
Suction Dredge Operation
Suction Dredge Condition5
Daily Inspections
Weather7
Training and Experience7
ROOT CAUSE ANALYSIS
CONCLUSION
ENFORCEMENT ACTIONS
APPENDIX A
APPENDIX B11
APPENDIX C12
APPENDIX D



### **OVERVIEW**

Caleb J. Brown, a 25-year-old Plant Operator with 21 weeks of experience, drowned on December 29, 2018 at 7:59 p.m., after the suction dredge he was operating sank in an impoundment pond.

The accident occurred because: 1) the mine contractor did not have sufficient policies or procedures to maintain the suction dredge's pontoons, bilge pumps, and dredge operator's compartment doors to safely conduct mining operations, and 2) the mine contractor conducted inadequate on shift examinations and took no action to correct hazardous conditions.

#### GENERAL INFORMATION

Trans Alta Centralia Mining LLC (Trans Alta) owns and operates the Centralia Coal Mine (Centralia), a surface coal processing operation located near Centralia, Lewis County, Washington. Trans Alta operates 7 days per week with 4 crews alternating 12-hour shifts, (4 days on and 4 days off), and employs 12 miners. Fine coal slurry is reclaimed from onsite impoundments, processed and mixed with coal shipped by rail to the plant from various locations in the western United States. The material is used by a coal-fired power generation plant.

Coalview Centralia LLC (Coalview) is a contractor hired by Trans Alta to suction dredge fine coal refuse from Centralia's impoundments. The contractor operates 5 days per week with two 12-hour shifts per day and employs 23 miners.

The principal officers for Trans Alta at the time of the accident were:

Bob Nelson	President
Mickey Dreher	Treasurer

The principal officers for Coalview at the time of the accident were:

Roger Fish	President
James Krause	Plant Manager

The Mine Safety and Health Administration (MSHA) started the last regular inspection at this operation on November 26, 2018 and completed it on February 19, 2019. MSHA last inspected the dredge on November 29, 2018.

The non-fatal days lost (NFDL) incidence rate for the mine for 2017 was zero (0) compared to the national average of 0.78 for mines of this type.

### DESCRIPTION OF THE ACCIDENT

Caleb J. Brown began his shift on December 29, 2018, at approximately 6:00 p.m. Ronald Coleman, Night Shift Supervisor, conducted a safety meeting with the night shift workcrew: Brown; Gregory Raley, Plant Operator; Mathew Rumley, Plant Operator; and Steven Strasser, Plant Operator. Employees rotated positions every three to four hours during the shift, in accordance with Coalview's procedures. Brown operated the suction dredge, Raley went to the control room, and Rumley and Strasser were the groundsmen for the first rotation.

At approximately 6:30 p.m., after the safety meeting, Brown drove out to the impoundment, referred to as pond 3C (see Appendix A), to begin operating the suction dredge and relieve William Bachman, Plant Operator. Bachman stated in his interview that when Brown relieved him, he told Brown that the walking surface of the starboard side of the stern pontoon was around one inch below the water surface. Bachman released some tension on the stern-line and brought the pontoon up about four inches above the water line. Bachman then left the suction dredge, but

returned when he discovered that he left his portable radio. Brown handed Bachman the radio and Bachman left the suction dredge.

Approximately 6:53 p.m., Raley radioed Brown to relay flow information, and Brown told Raley that he was going to see clear water, because he was going to pump out the pontoon. The investigators found a portable bilge pump in the starboard compartment of the stern pontoon. (See Appendix B) Based on the location of the portable pump, the investigators concluded that Brown intended to pump the stern pontoon.

At approximately 7:14 p.m., Raley noticed that the output from the suction dredge had dropped off. He attempted to radio Brown, but received no response. At that time, Rumley and Strasser were checking a light plant near the power box for the suction dredge, Rumley noticed that the power indicator lights were not on. Strasser radioed Raley alerting him that there was no power to the dredge and that he could not see the dredge. At this time, Rumley traveled by boat to check on the dredge. When Rumley reached the location of the dredge, he found it had sunk with only the A-frame protruding out of the water. Rumley radioed Coleman, who notified Brian Casperson, Trans Alta's Shift Supervisor, and asked him to call for help. Coleman and Strasser also joined in the search for Brown by boat.

Casperson called for emergency responders at 7:54 p.m. The fire department, law enforcement and emergency medical services arrived and continued to search for Brown. At approximately 10:28 p.m., rescuers halted search efforts because of the weather and poor visibility. The search resumed during the daylight hours on December 30, 2018. Law enforcement officers called rescue divers from Thurston County, Washington. The rescue divers located Brown, who was wearing a flotation device, at approximately 2:35 p.m. in the dredge operator's compartment. The interviews with the divers revealed that they had a difficult time opening the dredge operator's compartment door. They recovered the victim and turned him over to the Lewis County Coroner for an autopsy. The medical examiner determined that the cause of death was from drowning.

### INVESTIGATION OF THE ACCIDENT

On December 29, 2018, at 7:50 p.m., Roger Fish, Coalview's President, contacted the Department of Labor's National Contact Center (DOLNCC), to notify MSHA that a miner was unaccounted for and possibly trapped in a suction dredge. DOLNCC notified Melvin Palmer, MSHA's Kent Field Office Supervisory Inspector, of the accident at 8:05 p.m. Palmer dispatched John Uriona, MSHA Inspector, to the mine and the investigation started the next day. Upon arrival, Uriona issued an order under the Section 103(k) of the Mine Act to secure the scene and ensure the safety of the miners.

MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident site, interviewed miners, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management and contractors. See Appendix C for persons participating in the investigation.

Coalview took over two months to contract Global Diving and Salvage Inc., a maritime salvage company to recover the suction dredge. The recovery process began on March 4, 2019. They

recovered the suction dredge and brought it to a prepared examination area on April 11, 2019. The recovery was hampered by the dredge being stuck in the several feet of coal slurry.

Johnathan Hall, MSHA's Approval and Certification Center Mechanical Engineer, arrived on April 16, 2019, to begin assessment of the condition of the suction dredge. Jordan Rose and Robert Bates, MSHA's Pittsburgh Safety and Health Technology Center Electrical Engineers arrived on April 30, 2019, to assess the electrical distribution system.

#### DISCUSSION

### Location of the Accident

The accident occurred in a coal refuse impoundment identified as pond 3C. The maximum depth of the pond is approximately 30 feet and investigators estimate the depth where the dredge sank was 21 feet.

#### Suction Dredge

Investigators were unable to determine the manufacturer and the year of manufacture of the suction dredge. There was a weld bead on the starboard side of the center hull section with the letters and numbers WB133MIF0493. This was the only identification marking on the suction dredge, and investigators were not able to track it or find any information on the dredge searching various databases.

Coalview purchased the suction dredge in 2015, from Dredge Central of Goodlettsville, Tennessee. It is approximately 72 feet long and 17 feet wide. It consists of four sections with flotation: the starboard pontoon; the port pontoon; the stern pontoon; and the center hull (See Appendices B and D). The starboard and port pontoons had four sealed compartments each. The stern pontoon had two sealed compartments. The center hull does not seal. Other major components include the cutter head assembly, the A-frame that supports the cutter head, and the dredge operator's compartment.

When Coalview purchased the suction dredge, it was equipped with a diesel engine. At Coalview's request, Dredge Central replaced the diesel engine with four electric motors. Dredge Central also added the stern pontoon, the electrical transformer on top of the stern pontoon, and the Motor Control Center (MCC) on top of the stern end of the center hull. Water was added to the first compartment on the starboard side pontoon to counter-balance the electrical transformer that was added to the portside stern pontoon when the suction dredge was modified from a diesel suction dredge, to an electrical suction dredge.

Coalview runs a 7200 volt power cable from the shore to the electrical transformer to provide power to the suction dredge.

Suction Dredge Operation

The suction dredge does not have conventional vessel controls or a propeller. Three winches control the suction dredge location by reeling in or spooling out cables attached to anchor points on the shore. The stern winch is located at approximately the center of the stern pontoon, in an elevated position, and next to the transformer. The front starboard and port winches are mounted at the front of the dredge operator's compartment.

The suction dredge recovers coal slurry from the bottom of the impoundment. The slurry is a mixture of water, coal fines, rock, and clay or dirt. The cutting head is lowered into the water from the A frame by a winch. The weight of the cutter head assembly caused the suction dredge trim to change. As the cutter head assembly lifts up, the bow (forward part of the hull) of the suction dredge lowers in the water and as the cutter head assembly lowers, the bow of the suction dredge lifts up and the stern of the suction dredge lowers into the water. Based on statements made during investigation interviews, investigators learned that portions of the deck were underwater, at times, during normal operation.

A large slurry pump, powered by a 500 horsepower electric motor, pulls the material loosened by the cutting head into the inlet pipe. The slurry pump pushes the slurry into a discharge pipe on the suction dredge.

#### Suction Dredge Condition

#### Pontoons & Compartments:

Investigators conducted tests for leaks on nine of the ten pontoon compartments. Damage sustained to the port side of the stern pontoon during recovery of the suction dredge made it impossible to test the port side compartment on the stern pontoon. The rubber seals on the ten hatch covers for the pontoon compartments were hardened and flat along the outer edges, preventing the hatches from getting a positive seal. Prior to testing, investigators removed a mixture of mud, coal slurry, rust, and water from each compartment. Investigators filled the nine undamaged pontoon compartments with water and documented any leaks.

Investigators determined that the first and fourth compartments on the starboard pontoon leaked. A pipe with a valve that did not fully close allowed water to flow between the third and fourth compartments. Pontoons should be kept independent of each other in case if one pontoon fails the other pontoons would continue to float.

The number four compartment of the starboard pontoon had an area of deterioration on its bottom outside weld seam that measured 31 inches long. Within that 31 inches of affected area, there were two, approximately 6.5 inches long cracks, and an approximately 0.5 inch hole located between the cracks. The hatch that secured the starboard compartment on the stern pontoon was missing. Brown appears to have been pumping water from the starboard compartment using a portable electric sump pump, as investigators found the pump with electrical cord and discharge hose here. Testing did not reveal any leaks in this compartment. The other nine hatches were in place and secured.

#### Bilge Pumps:

Two of the three built-in, float-equipped bilge pumps in the center hull were missing. The port and starboard bilge pumps on the bow end of the hull had been removed. The third portside aft bilge pump was not functional. Appendix B shows the three pumps with labels PF (Pump Forward), PL (Pump Left), and PR (Pump Right).

Investigators identified a hose that connected the sump pump in the stern end of the hull to its outlet pipe that discharges outside of the hull and into the pond. This pipe penetrated the stern end of the center hull 43 inches above the bottom. Neither the pipe, the hose, nor the pump included a check valve.

### Equipment Changes:

Coalview replaced the slurry pump that came with the suction dredge with a larger, heavier model. This larger pump required reinforcement of the floor of the center hull to support it. Coalview also replaced electric motors on the suction dredge multiple times after the hull had taken on enough water to submerge and destroy them. These changes added thousands of pounds of additional weight to the suction dredge.

### Dredge Operator's Compartment Doors:

The dredge operator's compartment had a metal door with windows on the starboard and port side. The starboard door did not line up properly with the doorframe and the plunger of the doorknob did not engage the doorframe. Opening and closing the starboard door required significant force. On many occasions during the investigation, investigators had to make multiple attempts to open the starboard door to the dredge operator's compartment. The port side door lined up with the doorframe and the plunger of the knob engaged with the doorframe. However, the plunger was badly worn and came apart during the investigation, and mine personnel reported that both doors routinely stuck closed. Coalview reportedly replaced the entire doorknob assembly about once a year. There was a new replacement assembly on the floor of the dredge operator's compartment, unopened in the original packaging.

### Electrical:

Based on the information gathered during the investigation and the data recorded by Trans Alta, an electrical fault occurred in the 7200 volt dredge circuit at 7:19 p.m. on the day of the accident. The fault was of sufficient magnitude and duration to cause the oil blast circuit breaker in Substation 6 to trip. Vacuum circuit breaker 14, which is located in the switch house near the shore of the settling pond, did not trip during the event because the shunt trip mechanism had been disassembled.

MSHA Mine Electrical Systems Division examined three short segments of Anaconda Brand 1/0 AWG, 8 KV, portable cable that supplied power to the dredge. Their examination found the outer jacket of these segments was damaged, and this damage had allowed water to enter into the interior of the cable. The damage extended into the insulation of one of the phases, but did not penetrate all the way to the copper conductor.

Daily Inspections

The hazardous conditions that were found on the dredge, after it was recovered, were obvious and widespread. Also, management was aware of many of these conditions found on the dredge and continued to operate the dredge by using bilge pumps to remove water from the pontoons and hull. Investigators discovered an electronic file that contained hazardous conditions observed during the mine operator's daily inspections. However, many of these hazardous conditions were not recorded in the preshift/on-shift daily report record book.

### Weather

The weather conditions near the time of the accident were rainy and windy, with a temperature in the mid 40's. The suction dredge operators from prior shifts reported "brown caps", or large waves in the pond.

### Training and Experience

Caleb J. Brown had 21 weeks of experience as a plant operator, all of which were at this mine. On March 20, 2019, Heather Smith, MSHA's Educational Field and Small Mine Services Training Specialist, traveled to the mine and conducted an in-depth review of the mine operator's training records. The training records for Mr. Brown were in compliance with 30 CFR.

### ROOT CAUSE ANALYSIS

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

<u>Root Cause</u>: Mine management allowed several unsafe conditions to exist on the dredge. There were leaks in several compartments of the starboard pontoon. Efforts to correct the leaks were unsuccessful, forcing miners to pump the pontoons and hull on a regular basis. The combination of the water already in the starboard pontoon and hull, water entering through the open stern hatch and the stormy weather caused the dredge to sink.

<u>Corrective Action</u>: The dredge has been taken out of service and is being evaluated for salvage / scrap value. The operator has submitted a new operating plan, which must be approved by the District Manager before any mining activities can resume.

Root Cause: Mine management did not correct hazards found during examinations.

<u>Corrective Action</u>: The dredge has been taken out of service and is being evaluated for salvage / scrap value. The operator has submitted a new operating plan, which must be approved by the District Manager before any mining activities can resume.

### CONCLUSION

Caleb J. Brown drowned after the suction dredge he was operating sank in an impoundment pond. The accident occurred because: the mine contractor did not have sufficient policies or procedures to maintain the suction dredge's pontoons, bilge pumps, and dredge operator's compartment doors to safely conduct mining operations; and the mine contractor conducted inadequate on shift examinations and took no action to correct hazardous conditions.

Date:\_\_\_\_\_

Approved: \_\_\_\_\_ Donald R. Vickers Acting District Manager

### ENFORCEMENT ACTIONS

1. A 103(k) Order No. 9371818 was issued to Trans Alta Centralia Mining LLC on 12/29/2018.

An accident occurred at this operation on 12/29/2018 at approximately 1935. As rescue and recovery work is necessary, this order is being issued, under Section 103(k) of the Federal Mine Safety and Health Act of 1977, to assure the safety of all persons at this operation. This order is also being issued to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity at the Pond 3C Site until MSHA has determined that it is safe to resume normal mining operations in this area. This order applies to all persons engaged in the rescue and recovery operation and any other persons on-site. This order was initially issued orally to the mine operator on 12/29/2018 at 2010 and now has been reduced to writing. This order was terminated after conditions that contributed to the accident no longer existed.

 A 104(d)(1) Citation No. 8568345 was issued to Coalview Centralia LLC for a violation of 30 CFR 77.404(a).

A fatal accident occurred on December 29, 2018, when the dredge sank in approximately 21 feet of water and the operator drowned. The dredge operator had called out over the radio that he was going to clear water and was going to pump water out of a pontoon. When water stopped flowing to the processing plant from the dredge, two miners were sent to Pond 3C and found the dredge was sunk. The dredge was found to have unsafe conditions that allowed the inflow of water into the pontoons and hull.

3. A 104(d)(1) Order No. 8568346 was issued to Coalview Centralia LLC for a violation of 30 CFR § 77.1713(a).

A fatal accident occurred on December 29, 2018, when the dredge sank in approximately 21 feet of water and the operator drowned. The dredge operator had called out over the radio that he was going to clear water and was going to pump water out of a pontoon. When water stopped flowing to the processing plant from the dredge, two miners were sent to Pond 3C and found the dredge was sunk. Mine management did not correct hazards found during daily on-shift examinations.

4. A 104a Citation No. 8568347 was issued to Trans Alta Centralia Mining LLC for a violation of 30 CFR 77.404(a).

A fatal accident occurred on December 29, 2018, when the dredge sank in approximately 21 feet of water and the operator drowned. The dredge operator had called out over the radio that he was going to clear water and was going to pump water out of a pontoon. When water stopped flowing to the processing plant from the dredge, two miners were sent to Pond 3C and found the dredge was sunk. The dredge was found to have unsafe conditions that allowed the inflow of water into the pontoons and hull.

# APPENDIX A Diagram of the 3C pond



APPENDIX B Diagram of pump and leak locations



Typical water level (freeboard) on Starboard side @ back (stern), 6 inches.

Typical water level (freeboard) on Port side @ stern, around 12 inches.

### APPENDIX C Persons Participating in the Investigation (Persons interviewed are indicated by a \* beside their name)

# Trans Alta Centralia Mining LLC

*Dennis Morr	Environmental Specialist
*Todd Wilson	Coal Yard Shift Supervisor
*Brian Casperson	Shift Supervisor
Joe Cavin.	Reclamation Supervisor
Ken Johnson	Engineering Supervisor
*Ryan Morgan	Electrical Supervisor
*Ian Lucas	Electrician

### Coalview Centralia LLC (A5961)

*Justin Livingston	Electrician
*Gregory Raley	Plant Operator
*Timothy Richardson	Day Shift Supervisor
*William Bachman	Plant Operator
*Neal Amos	Plant Operator
*Glen Womack	Plant Operator
*Mathew Rumley	Plant Operator
*Steven Strasser	Plant Operator
*Ronald Coleman	Night Shift Supervisor
*Joseph Cavin	Reclamation Supervisor
*Robert Dalmeny	Plant Operator
*Marvin Johnson	Plant Operator
*Jake Holmes	Plant Operator
*Micheal Mielitz	Relief Supervisor/Operator
*Jori Bensching	Shift Supervisor
*Christopher Wolfe	Plant Operator
*Blake West	Plant Operator
*Anthony Sambrano	Plant Operator
*James Krause	Plant Manager
*Roger Fish	President

### Dredge Central

*James MorrisG	eneral Manager
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# B&B Electric

*John	Battle	Electrician/Owner
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# Lewis County Sherriff's Office

Alan Stull	Sergeant
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# Lewis County Coroner's Office

Warren McLeod.	.Coroner
Sandra Peck	Deputy Coroner.

# Global Diving and Salvage Inc.

Kris Lindberg	Salvage Master
Chris Sharer	Dive Supervisor
Tracy Crawlick	Site Safety

### Mine Safety and Health Administration

Randy Cardwell	Supervisory Inspector
Benjamin Burns	Mine Inspector
Mathew Johnson	Mine Inspector
John Uriona	Mine Inspector
Joshua Mathisen	Mine Inspector
Melvin Palmer	Supervisory Inspector
Johnathan Hall	Mechanical Engineer
Heather Smith	Training Specialist
Kevin Hirsch	Assistant District Manager
Jordan Rose	Electrical Engineer
Robert Bates	Electrical Engineer

### APPENDIX D

# Dredge Diagram



Figure 2: Overhead view of dredge. Major components and compartments are shown. Small round circles indicate hatch covers. Red circle indicates hatch open at time of accident. The operator's Compartment is not shown.