



# Nutrien Cory Service Shaft Cable Failure

Cory Potash Safety Share

Presenter: Tim Sirois

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Remedial Actions



# Summer Maintenance Shutdown Planning

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Cory's summer maintenance shutdown was scheduled for June 30<sup>th</sup> to July 27<sup>th</sup> 2019.

This is a compressed window of opportunity to complete as much hoist maintenance as possible.

Single egress application for 2019's summer shutdown:

- Production hoist PLC upgrade July 1<sup>st</sup> to July 14<sup>th</sup>

# Shaft Feeder Cable History

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# Original Shaft Feeder

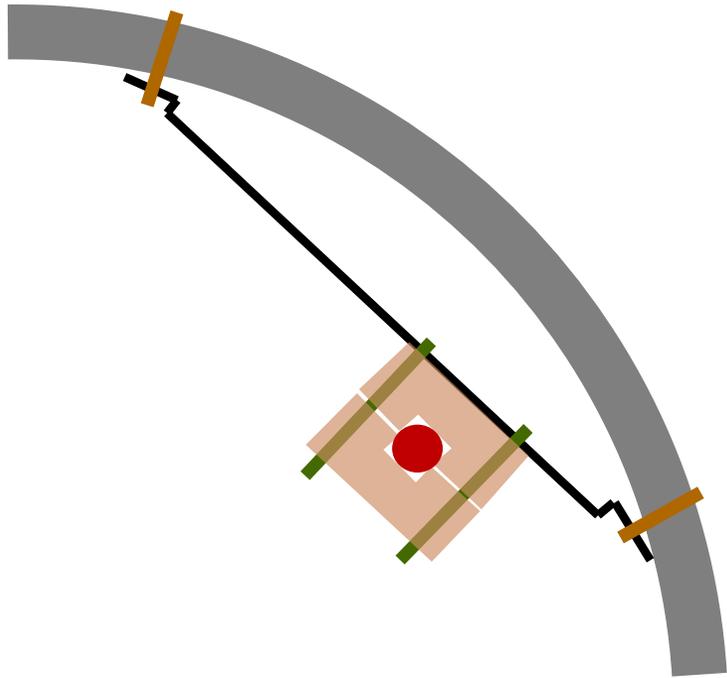


Both of Cory's shafts contained original 13.8kV shaft feeder cable that was commissioned in 1969

New shaft feeder cables were installed in Service Shaft in 2010 and Production Shaft in 2011

The original 13.8kV cable was decommissioned in 2012 and since then has been on the shaft crew's list to remove from both shafts.





Metal brackets with keyholes are anchored to the concrete lining every 20ft vertically . Bolts are fed through the keyholes to support two wood blocks that pinch the 13.8kV cable in place.

Most of the blocks in the upper shafts have 6-18 inches of built up mud on top of them.

Over the years some of the blocking has been removed and there are longer stretches of cable that are unsupported.



At the 2700ft mark the shaft crew had previously cut out a piece of the cable for testing. It is believed this was cut 6 months prior to the incident. The piece was to be used for testing of new hydraulic cutters.

Previous cable removals would start with a shaft inspection and removal of any loose debris on the cable. Next a Sawzall would be used to cut the cable and bring 10 ft sections on the work deck before making the next cut





- The advantage of hydraulic cutter is to reduce the shaking and vibrations on the 13.8kV cable to reduce the potential of debris falling towards the operators.



# Sequence of Events



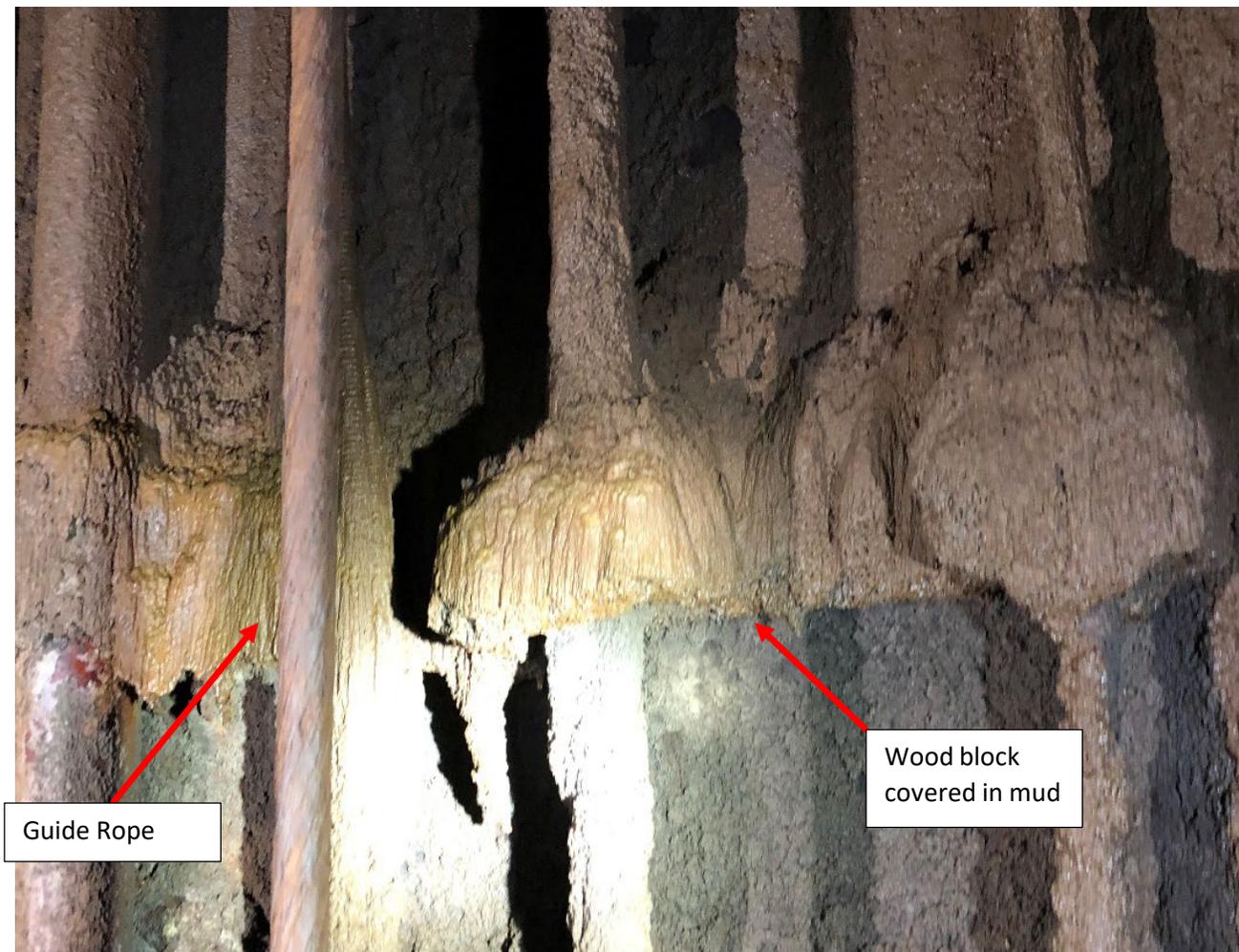
# Sequence of Events



July 1 – ABB began removing hoist controls from the production hoist

July 2 – Shaft crew completes regular compliance work throughout the shift

July 2 @ 2:00pm – Shaft crew went into the shaft to **test** hydraulic cutter



# Pictures of the 13.8kV cut point



The cable fell an approximate distance of 650ft. Between 1350 ft and the 2000 ft mark, the cable ripped through 24 blocks including one newer bracket and steel block.



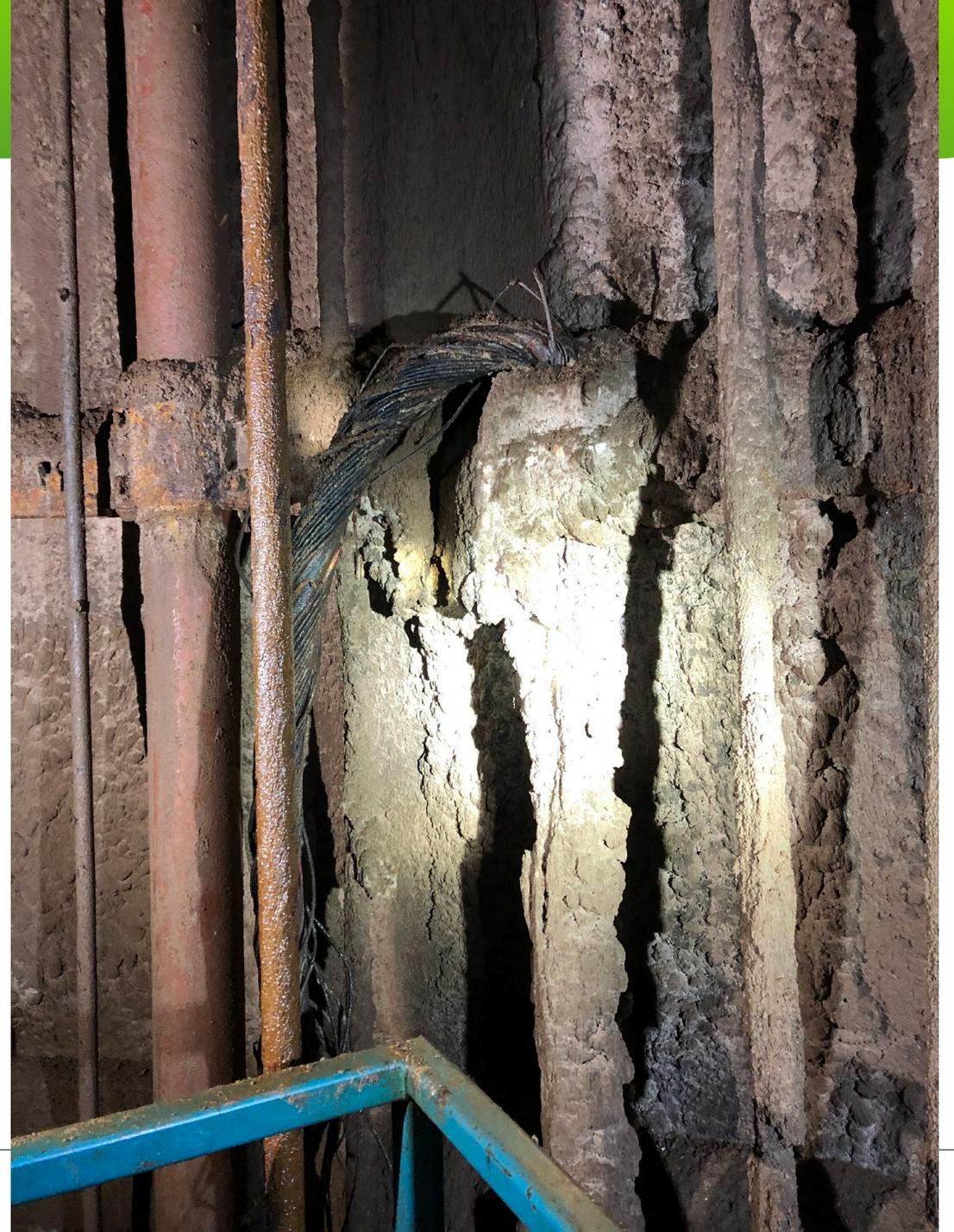
The cable fell through the tubing section and the blocking through it.



# Cable Arrested

The 13.8kV cable ripped through 24 blocks before being arrested by, a presumed, wood block with calcium build up around the block. The calcium build up is from leaks in the shaft lining just above the area.

The brackets are spaced down the shaft every 20ft, suggesting that there should have been 32 blocks holding the cable in place but, only 75% of the blocks were intact prior to incident.



# Cable arrested in calcium coated wood block



Cable ripped itself apart



# Balance Ropes

The balance ropes caught roughly 565 ft of the fallen 13.8kV cable. A weight estimated at 4520 lbs.

The service cage with 4 workers were stranded in the shaft and 32 workers were underground with no egress. (2:00 pm July 2)

The 32 workers in the mine were stood down and not allowed to work on removing the 13.8kV cable as there would be no way to get them out of the mine in the event of an injury.

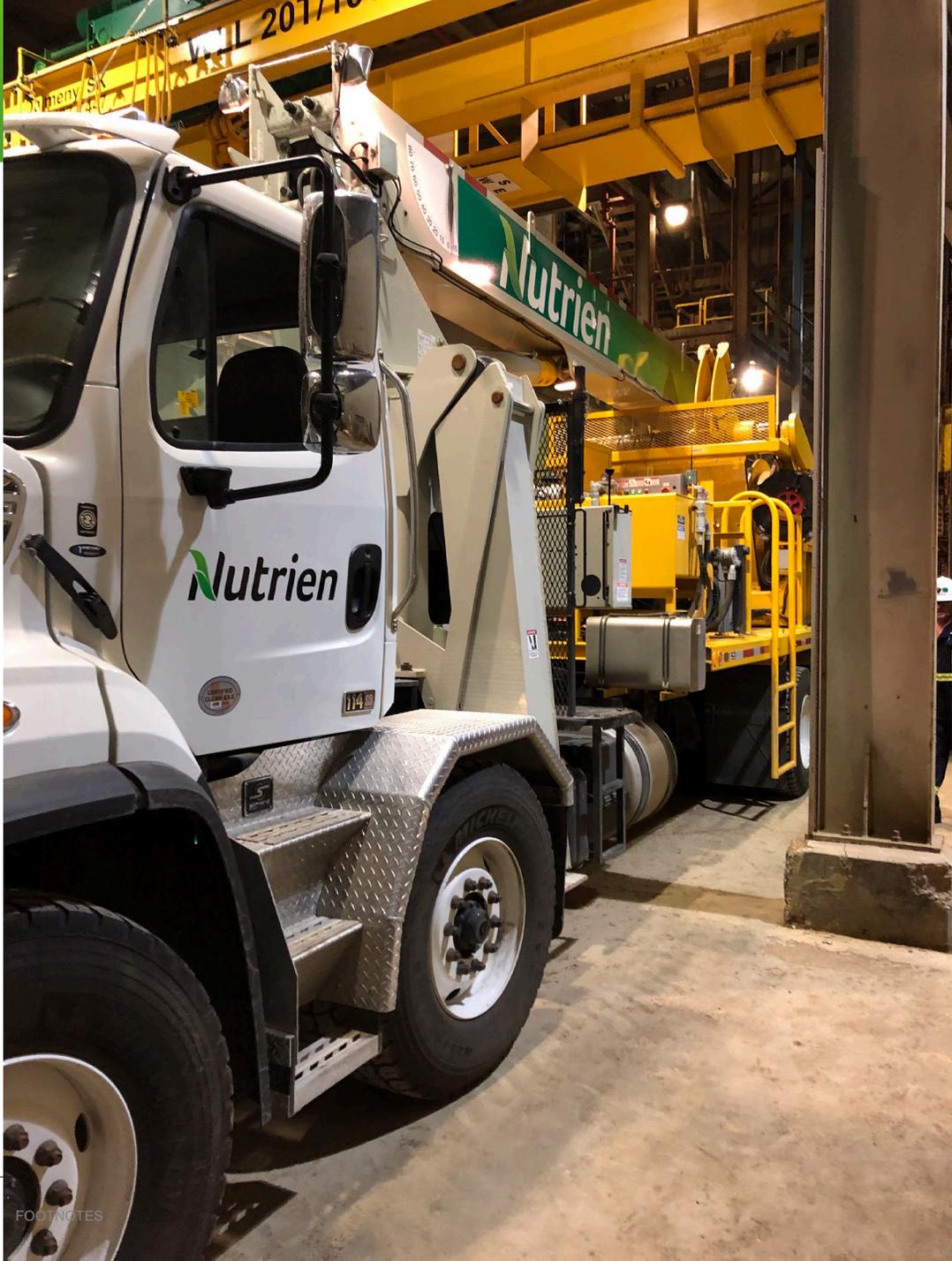


# Service Shaft Rescue

- The emergency hoist shared with other potash sites and stored at Lanigan was delivered at 6:00 pm (4 hrs of no egress)
- The decision was taken to wait for the Rocanville Emergency Hoist because of fewer risks of working over the open whole of the service shaft with workers on the work deck
- When the call to Rocanville went out, its was just after the shaft crews regular hours ended. Without hesitation the crew returned to the Rocanville site to pick up the emergency hoist truck
- The Rocanville Emergency Hoist arrived on site at 10:30 pm



March 24, 2020



# Preparation for Rescue

9.5 hours after cable failure

External Pressure

Internal Pressure

Take the time to assess the situation



# Service Shaft Rescue

- 2 rescue personnel were sent down to retrieve the stranded workers on the service shaft work deck
- 3 trips in total to bring the workers up
- All workers were out of the service shaft at 12:45 am July 3<sup>rd</sup> (almost 11 hours after the incident)





# Reestablishing Egress



The production hoist was brought back into operation at 5:30 pm July 3<sup>rd</sup> (26.5 hours after stand down)

All personnel were up from underground by 7:00 pm July 3<sup>rd</sup> (28 hours after stand down)

Underground resumed shutdown work on July 4<sup>th</sup> with permission from the branch to operate in single egress for the purpose of removing the 13.8kV cable caught in the balance ropes.

The balance ropes were freed of the 13.8kV cable the next day. Some damage was evident to the balance ropes and so they were changed out inside of the summer shutdown.

Ensure all single egress applications to the Mines Branch have wording to discuss that no work outside of compliance work will be conducted in the single egress shaft.

Collaborate with other sites to develop guidelines for removing, installing, and handling services and infrastructure in the shaft.

Site procedures must be developed and approved by the Shaft General Foreman prior to removing, installing, or handling infrastructure in the shaft.

Explore the opportunities for the procurement of a new emergency hoist for the Saskatoon area Nutrien Mines.

## Pre-job hazard identification

Under pressure, even internal, take the time to properly assess the situation

Recognize the contributions from the team:

- Rocanville Shaft Crew
- ABB contractors
- Cory Mine Electrical Engineering group
- Everyone else who took part in the rescue efforts

# Questions

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