McElroy Mine Shaft Explosion Investigation Summary

*This presentation is for illustrative and **general** educational purposes only and is not intended to substitute for the official MSHA Investigation Report analysis nor is it intended to provide the sole foundation, if any, for any related enforcement actions.*

Overview

- At 1:00 a.m. on January 22, 2003, an explosion occurred inside the 5 South #2 Airshaft being constructed for the McElroy Mine by Central Cambria Drilling Company.
- Six miners were inside the shaft at the time of the explosion. The explosion fatally injured three miners and seriously injured three others.

General Information

- The McElroy Mine is operated by McElroy Coal Company, a subsidiary of CONSOL Energy Inc.
- CONSOL awarded Central Cambria Drilling Company a contract to construct the 5 South #2 Airshaft on October 5, 2001.
- CCD is headquartered in Ebensburg, Pennsylvania.
- CCD has been constructing shafts and slopes since 1973.
- The 5 South #2 Airshaft was the only active CCD construction operation at the time of the accident.

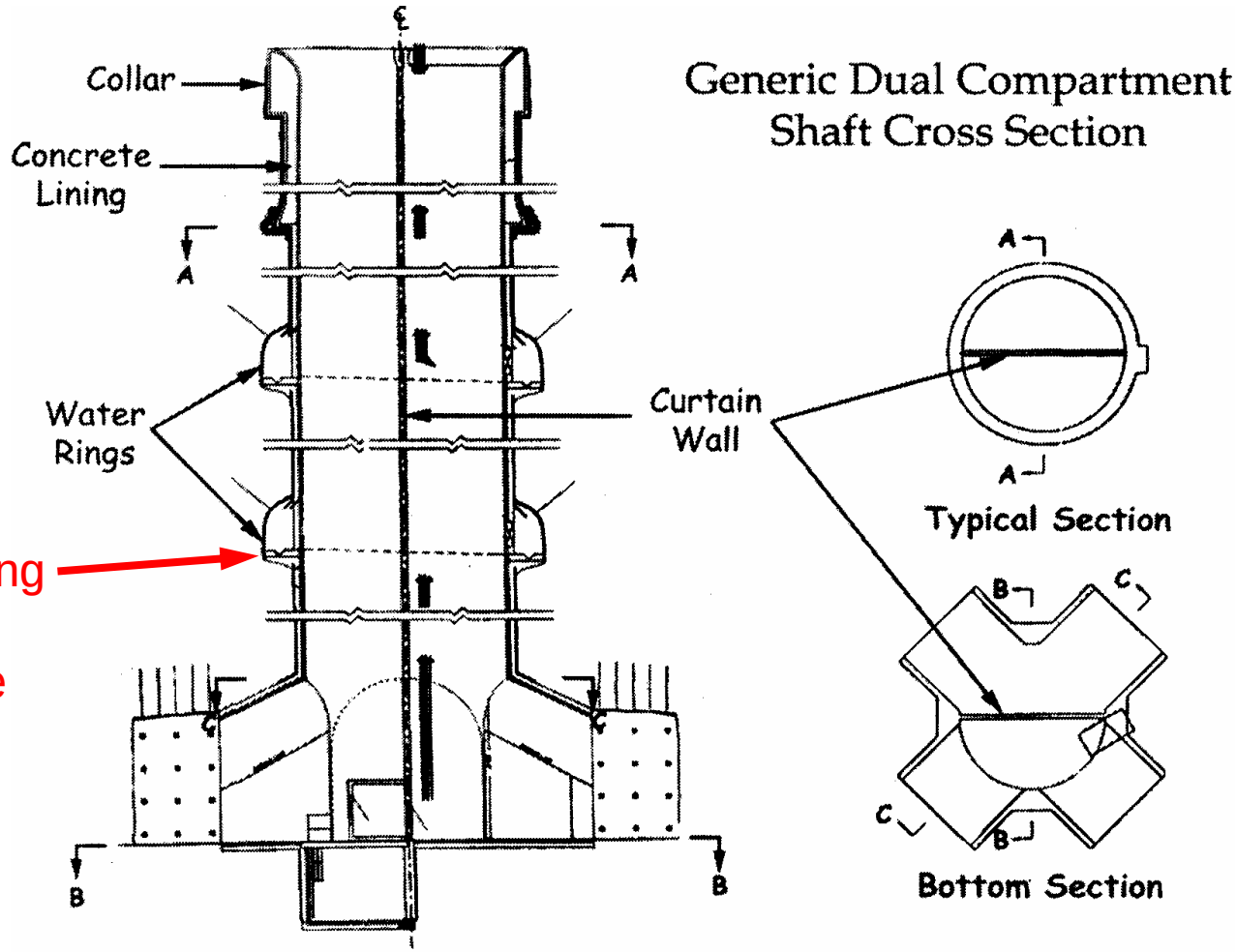
5 South #2 Airshaft

Construction started December 2001 by conventional shaft sinking methods.

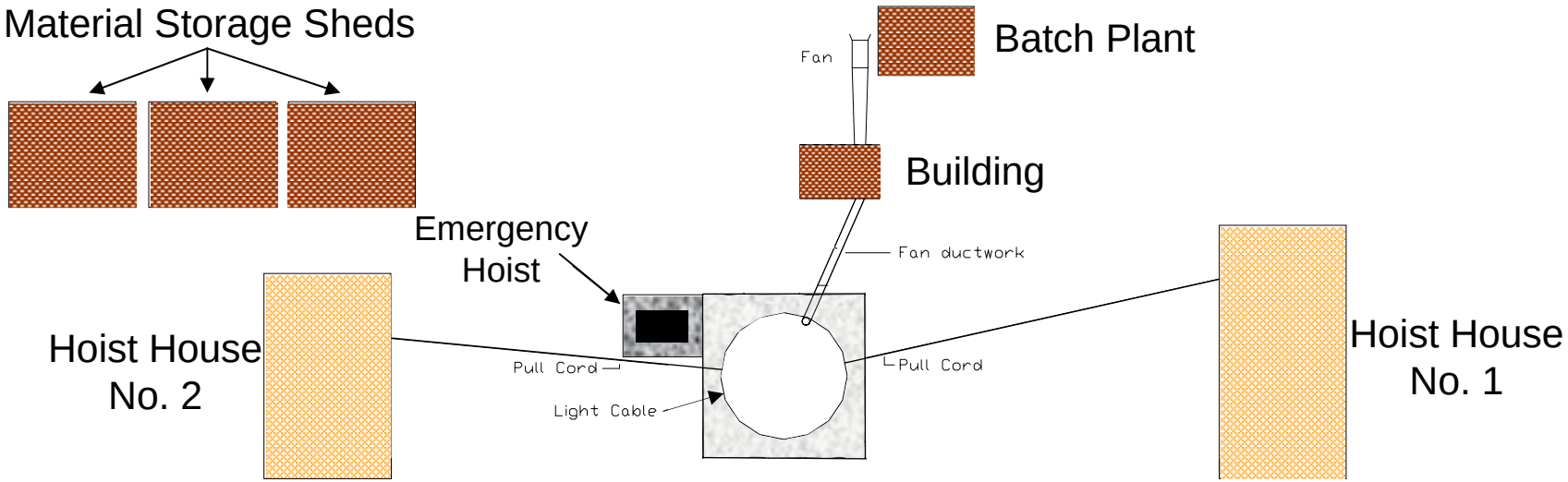
Shaft Specifications:

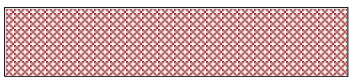
- Diameter - 24 Feet I.D.
- Two compartment airshaft.
- Depth - 1,018 Feet.
- Minimum concrete wall thickness - 9 Inches.
- Two water rings.

Water ring being constructed at the time of the accident.

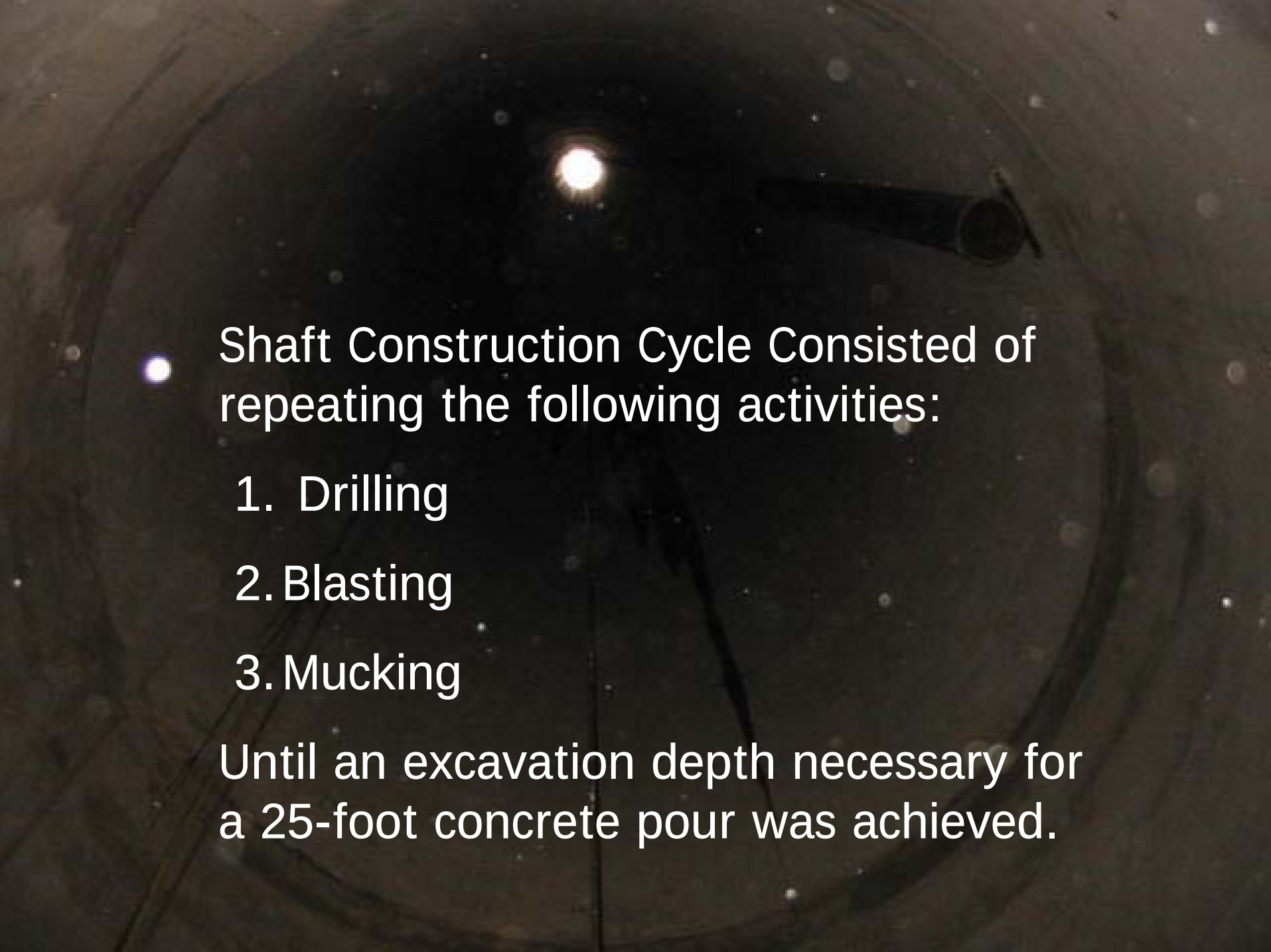


Central Cambria 5 South #2 Airshaft Construction Site





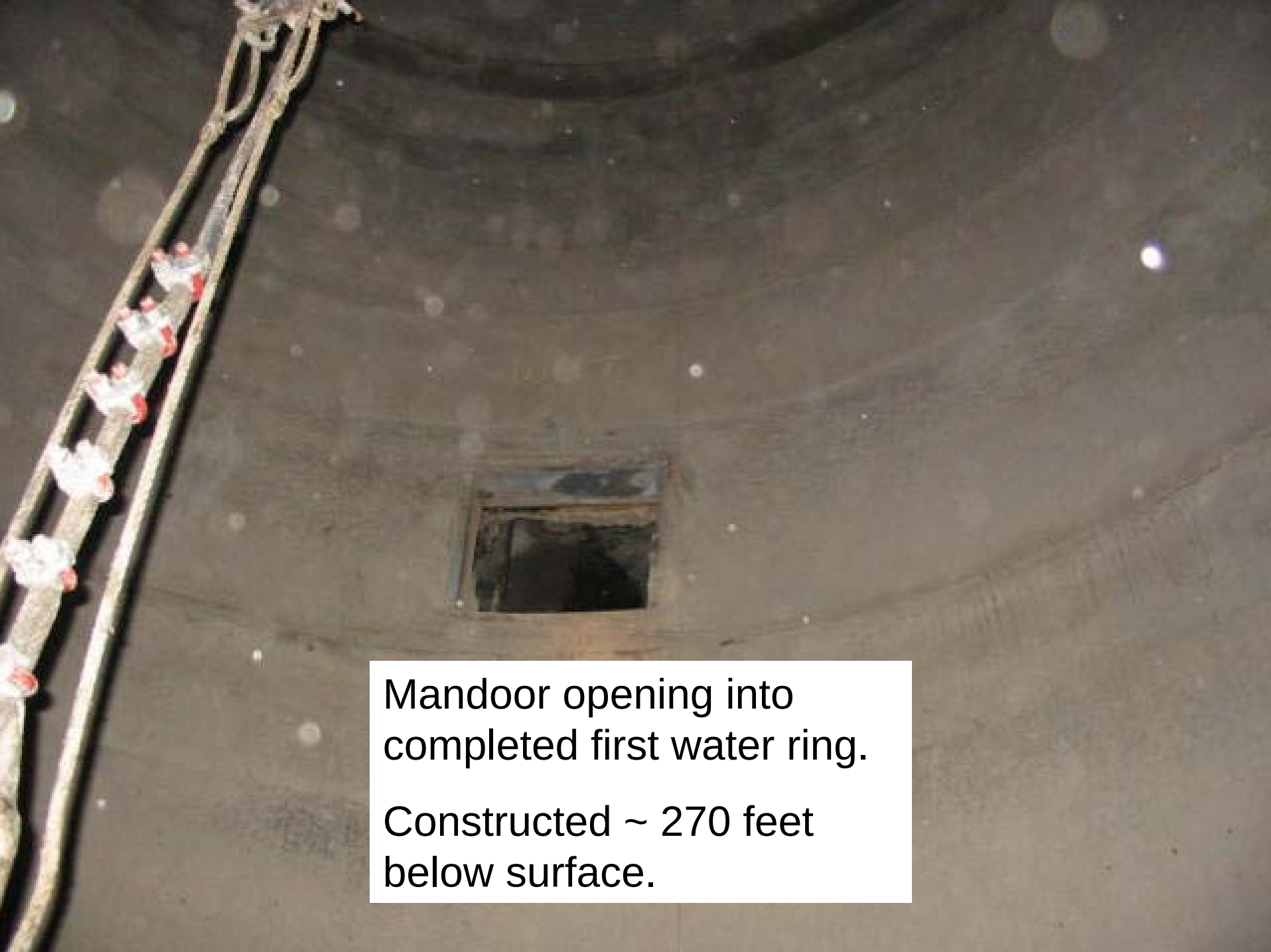
Office Trailer/Dry House



Shaft Construction Cycle Consisted of repeating the following activities:

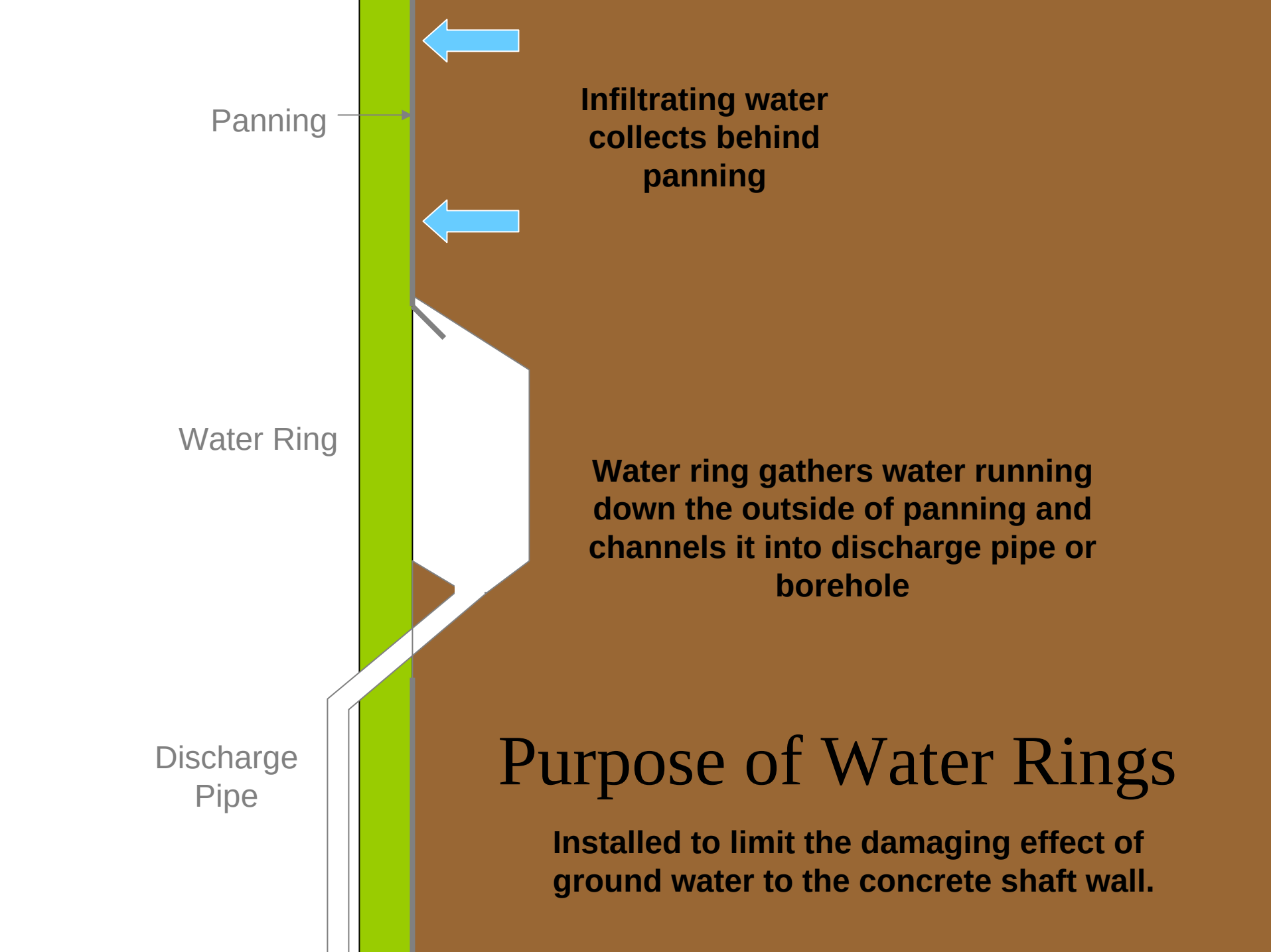
1. Drilling
2. Blasting
3. Mucking

Until an excavation depth necessary for a 25-foot concrete pour was achieved.



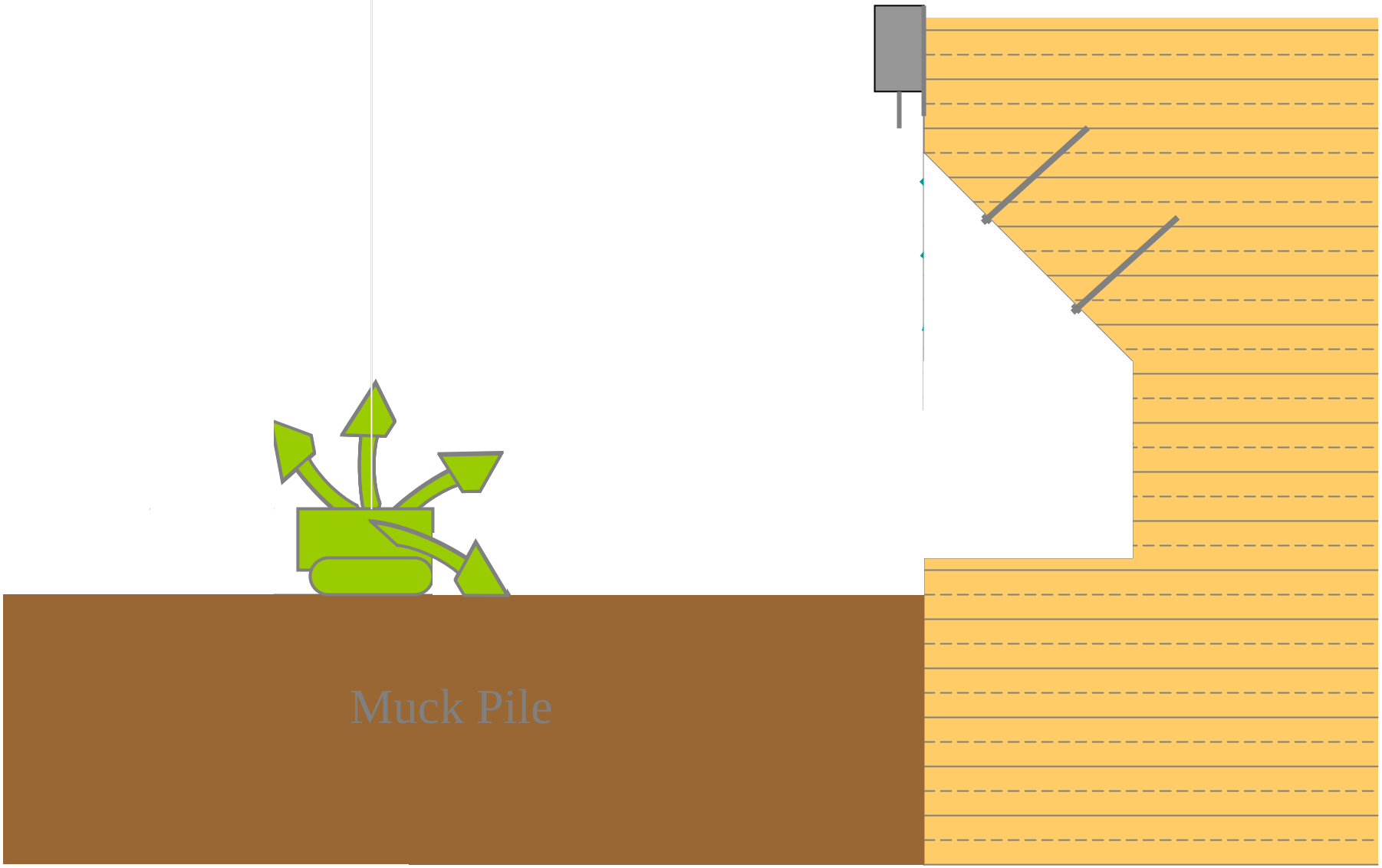
Mandoor opening into completed first water ring.

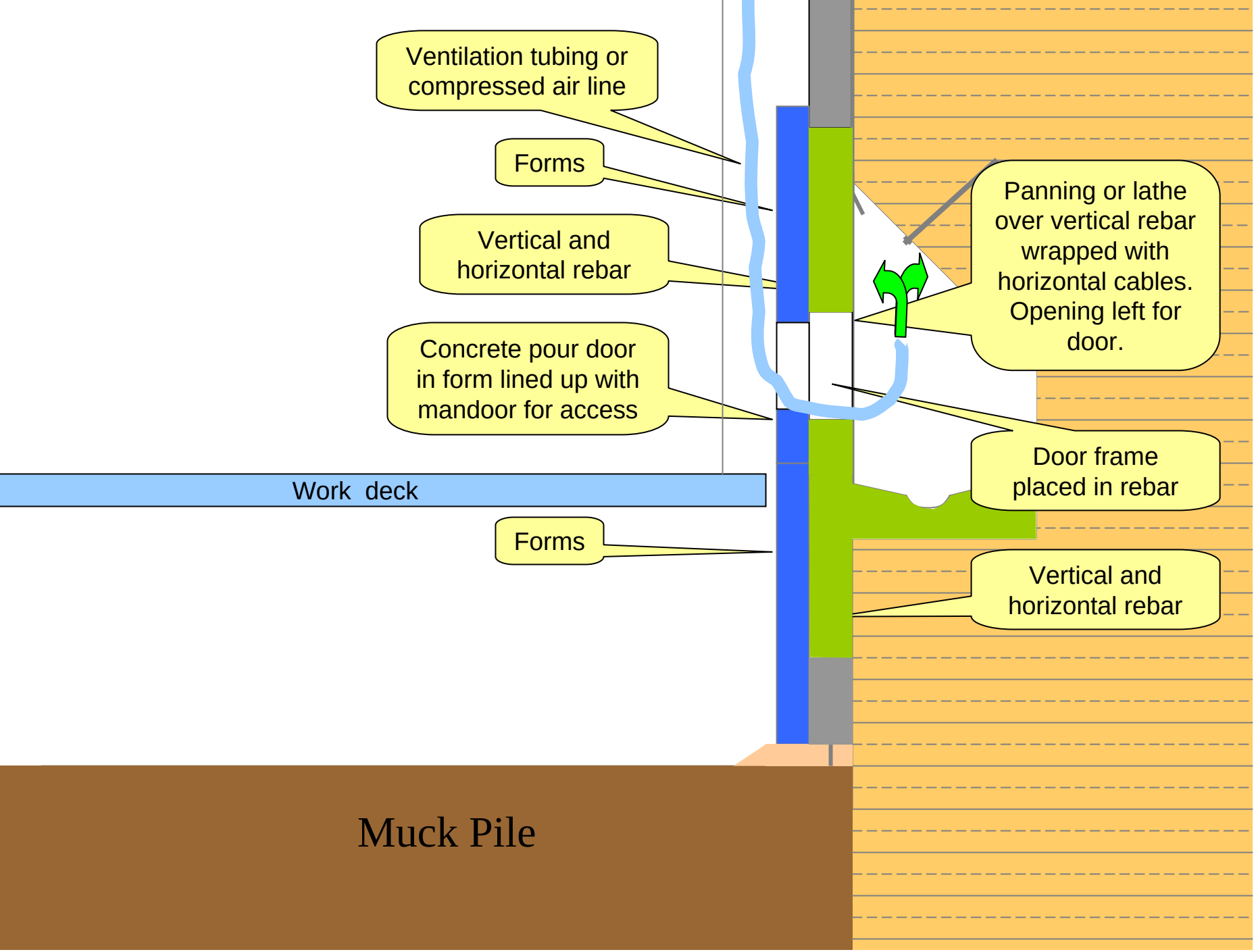
Constructed ~ 270 feet below surface.



Purpose of Water Rings

Installed to limit the damaging effect of ground water to the concrete shaft wall.


Muck Pile


Ventilation tubing or compressed air line
Forms
Vertical and horizontal rebar
Concrete pour door in form lined up with mandoor for access
Work deck
Forms
Panning or lathe over vertical rebar wrapped with horizontal cables. Opening left for door.
Door frame placed in rebar
Vertical and horizontal rebar
Muck Pile

Timeline
2nd Water Ring Construction

- January 11, 2003 - Water ring construction started, 950 feet below the surface.
- January 15 - Water ring cavity completed.
- January 19 - Pour Ring #114 created water ring floor.
- January 20 - Day shift finished installing panning isolating water ring from shaft ventilation system and Pour Ring #113.
- January 21 - Day shift completed Pour Ring #112 and the Enclosure Ring.

Description Of the Accident

Night Shift - January 21-22, 2003

View of bucket containing oxygen-acetylene tanks and hoses which were in shaft at time of explosion

- Night shift crew removed the Enclosure Ring and Pour Ring #112.
- At 10 pm, ventilation holes drilled into the water ring. Three of these holes were found plugged with debris.
- They removed Pour Ring #113.
- At 12:30 am, they called and requested a chipper and torch to open the man door. These items were loaded into the bucket and sent in.

- They attempted to remove corrugated, galvanized steel sheeting (panning) which blocked access to the unventilated water ring being constructed**.**
- The miners first partially opened the panning with an axe, and the shift foreman placed a hand-held methane detector into the opening to test for methane.
- After reading 0.2% methane on his hand-held detector, the foreman directed the mechanic to cut the panning with an oxygen-acetylene torch.

- At approximately 1:00 am, the mechanic ignited the torch and started cutting the panning.
- An explosion occurred when an explosive methane-air mixture contained inside the water ring was ignited by the torch cutting process.

- An injured miner exited the shaft after unsuccessfully attempting to assist the two other injured miners.
- He then re-entered the shaft with a CCD surface worker (Top Man), but they were also unsuccessful in assisting the injured miners and returned to the surface.
- In response to 911 calls, emergency personnel arrived on site. Two deputy sheriffs, a paramedic, and the Top Man entered the shaft and recovered the two injured miners.

CAUSAL FACTORS

- The examination for methane performed by the night shift foreman prior to the explosion was not adequate. An adequate examination would have required testing for methane in all areas that could have been affected by the use of the cutting torch.

- The water ring was not ventilated to dilute and remove hazardous gases. Proper ventilation of the water ring prior to performing any work would have prevented the accident.

- The water ring construction method created an unventilated area where methane was able to accumulate. The method also required the use of a cutting torch and other potential methane ignition sources.

ENFORCEMENT ACTIONS

Central Cambria Drilling Co.

- Section 104(d)(1) Citation, 77.1916(c), S&S, High Negligence
  The on site supervisor, Richard Brumley, conducted an inadequate examination for methane in the shaft immediately before directing a miner to use a cutting torch to gain access into an unventilated water ring containing an explosion methane mixture.
- Section 104(d)(1) Order, 77.1900-1, S&S, Reckless Disregard
  The operator was not in compliance with the approved Shaft Sinking Plan Part G Ventilation Description. Item 6 requires that the quantity and velocity of the current [of] air shall be sufficient to dilute so as to render harmless and to carry away flammable or harmful gasses; Item 7 requires that additional ventilating equipment will be available so that such air shall contain less than 1.0 volume percent of methane.