38Th Annual Southwestern Regional Mine Rescue Contest

JUDGE PACKET

Field Competition Day 2



April 12, 2023

Mescalero/Ruidoso, New Mexico

Mine Information Ruidoso, NM April 11 - 12, 2023

General

The Rude Oso Mine is an underground single level category IV room and pillar Potash mine. The mine was recently purchased by the Grylls Family. Barry Grylls, Mine Manger, operates the daily activities and is new to the mining industry. This mine is located in Southern New Mexico and is active and operating at full capacity. The mine operates two 12 hours shifts per day, 5 days a week. Hours of operation are from 6 am to 6 pm on day shift and 6 pm to 6 am on night shift. All production is on the 800' level. The mine has been in active status for only 2 months and has primarily been rehabilitating the mine since it opened. Currently the mine emphasized rehabilitating the far northern part of entry 1 in order to safely access ventilation raise #1. The mine plans to install an exhaust fan at this location on surface in the future.

Mine Access

Mine access is provided by two 12-foot diameter concrete-lined shafts. The two12-foot shafts are known as the #1 Intake shaft and the #2 Exhaust shaft. Pillar sizes are 15 feet by 15 feet, Entries are 10 feet wide, and crosscuts are 10 feet wide.

Explosives

All explosives are stored on the surface in an approved storage facility.

Electricity

Electrical service to the mine is provided by an independent electric company and enters the mine by way of the #1 shaft. Power is provided to transformers located underground and distributed to the working areas.

Mine Classification

The mine was previously classified as a category IV (applies to mines in which noncombustible ore is extracted and which liberate a concentration of methane that is not explosive nor capable of forming explosive mixtures with air based on the history of the mine or the geographical area in which the mine is located.

Communication

This is accomplished by two-way radios that are carried by mine personnel.

Ground Control

Ground control is maintained with 6-foot mechanical bolts. Timbers are known to be used for secondary supports.

Materials

All materials to work the problem are located underground or on the surface.

Mining Methods

Room and pillar method is accomplished by conventional mining techniques. Material is loaded by front end loaders into haul trucks, hoisted to surface, screened, and loaded to be shipped overseas.

Mine Maps

The mine maps are not accurate. New maps have yet to be developed. Maps provided were developed based on previous management information and current information provided by miners.

Mine Equipment

The mine plans to utilizes under-cutters, face drills, haul trucks, loaders, bolters, and other mobile equipment used as man trips for transporting personnel.

Ventilation

The mine is ventilated by a non-reversible 100,000 cfm fan that is located on surface at the #1 shaft. The mine utilizes a blowing system; ventilation enters the mine via the #1 Intake shaft and exits the mine via the #2 exhaust shaft. The mine received an exhaust fan designed for the #2 shaft but it has not yet been installed. There is a total of four 6' in diameter ventilation raises in the mine, known as "Ventilation Raise's #1, #2, #3, & #4". These raises along with ventilation controls in the mine are used to course airflow.

Water

No reported or historical water issues.

Notification

All federal, state, and local officials have been notified.

Backup Teams

Two additional trained and fully equipped mine rescue teams are on site and are available for backup support.

TEAM BRIEFING Ruidoso, NM Day 2 April 12, 2023

You have arrived back at the Rude Oso Mine and Mine Manager Grylls has more information to provide. After you left the site yesterday, I sent my night crew of 5 miners in to start rehabilitation and develop a hazard map of the mine.

We have no communication with any of the crew that's underground currently. Two miners arrived on surface to bring me an updated hazard map. Before they made it back underground, they called me from the #1 shaft and told me they could see smoke exiting the ventilation raise #3 in the distance. They also informed me that they tried to stop the fan again and could not turn it off. I sent those two miner's homes for now. I don't know what's going on right now, but I do have an update map up to the last known safe location underground.

It is now 2:00 a.m., there is still power to the mine and the main fan is stuck in the "ON" position but only operating at 25%. We know from the last report that the crew has established a fresh air base underground. You will be provided a map of what we understand to be the conditions and items in the area. If you are ready and willing the services of your team is needed. Two teams are also onsite and are available for backup. Your objectives are listed below and the mine manager will be available for any questions or requests. GOOD LUCK!

Field Problem Objectives:

- Explore all accessible areas of the mine
- Extinguish or seal all fires
- Locate all missing miners
- Bring all survivors to the fresh air base



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Southwestern Regional Mine Rescue Contest 2023 Day #2 Field Problem Solution (See Solution Maps)

Fresh Air Base

The teams will arrive at the FAB and have introductions, the team will also be informed that they will be able arrange their communication system and check functionality prior to starting the clock. Once the clock has been started the team will receive all of their maps and information.

Note: Throughout the field problem, while advancing and at the intersections the team will check for loose ground (loose roof or rib). Captain must verbally indicate he/she is checking the roof/back when constructing temporary stopping.

Note: "Possible Infractions" are highlights of potential discounts at each team stop. These lists are not all inclusive, Judge's may identify additional discounts during the working of the field problem.

Note: Entry Examination and Team Stop No.1 (See Solution Map 1)

Note: When the team arrives at the advanced fresh air base, the area map provided by the miners interviewed will have most of the items in the area already mapped. The team will need to remember that the main fan is stuck in the "on" position (air movement & quantity indicated by placard).

Entry #1 check reveals:

The team will travel to entry 1. A placard at the intersection of the advanced fresh air base indicates "clear air." The team must conduct necessary gas tests. The team will identify a "Permanent Stopping (with door)" the door will be closed. The team will not have any building materials to create an airlock to advance into entry 1. The team will DI the stopping.

<u>Possible Infractions</u>: Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team. In the event the team opens the door without creating an airlock, they will draw ventilation into the mine and pass IDLH gas over a missing miner.

Entry #2 check reveals:

The team will travel to the entry 2. A placard at the intersection of the advanced fresh air base indicates "clear air." The team must conduct necessary gas tests. The team will identify a "Permanent Stopping (with door)" the door will be closed. The team will not have any building materials to create an airlock to advance into entry 2. The team will DI the stopping. <u>Possible Infractions:</u> Same as Entry #1 Check.

Entry #3 and Team Stop #1

The team will travel to entry 3. The team will check the entry and identify "Brattice Cloth and Brattice frames (2)" and "Fire Extinguisher (2)", and south "Caved (airtight)". The team will advance north in entry 3 until they reach a "B" placard that shows " $O_2 - 16\%$, CO - 2500 ppm, NO₂ - 10 ppm, and CH₄ - 0% with Heavy Smoke" and "Haul Truck on Fire (intense heat)" the team shall, without undue delay, seal or regulate the fire. The team will need to install a temporary stopping with a regulator. The team will also conduct their 50' check at this location.

<u>Possible Infractions</u>: Team member endangerment if team members make an attempt to extinguish the fire with hand-held fire extinguishers, advancing past a sign indicating "intense heat", Failure of the captain to verbally indicate he/she is checking the roof/back when constructing the temporary stopping, Failure to perform the 50° check, and ventilation change if the team installs a seal.









<u>Note:</u> Team Stop Nos. 2 – 5 (See Solution Map 2)

Team Stop #2

The team will return to entry 2. The team will need to utilize building materials to create an airlock to enter and continue exploration. The team will explore until they reach intersection of XC-B. The team will identify an "B" gas placard (See map for gas concentrations). The team will conduct the necessary gas tests. Stretching west the team will identify "permanent Stopping", north the team will identify "Hung Curtain (sealed at top and bottom), the curtain is 24" from each rib. While advancing east team will identify a "Brattice Cloth and Brattice Frames" and "Permanent Stopping (with door)" the door will be closed. Team will need to create an airlock to continue advancing east.

<u>Possible Infraction</u>: Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team. In the event the team opens the door without creating an airlock, they will draw ventilation into the mine and pass IDLH gas over a missing miner.

Team Stop #3

The team will continue exploration east until they reach the intersection of entry 3. While advancing, the team will identify "Brattice Cloth and Brattice Frames". At the intersection the team will identify a "B" gas placard and conduct the necessary gas tests. Examining south the team will identify "Haul Truck on Fire (intense heat)" the team shall, without undue delay, seal or regulate the fire. The team will need to install a temporary stopping with a regulator.

<u>Possible Infractions:</u> Team member endangerment if team members make an attempt to extinguish the fire with hand-held fire extinguishers, advancing past a sign indicating "intense heat", Failure of the captain to verbally indicate he/she is checking the roof/back when constructing the temporary stopping, and making a ventilation change if the team installs a seal.

Note: The team will need to keep the fire regulated in order not to stall the fan. The fire will continue to emit contaminant into mine atmosphere until fully sealed.

Team Stop #4

The team will continue north in entry 3 until thy reach the intersection of XC-C. The team will identify a "B" gas placard. The team will conduct the necessary gas tests. The team will identify a "Permanent Stopping (Door Stuck Closed). Knocking on the door the team will make verbal contact with a missing miner, the miner will relay the following message: "Get me out of here, I'm not injured, this room is completely enclosed, and the air in here is ok". The team will not be able to enter due the condition of the door and the gas concentrations. The team will also not be able to continue exploration north in entry 3 due to exceeding their 2+3 limit.

<u>Possible Infraction</u>: Failure of the team to explore or examine working systematically and thoroughly. Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team.

Team Stop #5

The team will retreat to the intersection of entry 2 and XC-B. Exploring north and while advancing the team will identify "Hung Curtain (sealed at top and bottom), the curtain will be 24" from each rib. At the intersection of XC-C, the team will identify an "A" gas placard (See map for gas concentrations). The team will conduct the necessary gas tests. Stretching west the team will identify "Unsafe Roof", they will make visual contact with a missing miner. The team will also identify "Brattice cloth and Brattice Frames" and "Caved (impassable)". The team will not have the means to support the area to examine the miner. Stretching east the team will identify "Barricade" and make verbal contact with the missing miner from team stop 4. The team will also not be able to continue exploration north in entry 2 due to exceeding their 2+3 limit.

<u>Possible Infractions:</u> Failure of the team to explore or examine working systematically and thoroughly. Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team. Team member traveling under unsafe roof.







<u>Note:</u> Team Stop Nos. 6 – 10 (See Solution Map 3)

Team Stop #6

The team will return to entry 1 and travel north. The team will need to utilize building materials to create an airlock to enter and continue exploration. While advancing the team will identify a "B" gas placard and a "Mantrip on Fire". The team will need to utilize two fire extinguishers (2/3 sweeping method) to extinguish the obstacle fire. The team will advance until they reach the intersection of XC-B. The team will make the necessary gas tests and identify a "B" gas placard. Stretching east the team will identify a "Permanent Stopping" the team will DI the stopping.

<u>Possible Infractions:</u> Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team.

Team Stop #7

The team will continue exploration north in entry 1 until they reach the intersection of XC-C. At the intersection the team will identify a "A" gas placard. The team will conduct the necessary gas test. Exploring north and east the team will identify "Caved (impassable)". The team will DI the impassable falls.

<u>Possible Infractions:</u> Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team.

Team Stop #8

The team has tied across and behind and can now continue north in entry 2. The team will need to utilize building materials to create an airlock to enter and continue exploration. The team will explore north beyond XC-C, while advancing the team will identify a set of air doors, the first "Air Door" is open and the second "Air Door" is closed. The team will also identify "Ventilation Raise #4".

<u>Possible Infractions:</u> Failure to take necessary gas tests, team member exposed underneath vent raise, and Failure of the captain to "DI" at the point of farthest advance of the team.

Note: Prior to the ventilation change #1, team will need to explore the ventilation path to fully understand the changes.

Team Stop #9

The team will continue exploration north in entry 3 until they reach the intersection of XC-D. while advancing the team will identify "Clear Air" placards from the vent change. The team will conduct necessary gas test. The team will identify "Ventilation Raise #3" and the face of the entry. The team will DI the face.

<u>Possible Infractions</u>: Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team and the body and Captain or team member doing anything to endanger himself/herself.

Team Stop #10

The team will continue exploration west in XC-D until they reach the intersection of entry 2. The team will identify "Air Door" that is closed and a "Barricade". Knocking on the barricade the team will make contact with the final missing miner. The miner will provide the following statement. "Get me out of here, I'm not injured, this room is completely enclosed, and the air in here is ok". The team will need to ventilate in front of the barricade in order to enter and rescue the miner.

<u>Possible Infractions:</u> Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team.









Note: Ventilation Change #1 and Team Stop No. 11 (See Solution Map 4)

Note: The team will have the means and have explored enough to isolate a path to execute ventilation change #1 and rescue two missing miners.

Ventilation Change #1

The team will request a ventilation change, once granted the following steps will be required to clear the area in front of the door.

- Maintain the second Air Door "closed" and the first Air Door "open" in entry 2.
- Build Temporary Stopping XC-C between entry 1 & 2 to protect the miner in the unsafe roof.
- Maintain the door closed in XC-B between entry 2 & 3.
- Open the door in entry 2 between XC-A & XC-B
- Close door in XC-A between entry 2 & 3 to utilize all air to clear Barricade.
- Fan remains stuck in "ON" position.

Note: Ventilation path is indicated by blue arrows on the map and will clear gases along this path.

Note: Upon reentry into areas cleared of smoke and toxic or dangerous gasses, teams shall make gas tests rib to rib at all openings along the route they travel (indicted by red dotted line and depends on teams travel (RGT = Return Gas Tests) on map).

Team Stop #11

The team has cleared the contaminant in from of the barricade. The team knows the conditions inside of the barricade and can enter. The team will identify "Ty (07)", the miner is not injured and can walk out with the team. The team will also examine the rest of the room and identify "Timbers (2)". The team will take the timbers.

<u>Possible Infractions:</u> Failure to take necessary gas tests and Failure of the captain to "DI" door and survivor, and the team performing an act that may result in death or injury of survivor.









<u>Note:</u> The team will restore ventilation to the original path to prevent air from crossing over the caved impassable and up entry 1.

Team Stop #12

The team has the means to support the unsafe area where they visually identified one of the missing miners. The team will restore the ventilation to the original configuration. The team will travel to the intersection of XC-C and entry 2. The team will utilize the two timbers to support the area and access the miner. The team identifies "Barry (006)", the miner tells the team, he thinks he broke his arm. The team can perform an emergency drag move and remove the miner from underneath the unsafe roof. Upon examination the team will identify that the miner has a broken right forearm. The team will treat the injury and walk the miner to the FAB.

<u>Possible Infractions:</u> Failure to take necessary gas tests and Failure of the captain to "DI" the survivor, Captain or team member doing anything to endanger himself/herself, and improper survivor care.









<u>Team Stop #13 (Ventilation Change to seal fire)</u> The team will request a ventilation change, once granted the following steps will be required to alter the ventilation path and seal the fire.

- Build Temporary Stopping in entry 2 between XC-C and XC-B to prevent ventilation from entering this area of the mine. (front of hung curtain)
- Open the door in XC-B between entry 2 & 3.
- Convert the regulator to full seals on both sides of the fire.
- Close door in XC-A between entry 2 & 3.
- Fan remains stuck in "ON" position.

Note: Ventilation path is indicated by blue arrows on the map and will clear gases along this path.









Note: Ventilation Change #2 and Team Stop No. 14 (See Solution Map 7)

Note: The team will have the means and have explored enough to isolate a path to execute ventilation change #2 and rescue the final missing miner.

Ventilation Change #2

The team will request a ventilation change, once granted the following steps will be required to clear the area in front of the door.

- Build a temporary stopping between entry 2 & 3 in XC-D. This is to maintain no ventilation changes when the air door is opened. (if 1st air door was not previously closed)
- Open the second Air Door
- Close the first air door (this will prevent any air from entering entry 1 through the caved impassable).
- Remove the built stopping between entry 2 & 3 in XC-D. this will allow ventilation to exit the #4 raise.

Note: Ventilation will split, and placard will reveal a slight decrease. Team will need to utilize <u>all</u> air to clear the barricade.

- Build a temporary stopping in entry 3 in front of ventilation raise #3. This will allow <u>all</u> the air to exit #4 raise and clear the Barricade.
- Fan remains stuck in "ON" position.

Note: Ventilation path is indicated by blue arrows on the map and will clear gases along this path.

Note: Upon reentry into areas cleared of smoke and toxic or dangerous gasses, teams shall make gas tests rib to rib at all openings along the route they travel (indicted by red dotted line and depends on team's travel (RGT = Return Gas Tests) on map).

Team Stop #14

The team has cleared the contaminant in from of the barricade. The team knows the conditions inside of the barricade and can enter. The team will identify "Porta John", and inside will be "Pancho (005)", the miner is not injured and can walk out with the team. The team will also examine the rest of the room and identify "Permanent Stopping". The team will DI the miner location and stopping. The team will bring the miner to the FAB, report their finding, turn in all maps and stop the clock. THE END!







