38Th Annual Southwestern Regional Mine Rescue Contest

JUDGE PACKET

Field Competition Day 1



April 11, 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 #1 April 11, 2023

You have arrived at the Rude Oso Mine, Mine Manager Barry Grylls has arrived and provided the following information. Six miners were scheduled on this shift, they began their shift at 6:00 a.m. and we finished up our safety meeting at around 7:00 a.m. I assigned three of the miners to continue rehab in north entry 1. The other three miners went to the mine shop to get things ready for mobile equipment maintenance.

At approximately 10:00 a.m., I received a radio call from Edward my foreman, informing me that he sent the two new miners to surface so that they could get more bolts and that I should keep a look out for them because they are easily distracted. Edward said he would wait for them underground at the supply room.

At approximately 11:00 a.m., the two new miners arrived at my office and informed me that they witnessed smoke exiting the exhaust shaft, so they shut off the main fan at the #1 shaft. I called Edward via radio and he said he was not sure what had happened but the smoke in his escape route was too bad to continue walking out, he also told me he had forgotten his self-rescuer on surface. Edward said he was going to barricade himself into the supply room when I lost communication with him. I made several attempts to contact the other three miners but was not successful.

It is now 2:00 p.m. and you will be the first team to enter the mine. The mine fan is currently off, the main controls are on surface, and can be started at your request. None of the vent raises are accessible on surface and the mine does not have any gas detectors. If you are ready and willing, the service of your mine rescue team is needed. 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 surface

Team Map Day 1

Team Name: _____

Team Draw # _____













Southwestern Regional Mine Rescue Contest 2023 Day #1 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).

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

Shaft #1 check reveals:

The team must conduct necessary gas tests. A placard at the shaft shows "clear air." A second placard will indicate "Fan Controls" in the "OFF" position. The conveyance will be at the top of the shaft and the team will place combustible material on the cage and send it down, using the posted Nevada hoisting signal codes. The team must then signal the cage to return to the surface. When the material is checked, it will be intact and dry. The team will close the cage door and release the cage prior to traveling to Shaft #2.

<u>Possible Infractions</u>: Failure to check shaft for damage, failure to close shaft gate, failure to take necessary gas tests, Failure of the captain to "DI" at the point of farthest advance of the team, and failure to use posted signals.

<u>Note:</u> At each shaft and each time a conveyance is used, Judge No. 1 will indicate movement of the conveyance as soon as the proper hoisting signal codes are demonstrated.

Shaft #2 check reveals:

The team must conduct necessary gas tests. An "A" gas placard at the shaft shows " $O_2 - 18\%$, CO - 1100 ppm, NO₂ - 10 ppm, and CH₄ - 0% with Light Smoke". The conveyance will be at the top of the shaft and the team will place combustible material on the cage and send it down, using the posted hoisting signal codes. The team must then signal the cage to return to the surface. When the material is checked, it will be intact and dry. Possible Infractions: Same as Shaft Check #1

Team Stop #1

The team will elect to advance into the mine through Shaft #1. In order to do this, the team must count off before entering the cage (first time they go underground). Then, they must close the shaft gate and signal the hoist operator. Afterward, the team will descend to Shaft #1 station. Before exiting the cage the captain must check for loose roof in front of the cage. The team will identify an "A" gas placard (see map for gas concentrations). After the team releases the cage, the team will advance north in entry 1 until they reach the intersection of XC-A. At the intersection, the team will also identify a "B" gas placard that shows "O₂ – 17%, CO – 2000 ppm, NO₂ – 10 ppm, and CH₄ – 0% with Heavy Smoke". The team will also conduct their 50' check at this time. The team may stretch east in XC-A and identify a "Permanent Stopping with Door" the door will be open. The team will conduct the necessary gas test and check the back/roof upon passing through the door.

<u>Possible Infractions</u>: Failure to close shaft gate, failure to take necessary gas tests, Failure to perform the 50' check, failure to verbally indicate he/she is checking the back or roof, Failure to count off entering the mine, and failure to use posted signals.







Team Stop #2

At the intersection the team will identify an "A" gas placard (See map for gas concentrations). At the entrance to entry 2, the team will identify a "B" gas placard (See map for gas concentrations). The team may stretch north in entry 2 and identify a "Check Curtain".

Team Stop #3

The team will continue exploration east until they reach the intersection of entry 3. The team will identify an "A" gas placard and examine up the "Cage Door". Because the team will need to travel shaft #2 in order to consider it explored, the team may elect at this time to return to surface and reenter the mine via Shaft #2.

Note: If the team continues exploration north in entry 2, no team member may advance more than three (3) feet beyond the second intersection before traveling Shaft #2. Possible Infraction: Failure of the team to explore or examine working systematically and thoroughly.

Team Stop #4

The team will enter the mine via Shaft #2 and continue exploration north in entry 3 until hey reach the intersection of XC-B. While advancing, the team will identify an area of "Unsafe Roof" and will visibly identify a missing miner under the area. The team will not have the means to the support the area at thus time. At the intersection the team will identify an "A" gas placard and a "Permanent Stopping (Door Stuck Closed). Stretching north the team will identify a "permanent Stopping with Door" the door will be closed and this will stop the teams progress at this point.

<u>Possible Infraction:</u> Any team member travels under the unsafe roof area.

Team Stop #5

The team will retreat to the entrance of entry 2 and continue exploration north. Just immediately beyond the check curtain, the team will identify "Fire Extinguisher (2)" and "Lube Truck on Fire (fire out of control)", the team shall, without undue delay, seal or regulate the fire. The team will need to convert the check curtain into 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 "fire out of control", and Failure of the captain to verbally indicate he/she is checking the roof/back when constructing the temporary stopping.

Team Stop #6

The team will retreat to entry 1 and continue exploration to identify all approached to the fire. At the intersection the team will identify a "B" gas placard. The team will stretch east and identify a "Check Curtain", just beyond the curtain the team will identify "fire Extinguisher (2)" "Lube Truck on Fire (fire out of control)", the team shall, without undue delay, seal or regulate the fire. The team will need to convert the check curtain into a temporary stopping with a regulator. Possible Infractions: Same as Team Stop 5.

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 "B" gas placard and a "Permanent Stopping with Door" the door will be closed. On the corner of the pillar the team will identify "Timbers (6)" and will likely pick up the timbers for use in the field problem.

<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 failure to use posted signals.







Note: Team Stop Nos. 8 – 11 (See Solution Map 3)

Team Stop #8

The team will continue exploration east until they reach the intersection of entry 2. While advancing, the team will identify "Brattice Cloth and Brattice Frames". At the intersection the team will identify a "B" gas placard. Stretching north the team will identify a "Permanent 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 and the survivor,

Team Stop #9

The team will return to the intersection of XC-C and entry 2 to continue exploration south in entry 2. While advancing, the team will identify "Hung Curtain (Sealed at top/bottom, 24" from Rib)", "Unsafe Roof (Rib to Rib)", and "Unsafe Rib". The unsafe area is 5 feet in length, the team does have the means to support the area and they are already aware that the door in XC-B is stuck closed. The team will be able to utilize the safe rib and support down the center of the unsafe area. The team will need to travel on safe side of the supports due to the unsafe rib. Continuing exploration, the team will identify "24" Portable Ventilator Fan", "Power Cord (10')", "Caved Impassable (intense heat)" that extends diagonally across the intersection, "Brattice Cloth and Brattice Frames", two additional locations indicating "Hung Curtain (Sealed at top/bottom, 24" from Rib)", a "B" gas placard, and "Permanent Stopping with Door" the door is closed. The team will also examine up to the "Permanent Stopping (Door Stuck Closed)". The team has identified the final approach to the fire and will regulate or seal the fire by utilizing two sets of materials to build diagonally across the caved impassable. 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". Due to gas concentrations the team will need to ventilate the area prior to entering and safely rescuing the miner. The team will likely take the timbers and continue exploration.

<u>Possible Infractions:</u> Captain or team member doing anything to endanger himself/herself, Failure to take necessary gas tests and Failure of the captain to "DI" at the point of farthest advance of the team, Failure of captain to verbally indicate he/she checking the back or roof, The team performing an act that may result in death or injury of survivor.

Team Stop #10

The team has the means to support the unsafe area where they visually identified one of the missing miners. The team can travel south in entry 3 and will need to utilize a minimum of two timbers to access the miner. Examining the miner they identify "Ed (01)" and the miner is deceased.

<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 #11

The team will return to continue exploration east in XC-C until they reach the intersection of entry 3. While advancing the team will identify a "Power Center". At the intersection the team will identify an "A" gas placard. Stretching south the team will identify "Barricade (partially open)", the team will enter the area and identify "Eddy (03)" the miner is not bleeding and there are no visible injuries but he is unconscious. The team will examine the miner and place him under oxygen in order to transport him to surface. The team captain will also examine the area and identify the backside of the "Permanent Stopping", the door is closed.

<u>Possible Infractions</u>: Failure to follow proper procedures when putting apparatus on survivor, Failure to properly secure survivor to stretcher, and the team performing an act that may result in the death or injury of survivor.









Note: Ventilation Change #1 and Team Stop No. 12 (See Solution Map 4)

Note: The team has now found the materials necessary to execute the first ventilation change to enter the room and rescue the missing survivor.

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.

- Seal all approached to the fire by closing the regulators (if not already done)
- Build Temporary Stopping entry 3 between XC-C & XC-D (utilize Barricade materials)
- Open door in entry 3 between XC-B and XC-C
- Close the door in XC-A between entry 1 and entry 2.
- Turn "ON" the Fan (FAB or Team)

Note: Ventilation path is indicated by blue arrows on the map and will clear gases along this path. In order for the team to ventilate in front of the door, the team will need to perform the following steps.

- Relocate the fan to the entrance of the hung curtain (Arrow must face into curtain)
- Utilize the 10' power cord to power the fan from the power center.
- Turn Fan "ON"

Note: Ventilation path is indicated by blue arrows on the map and will clear gases in front of the door.

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 #12

The team already knows the conditions inside of the room and will be permitted to enter the room and assess the miner. The team will identify "Edd (02)", the miner is not injured and can walk out with the team. The team will also examine the rest of the room.

<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 #13

The team will likely turn the mine fan "OFF" and continue exploration north in entry 3. The team will need to take down the temporary stopping and will likely take it with them. At the intersection of XC-D, the team will identify "Caved Tight" that extends across the entry.

<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 #14

The team will continue exploration west in XC-D until they reach Entry 2. At the intersection, the team will identify an "A" gas placard, stretching south the team will identify "Permanent Stopping". <u>Possible Infarctions:</u> same as Team Stop 12.

Team Stop #15

The team will continue exploration west in XC-D until they reach the intersection of entry 1. While advancing, the team will identify "B" gas placard and a "Barricade". The team will make verbal contact with the final 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". Due to gas concentrations the team will need to ventilate the area prior to entering and safely rescuing the miner. The team will continue exploration. At the intersection the team will identify "Caved Tight" that extends from rib to rib at entry 1. Exploring south the team will explore up to and tie-in at the "permanent Stopping with Door". The team will also identify a "Line Curtain" and will take it with them for use.

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

The team has explored all accessible areas of the mine to this point and will need to clear the gas in front of the barricade in order to enter and rescue the final missing miner.







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.

- Build Temporary Stopping in XC-C between entry 1 and entry 2. (anywhere in XC-C will suffice)
- Open door in entry 1 between XC-C and XC-D
- Maintain the door closed in XC-A between entry 1 and entry 2
- Maintain the door open in entry 3 between XC-B and XC-C
- Turn "ON" the Fan (FAB or Team)

Note: Ventilation path is indicated by blue arrows on the map and will clear gases along this path. In order for the team to ventilate in front of the Barricade, the team will need to utilize the Line Curtain to course the air up to the barricade.

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.

Team Stop #16

The team already knows the conditions inside of the Barricade and will be permitted to enter the room and assess the miner. The team will identify "Edward (04)", the miner is not injured and can walk out with the team. The team will also examine the rest of the room. The team will bring the miner to the FAB, report their finding, turn in all maps and stop the clock. THE END!

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





