

# 2016 Northern Regional Mine Rescue Contest

## JUDGES' PACKET Field Competition



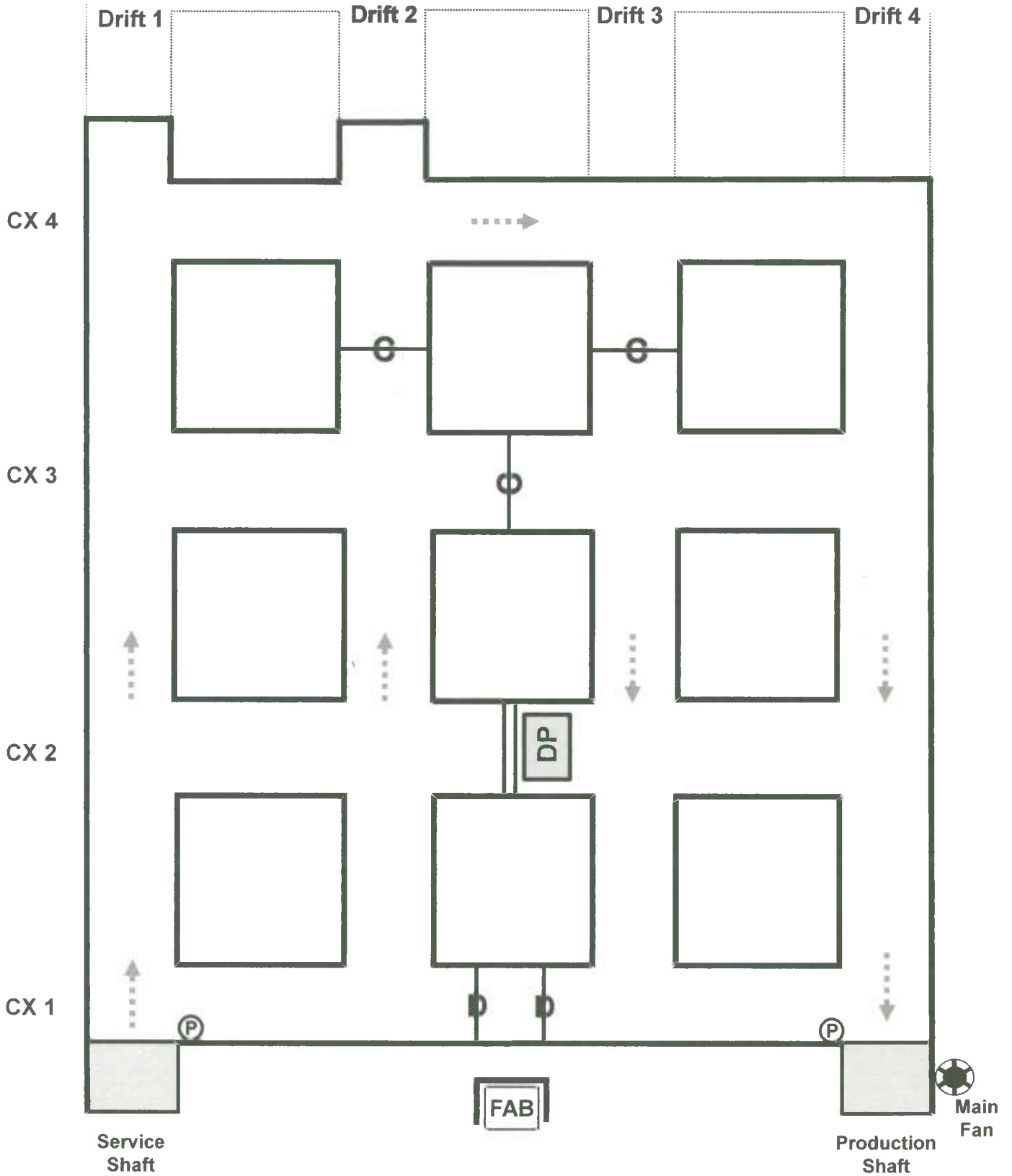
**June 15, 2016  
Clymer, New York**



## Table of Contents

	<u>Page</u>
Mine Information .....	1
Team Briefing Statement.....	3
Team & Fresh Air Base Instructions.....	5
Problem Orientation.....	6
Problem Solution (with Solution Maps Nos. 1 – 8).....	7
Placard Key.....	26
Map Legend .....	29
Team Map.....	30
Fresh Air Base Map .....	31
Fresh Air Base Map (Alternate) .....	32
Judge's Map (blank) .....	33
Judge's Map (with Team Stops) .....	34
Placard Map.....	35
Field Construction Map .....	36

# Team Map



## **Mine Information Sheet**

### **PNP Mining Co. – Segway Mine No. 2**

#### **Mining & Equipment:**

The newly opened single-level, shaft mine uses a conventional room and pillar method to extract ore. The broken ore is loaded into haul trucks using face loaders and then transported to the shaft dump pocket located in CX 2 between Drift 2 and Drift 3. The ore is then hoisted to the surface via skips in the Production Shaft. The development entries are driven 8-feet high and 10-feet wide. Typical pillar dimensions are 15-feet by 15-feet (W x L). All underground mobile equipment (including the loaders, haul trucks, face drills, roof bolting machines, and transport jeeps) is diesel-powered.

#### **Mine Classification:**

In accordance with Title 30 CFR § 57.22003, the mine was classified as a Category VI mine. That is, the presence of methane has not been established in this mine and there is no history of methane gas in any other mine in the area. Historical hygiene data from the mine, both MSHA and Company's samples, have indicated no presence of methane.

#### **Mine Openings:**

The mine is opened by two 18-foot diameter shafts approximately 1,750 feet deep. The Service Shaft is equipped with a hoist used to transport people and to convey supplies. The shaft also serves as the primary escapeway from the mine. The Production Shaft is equipped with two ore skips and a separate compartment containing an escape hoist which can be used to bring a maximum of eight persons to the surface.

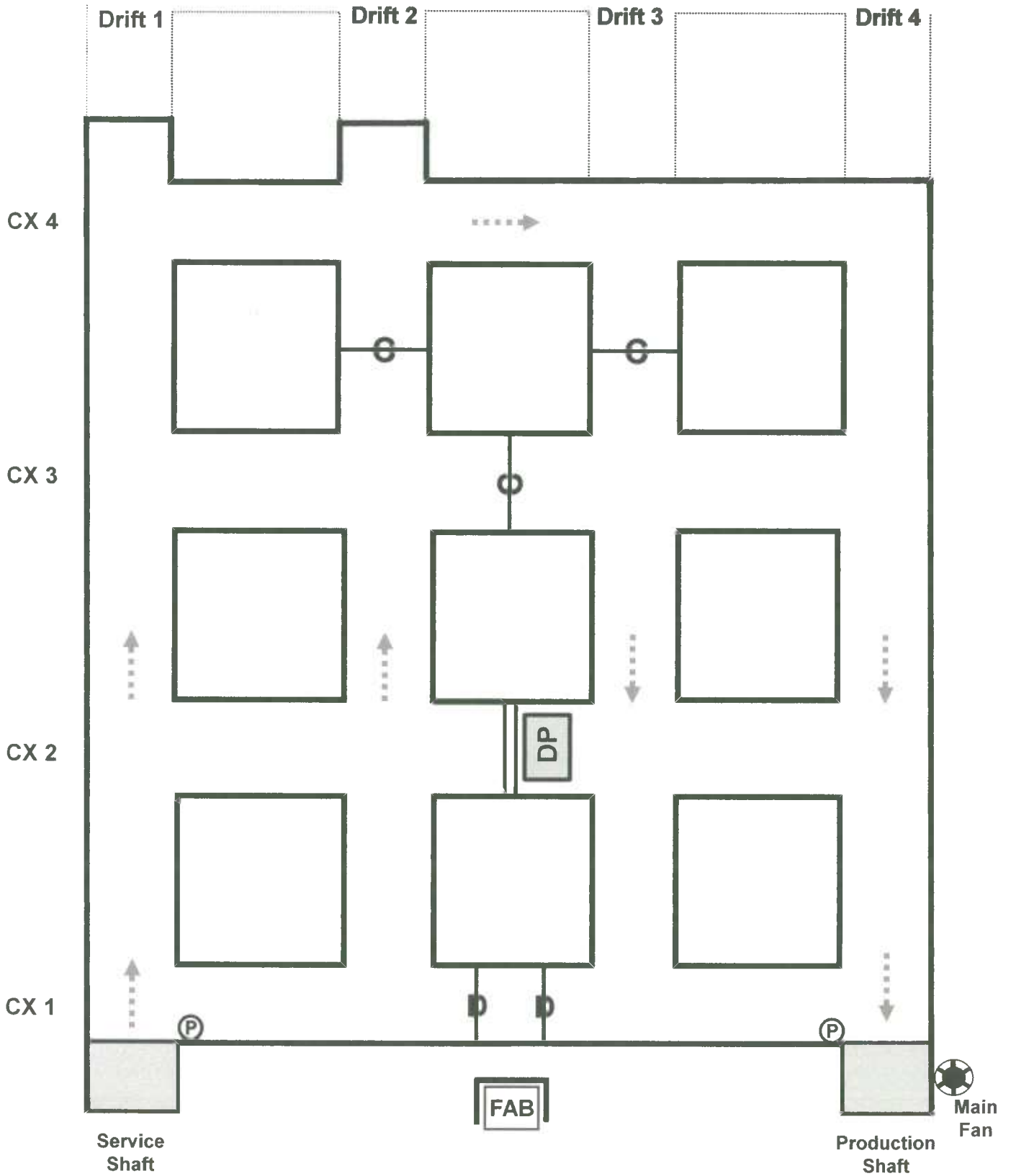
#### **Ventilation:**

A 6-ft. diameter exhausting Main Fan is located on the surface near the Production Shaft. The Main Fan is not reversible. The fan produces approximately 100,000 cfm and operates in the stable portion of its performance curve. Airlock doors have been installed in CX 1 to allow passage between the intake and the return drifts without disrupting the established airflow to the faces. The electrical power to the fan is on and the fan is operating. The air enters the mine through the Service Shaft and exhausts from the Production Shaft. Air is directed to the faces using permanent (concrete block) and temporary (brattice cloth) ventilation controls. The typical airflow direction is marked on the Team and Fresh Air Base Maps.

#### **Water and Pumps:**

The mine has no history of water problems in the active workings. Each shaft is equipped with a ten-foot deep sump. The main water pumps, located on the surface, can easily handle the volume of water produced in the mine and the shafts. The main water pumps have been activated along with the power to the shafts.

# Team Map



## **Mine Information Sheet (continued)** **PNP Mining Co. – Segway Mine No. 2**

### **Ground/Rib and Roof Control:**

The immediate roof, or back, is supported by six-foot rock bolts. The back is fairly competent, but problem areas are supported by wooden posts or stacked crib blocks.

### **Explosives:**

Explosives are available and stored on the surface. They are used during the mining cycle and blasting is conducted at the end of each shift while all persons are out of the mine. Only enough explosives for a day's use are stored in day boxes on the blaster's truck.

### **Electric Power:**

The electrical power to the shafts, the surface pumping station, and the Main Fan has been restored; however, all power to the underground has been de-energized, locked out, and guarded.

### **Mine Map:**

The onsite Engineering Department updated the mine map on June 1, 2016.

### **Other Mines:**

There are several known mines, active and abandoned, in Clymer, New York. At this time, the Segway Mine No. 2 is not connected to any of these mines.

### **Materials:**

Most available equipment and materials to work the problem are located in the mine and are identified with placards. The materials are stored in several areas underground and can be readily located if needed. If there is something else deemed necessary by the team, upon request, it can be delivered in a reasonable amount of time.

**Note: The brattice material available for use by the team is relatively lightweight and compact (10-foot strips of brattice cloth with a clip on each end). For the sake of realism, the team will only be allowed to carry two sets of material at any one given time.**

### **Communications:**

Three mine phones are available in the mine for contact with the surface. The current phone locations are marked on the mine map. At this time, we do not know the status of the communication system, because there has been no contact with the missing miners.

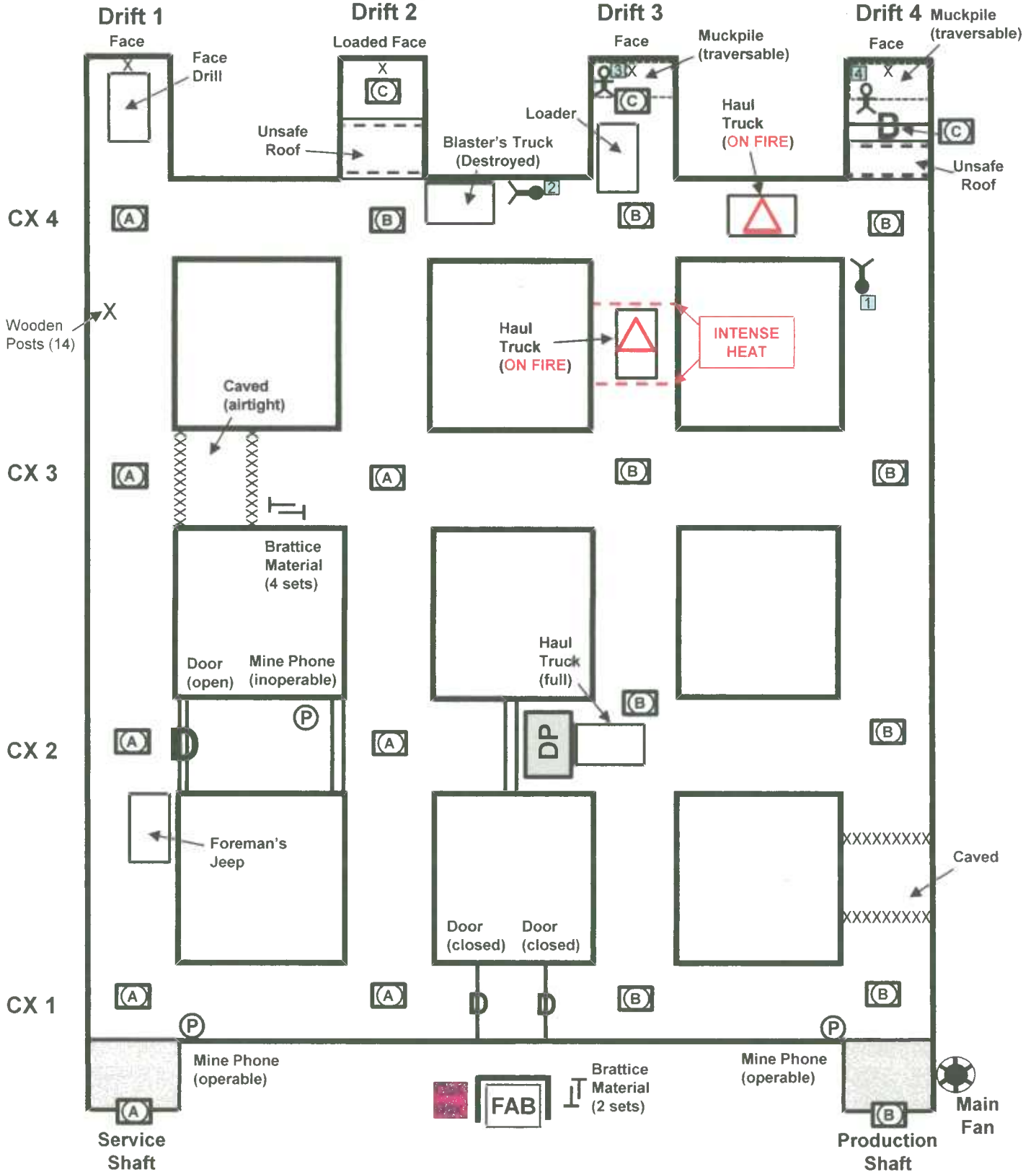
# Problem Map

**Gas Placard Key:**

(A)	= Clear Air
(B)	= 16 % O <sub>2</sub> 1,300 ppm CO 3.0 ppm NO <sub>2</sub> Heavy Smoke
(C)	= 17.5 % O <sub>2</sub> 800 ppm CO

**Missing Miners:**

1	Miner #1 (ID - 0327)
2	Miner #2 (ID - 1958)
3	Miner #3 (ID - 5432)
4	Miner #4 (ID - 6788)





## Team Briefing Statement

You are located at the surface of the PNP Mining Company's Segway Mine No. 2. The newly opened single-level, shaft mine uses a conventional room and pillar method to extract ore. The mine is opened by two shafts approximately 1,750 feet deep. Air enters the mine through the Service Shaft which is equipped with a hoist used to transport people and to convey supplies. This shaft serves as the primary escapeway from the mine. Air exhausts from the Production Shaft which is equipped with skips, as well as an escape compartment which can be used to hoist a maximum of seven persons to the surface. This shaft serves as the secondary escapeway from the mine. The mine is ventilated by a surface-mounted Main Fan located near the Production Shaft. The Main Fan exhausts 100,000 cfm from the mine and cannot be reversed.

Ore is mined by the traditional room and pillar method. The entries are initially driven 8-feet high and 10-feet wide. Typical pillars dimensions are 15-feet by 15-feet (W x L). The immediate roof, or back, is supported by six-foot rock bolts. The back is fairly competent, but problem areas are supported by wooden posts or stacked crib blocks. The mine has no history of water problems in the active workings.

This morning at 5:00 a.m., a foreman and his five-person crew went underground to start the day shift. At about 6:15 a.m., the foreman called out from the underground office and informed the hoist engineer that there was an apparent explosion near the faces and dark black smoke was filling the mine. At that time, communication was lost. The hoist engineer called the superintendent who immediately gave the order to activate the warning system to evacuate the mine. A short time later, two miners called out from the Service Shaft station and asked to be hoisted out of the mine. They reported that they had difficulty traveling in Drift 4 due to heavy smoke. Once they found their way, they headed through the airlock doors toward the Service Shaft. They had no specific information as to what had happened nor were they aware of the condition or location of the rest of their crew. Since that time, no one has entered or exited the mine. We do not know the status of the mine's communication system since there has been no further contact with the missing miners.

All power to the underground has been de-energized, locked out, and guarded. Both hoists are operational and the Main Vent Fan is operating. Continuous gas monitoring has been established at both shafts. The latest readings show "clear air" at the Service Shaft and 16 % oxygen (O<sub>2</sub>), 1,300 ppm carbon monoxide (CO), and 3.0 ppm nitrogen dioxide (NO<sub>2</sub>) with heavy smoke at the Production Shaft.

We have called all of the government agencies for help. Guards have been posted at the shafts and at the main power supply for the mine. There is a fully equipped mine rescue team located on the surface and they are ready to serve as your team's backup.

If your team is willing to help, we would like you to account for all missing miners; bring any live miners to the surface; extinguish or seal any fires; and explore and map all

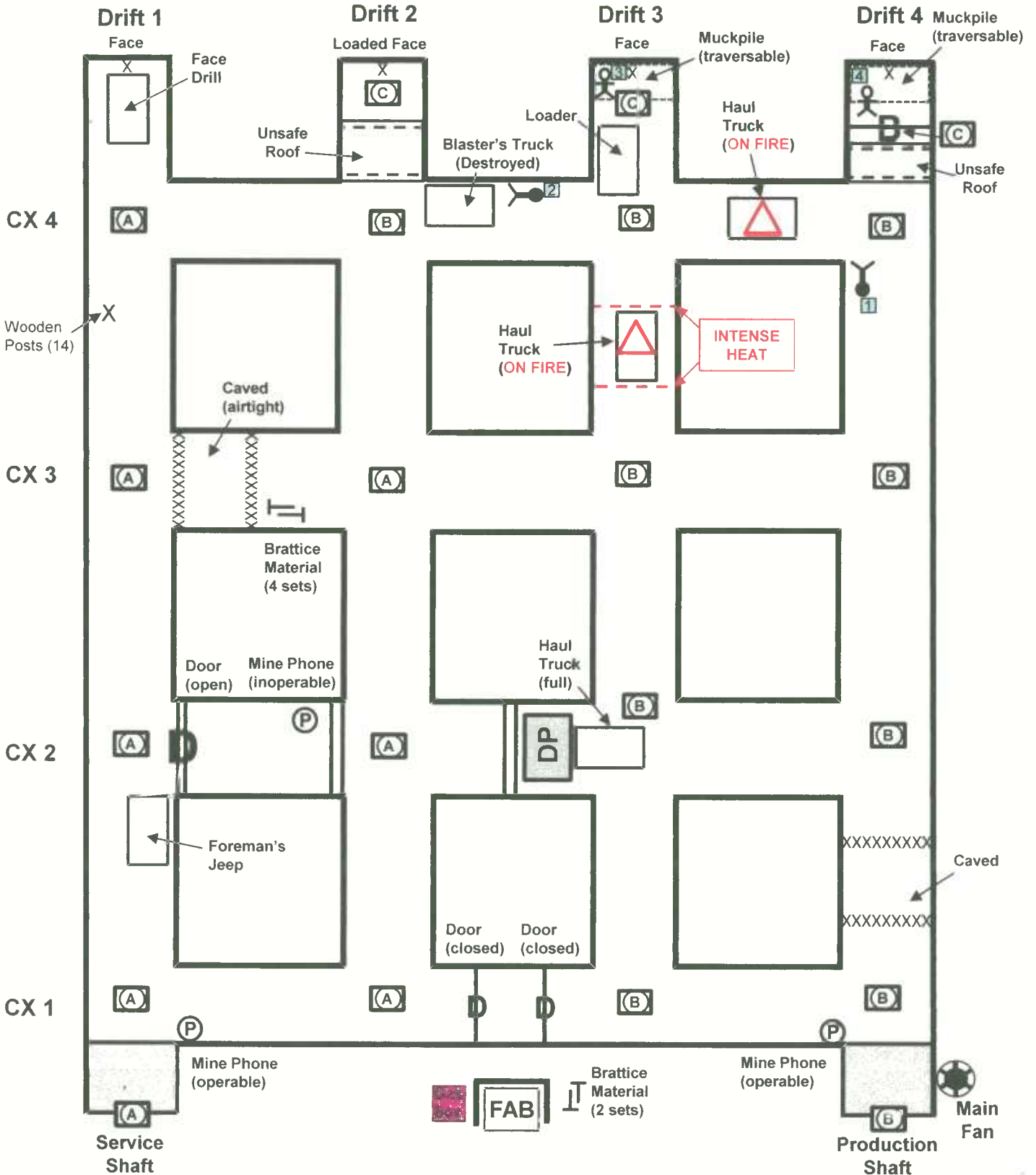
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accessible areas of the mine. **Another team will be sent into the mine to replace you after 90 minutes.**

All available equipment and materials to work the problem are located in the mine and are identified with placards. The materials are stored in several areas underground and can be readily located if needed. If there is something else deemed necessary by the team, upon request, it can be delivered in a reasonable amount of time.

When you reach the mine rescue course, the Mine Manager will introduce you to the judges. Once the Team Captain has started the timer, the Mine Manager will provide you with any changes to the briefing information that you have received. The Mine Manager will not answer any additional questions concerning the team briefing statement. However, if you do not understand a term, it will be defined. The Manager will only respond to questions allowed by the rules while you are working the problem.

The fresh air base attendant and alternate will be assigned a location where they can study the team briefing information, mine information, and map. Only one attendant or alternate will be allowed to assist at the fresh air base. This fresh air base attendant can assist the team and communicate with them while they advance past the fresh air base using the wire communication system. He must maintain an accurate map indicating all initial information that the team relays to him. He may also assist the team by relaying information to the mine manager when required by the problem. He may also assist the team when they retreat to the fresh air base.

The fresh air base attendant and mine rescue team alternate are not allowed to speak to anyone during the working of the problem except their team members, the mine manager, and the judging officials.

**GOOD LUCK!**

## **Team Instructions**

- Explore and map all conditions found in the mine (problem field) and any changes made by the team;
- Extinguish or seal any fires;
- Account for the four missing miners;
- If necessary, re-ventilate the mine; and
- Bring any live miners to the surface

## **Fresh Air Base Instructions**

- The fresh air base attendant and alternate will be assigned a location where they can study the team briefing information, mine information, and map.
- Only one attendant or alternate will be allowed to assist at the fresh air base. This person can assist the team and answer any questions the team may ask.
- The fresh air base attendant and mine rescue team alternate are not allowed to speak to anyone during the working of the problem except their team members, mine manager, and the judging officials.

## Problem Orientation

Introduce yourself to the team as the "Mine Manager." Then, introduce the #1, and #2 Judges. The team has been briefed on the problem and the mine information, and been provided with the mine maps in isolation. Read the following instructions to the team:

**At this time, I have no new information for your team. During the working of the problem, I will answer any question that you may have; however, by problem design, my response may be limited in scope. The fresh air base attendant and mine rescue team alternate must remain at the surface fresh air base. Only the fresh air base attendant can speak with the team via the communication system to discuss the rescue activities performed or proposed. If the team returns to the fresh air base, only the attendant or alternate will be allowed to assist them. However, neither the attendant nor the alternate can physically go beyond the fresh air base to assist the team unless he/she becomes a team member when someone drops out.**

**After the team has completed its 50 foot check, they will not be allowed to physically compare the team map with the fresh air base attendant's map or the team alternate's map. No side by side comparison will be allowed and no changes (edits) can be made to any map while the team is at the surface fresh air base.**

**The fresh air base attendant or team alternate is not allowed to speak with anyone except the team members, the mine manager, or the judges.**

**At the end of the problem, both the team map and the fresh air base attendant's map will be collected and scored. All map editing must take place prior to stopping the clock. The alternate's map will also be collected at this time but it will not be scored.**

**Do you understand these instructions?**

When they verify understanding the instructions, have the Team Captain start the clock and hand the team their copies of the Team Briefing Information, the Mine Information Sheets, and the three mine maps.

Remember to add: **"Good Luck!"**

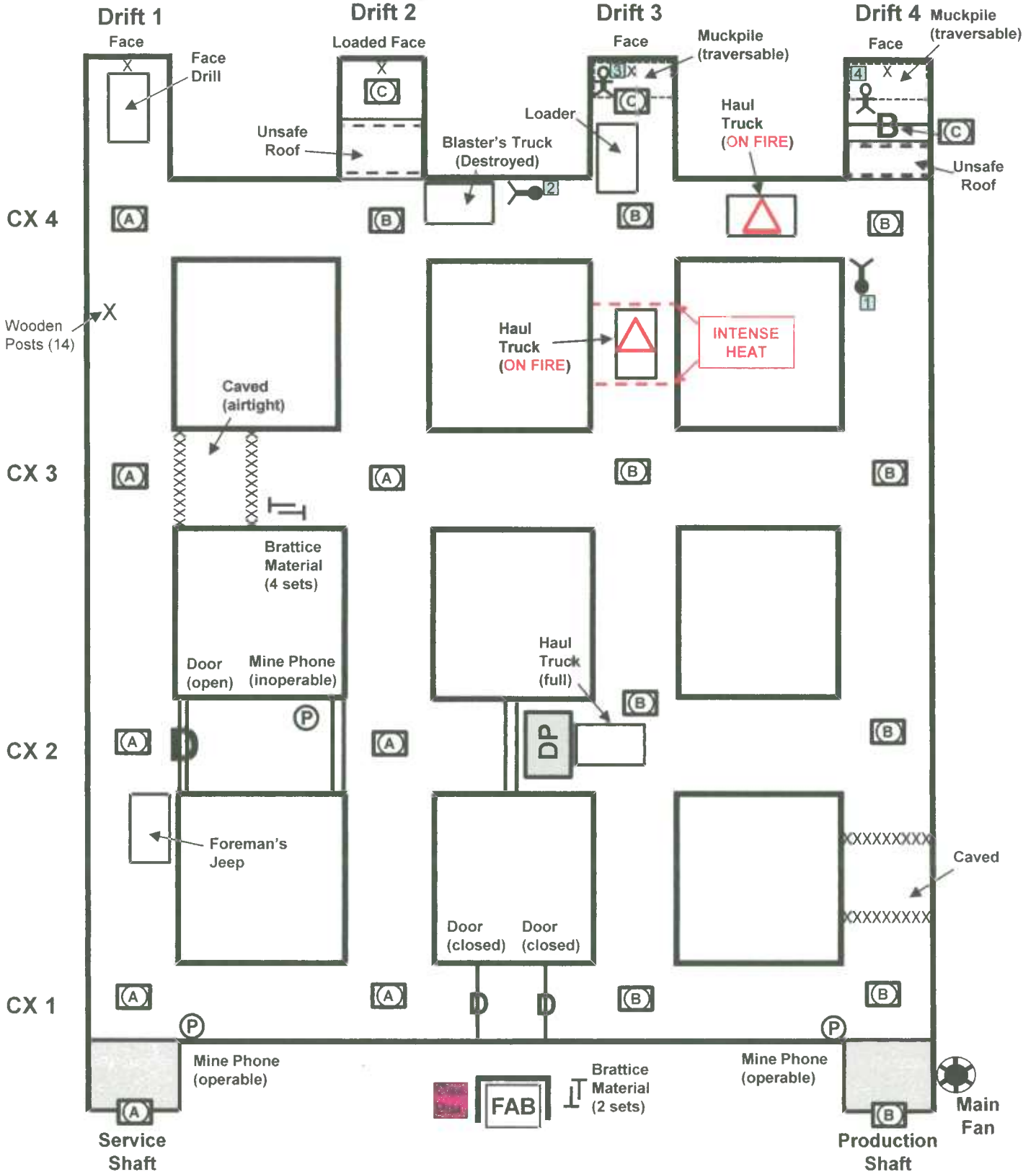
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## Problem Solution

### **DISCLAIMER:**

**There are many ways to successfully solve this problem. The following outlines one possible way for use during MSHA field judges' training.**

Each team will receive a briefing in isolation. At that time, the teams will be allowed to review the team briefing statement, mine information sheet, mine maps, and instructions for rescue teams and fresh air base attendants. However, copies of these documents and maps will be collected at the conclusion of the briefing session.

Upon arrival at the fresh air base, the team will meet the Mine Manager and will be introduced to the judges. The Mine Manager will read the Problem Orientation and update the team with any information obtained since their briefing.

When the team verifies that they understand the instructions, the captain immediately starts the official clock. He writes the month, day, year, and the team position number on the sign-in board (or sheet). **The captain's failure to perform any of these tasks will result in discounts (4 x each infraction) per Judge 1 – Surf Rule #8.**

After receiving the information from the Mine Manager (i.e., team briefing statement, mine information sheet, instructions for rescue teams and fresh air base attendants, and the mine maps), the team may discuss the conditions presented by the problem and the map. The team is not required to check their equipment again. These equipment checks were conducted prior to reporting to the field and the team is fully equipped, physically fit, and ready to go. However, deficiencies with the team's equipment, identified by the judges during the working of the problem, should be discounted appropriately.

Since the mine is a Category VI, the team does not need to use non-sparking tools to work the problem. However, if the team does not have non-sparking tools and requests them from the official in charge, the tools that they brought with them will be deemed non-sparking.

**The team will find that there are two sets of brattice material at the fresh air base to be used as needed during the working of the problem. The team may elect to take these along with them during exploration of the mine.**

Note: The brattice material available for use by the team is relatively lightweight and compact (10-foot strips of brattice cloth with clips on each end). Therefore, for the sake of realism, the team will only be allowed to carry two sets of material at any one given time. This information was provided to the team on the Mine Information Sheet.

When ready, the team must examine the mine openings. Both shafts must be examined while under oxygen. In air clear of smoke, these checks may be made without a lifeline, provided the entire team does not go into the entrance.

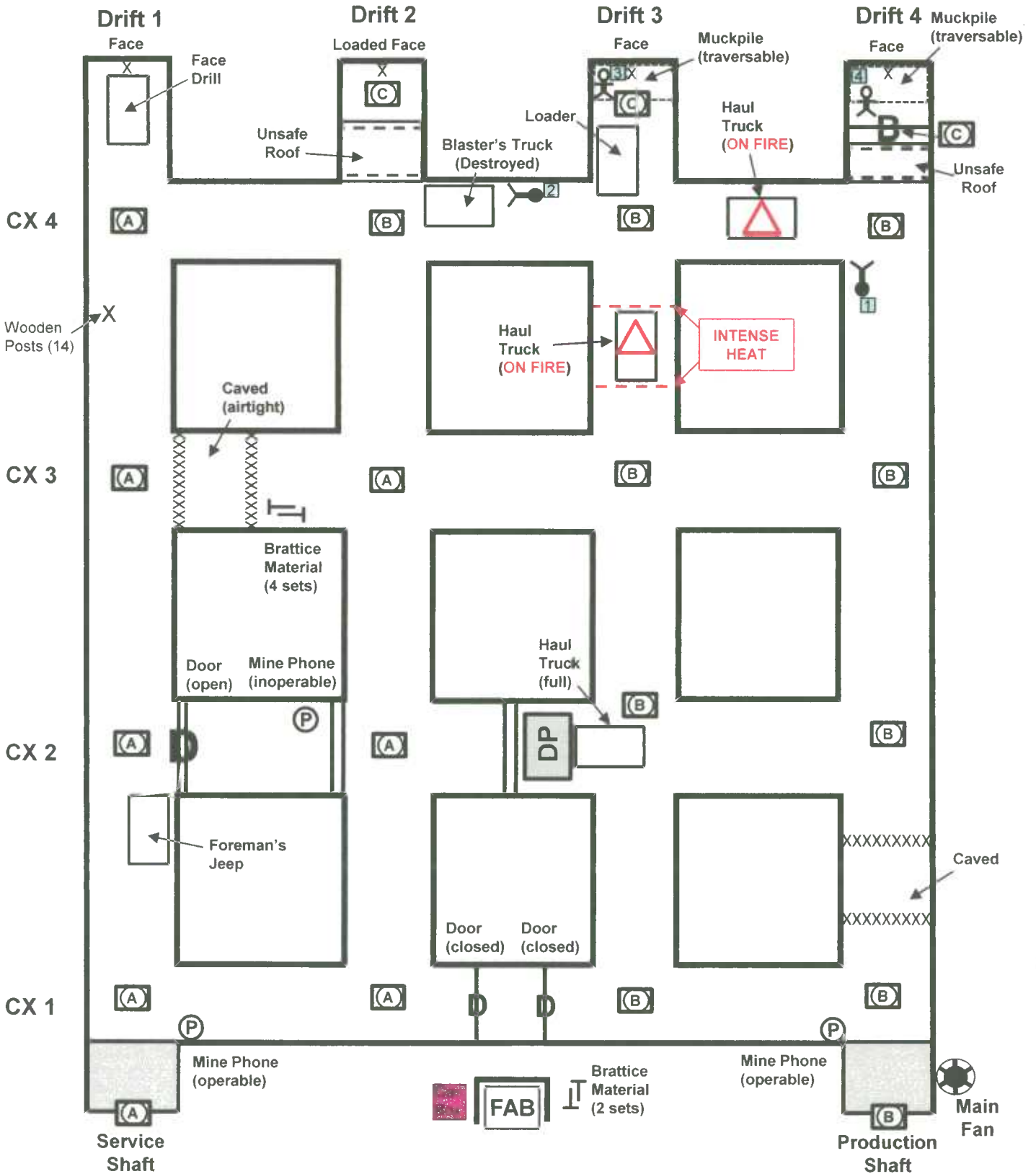
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The team's failure to wear apparatus while checking the mine openings will result in individual endangerment discounts (15 x each person) per Judge 1 – UG Rule #10(a)(6).

Note: These checks must be made to assure the conditions are safe to proceed. The team's failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1x each omission) per Judge 2 - UG - Rule #1.

**Service Shaft checks reveal:**

A placard at the shaft shows "Clear Air." 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's failure to check both shafts for damage will result in a team endangerment (75 discounts) per Judge 1 – UG Rule #10(b)(1).

Note: At each shaft, Judge No. 1 will allow 10 seconds for the conveyance to travel in each direction.

**Production Shaft checks reveal:**

A placard at the shaft shows 16 % oxygen (O<sub>2</sub>), 1,300 ppm carbon monoxide (CO), and 3.0 ppm nitrogen dioxide (NO<sub>2</sub>) with heavy 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 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.

Note: Gas concentrations found at this shaft was provided to the team during their briefing. Therefore, the team must perform an apparatus and personnel check before entering smoke at this location. They must also be attached to their lifeline. The team's failure to conduct a team check before entering smoke will result in discounts (5 x each infraction) per Judge 1 – UG Rule #12. Additionally, a team member's failure to be attached to or have hold of the lifeline when in smoke will result in discounts (2 x each infraction) per Judge 2 – UG Rule #9.

**Gas Box Testing Station:**

The team will also find the gas box testing station located at the fresh air base. A team member must use the team's multi-gas instrument to determine the gas concentrations in the unknown mixture. The team must provide its own calibration cup to report: O<sub>2</sub>, CH<sub>4</sub>, CO, and NO<sub>2</sub>. **This will be the only gas box on the mine rescue field.** Judge No. 2 will assess the team's measurements and, if warranted, apply appropriate discounts (15 x each incorrect gas measurement) per Judge 2 – UG Rule #4.

# Solution Map 1

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