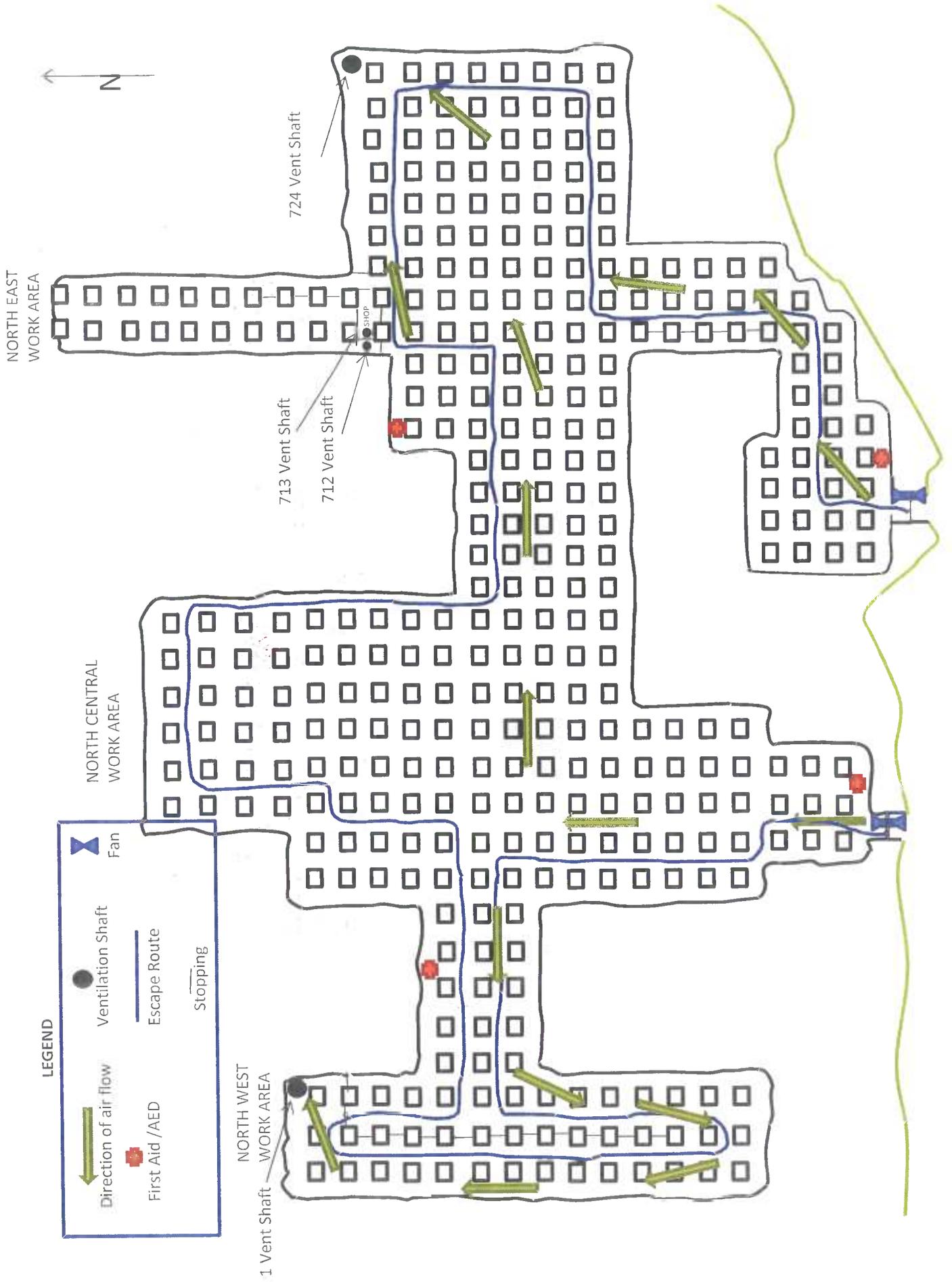


# 2016 Southeast Region Metal and Nonmetal Mine Rescue Contest

## JUDGES' PACKET Field Competition Day 1



June 21, 2016  
Maysville, Kentucky



**LEGEND**

-  Direction of air flow
-  First Aid / AED
-  Ventilation Shaft
-  Escape Route
-  Fan
-  Stopping

NORTH EAST  
WORK AREA

NORTH CENTRAL  
WORK AREA

NORTH WEST  
WORK AREA

1 Vent Shaft

713 Vent Shaft

712 Vent Shaft

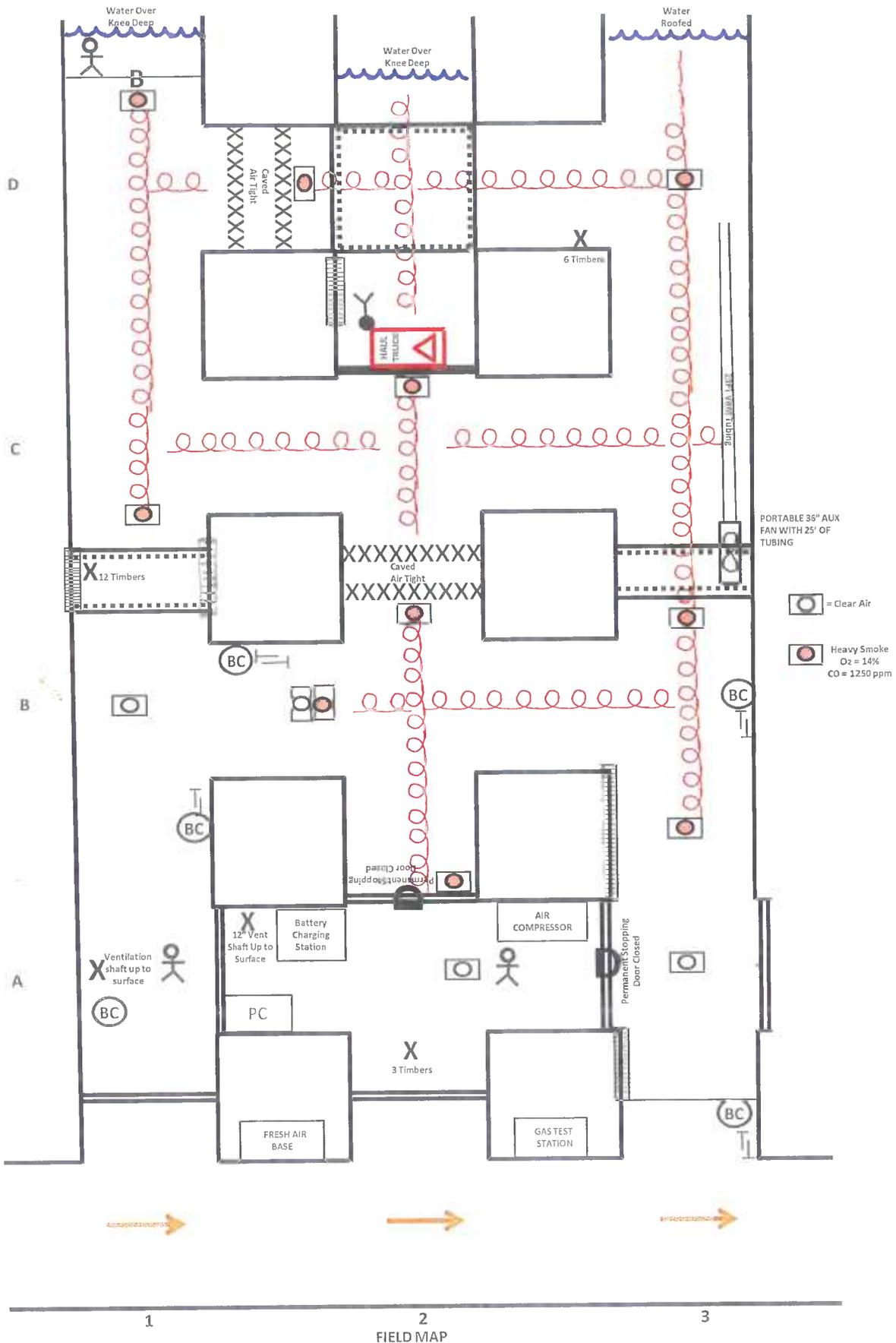
724 Vent Shaft

SHOP



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## Introduction

Welcome to the 2016 Southeast Region Metal and Nonmetal Mine Rescue Contest. Before we begin, we want to commend each of you for the countless hours that you have volunteered, and your selfless dedication and willingness to participate as a mine rescue team member. We would also like to recognize each team for the hard work spent during the past year while training and preparing to help your fellow miners during a mine emergency. In addition, we want to thank each team's company for their support and financial backing for this important training function.

This year all teams will participate in a two-day field competition. We have put together a challenging problem for each day. Both of which will make you think and exercise all of your mine rescue skills. Hopefully, every team will go away feeling that they are better prepared for an actual emergency based on what they have learned.

Your team's final placement will be based on your combined cumulative discounts for both day's field problems plus your written test discounts. Those teams with the least amount of total discount will vie for the trophies.

Even though there can only be a handful of contest winners, the real winners are the miners and their families, communities, and the companies you represent. It is for all of them that we are here today.

Now, let us continue with the briefing for this year's Day 1 mine rescue problem.



**Mine Information Sheet**  
**Mason County Mining Co. – Wildcat Mine**

**Mining & Equipment:**

The single-level, drift mine uses a conventional room and pillar method to extract limestone. The limestone is shot and loaded into haul trucks using loaders and then transported to the surface by haul trucks. The development entries are driven 10-feet high and 8-feet wide. Typical pillar dimensions are 15-feet by 13-feet (W x L).

**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.

**Mine Openings:**

The mine is opened by two drifts that are approximately 24 feet by 24 feet. There are 4 ventilation shafts to the surface. The main haulroad serves as the primary escapeway from the mine.

**Ventilation:**

The mine is ventilated with two blowing fans that are located at the drift mouth. The Fans are not reversible. Each fan produces approximately 250,000 cfm and operates in the stable portion of its performance curve. The electrical power to the fan is on and the fan is operating. The air enters the mine through the drift mouth and exhausts through the 4 ventilation shafts. Air is directed to the faces using permanent and temporary stoppings (brattice cloth) ventilation controls. The typical airflow direction is marked on the Team and Fresh Air Base Maps.

**Water and Pumps:**

The mine has a history of water problems in the active workings. The main water pumps are located on the surface and several portable pumps are located underground.

**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 mine, the surface pumping station, and the Main Fan is energized; however, all power to the underground has been de-energized, locked out, and guarded.

## **Mine Information Sheet (continued)**

### **Mine Map:**

The onsite Engineering Department updated the mine map on June 10, 2016.

### **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 S hooks 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. Teams must simulate airtight building)

### **Communications:**

Mine phones are available in the mine for contact with the surface. At this time, we do not know the status of the communication system, because there has been no contact with the missing miners.

## **Team Briefing Statement**

You are located outside the Command Center on the surface of the Wildcat Mine.

This morning at 5:00 a.m., a foreman and his six-person crew went underground to the Northeast work area to start their shift. At about 6:00 a.m., the foreman called out from the underground shop and informed the mine foreman that he had encountered heavy smoke in the work area and retreated to the shop. He could not find any of his crew but was sure they were in by the shop area. At that time, communication was lost and we have not been able to reach anyone of the Northeast crew. The mine foreman called me and we decided to activate the warning system to evacuate the mine. All miners were safely evacuated and accounted for except the seven miners on the Northeast 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. The two Main Vent Fans are operating. Continuous gas monitoring has been established on the surface at all vent shafts. The latest readings show "clear air" at all ventilation shafts.

We have notified all Federal and State agencies of the incident and their representatives are in the Command Center on the surface. 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 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 available in several areas underground and can be readily located if needed. If there are additional supplies needed by the team, upon request, it can be delivered in a reasonable amount of time.

When you reach the underground fresh air base, the Mine Manager will introduce you to the judges and the Mine Manager will provide you with any changes to the briefing information that you have received. Once the Team Captain has started the timer, The Mine Manager will give the team their maps and the written

information but 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;
- If it can be done safely, account for the seven 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. Read the following instructions to the team.

**At this time, I have no new information for the team. During the working of the problem, I will answer any questions that you 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 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. Of the team returns to the fresh air base, only the attendant or 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 fresh air base.**

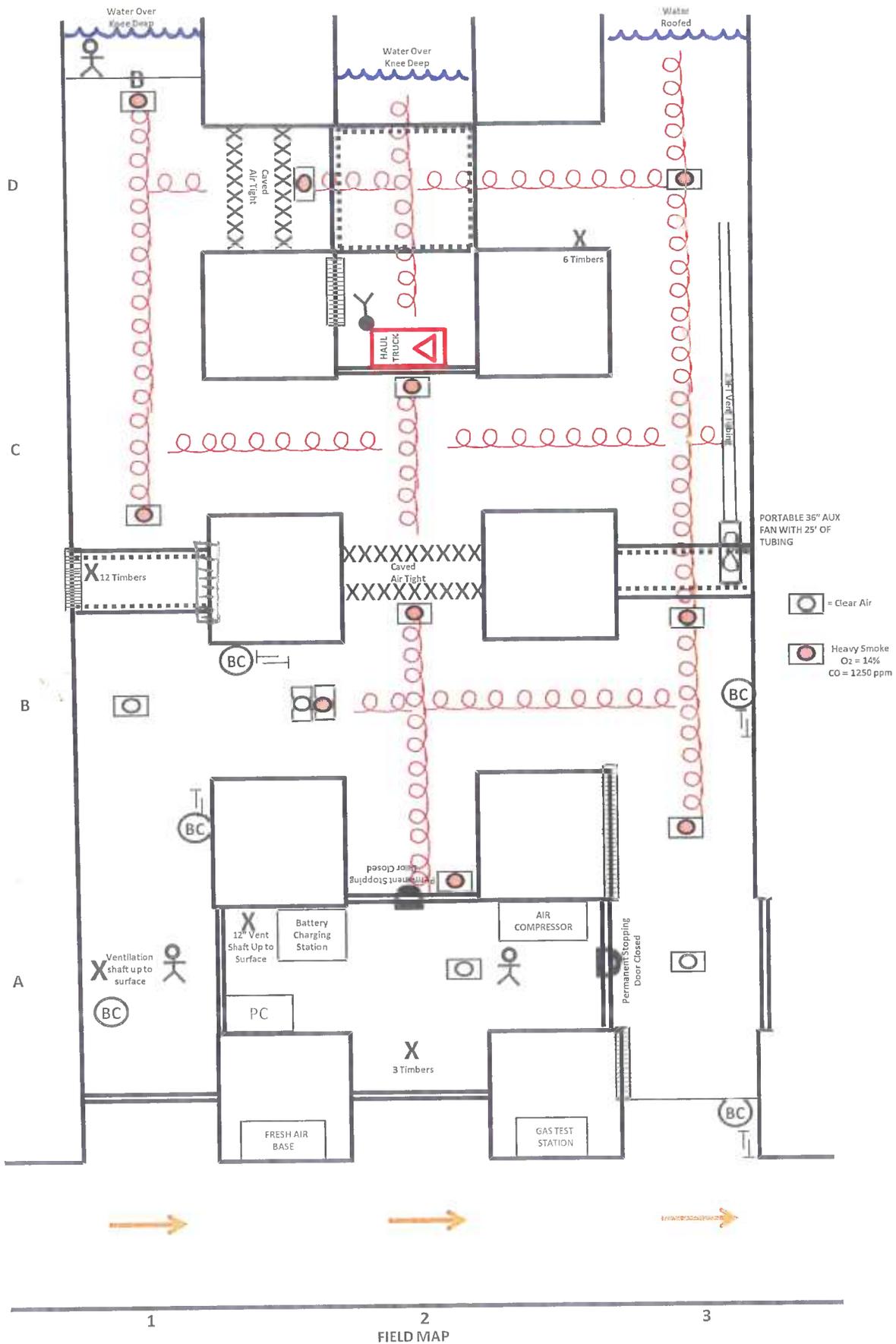
**The fresh air base attendant or team alternate is not allowed to speak with anyone except the team members, the mine manager, or the judges.**

**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**"



PORTABLE 36" AUX FAN WITH 25' OF TUBING

- = Clear Air
- Heavy Smoke  
O<sub>2</sub> = 14%  
CO = 1250 ppm

FIELD MAP

## Day 1 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 while in isolation. At that time, the teams will be allowed to review the team briefing statement, mine information sheet, mine maps, and instruction for rescue teams and fresh air base attendants.

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 give them a copy and read the Problem Orientation and update the team with any information obtained since their briefing.

*No work will be done prior to starting the clock, will result in discounts (4 x total) per Judge 1 - Surf Rule #9*

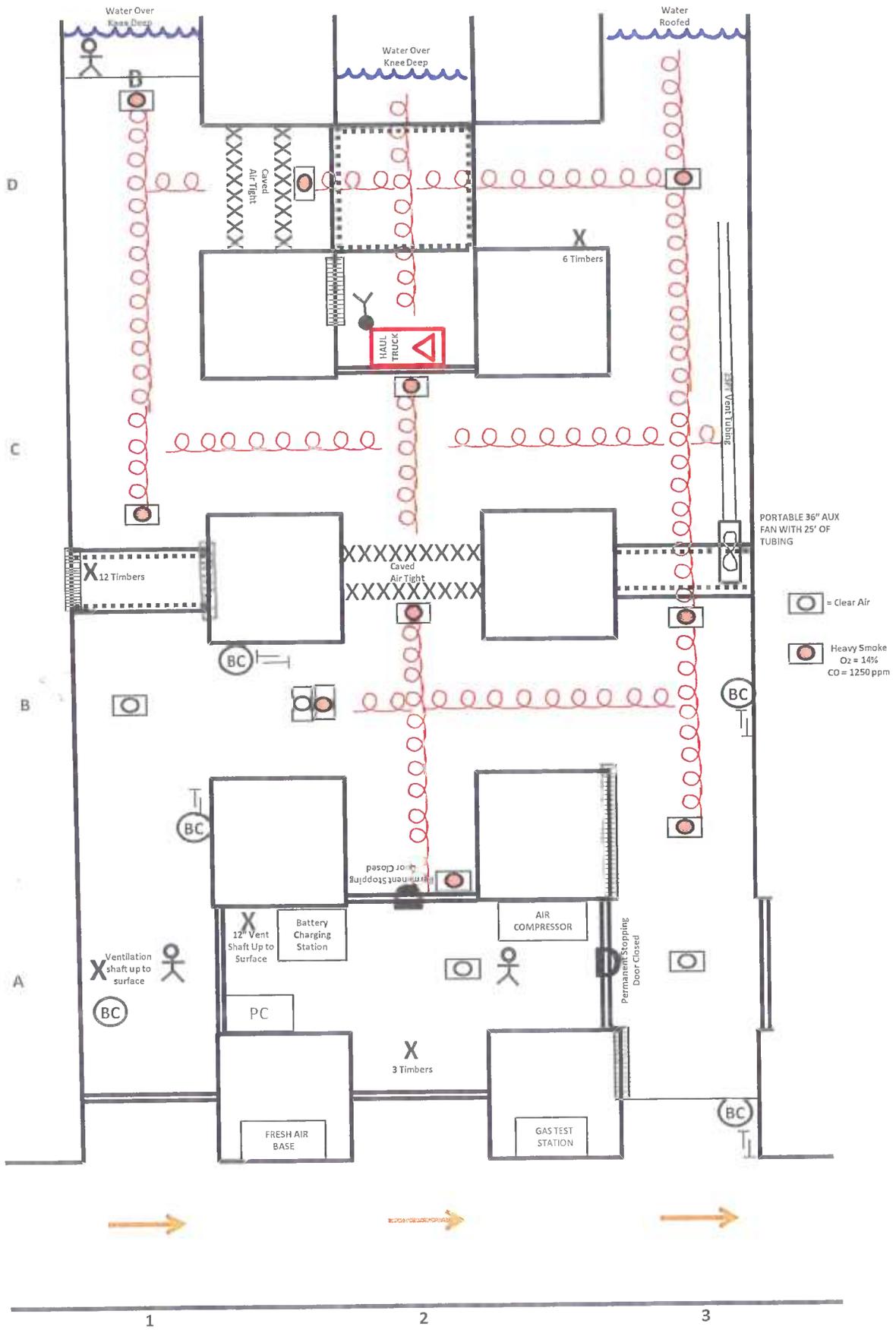
When the team verifies that they understand the instructions, the captain immediately starts the official clock. He writes the month, day, year, and team position number on the sign-in board (on the time clock).

*Failure of the team captain to mark date and team position number on the check board at mine portal or fresh air base, or start timing device, will result in discounts (4 x each omission) 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, physical 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.

*Apparatus improperly assembled, will result in discounts (10 x each apparatus) per Judge 1 - Surf Rule #1*

*Apparatus improperly adjusted to the wearer, will result in discounts (1 X each infraction) per Judge 1 – Surf Rule #2*



FIELD MAP

*Apparatus part or parts worn or deteriorated so as to be dangerous to wearer, will result in discounts (10 x each apparatus) per Judge 1 - Surf Rule #3*

*Failure to follow prescribed procedures for going under oxygen, will result in discounts (3 x each person) per Judge 1 - Surf Rule #4*

*Failure of team member to be clean shaven in the area that affects a good face-to-face piece seal, will result in discounts (10 x each infraction) per Judge 1 - Surf Rule #5*

*Failure of captain to examine each apparatus and have captain's examined before entering the mine, will result in discounts (2 x each infraction) per Judge 1 - Surf Rule #6*

*Team members not wearing identification, protective clothing, including safety shoes, hard hat, permissible cap lamp, will result in discounts (2 x each infraction) per Judge 1 - Surf Rule #7*

*No work will be done prior to starting the clock; will result in discounts (4 total) per Judge 1 - Surf Rule #9*

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 request them from the official in charge, the tools that they brought with them will be deemed non-sparking.

The team will don their apparatus and go under oxygen.

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 given time. This information was provided to the team on the Mine Information Sheet.

When ready, the captain must examine the mine openings. The team will find a temporary stopping in Drift No. 1, Drift No. 2, and Drift No. 3, one set of brattice material and the gas box testing station.

*Failure of the captain to verbally indicate he/she is checking the back or roof at intersections, shafts stations, rooms, faces, mine openings: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)1*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

Note: These checks must be made to assure the conditions are safe to proceed. The captain must D&I and a gas check will be made in each drift.



*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

Note: No physical comparison of the fresh air base map and team map will be allowed after this initial entry into the mine. No changes can be made to any map while the team is at the surface fresh air base.

*Physically comparing team map with fresh air base map, once the team has entered the mine, will result in discounts (25 total) per Judge 2 – Surf Rule #5*

### **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 instruments 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.**

*At the fresh air base, the team must stop at the gas box, take a measurement, and report the respective gas concentrations within the acceptable limits; Oxygen (O<sub>2</sub>) readings are considered to be correct if within plus or minus 0.5% by volume; failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(a)*

*Methane (CH<sub>4</sub>) readings are considered to be correct if within plus or minus 0.2% by volume with an instrument equipped with a catalytic sensor. Note: For those instruments equipped with an infrared sensor, the readings would be rounded to the nearest whole number. Therefore, a team must use an instrument equipped with a catalytic sensor in order to be within the required tolerance, failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(b)*

*Carbon Monoxide (CO) readings are considered to be correct if within plus or minus 10% of the actual value present, failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(c)*

*Nitrogen Dioxide (NO<sub>2</sub>) readings are considered to be correct if within plus or minus 3 ppm of the actual value present, failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(d)*



**Note: Team Stop Nos. 1- 12 - Day 1 Solution Map (a)**

**Team Stop No. 1 Drift #3**

The team must use the brattice material to air lock into the No. 3 Drift. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the temporary stopping is breached. The captain will find unsafe rib on the west side of the drift, the captain will indicate to the team he has recognized the bad ground and will check the unsafe rib.

*The team's failure to erect a temporary stopping will result in discounts (10 x each infraction) per Judge 2 – UG Rule #10.*

*In addition, making a ventilation change before the effects of such changes are known will result in discounts (15 x each infraction) per Judge 2 – UG rule #12.*

*If the captain doesn't check the roof and rib prior to building a temporary stopping, assess 5 discounts per Judge 1- UG Rule #8(b)(3).*

*If the captain does not D&I the build, assess discounts per Judge 1 – UG Rule #9 (2x each place – 10 max).*

*Note: Roof (back) and Rib test- shown on the Judge's Map (with Team Stops) as "RR".*

*Note: Gas test – shown on the Judge's Map (with Team Stop) as "△"*

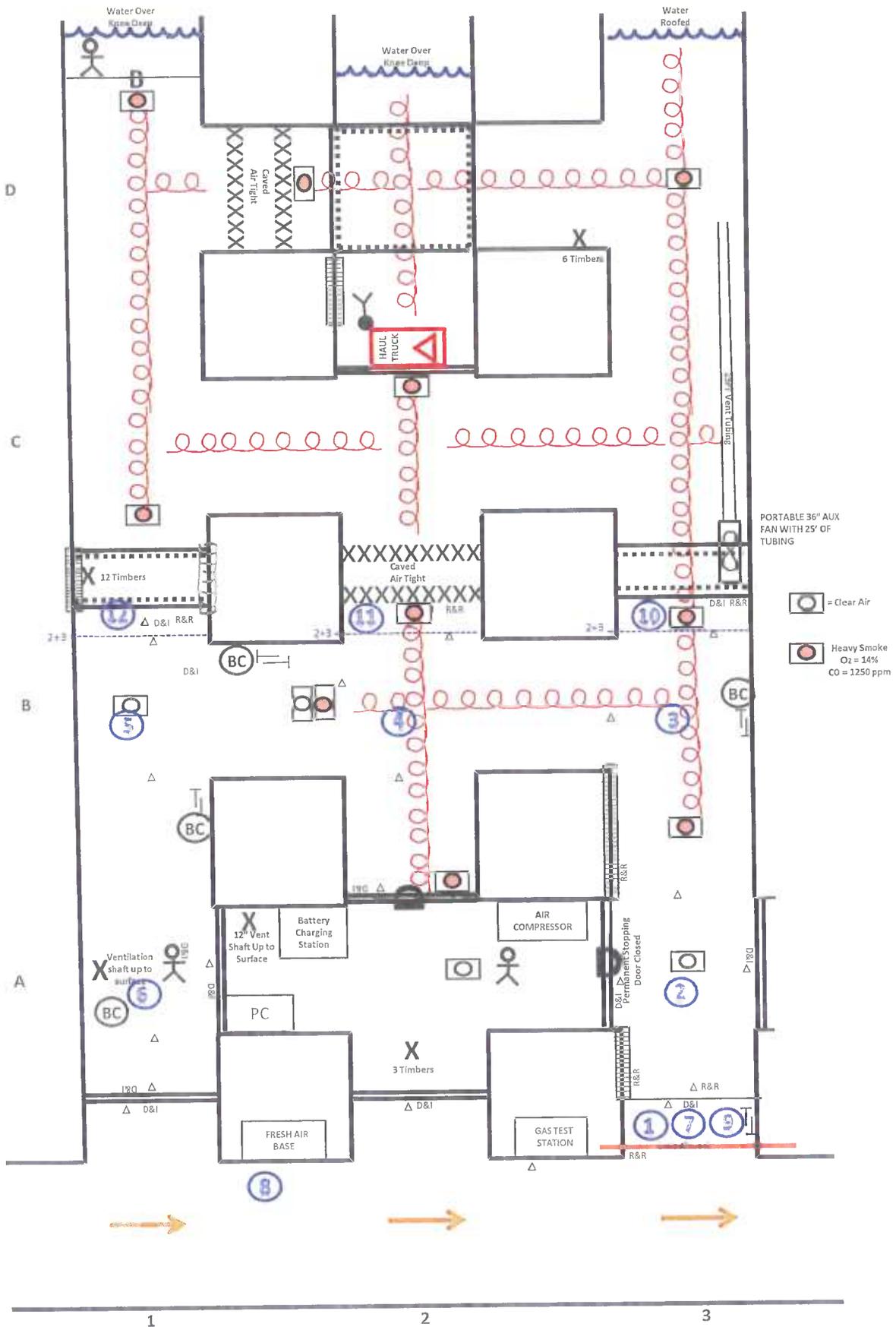
*Note: Date and Initial shown on the Judge's Map (with Team Stop) as "D&I"*

Note: After advancing not more than fifty (50) feet from the fresh air base, the captain must give a signal for the team to stop. At this time, all team members and their apparatus must be checked. After the first 50 feet apparatus check, the team is required to conduct apparatus examinations not exceeding 20-minute intervals while working the problem. Additionally, apparatus removed in order to enter a confined area or apparatus that has sustained possible damage from impact must be checked before continuing.

*If team fails to conduct 50 foot check, assess 10 discounts per Judge 1- UG Rule #3.*

*Also, if the team fails to conduct apparatus examinations exceeding 20-minute intervals, assess discounts per Judge 1- UG Rule #5 (5x each occurrence).*

# Day 1 Solution Map (a)



### **Team Stop No. 2 CX A-3**

When the stopping is breached the captain will find an unsafe rib on the west rib. The captain will indicate to the team he has recognized the bad ground and will check the unsafe rib. The captain will break the plane to the north and verbally indicate he is checking the back. The captain will find more unsafe rib along the west rib inby the cross cut. The captain will indicate to the team he has recognized the bad ground and will check the unsafe rib. The captain will find a gas placard showing clear air. Gas test will be made at the opening to the intersection. The captain will find a permanent stopping with door closed to the west and a permanent stopping to the east. Should the captain knock on the door the person will reply “help get me out” but nothing else. The team cannot build an air lock and open the door due to the unsafe rib inby along the west rib. The captain must D&I the permanent stopping with door closed to the west and the permanent stopping to the east.

*The captain's failure to indicate to the team he/she has recognized bad ground access discount (5 x each omission) per Judge 1 UG Rule 8(a).*

*The team's failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

If the team opens the door *assess discounts for, Failure to erect temporary barricade, stopping, or regulator when necessary, will result in discounts (10 x each infraction) per Judge 2 – UG Rule #10*

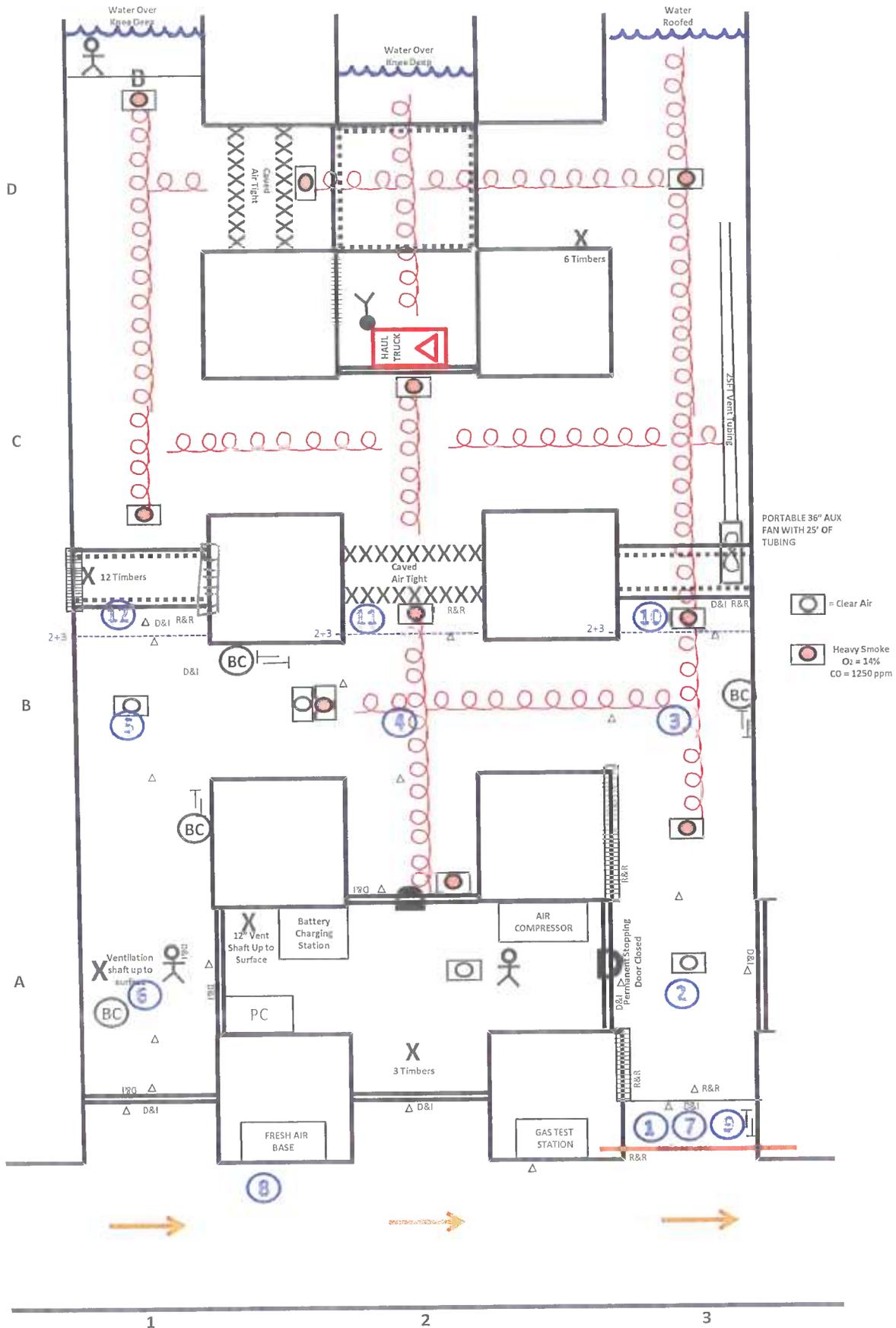
### **Team Stop No. 3 CX B-3**

The team will advance north and will find a gas placard with **Heavy Smoke, O<sub>2</sub>=14%, CO=1250ppm**. The team must count off as they enter the heavy smoke. The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find brattice material with frames on the east rib. **No team member can advance more than 3 feet beyond the intersection to the north.**

*Teams must be checked immediately before entering smoke; failure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #12*

*Failure of team to explore or examine workings systematically and thoroughly, will result in discounts (4 x each omission) per Judge 1 – UG Rule #11*

# Day 1 Solution Map (a)



#### **Team Stop No. 4 CX B-2**

The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. **No team member can advance more than 3 feet beyond the intersection to the north.**

To the west the captain will find a placard showing clear air. To the south, the captain will find a gas placard with **Heavy Smoke, O<sub>2</sub>=14%, CO=1250ppm** and a permanent stopping with door closed. Should the captain knock on the door the person will reply “help get me out”. The teams cannot air lock and open the door because of the irrespirable atmosphere at the door. The captain must D&I the permanent stopping with door closed and a gas check must be made at the door.

*Teams must be checked immediately before entering smoke (count off) access discounts (5 x each omission) per Judge #1 UG Rule 12.*

*If the team travels beyond this limit and fails to explore systematically, assess discounts (4 x each infraction) per Judge 1 – UG Rule #11.*

*The team’s failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

#### **Team Stop No. 5 CX B-1**

The captain will find brattice materials with frames on the north rib.

The captain will find a gas placard showing clear air. The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. **No team member can advance more than 3 feet beyond the intersection to the north.** To the south the captain will find another brattice material with frames on the east rib.

Note: Teams can carry only two sets of brattice material with frames as they travel throughout the mine.

**NOTE: As the team passes the brattice material with frames on the east rib, the survivor will run toward the team acting very excited to see them. The survivor will attempt to pass them walking toward CX B1. The team must stop the survivor from traveling past them into the smoke.**

*Should the team allow the survivor to pass them and enter smoke the survivor will fall to the ground as if he became unconscious; assess discounts for the team performing an act that may result in the death or*



*injury of survivor(s) such as improperly protecting survivor(s) from toxic gases, will result in discounts (50 x each infraction) per Judge 1 – UG Rule #18(d)*

*The team's failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

*If the team travels beyond this limit and fails to explore systematically, assess discounts (4 x each infraction) per Judge 1 – UG Rule #11.*

### **Team Stop No. 6 CX A-1**

While the survivor is being assessed, the captain can continue to explore; he must break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find a ventilation shaft to the surface, and a brattice cloth (wing curtain), permanent stoppings to the south and east. The captain must D&I the location of the survivor (where survivor is being assessed), the permanent stoppings and a gas checks must be made at the permanent stoppings. But the team must fit an apparatus on the miner and escort him to the fresh air base via the #3 drift without delay. When the team retreats they must be checked/count off before entering smoke.

*The captain must D&I the location of any live person. Failure to D&I person assess discounts (2 x each omission)(maximum 10 discounts) per Judge #1 UG Rule #9.*

*Teams must be checked immediately before entering smoke (count off) assess discounts (5 x each omission) per Judge #1 UG Rule 12.*

### **Team Stop No. 7 #3 Drift**

The team must retreat out the #3 Drift and air lock out to the fresh air base.

*If the captain doesn't check the roof and rib prior to building a temporary stopping, assess 5 discounts per Judge 1- UG Rule #8(b)(3).*

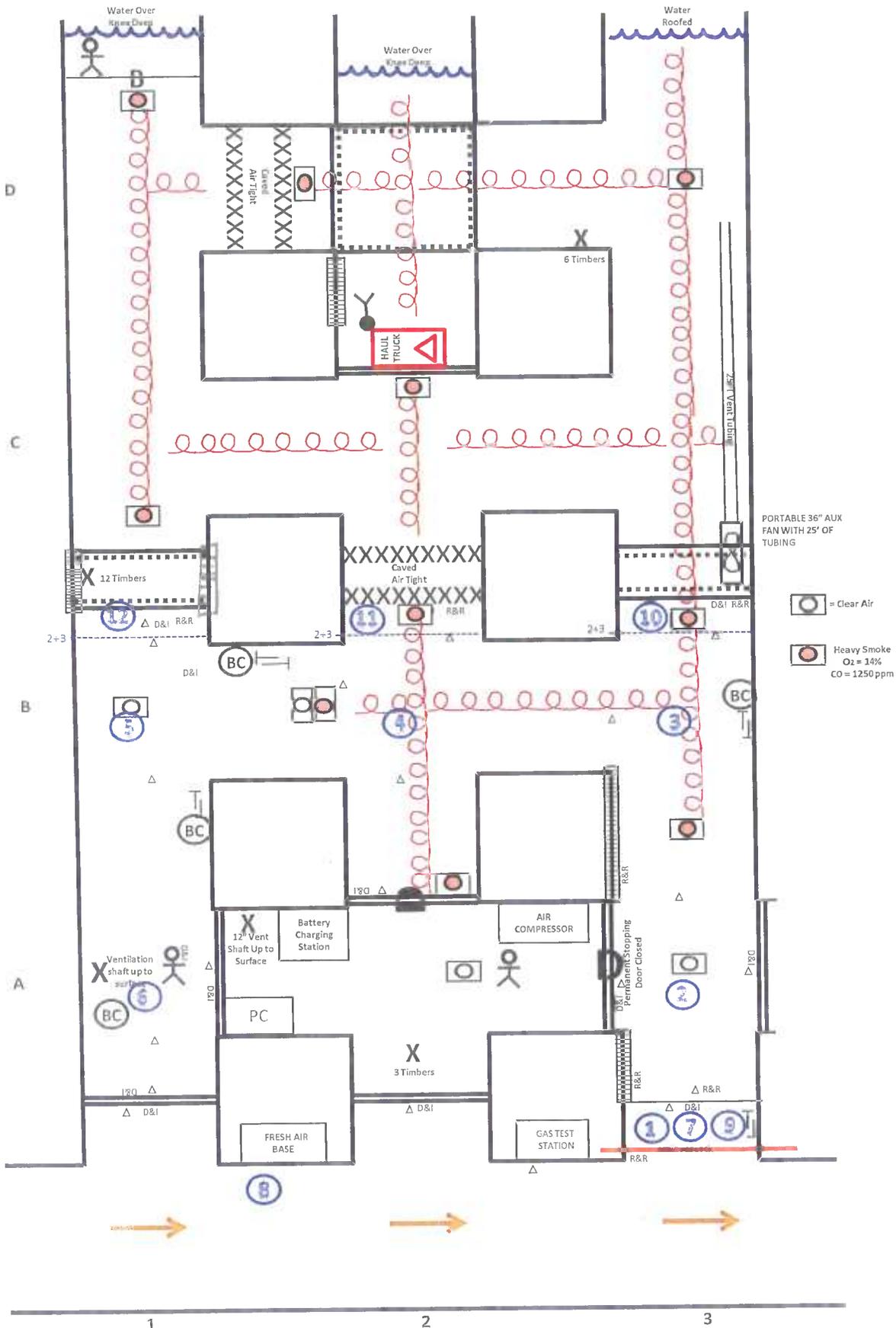
*Failure to erect temporary barricade, stopping, or regulator when necessary, will result in discounts (10 x each infraction) per Judge 2 – UG Rule #10*

### **Team Stop No. 8 FAB**

The team will turn over the survivor to the fresh air base.

The team has explored all areas they can access safely; this allows the team to go beyond the 2 + 3 rule, and explore north of B-3, B-2, and B-1.

# Day 1 Solution Map (a)



### **Team Stop No. 9 Drift #3**

The team must air lock back into #3 Drift.

*If the captain doesn't check the roof and rib prior to building a temporary stopping, assess 5 discounts per Judge 1- UG Rule #8(b)(3).*

*Failure to erect temporary barricade, stopping, or regulator when necessary, will result in discounts (10 x each infraction) per Judge 2 – UG Rule #10*

### **Team Stop No. 10 north of CX B-3**

The captain will find a gas placard showing **Heavy Smoke, O2=14%, CO=1250ppm** and unsafe roof, and will indicate to the team he has recognized the bad ground and will check the unsafe roof. The captain must D&I the unsafe roof.

*Failure of the captain to verbally indicate he/she is checking the back or roof at all points of farthest advance: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)2*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

### **Team Stop No. 11 north of CX B-2**

The captain will find a gas placard showing **Heavy Smoke, O2=14%, CO=1250ppm** and caved air tight and will indicate to the team he has recognized the bad ground and will check the caved air tight. The captain must D&I the caved air tight.

*Failure of the captain to verbally indicate he/she is checking the back or roof at all points of farthest advance: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)2*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*



### **Team Stop No. 12 north of CX B-1**

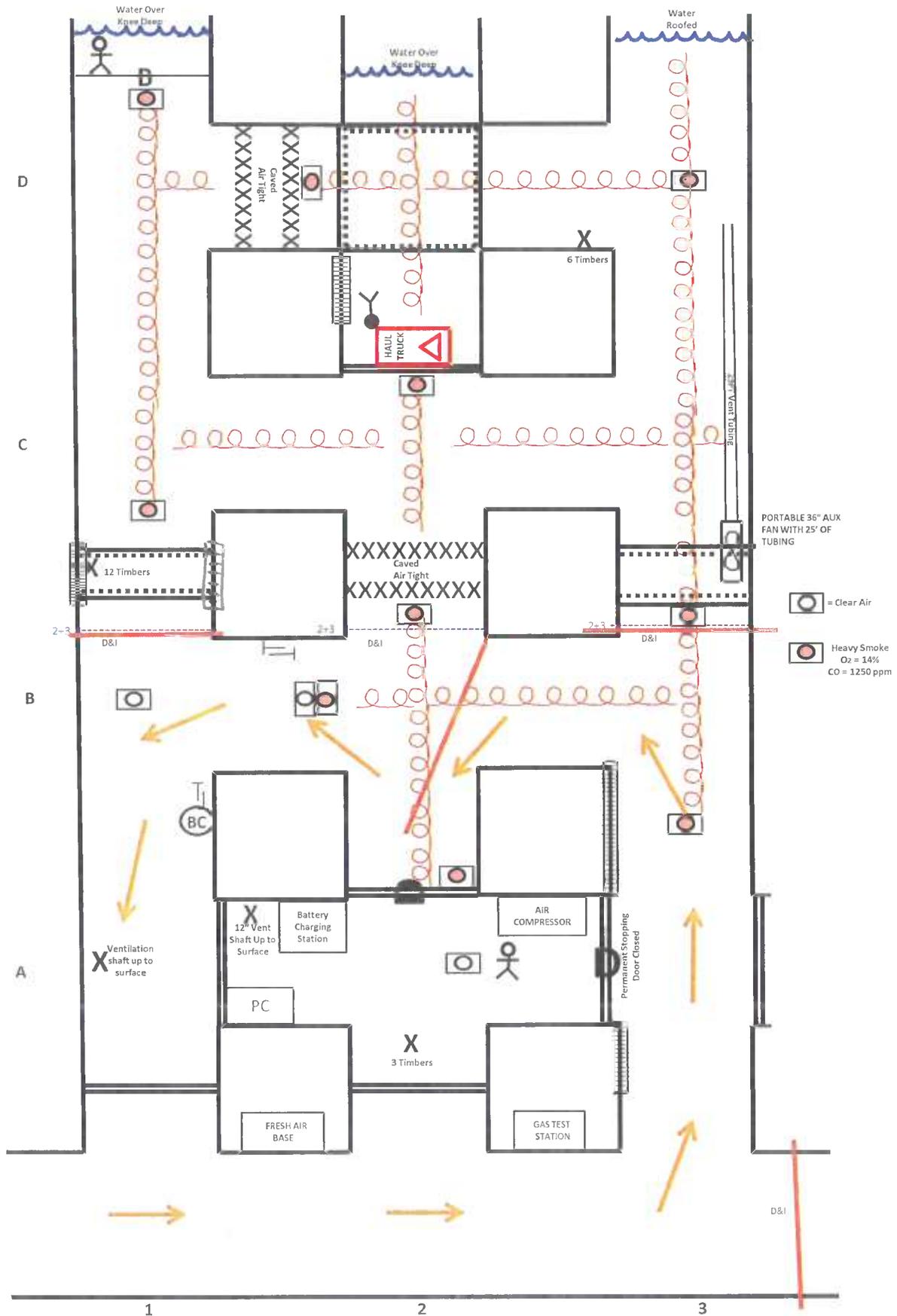
The captain will find unsafe roof and will indicate to the team he has recognized the bad ground and will check the unsafe roof. The captain must D&I the unsafe roof.

*Failure of the captain to verbally indicate he/she is checking the back or roof at all points of farthest advance: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)2*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

Note: at this time the team has not found any timbers and if asked the Judge should tell them **(Everything you need to work this problem is in the mine.)** The team must make a ventilation change to rescue the survivor behind the shop door south of B-2.

# Day 1 Ventilation Map (a)

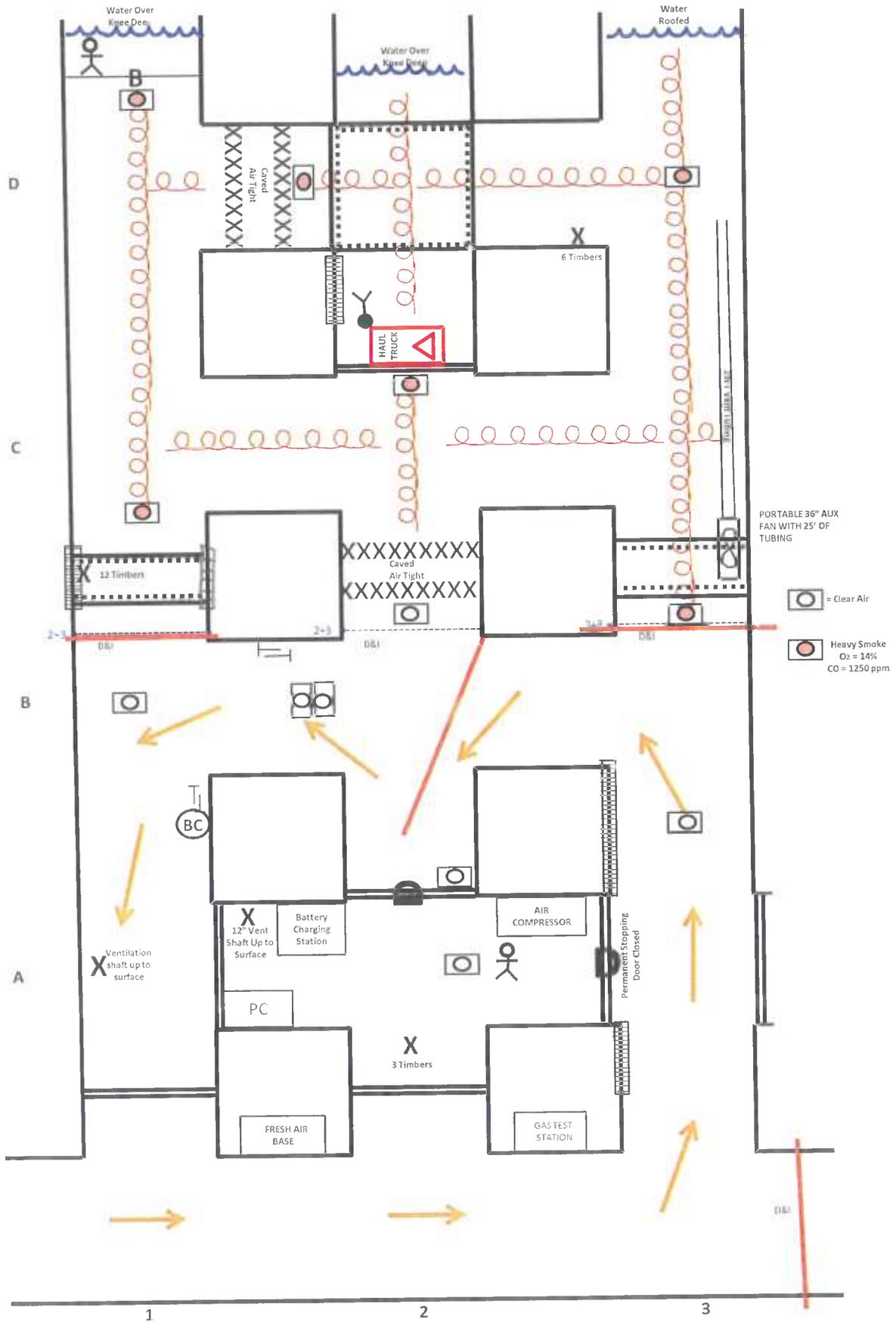


## **Day 1 Ventilation Map (a)**

The team must build:

- 1) Temporary stopping north of B-1.
- 2) Temporary stopping north of B-3.
- 3) The team must request a ventilation change.
- 4) They must build a temporary stopping east of Drift #3 at the fresh air base.
- 5) The team can use the brattice cloth (wing curtain) to remove smoke and gas from outside the shop door.
- 6) Then they must remove the temporary stopping at the mouth of #3 Drift.

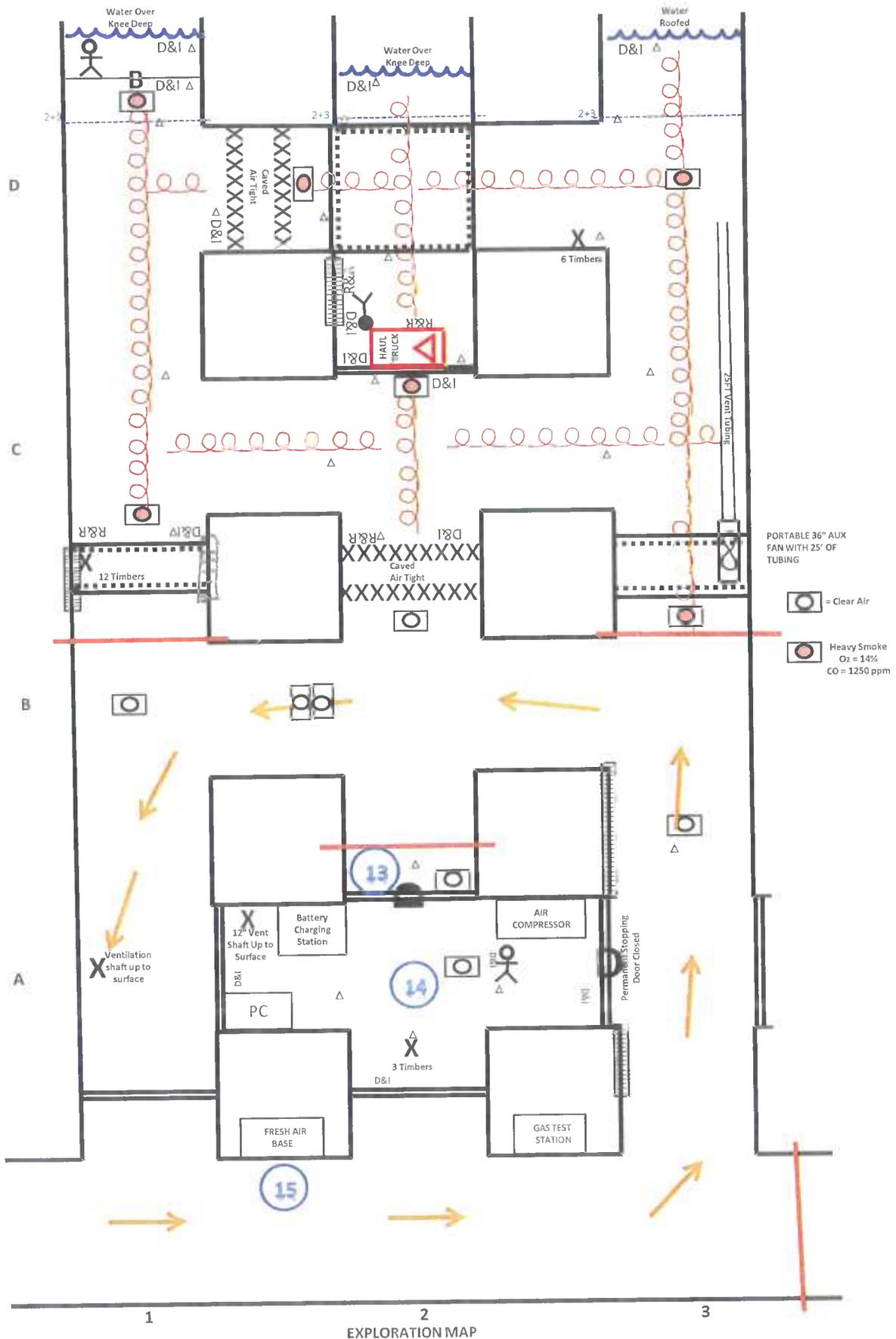
# Day 1 Ventilation Map (b)



### Day 1 Ventilation Map (b)

After this is done the judges will clear the placards showing **Heavy Smoke, O<sub>2</sub>=14%, CO=1250ppm.**

# Day 1 Solutions Map (b)



## Day 1 Solution Map (b)

### **Team Stop No. 13 airlock into shop**

After the 1<sup>st</sup> ventilation, because the miner would only say “help get me out”, the team must air lock into the permanent stopping with door closed located south of CX B-2. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the door is opened.

*The team’s failure to erect a temporary stopping will result in discounts (10 x each infraction) per Judge 2 – UG Rule #10. In addition, making a ventilation change before the effects of such changes are known will result in discounts (15 x each infraction) per Judge 2 – UG rule #12.*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

### **Team Stop No. 14 CX A-2**

The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find a conscious survivor, a clear air placard, 4 timbers, an air compressor, a battery charging station, and a power center. The captain must D&I the location of the survivor, permanent stopping to the west, and to the south, and the permanent stopping with door to the east. Gas test must be made at the permanent stoppings. The team can take the timbers with them, but must evacuate the survivor without delay.

Note: The team must test gas at all areas that have been cleared of smoke and toxic or dangerous gas as they retreat.

*The team’s failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

*The captain must D&I the location of any live person. Failure to D&I person assess discounts (2 x each omission)(maximum 10 discounts) per Judge #1 UG Rule #9.*



## Day 1 Solution Map #1 (c)

### **Team Stop No. 15 FAB**

The team will turn over the survivor to the Fresh Air Base.

The team must request a ventilation change and remove the temporary stopping they installed at the FAB, and install it at the mouth of #3 Drift behind them as they travel north via #3 Drift. The team must build a stopping south of CX B-1 and close the door in the permanent stopping south of CX B-2.

*Failure to make necessary ventilation changes, changing ventilation or electric power before the effects of such changes are known, will result in discounts (15 x each infraction) per Judge 2 – UG Rule #12*

**NOTE: The team must travel north via the #3 Drift because they do not have enough timbers to safely explore the #1 Drift due to the unsafe roof and unsafe rib which requires a double row of timbers.**

### **Team Stop No. 16 CX C-3**

The team can remove the temporary stoppings they installed north of CX B1 and CX B3.

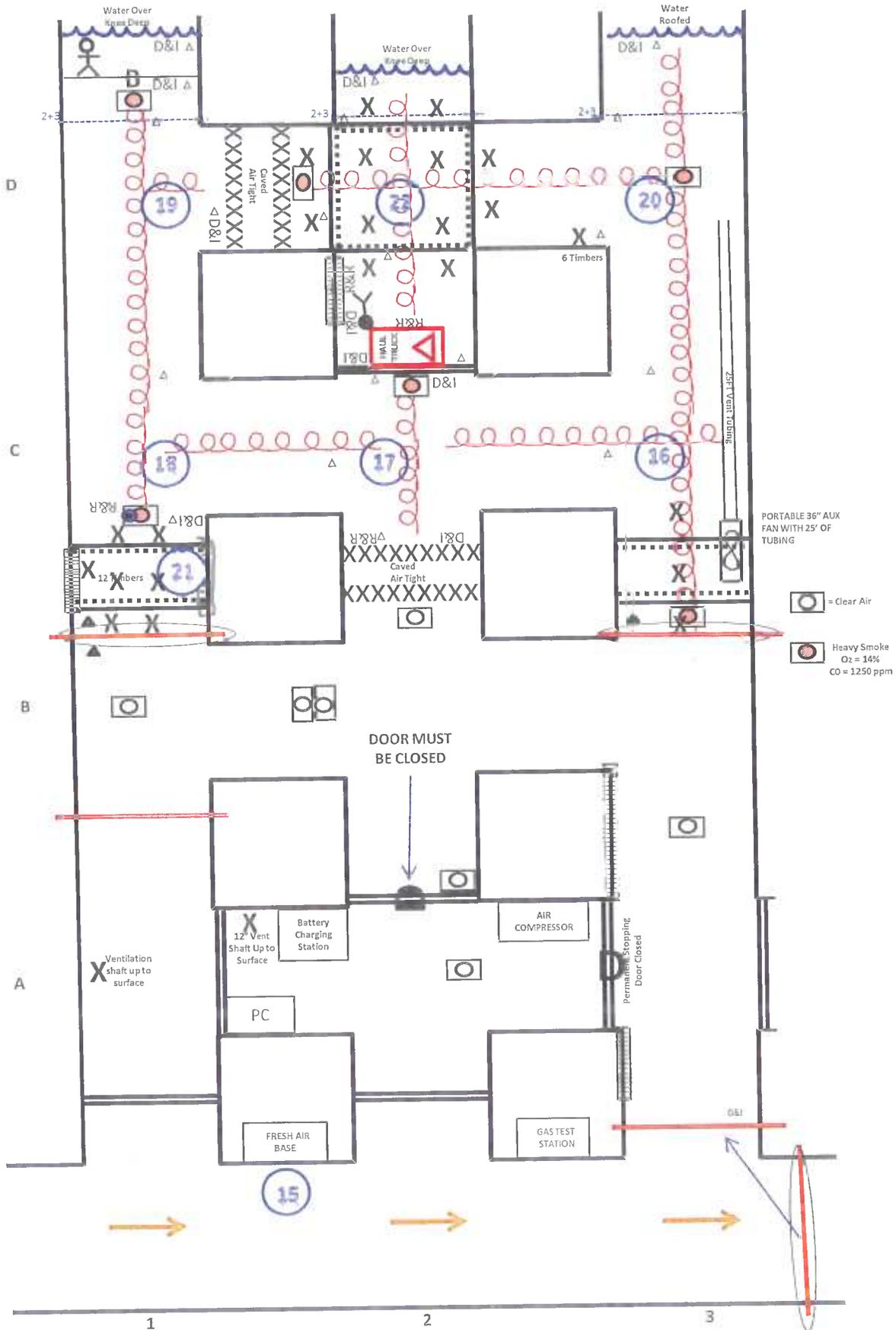
The captain will find a placard showing **Heavy Smoke, O<sub>2</sub>=14%, CO=1250ppm**. The team must count off when entering smoke. The team can set the timbers they found in the shop through the unsafe roof and advance north to CX C-3. The team will find a 36” Vent Fan with 25ft of tubing along the east rib. At C-3 the captain will break the planes to the intersection and enter the openings and verbally indicate he is checking the back. Gas tests will be made in each opening. The captain will find a gas placard showing **Heavy Smoke, O<sub>2</sub>=14%, CO=1250ppm**.

*The captain's failure to indicate to the team he/she has recognized bad ground access discount (5 x each omission) per Judge 1 UG Rule 8(a).*

*The captain's failure to D&I the unsafe ground where required (2 x each omission) (maximum 10 discounts) per Judge 1 UG – Rule #9.*

*The team's failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

# Day 1 Solutions Map (c)



### **Team Stop No. 17 CX C-2**

At C-2 the captain will break the planes to the intersections and enter the opening and verbally indicate he is checking the back. Gas test will be made in the openings. To the south the captain will find the back side of the caved air tight and must D&I the caved air tight.

*The captain's failure to indicate to the team he/she has recognized bad ground access discount (5 x each omission) per Judge 1 UG Rule 8(a).*

*The captain's failure to D&I the unsafe ground where required (2 x each omission) (maximum 10 discounts) per Judge 1 UG – Rule #9.*

*The team's failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

### **Team Stop No. 18 CX C-1**

At C-1 the captain will break the planes to the intersection and enter the openings and verbally indicate he is checking the back. Gas test will be made in the openings. To the south the captain will find a gas placard showing **Heavy Smoke, O<sub>2</sub>=14%, CO=1250ppm** and the back side of the unsafe roof. The captain will indicate to the team he has recognized the bad ground and must check and D&I the unsafe roof. The team can see the timbers located within the unsafe roof but cannot reach them.

*The team must conduct gas test, The team's failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

*The captain's failure to D&I the unsafe ground where required (2 x each omission) (maximum 10 discounts) per Judge 1 UG – Rule #9.*

### **Team Stop No. 19 CX D-1**

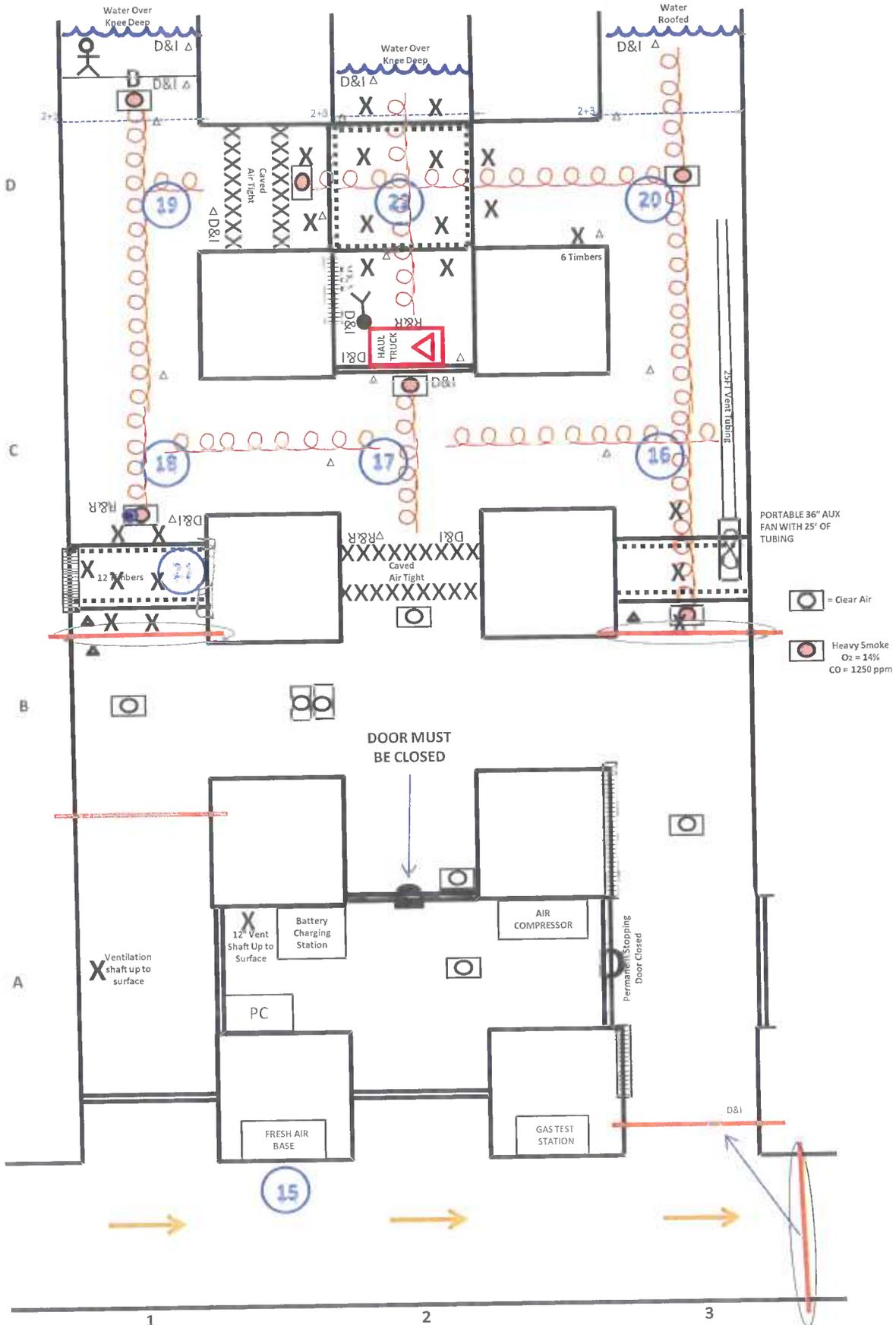
At D-1 the captain will break the plane to the intersection and enter the opening and verbally indicate he is checking the back. Gas test will be made in the openings. To the east the captain will find caved air tight and must D&I the caved air tight. To the north the captain will find a barricade and captain must D&I the barricade.

Should the captain knock on the barricade there will be no reply.

*Failure of the captain to D&I the permanent stopping Judge 1-UG- Rule 9.*

*The team must conduct gas test, The team's failure to take necessary gas tests where required (each gas and each infraction) assess discounts (1 x each omission) per Judge 2 – UG – Rule #1.*

# Day 1 Solutions Map (c)



### **Team Stop No. 20 CX D-3**

The team will retreat to CX D-3; the captain will break the plane to the intersection and enter the opening and verbally indicate he is checking the back. Gas test will be made in the openings. To the west the captain will find 6 timbers on the south rib and unsafe roof. The captain will indicate to the team he has recognized the bad ground and must check and D&I the unsafe roof. To the north the captain will enter the opening and verbally indicate he is checking the back and will find water roofed. A gas check must be made and the captain must D&I the water roofed.

*The captain's failure to indicate to the team he/she has recognized bad ground access discount (5 x each omission) per Judge 1 UG Rule 8(a).*

*The captain's failure to D&I the water over knee deep where required (2 x each omission) (maximum 10 discounts) per Judge 1 UG – Rule #9.*

The team will have to retreat and use the 6 timbers in the unsafe roof south of C-1.

NOTE: if the team sets the 6 timbers in unsafe roof at CX D-2 (GAME OVER)

### **Team Stop No. 21 South of C-1**

The team will set the 6 timbers south of CX C-1 in the unsafe roof and find 12 timbers. After the team has set the timbers and explored this area they can now advance north of CX-D2.

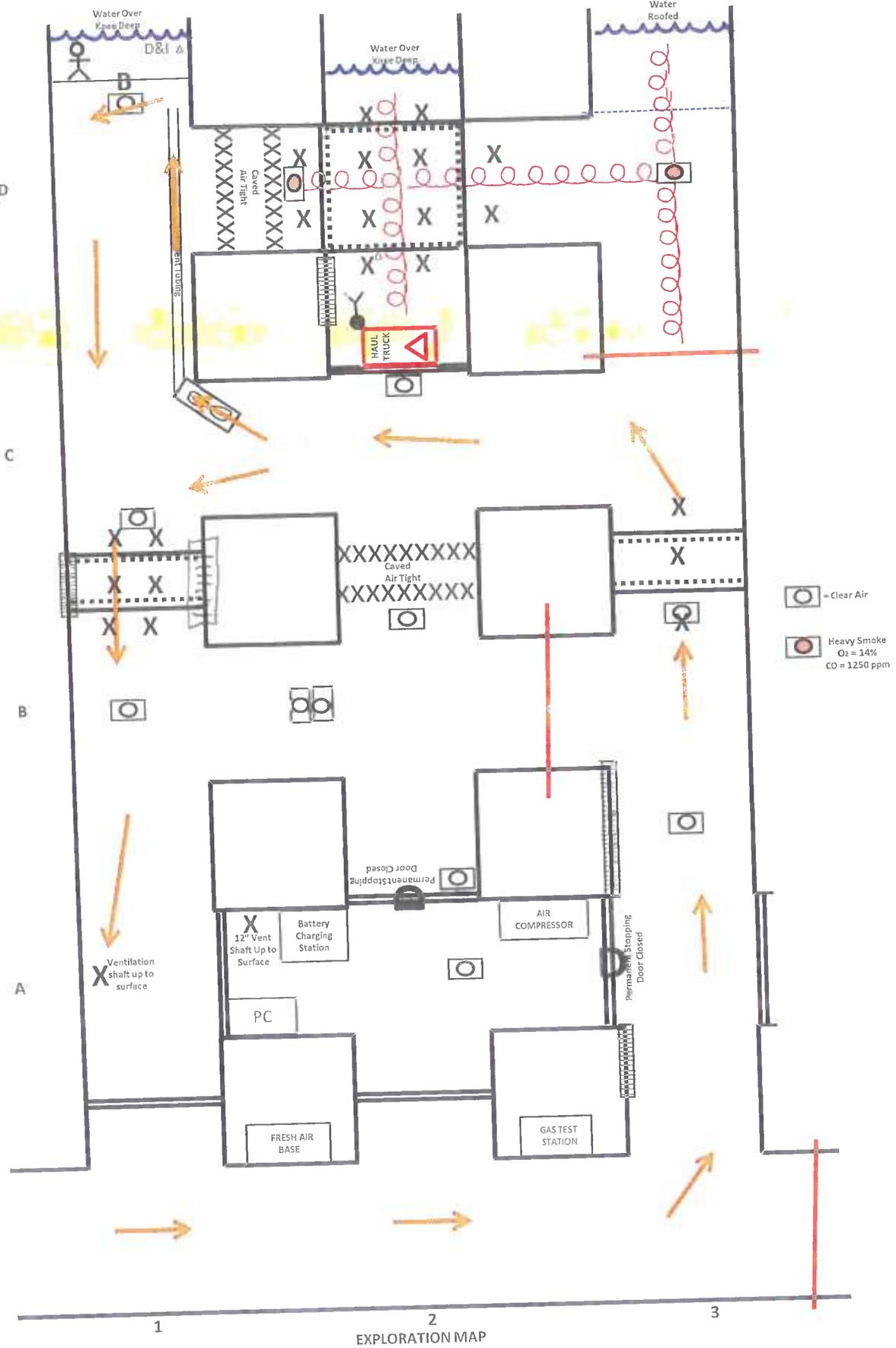
### **Team Stop No. 22 CX D-2**

The team will set 12 timbers in the intersection and to the west the captain will enter the opening and verbally indicate he is checking the back and will find caved air tight. A gas check must be made and the captain must D&I the caved air tight. To the north the captain will enter the opening and verbally indicate he is checking the back. The captain will find water over knee deep. A gas check must be made and the captain must D&I the water over knee deep. To the south the captain will enter the opening and verbally indicate he is checking the back.

The captain will find unsafe rib on the west rib, and will indicate to the team he has recognized the bad ground and will check the unsafe rib. The captain will find a person and check for vital signs. The miner is dead, he must D&I the body. They will find a haul truck on fire. The team must use at least one fire extinguisher to put out the fire. The captain will find a permanent stopping and the team must gas test and the captain will D&I the stopping.

*The captain's failure to indicate to the team he/she has recognized bad ground access discount (5 x each omission) per Judge 1 UG Rule 8(a).*

# Day 1 2<sup>nd</sup> Ventilation Map



## Day 1 2<sup>nd</sup> Ventilation Map

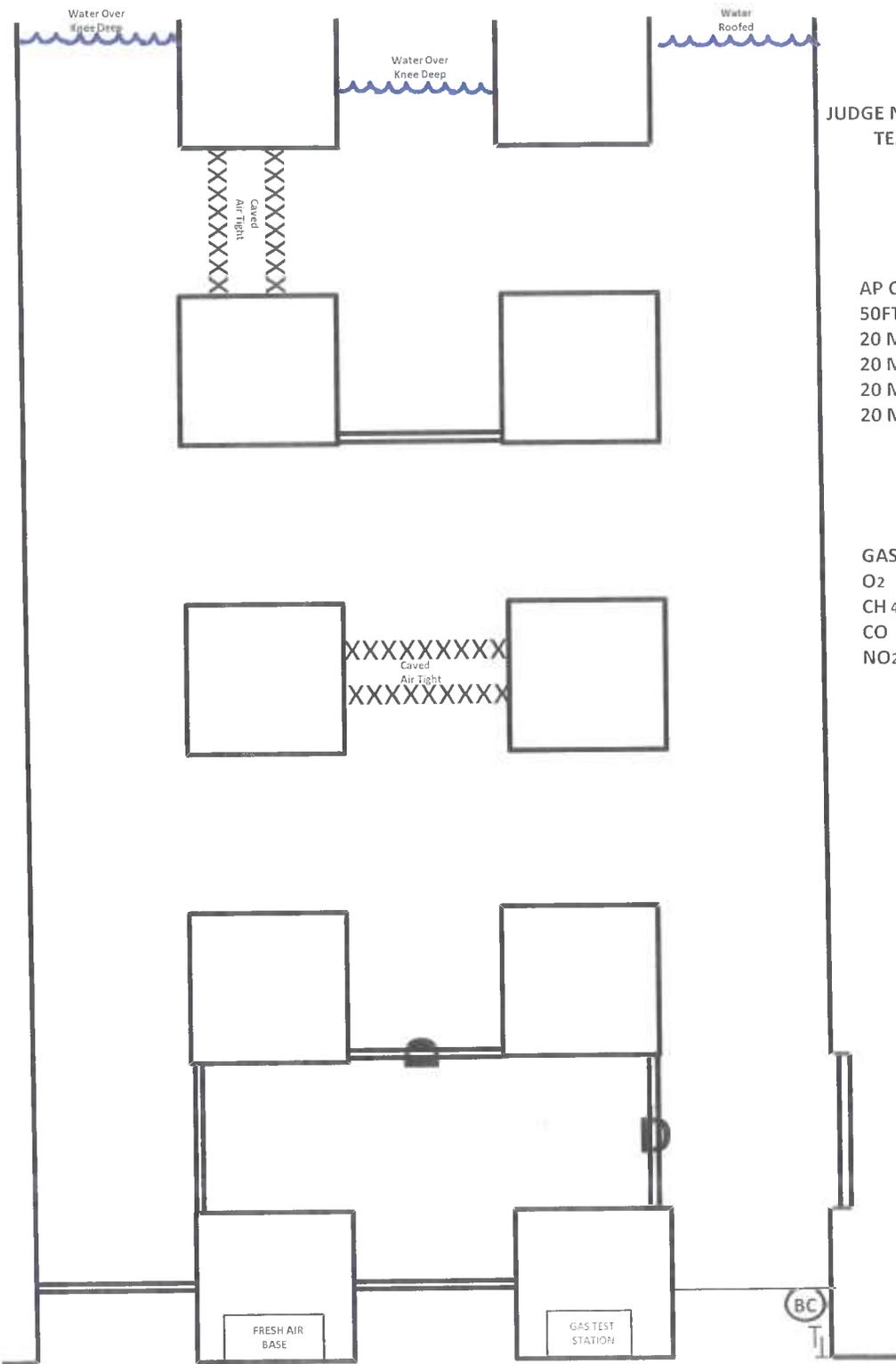
After this is done the judges will clear the placards showing **Heavy Smoke, O<sub>2</sub>=14%, CO=1250ppm.**

The captain must check roof before building airlock. A gas check must be made when the barricade is breached. The captain will find an unconscious survivor and water over knee deep to the north. The captain must D&I the location of the survivor and the water over knee deep. The unconscious survivor must be assessed and loaded onto a stretcher. The team must don an apparatus on the unconscious survivor and evacuate him to the fresh air base without delay. Upon retreat the team must make gas test (rib to rib) at each intersection.

*The team's failure to erect a temporary stopping will result in discounts (10 x each infraction) per Judge 2 – UG Rule #10. In addition, making a ventilation change before the effects of such changes are known will result in discounts (15 x each infraction) per Judge 2 – UG rule #12.*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

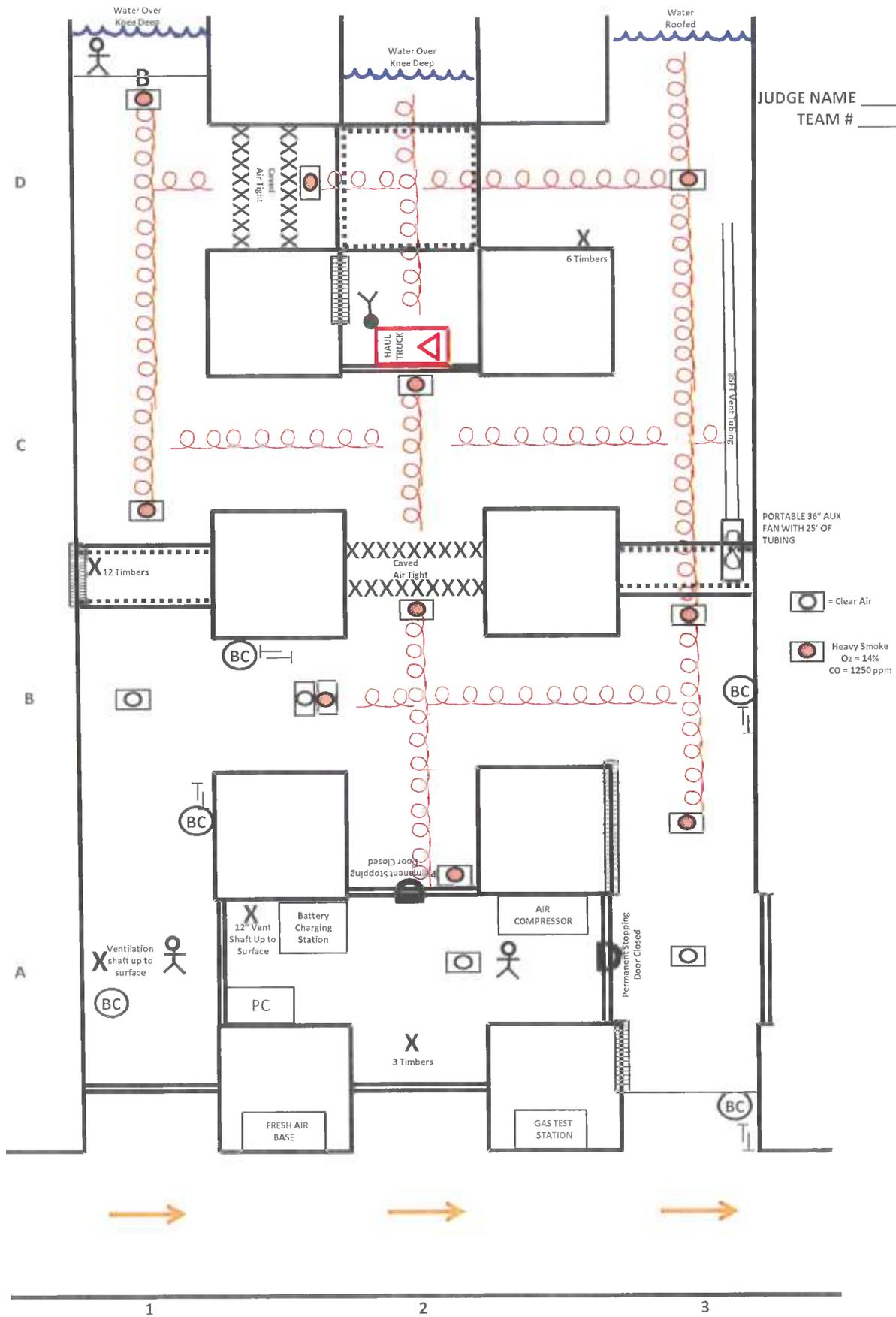
*If the team does not don an apparatus on the unconscious survivor; assess discounts for the team performing an act that may result in the death or injury of survivor(s) such as improperly protecting survivor(s) from toxic gases, will result in discounts (50 x each infraction) per Judge 1 – UG Rule #18(d)*



JUDGE NAME \_\_\_\_\_  
TEAM # \_\_\_\_\_

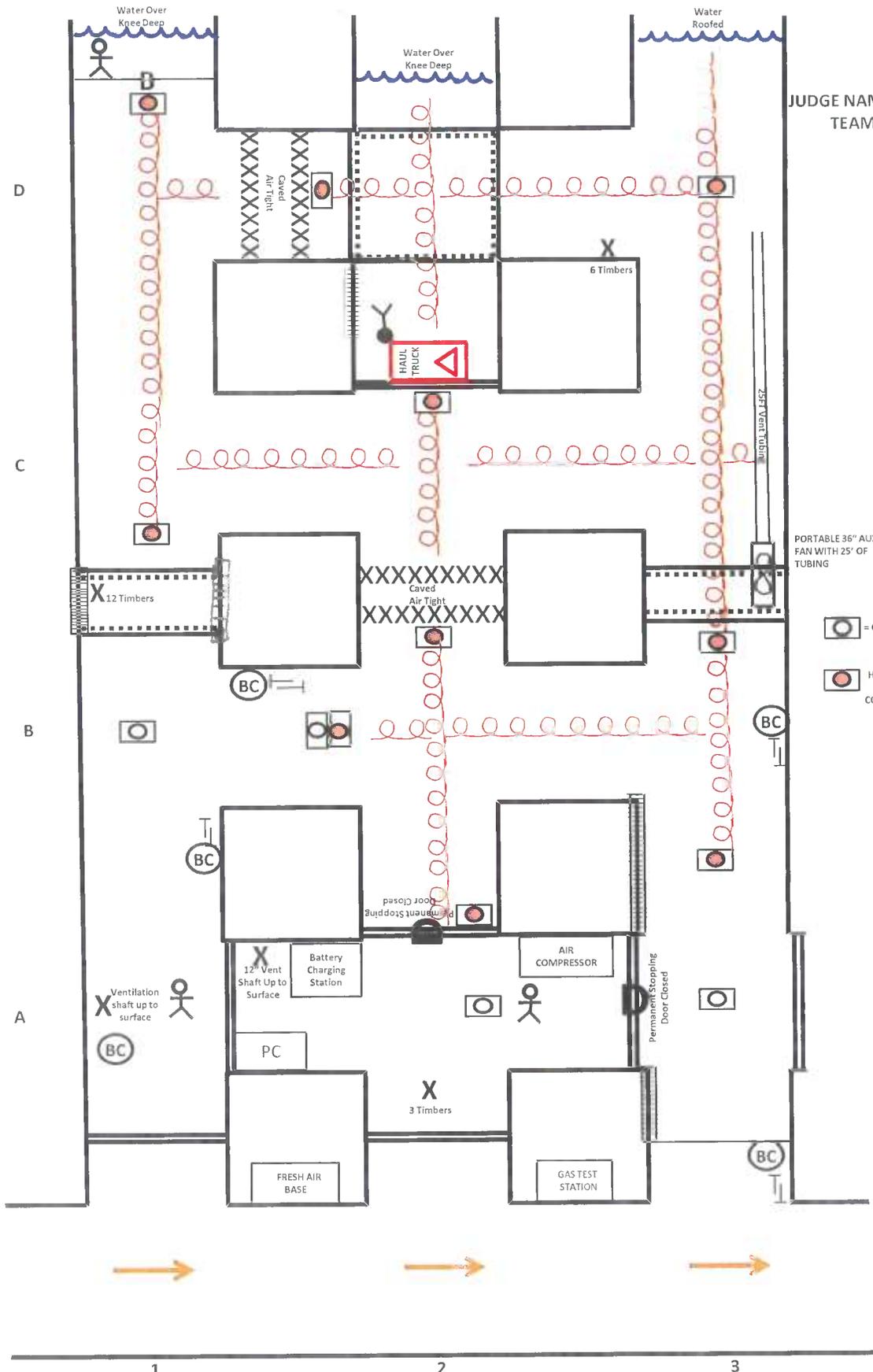
AP CHECK TIME  
50FT \_\_\_\_\_  
20 MIN \_\_\_\_\_  
20 MIN \_\_\_\_\_  
20 MIN \_\_\_\_\_  
20 MIN \_\_\_\_\_

GAS TEST STATION  
O2 = \_\_\_\_\_  
CH4 = \_\_\_\_\_  
CO = \_\_\_\_\_  
NO2 = \_\_\_\_\_



JUDGE NAME \_\_\_\_\_  
TEAM # \_\_\_\_\_

# 1 JUDGES MAP

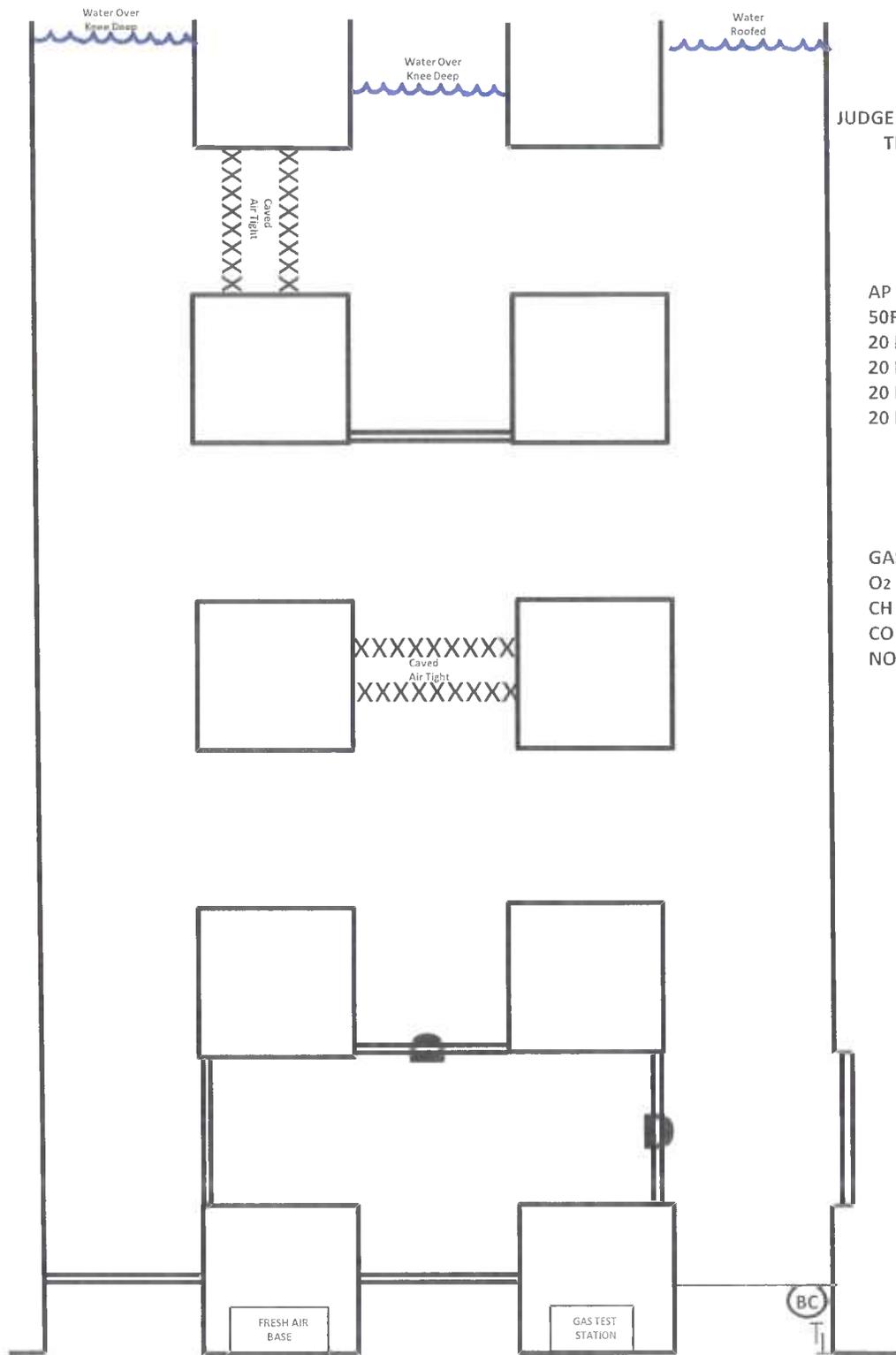


JUDGE NAME \_\_\_\_\_  
TEAM # \_\_\_\_\_

PORTABLE 36" AUX  
FAN WITH 25' OF  
TUBING

- = Clear Air
- Heavy Smoke  
O<sub>2</sub> = 14%  
CO = 1250 ppm

# 2 JUDGES MAP



JUDGE NAME \_\_\_\_\_  
TEAM # \_\_\_\_\_

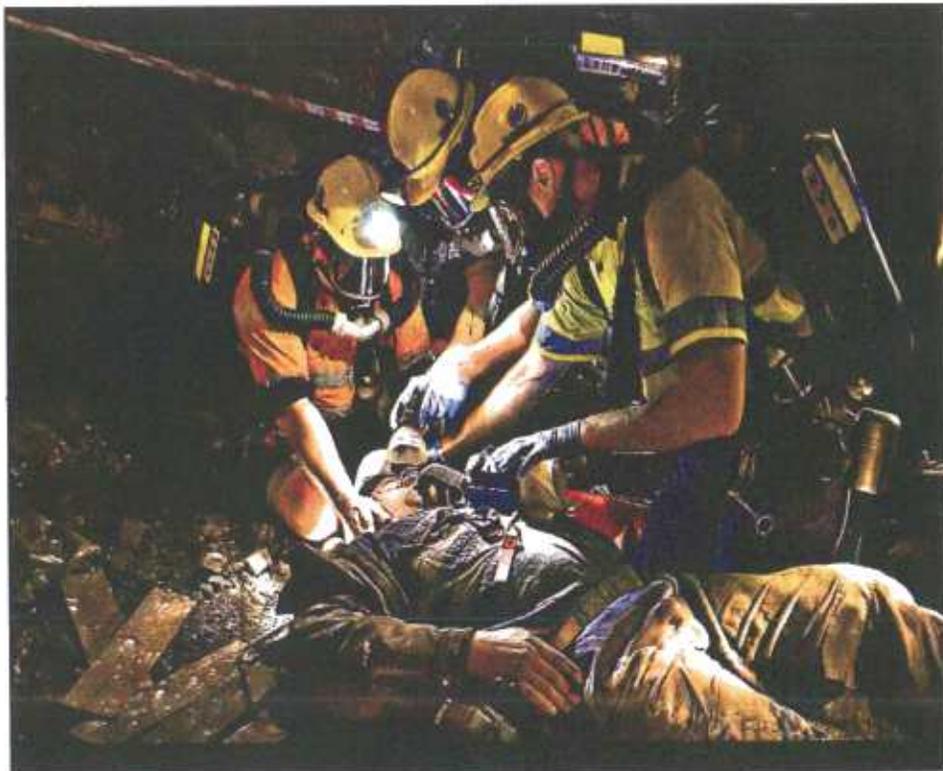
AP CHECK TIME  
50FT \_\_\_\_\_  
20 MIN \_\_\_\_\_  
20 MIN \_\_\_\_\_  
20 MIN \_\_\_\_\_

GAS TEST STATION  
O<sub>2</sub> = \_\_\_\_\_  
CH<sub>4</sub> = \_\_\_\_\_  
CO = \_\_\_\_\_  
NO<sub>2</sub> = \_\_\_\_\_



# 2016 Southeast Region Metal and Nonmetal Mine Rescue Contest

## JUDGES' PACKET Field Competition Day 2



June 22, 2016  
Maysville, Kentucky

LEGEND

Direction of air flow

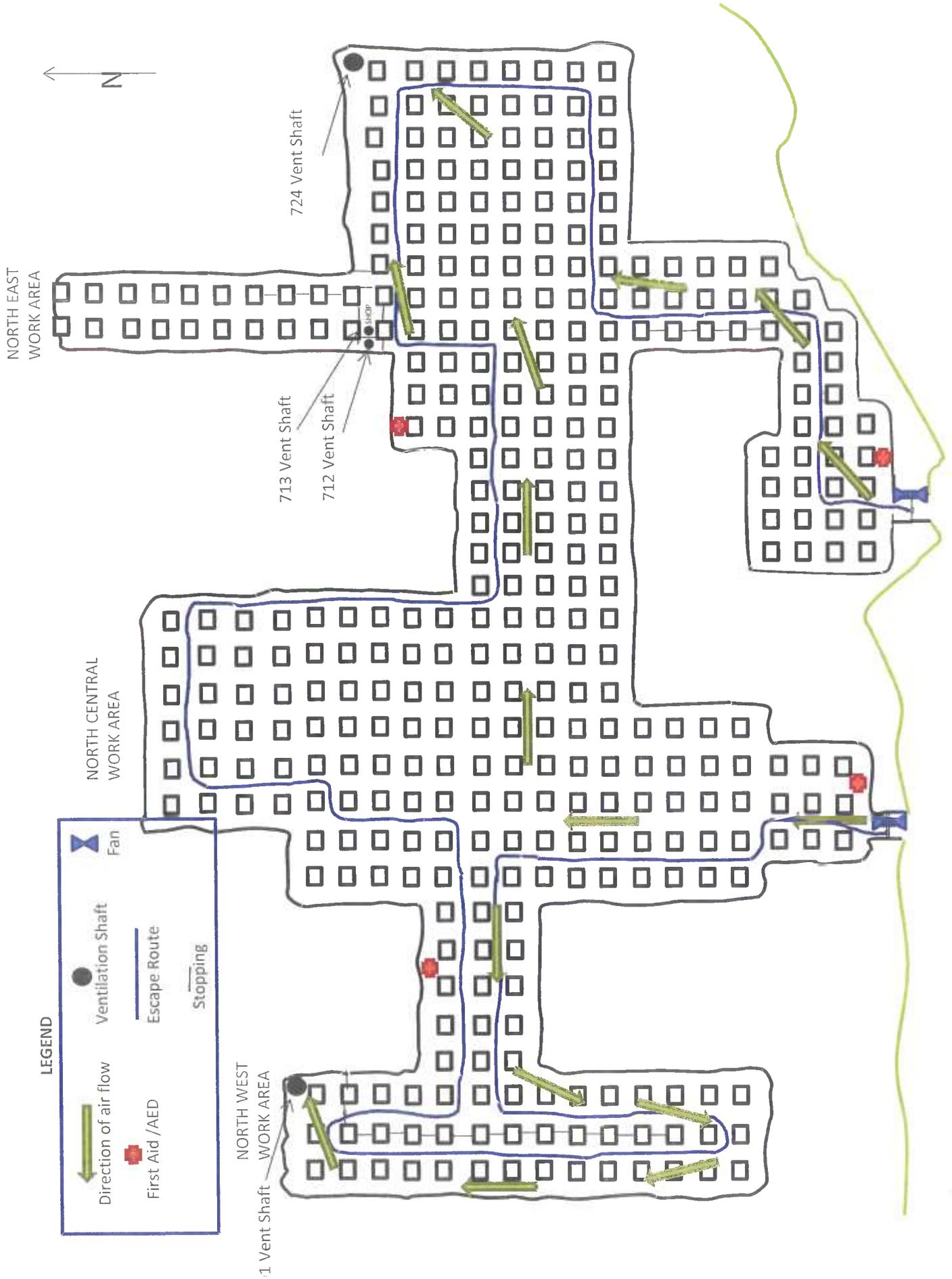
First Aid / AED

Ventilation Shaft

Escape Route

Stopping

Fan



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Team Briefing Statement.....	3
Team & Fresh Air Base Instruction.....	5
Problem Orientation.....	6
Problem Solution.....	7
#1 Judges Map.....	21
#2 Judges Map.....	22



**Mine Information Sheet**  
**Mason County Mining Co. – Wildcat Mine**

**Mining & Equipment:**

The single-level, drift mine uses a conventional room and pillar method to extract limestone. The limestone is shot and loaded into haul trucks using loaders and then transported to the surface by haul trucks. The development entries are driven 10-feet high and 8-feet wide. Typical pillar dimensions are 15-feet by 13-feet (W x L).

**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.

**Mine Openings:**

The mine is opened by two drifts that are approximately 24 feet by 24 feet. There are 4 ventilation shafts to the surface. The main haulroad serves as the primary escapeway from the mine.

**Ventilation:**

The mine is ventilated with two blowing fans that are located at the drift mouth. The Fans are not reversible. Each fan produces approximately 250,000 cfm and operates in the stable portion of its performance curve. The electrical power to the fan is on and the fan is operating. The air enters the mine through the drift mouth and exhausts through the 4 ventilation shafts. Air is directed to the faces using permanent and temporary stoppings (brattice cloth) ventilation controls. The typical airflow direction is marked on the Team and Fresh Air Base Maps.

**Water and Pumps:**

The mine has a history of water problems in the active workings. The main water pumps are located on the surface and several portable pumps are located underground.

**Ground/Rib and Roof Control:**

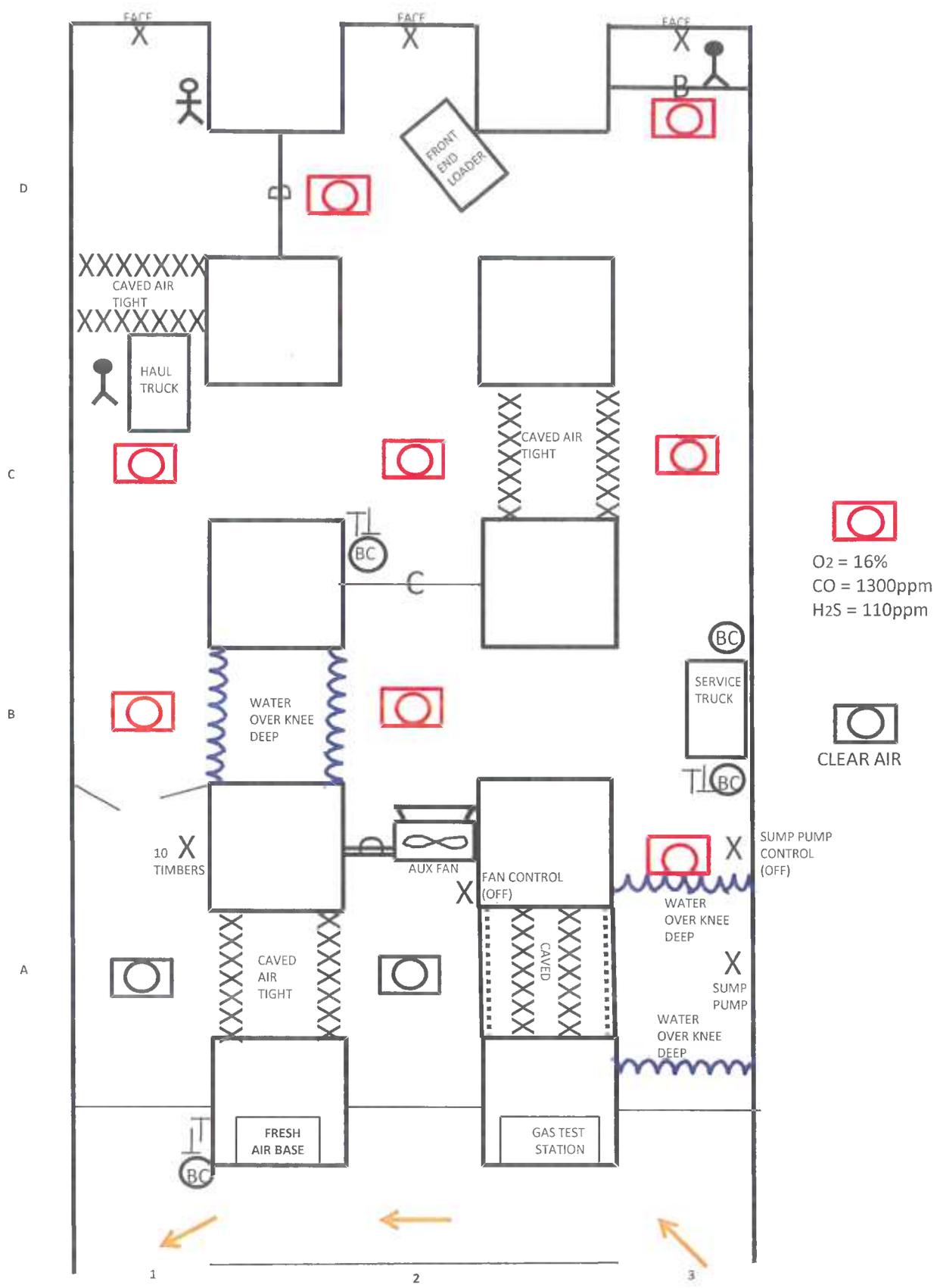
The immediate roof, or back, is supported by six-foot rock bolts. The back is fairly competent, but problem areas are supported by wooden posts or stacked crib blocks.

**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 mine, the surface pumping station, and the Main Fan is energized; however, all power to the underground has been de-energized, locked out, and guarded.



  
O<sub>2</sub> = 16%  
CO = 1300ppm  
H<sub>2</sub>S = 110ppm

  
CLEAR AIR

DAY 2 FIELD MAP

## Mine Information Sheet (continued)

### **Mine Map:**

The onsite Engineering Department updated the mine map on June 10, 2016.

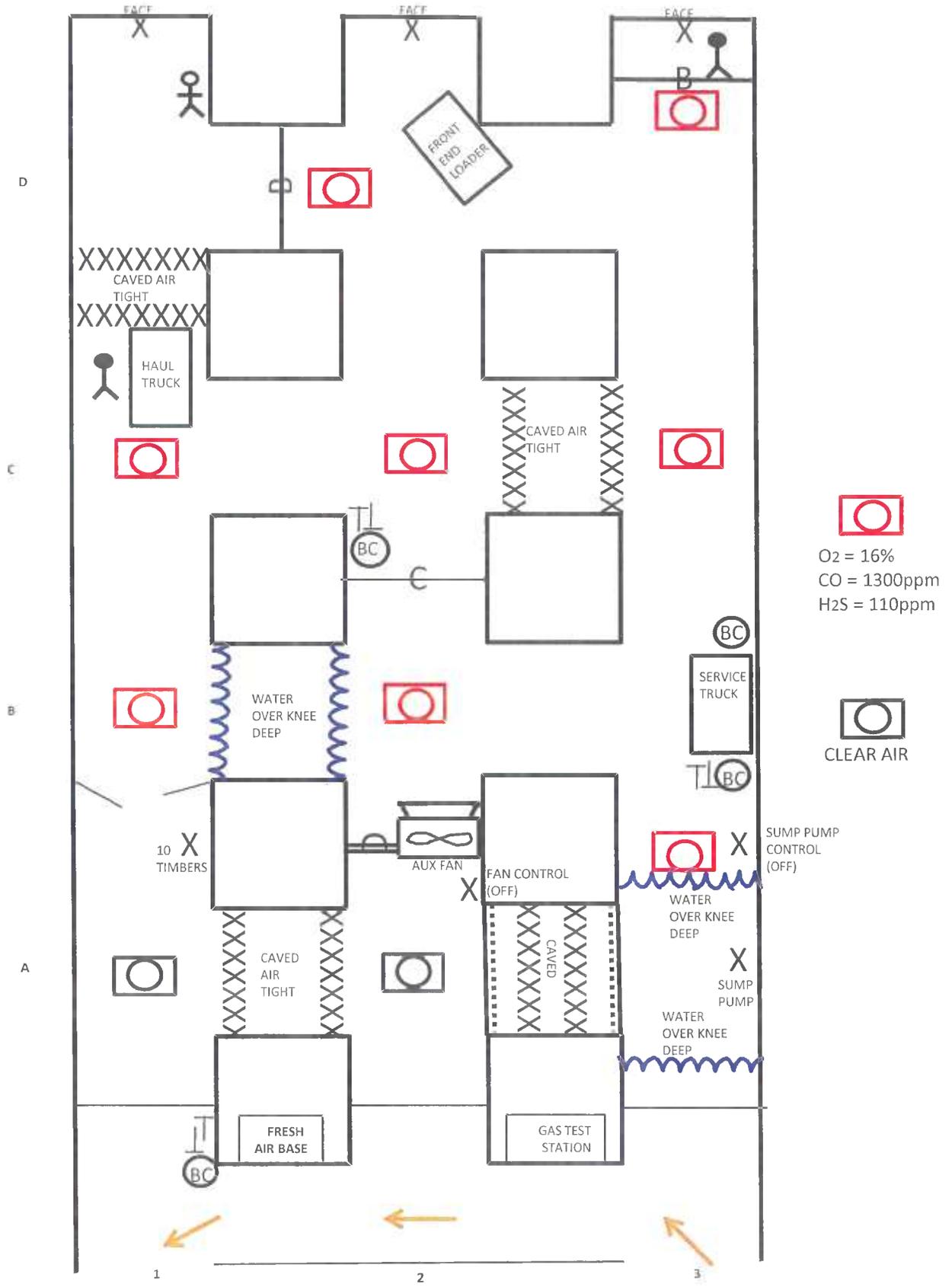
### **Materials:**

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 S hooks 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. Teams must simulate airtight building)

### **Communications:**

Mine phones are available in the mine for contact with the surface. At this time, we do not know the status of the communication system, because there has been no contact with the missing miners.



DAY 2 FIELD MAP

## Team Briefing Statement

You are located outside the Command Center on the surface of the Wildcat Mine.

Yesterday your team was able to find and rescue four of the missing miners but was stopped due to the Northeast work area being flooded. A pump was installed late last night and we believe the water level has been lowered enough to allow your team to continue the search. As you recall yesterday morning at 5:00 a.m., a foreman and his six-person crew went underground to the Northeast work area to start their shift. At about 6:00 a.m., the foreman called out from the underground shop and informed the mine foreman that he had encountered heavy smoke in the work area and retreated to the shop. He could not find any of his crew but was sure they were in by the shop area.

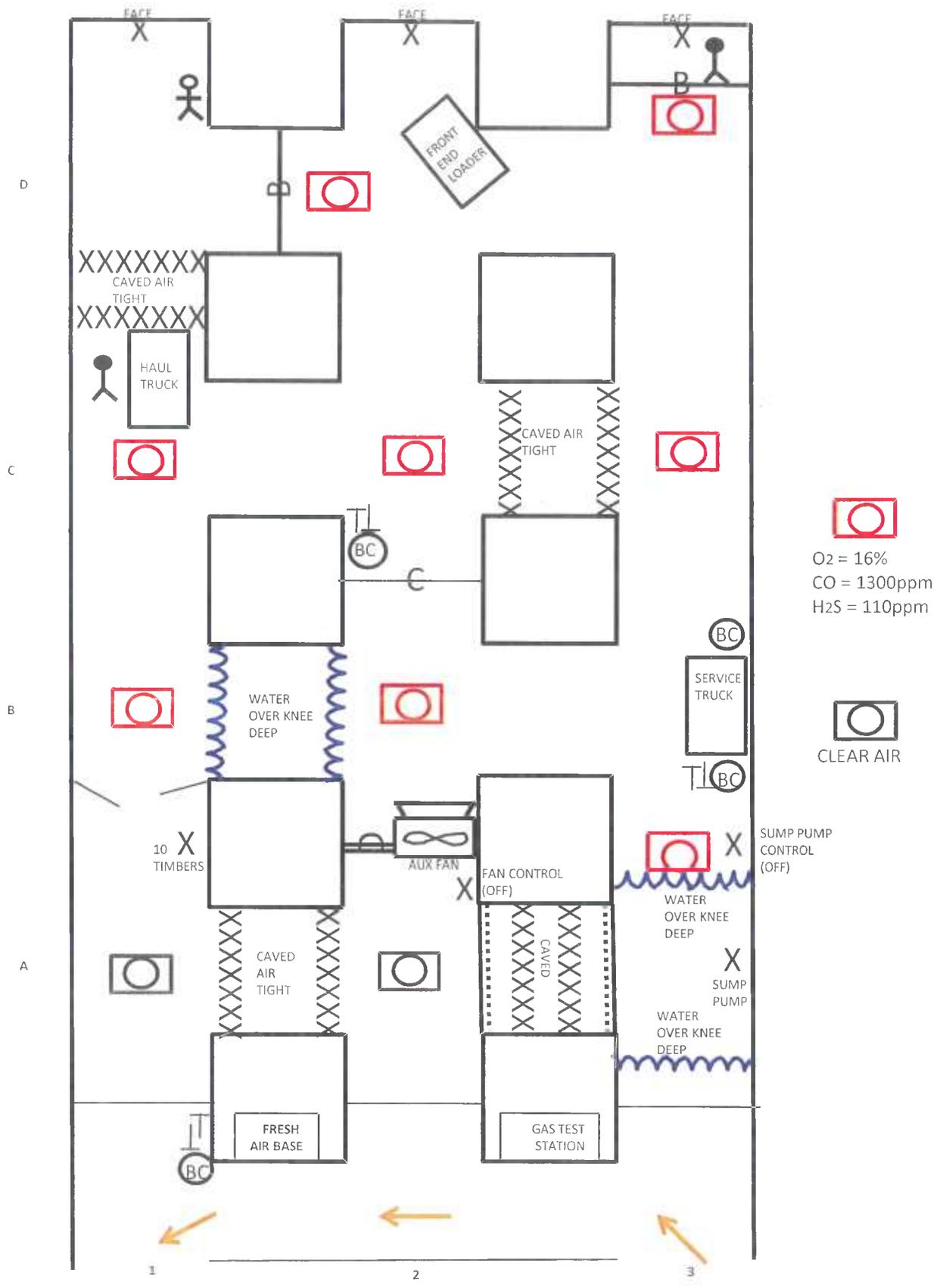
All power to the underground is still de-energized, locked out, and guarded. The two Main Vent Fans are operating. Continuous gas monitoring has been established on the surface at all vent shafts. The latest readings show "clear air" at all ventilation shafts.

Federal and State agencies and their representatives are in the Command Center on the surface. Guards are still 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 the remaining missing miners; bring any live miners to the surface; extinguish or seal any fires; and explore and map all 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 available in several areas underground and can be readily located if needed. If there are additional supplies needed by the team, upon request, it can be delivered in a reasonable amount of time.

When you reach the underground fresh air base, the Mine Manager will introduce you to the judges and the Mine Manager will provide you with any changes to the briefing information that you have received. Once the Team Captain has started the timer, The Mine Manager will give the team their maps and the written information but will **not** answer any additional questions concerning the team briefing statement. However, if you do not



O<sub>2</sub> = 16%  
CO = 1300ppm  
H<sub>2</sub>S = 110ppm

CLEAR AIR

SUMP PUMP CONTROL (OFF)

DAY 2 FIELD MAP

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;
- If it can be done safely, account for the seven 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. Read the following instructions to the team.

**At this time, I have no new information for the team. During the working of the problem, I will answer any questions that you 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 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. Of the team returns to the fresh air base, only the attendant or 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 fresh air base.**

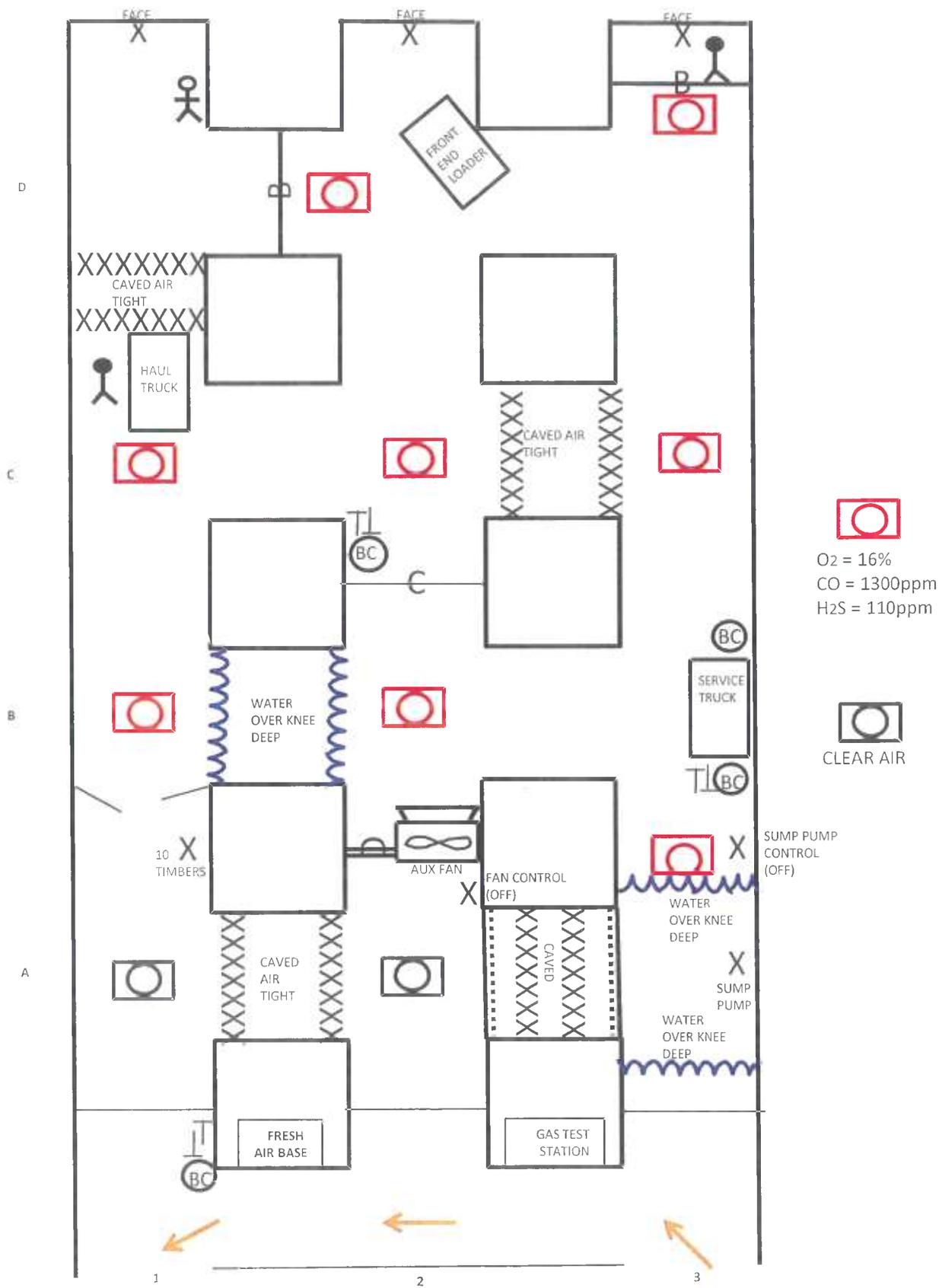
**The fresh air base attendant or team alternate is not allowed to speak with anyone except the team members, the mine manager, or the judges.**

**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.

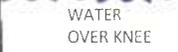
Remember to add: **"Good Luck"**



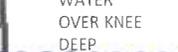
  
O<sub>2</sub> = 16%  
CO = 1300ppm  
H<sub>2</sub>S = 110ppm

  
CLEAR AIR

  
SUMP PUMP CONTROL (OFF)

  
WATER OVER KNEE DEEP

  
SUMP PUMP

  
WATER OVER KNEE DEEP

DAY 2 FIELD MAP

## Day 2 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 while in isolation. At that time, the teams will be allowed to review the team briefing statement, mine information sheet, mine maps, and instruction for rescue teams and fresh air base attendants.

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 give them a copy and read the Problem Orientation and update the team with any information obtained since their briefing.

*No work will be done prior to starting the clock, will result in discounts (4 x total) per Judge 1 - Surf Rule #9*

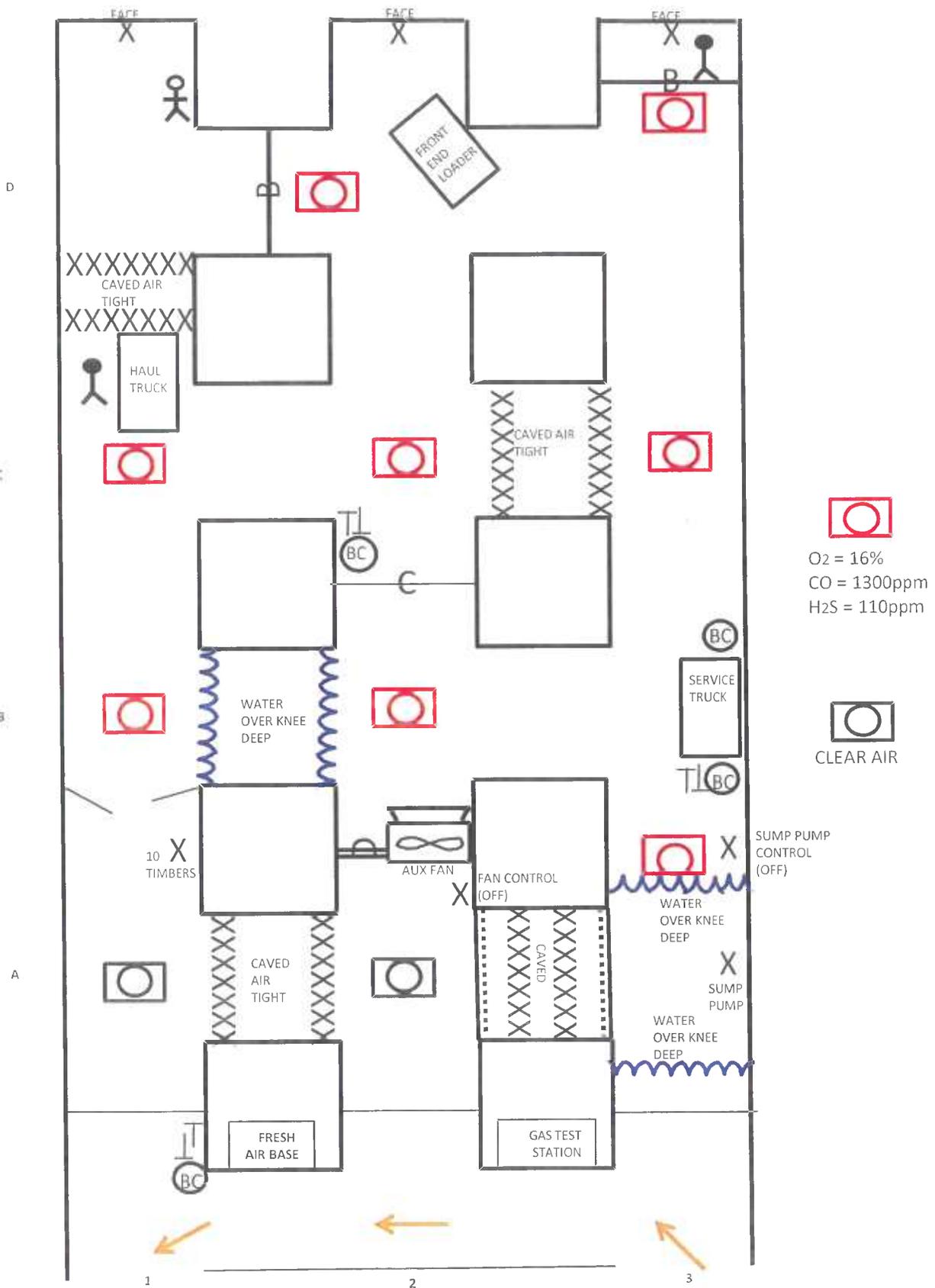
When the team verifies that they understand the instructions, the captain immediately starts the official clock. He writes the month, day, year, and team position number on the sign-in board (on the time clock).

*Failure of the team captain to mark date and team position number on the check board at mine portal or fresh air base, or start timing device, will result in discounts (4 x each omission) 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, physical 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.

*Apparatus improperly assembled, will result in discounts (10 x each apparatus) per Judge 1 - Surf Rule #1*

*Apparatus improperly adjusted to the wearer, will result in discounts (1 X each infraction) per Judge 1 – Surf Rule #2*



DAY 2 FIELD MAP

*Apparatus part or parts worn or deteriorated so as to be dangerous to wearer, will result in discounts (10 x each apparatus) per Judge 1 - Surf Rule #3*

*Failure to follow prescribed procedures for going under oxygen, will result in discounts (3 x each person) per Judge 1 - Surf Rule #4*

*Failure of team member to be clean shaven in the area that affects a good face-to-face piece seal, will result in discounts (10 x each infraction) per Judge 1 - Surf Rule #5*

*Failure of captain to examine each apparatus and have captain's examined before entering the mine, will result in discounts (2 x each infraction) per Judge 1 - Surf Rule #6*

*Team members not wearing identification, protective clothing, including safety shoes, hard hat, permissible cap lamp, will result in discounts (2 x each infraction) per Judge 1 - Surf Rule #7*

*No work will be done prior to starting the clock; will result in discounts (4 total) per Judge 1 - Surf Rule #9*

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 don their apparatus and go under oxygen.

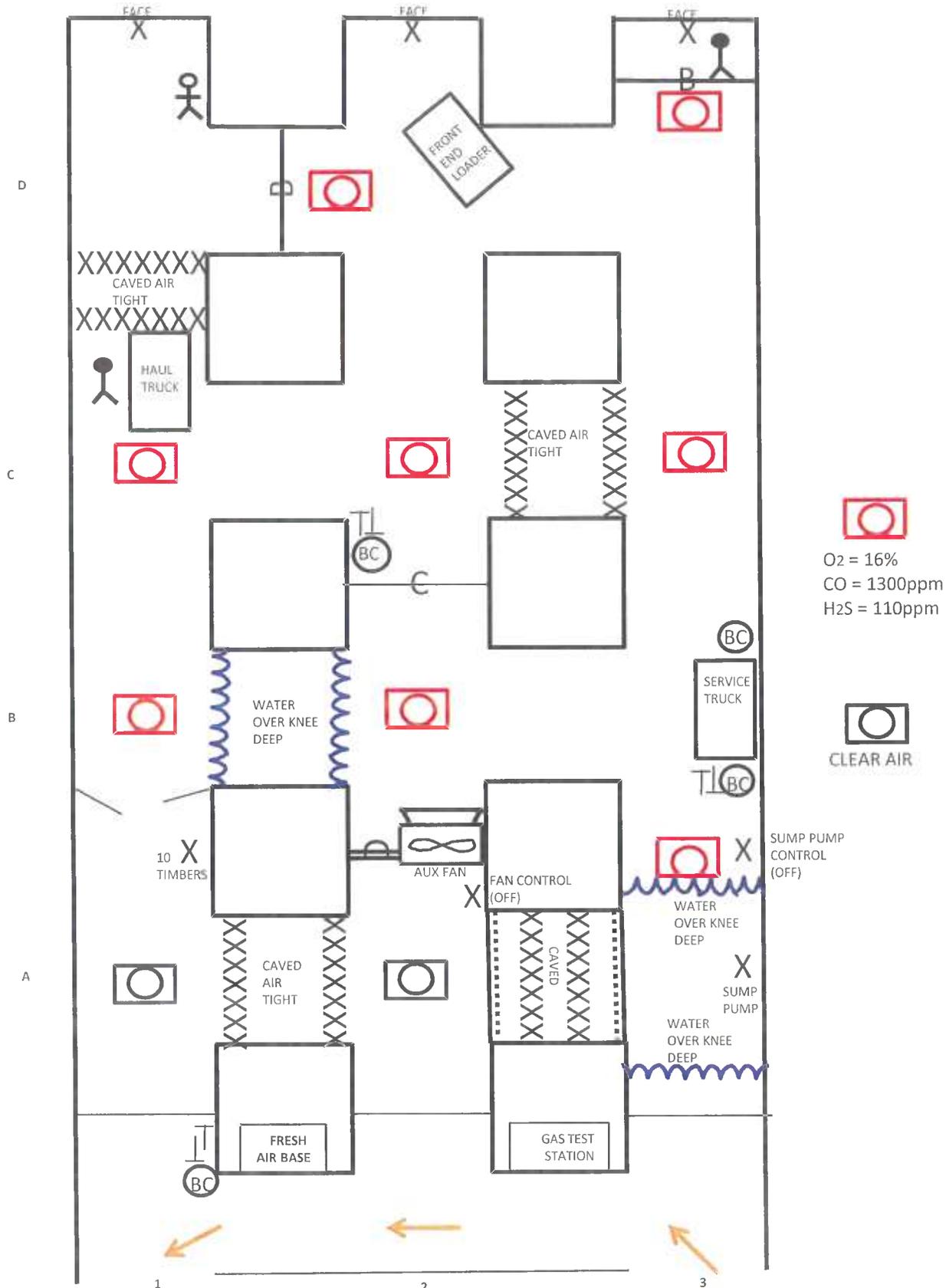
Note: The brattice material available for use by the team is relatively lightweight and compact (10-foot strips of brattice cloth with clips on each end). Therefore, for the sake of realism, the team will only be allowed to carry two sets of material at any given time. This information was provided to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

When ready, the captain must examine the mine openings. The team will find a temporary stopping in Drift No. 1, Drift No. 2, and Drift No. 3, one set of brattice material and the gas box testing station.

*Failure of the captain to verbally indicate he/she is checking the back or roof at intersections, shafts stations, rooms, faces, mine openings: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)1*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

Note: These checks must be made to assure the conditions are safe to proceed. The captain must D&I and a gas check will be made in each drift.



O<sub>2</sub> = 16%  
CO = 1300ppm  
H<sub>2</sub>S = 110ppm

CLEAR AIR

SUMP PUMP CONTROL (OFF)

DAY 2 FIELD MAP

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

Note: No physical comparison of the fresh air base map and team map will be allowed after this initial entry into the mine. No changes can be made to any map while the team is at the surface fresh air base.

*Physically comparing team map with fresh air base map, once the team has entered the mine, will result in discounts (25 total) per Judge 2 – Surf Rule #5*

### **Gas Box Testing Station:**

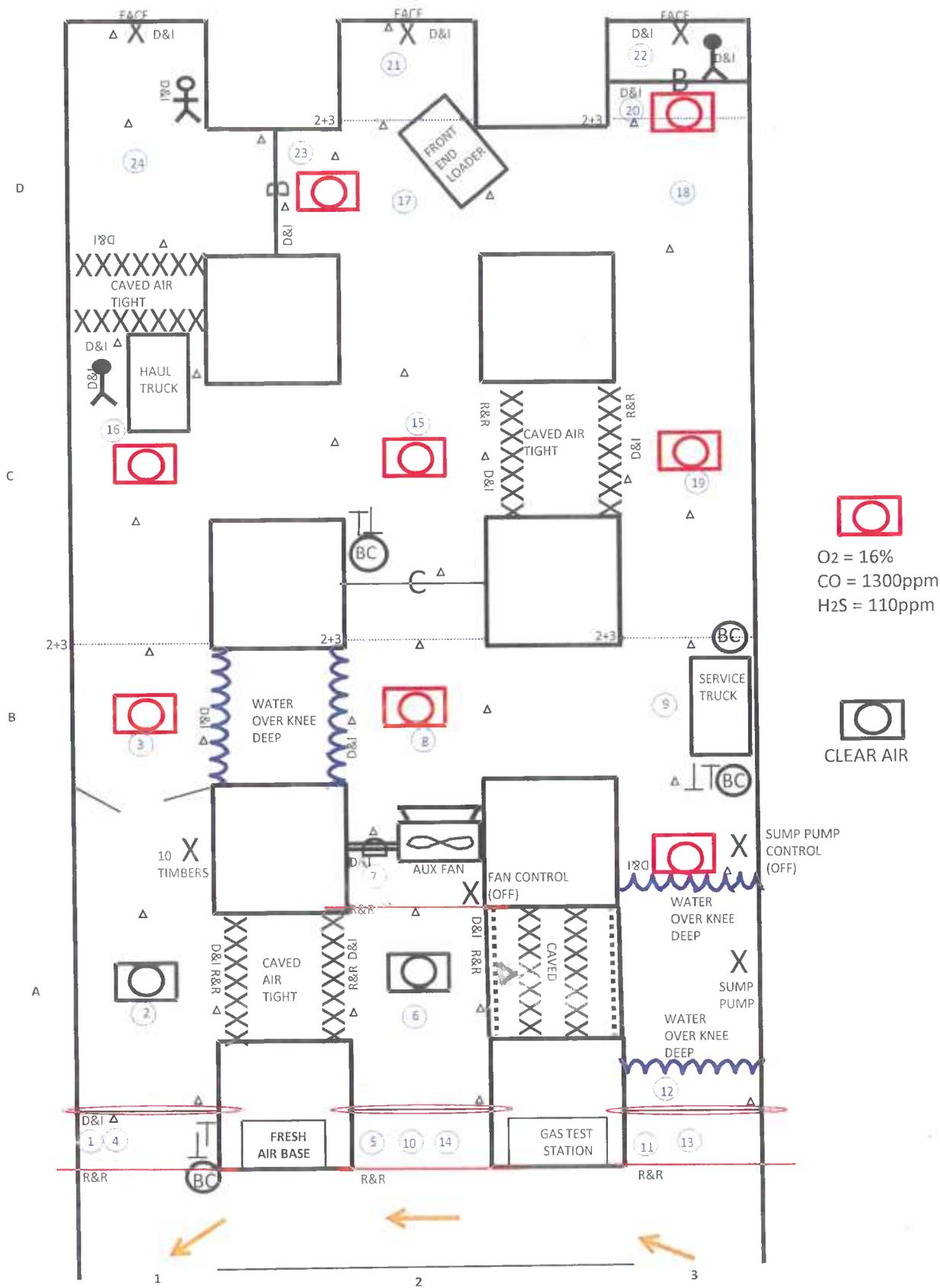
The team will also find the gas box testing station located at the fresh air base. A team member must use the team's multi-gas instruments to determine the gas concentrations in the unknown mixture. The team must provide its own calibration cup to report: O<sub>2</sub>, CH<sub>4</sub>, CO, and NO<sub>2</sub>. **This will be the only gas box on the mine rescue field.**

*At the fresh air base, the team must stop at the gas box, take a measurement, and report the respective gas concentrations within the acceptable limits; Oxygen (O<sub>2</sub>) readings are considered to be correct if within plus or minus 0.5% by volume; failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(a)*

*Methane (CH<sub>4</sub>) readings are considered to be correct if within plus or minus 0.2% by volume with an instrument equipped with a catalytic sensor. Note: For those instruments equipped with an infrared sensor, the readings would be rounded to the nearest whole number. Therefore, a team must use an instrument equipped with a catalytic sensor in order to be within the required tolerance, failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(b)*

*Carbon Monoxide (CO) readings are considered to be correct if within plus or minus 10% of the actual value present, failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(c)*

*Nitrogen Dioxide (NO<sub>2</sub>) readings are considered to be correct if within plus or minus 3 ppm of the actual value present, failure will result in discounts (15 x each) per Judge 2 – UG Rule #4(d)*



DAY 2 EXPLORATION MAP

### **Team Stop No. 1 Drift #1**

The team may air lock into #1 drift. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the temporary stopping is breached.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

### **Team Stop No. 2 CX A-1**

**The team must conduct a 50ft check of their apparatuses.**

*Failure of team to stop within 50 feet of the fresh air base or at the shaft station to perform personnel and apparatus checks, upon their first entry into the mine, will result in discounts (4 total) per Judge 1 - UG Rule #3*

The captain will find a gas placard showing clear air. The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will indicate to the team he has recognized the bad ground to the east at the caved air tight. The captain must D&I and check the roof at the caved air tight.

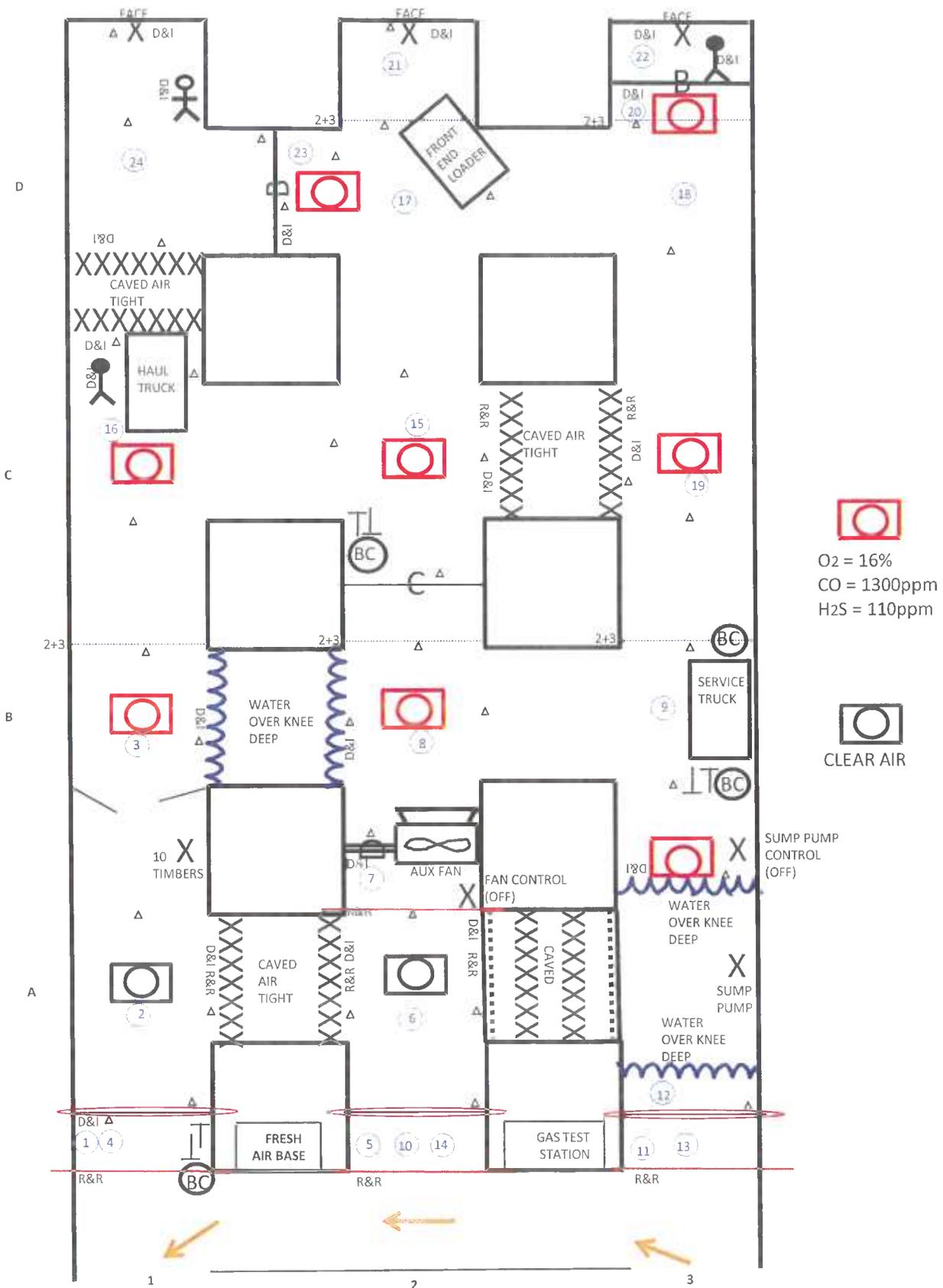
*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to verbally indicate he/she is checking the back or roof at all points of farthest advance: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)2*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

### **Team Stop No. 3 CX B-1**

The captain will find 10 timbers on the east rib and a temporary stopping not intact. The captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm. The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find water over knee deep to the east. The captain must D&I the water over knee deep. No



DAY 2 EXPLORATION MAP

team member can advance more than 3 feet beyond the intersection to the north.

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to verbally indicate he/she is checking the back or roof upon passing through any barricade, stopping, bulkhead, air lock, door, check curtain, or similar barrier will result in discounts: (5 x each infraction) per Judge 1 – UG Rule #8(b)4*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

*Failure of team to explore or examine workings systematically and thoroughly, will result in discounts (4 x each omission) per Judge 1 – UG Rule #11*

#### **Team Stop No. 4 Airlock out to FAB**

The team must airlock back out to the fresh air base. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts: (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

#### **Team Stop No. 5 Airlock Drift #2**

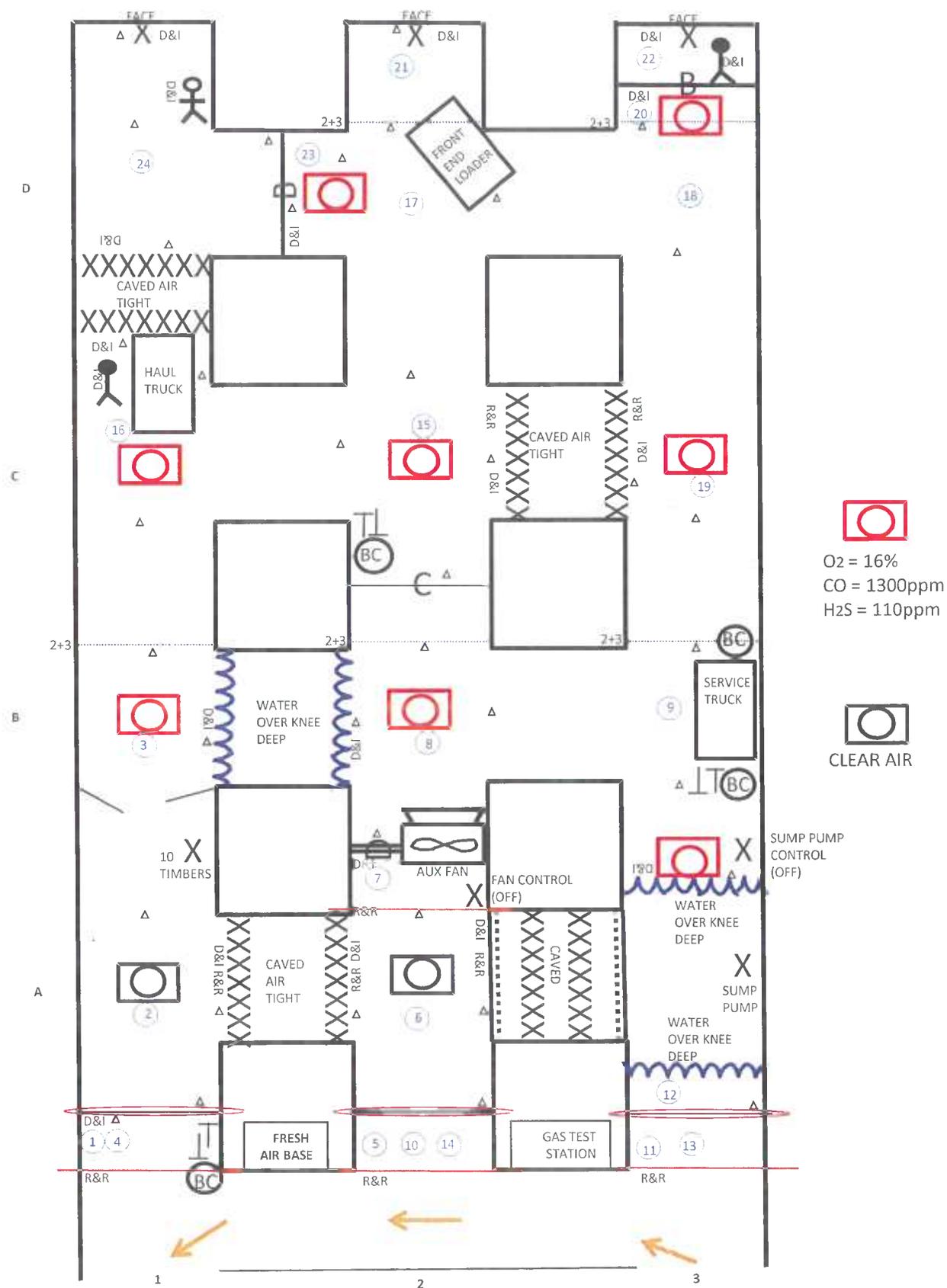
The team may air lock into #2 drift. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the temporary stopping is breached.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts: (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

#### **Team Stop No. 6 CX A-2**

The captain will find a gas placard showing clear air. The captain will break the plane to the north and enter the opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will indicate to the team he has recognized the bad ground to the



DAY 2 EXPLORATION MAP

west at the caved air tight and the unsafe roof to the east. The captain must D&I and check the roof at the caved air tight to the west and the unsafe roof to the east. The captain will find the fan control switch (off) on the east rib and an aux fan and door closed to the north and must D&I the close door.

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

#### **Team Stop No. 7 Airlock through door**

The team must build a stopping to airlock through the door.

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

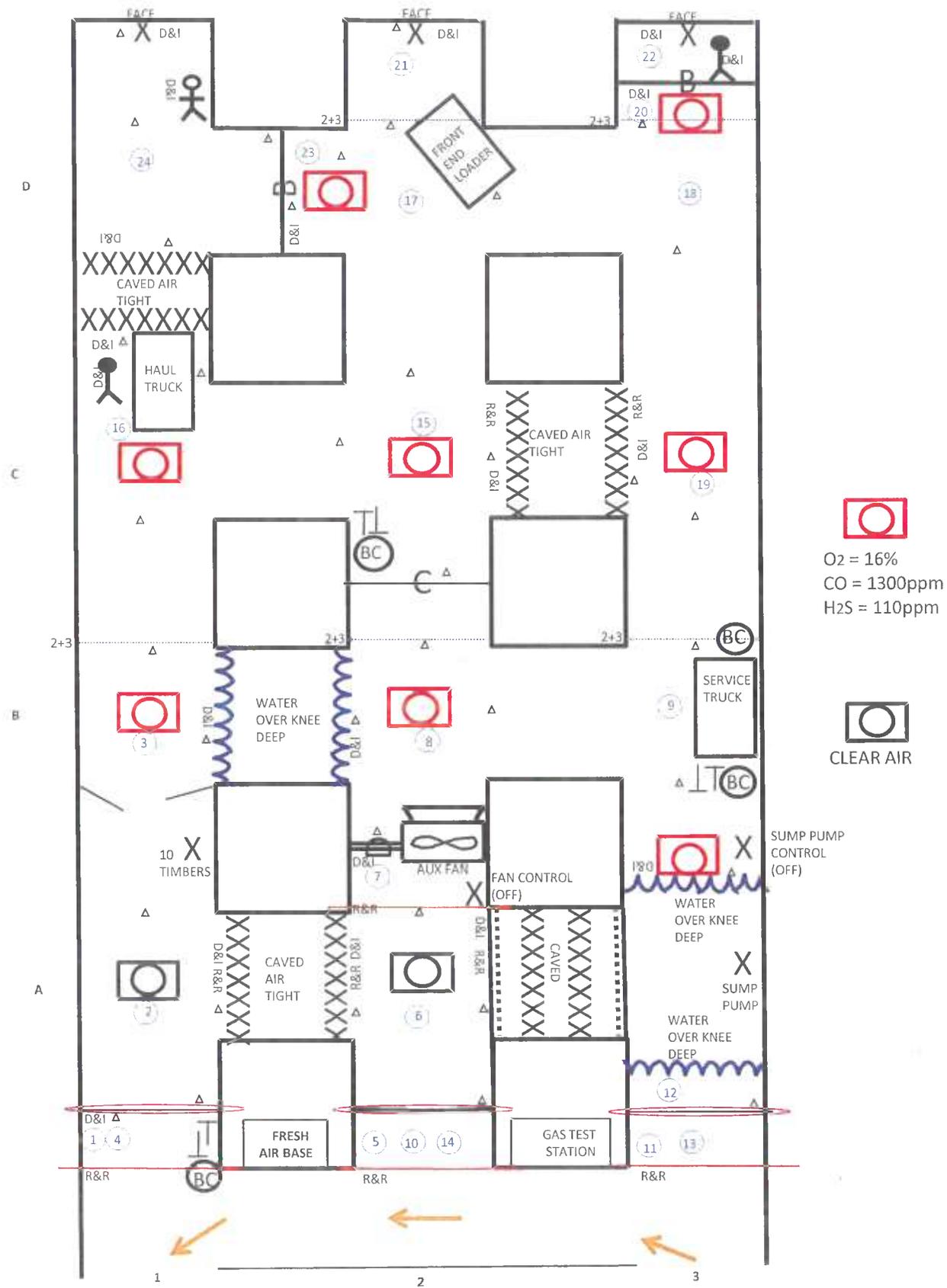
*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

#### **Team Stop No. 8 CX B-2**

The captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm. The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find water over knee deep to the west and must D&I the water over knee deep. No team member can advance more than 3 feet beyond the intersection to the north.

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires*



DAY 2 EXPLORATION MAP

*out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of team to explore or examine workings systematically and thoroughly, will result in discounts (4 x each omission) per Judge 1 – UG Rule #11*

### **Team Stop No. 9 CX B-3**

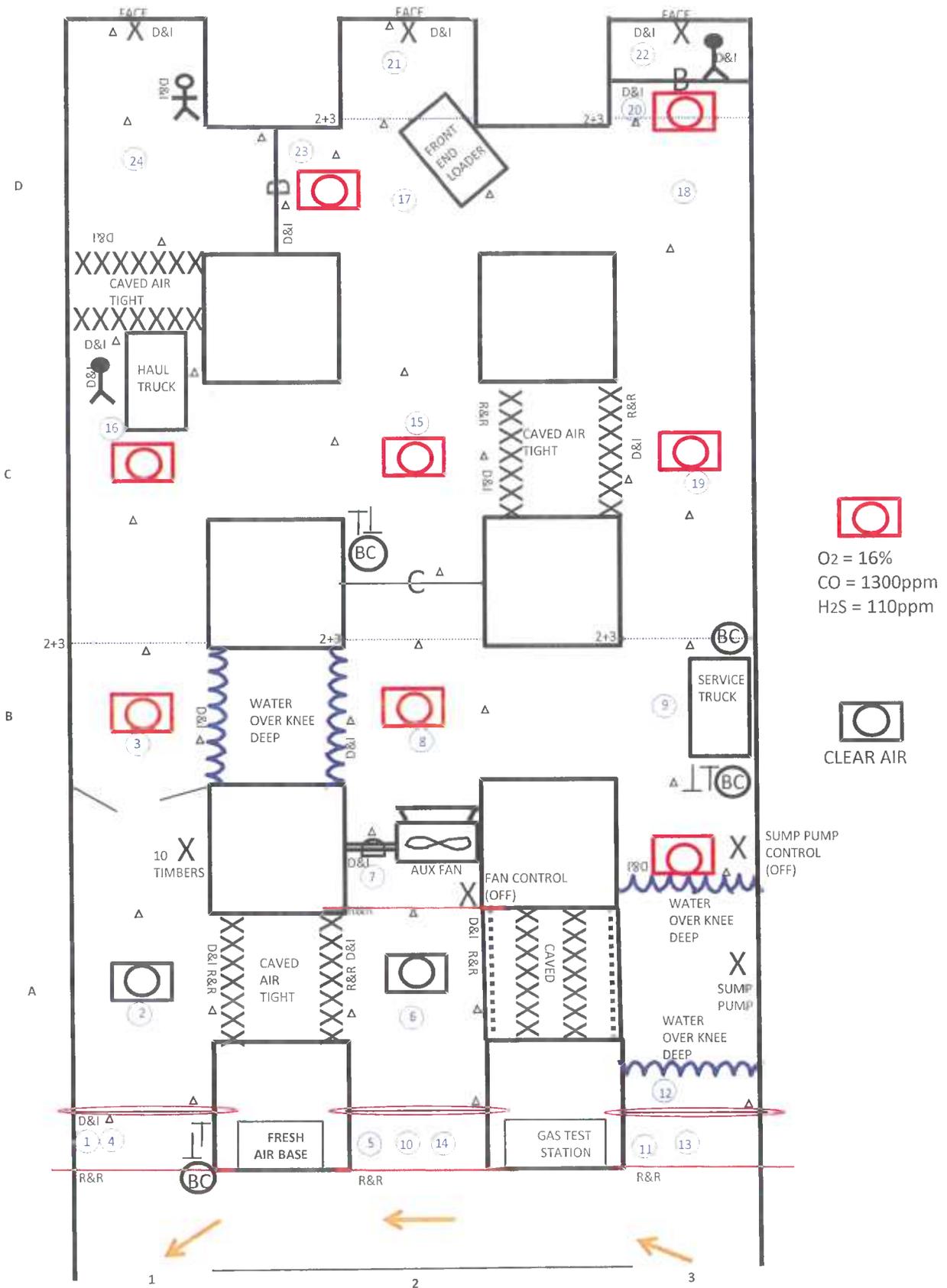
The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find a service truck, a wing curtain and brattice cloth with stands along the east rib. No team member can advance more than 3 feet beyond the intersection to the north.

Stretching south the captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm. The captain will find the sump pump control (off) and in by side of the water over knee deep. Should the captain want to pump the water the judge will inform him that the pump is showing a ground fault and its breaker will not set. Another pump is being brought from the surface but it will take a couple of hours. The captain must D&I the water over knee deep. Should the captain ask to pump the water, the judge will say “The pump is down and will not start.”

*Failure of team to explore or examine workings systematically and thoroughly, will result in discounts (4 x each omission) per Judge 1 – UG Rule #11*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*



DAY 2 EXPLORATION MAP

### **Team Stop No. 10 Airlock out to fresh air base**

The team must airlock back out to the fresh air base. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

### **Team Stop No. 11 Airlock into #3 Drift**

The team may air lock into #3 drift. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the temporary stopping is breached.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

### **Team Stop No. 12**

The captain will find the out/by side of the water over knee deep and the captain must D&I the water over knee deep. Should the captain ask to pump the water, the judge will say “The pump is down and will not start.” At this point they have tied back and can continue to CX C-2.

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

### **Team Stop No. 13 Airlock back out to Fresh Air Base**

The team may air lock back out of #3 drift. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the temporary stopping is breached.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*



*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

#### **Team Stop No. 14 Airlock into #2 Drift**

The team may air lock into #2 drift. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the temporary stopping is breached.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

#### **Team Stop No. 15 CX C-2**

The team will travel north through a check curtain and find a brattice cloth with frames along the west rib. The captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm. The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. To the east the captain will find caved air tight. The captain will indicate to the team he has recognized the bad ground to the east at the caved air tight. The captain must D&I and check the roof at the caved air tight.

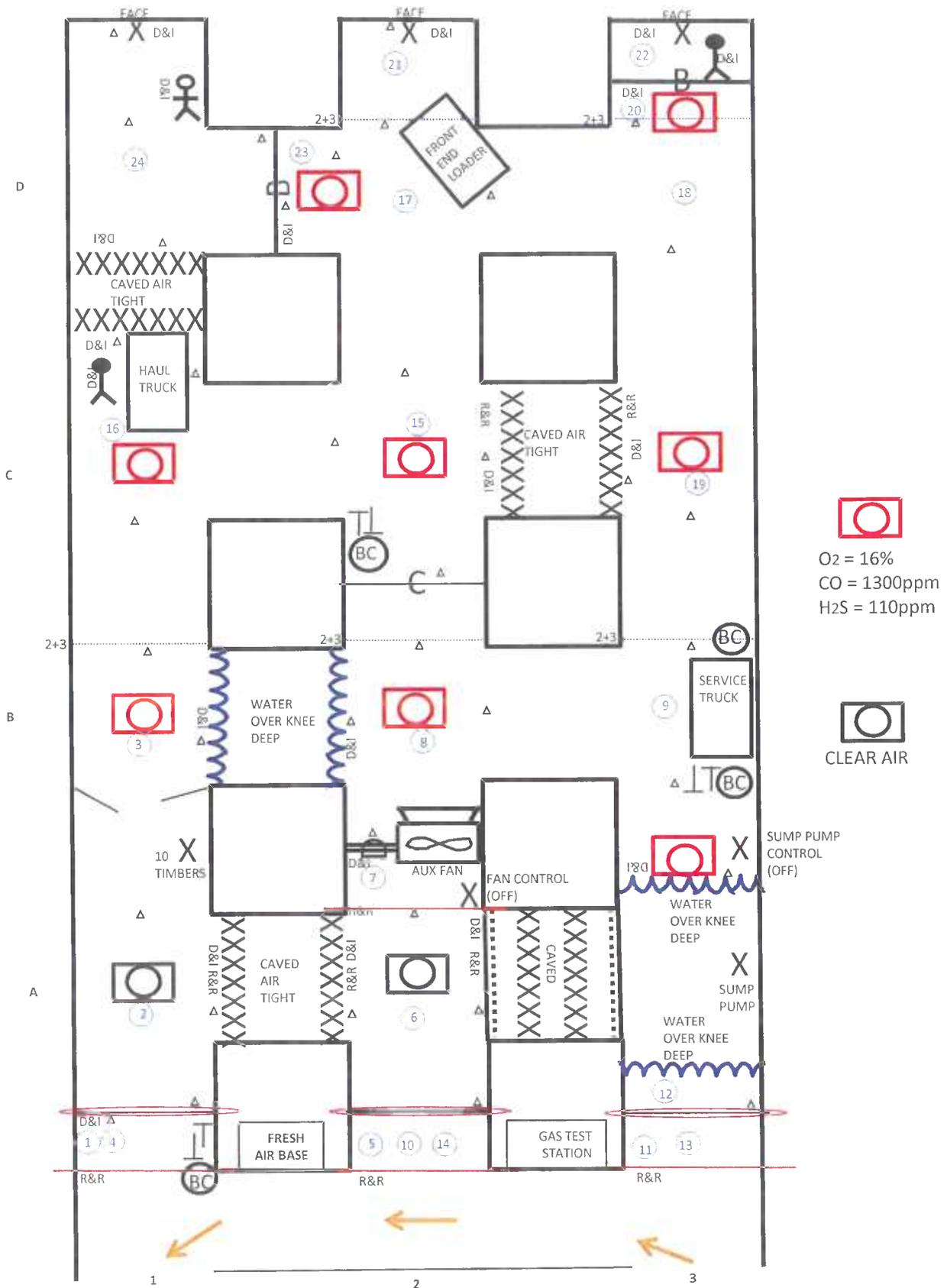
*Failure of the captain to verbally indicate he/she is checking the back or roof upon passing through any barricade, stopping, bulkhead, air lock, door, check curtain, or similar barrier will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)4*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

#### **Team Stop No. 16 CX C-1**

The captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm. The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find a haultruck, a



DAY 2 EXPLORATION MAP

body and caved air tight. The captain must D&I the body and the caved air tight.

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

### **Team Stop No. 17 CX D-2**

The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find a Front End Loader. No team member can advance more than 3 feet beyond the intersection to the north. To the west the captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm, and a barricade. Should the captain knock on the barricade there will be no answer. The captain must D&I the barricade and a gas check must be made at the barricade.

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of team to explore or examine workings systematically and thoroughly, will result in discounts (4 x each omission) per Judge 1 – UG Rule #11*

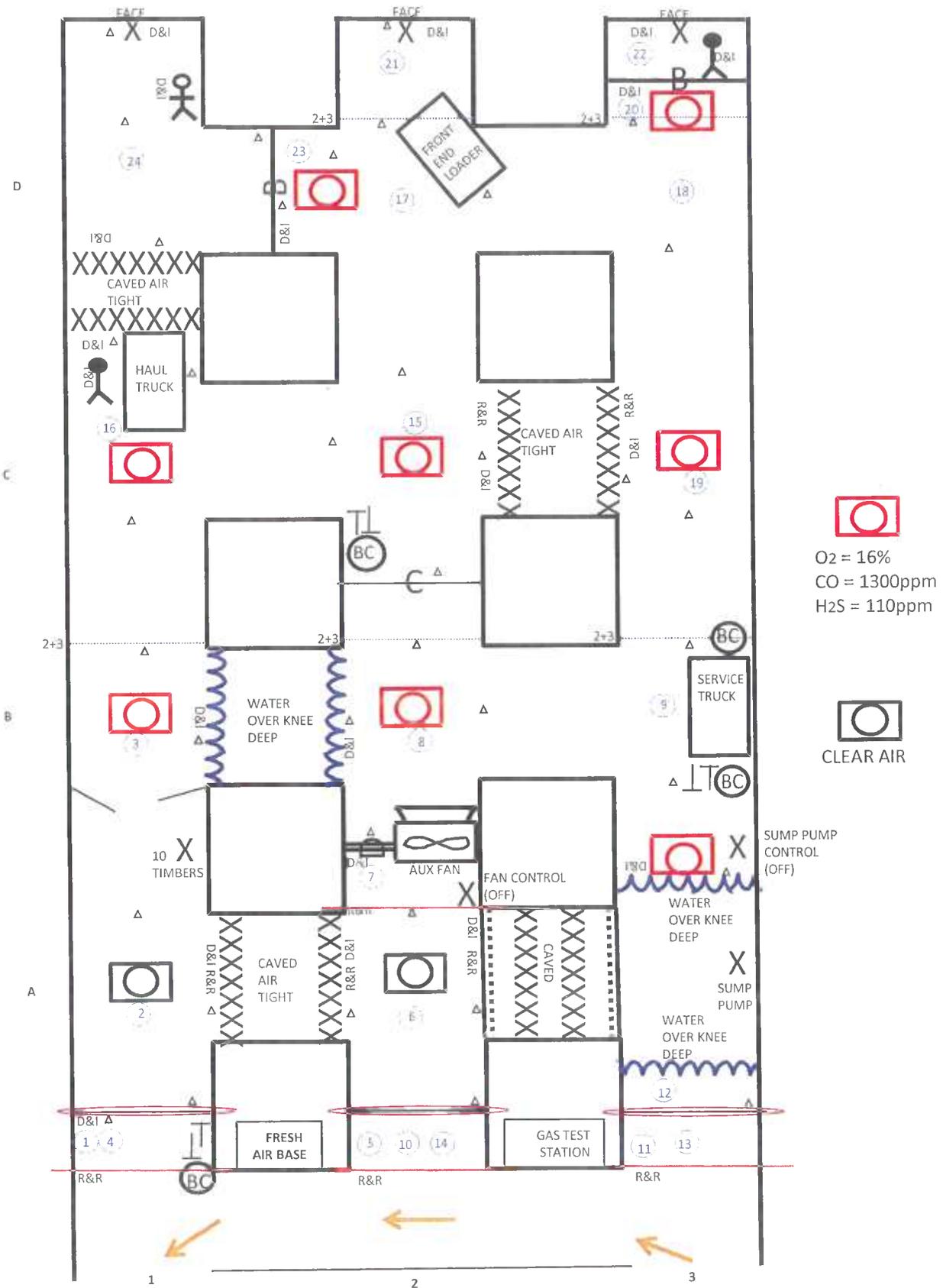
*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

*Failure of team to explore or examine workings systematically and thoroughly, will result in discounts (4 x each omission) per Judge 1 – UG Rule #11*

### **Team Stop No. 18 CX D-3**

The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. No team member can advance more than 3 feet beyond the intersection to the north.

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*



DAY 2 EXPLORATION MAP

*Failure of team to explore or examine workings systematically and thoroughly, will result in discounts (4 x each omission) per Judge 1 – UG Rule #11*

### **Team Stop No. 19 CX C-3**

The team will travel south, the captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. The captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm, and a barricade. To the west the captain will find caved air tight. The captain will indicate to the team he has recognized the bad ground to the west at the caved air tight. The captain must D&I and check the roof at the caved air tight. Stretching south the captain must tie back and then he can continue to the barricade in #3 Drift and the face of #2 Drift.

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

### **Team Stop No. 20 Barricade #3 Drift**

The captain will find a gas placard showing O<sub>2</sub>=16%, CO=1300ppm, H<sub>2</sub>S=110ppm, and a barricade. Should the captain knock on the barricade there will be no answer. The captain must D&I the barricade and a gas check must be made at the barricade.

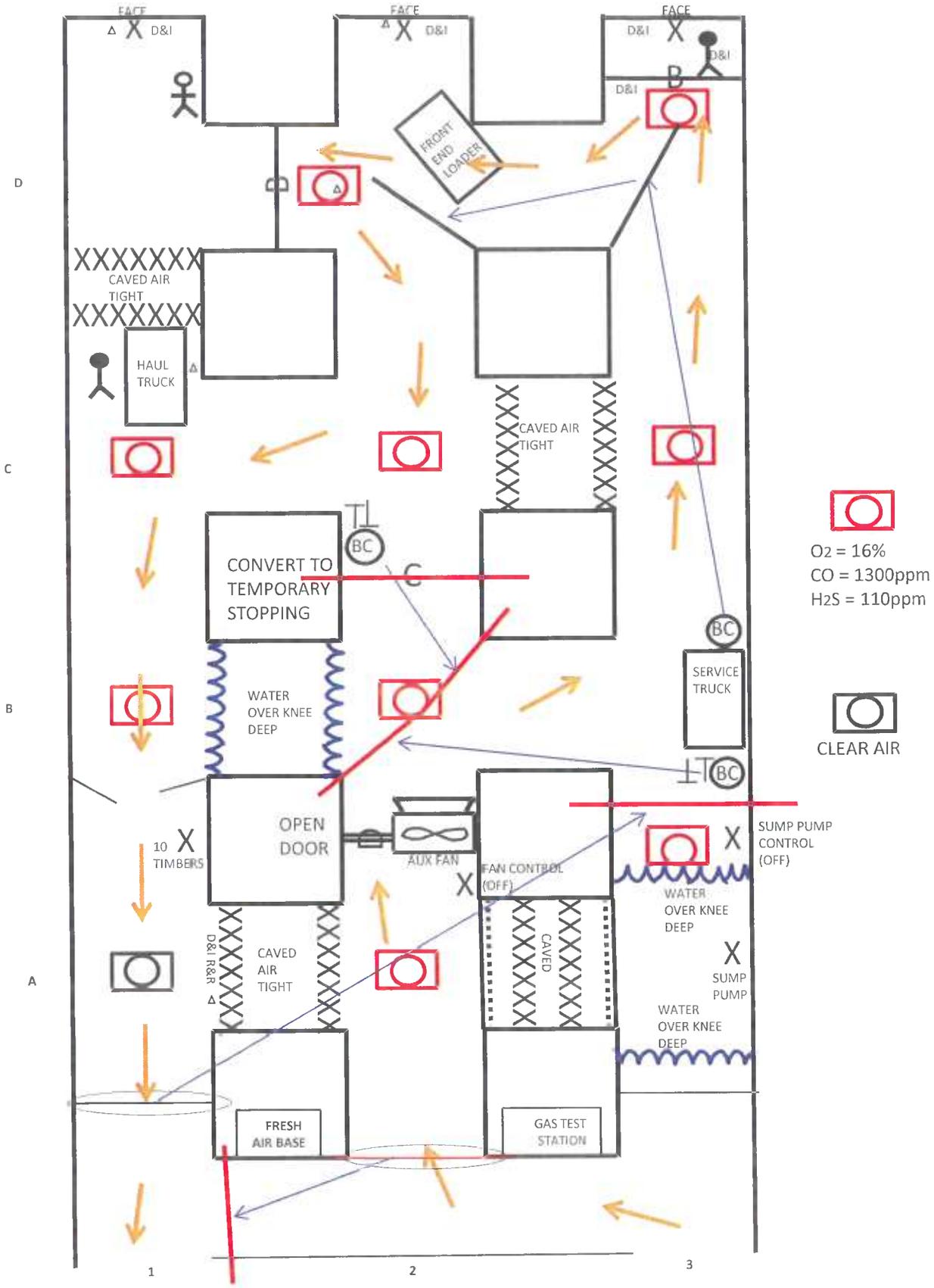
*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

### **Team Stop No. 21 Face #2 Drift**

The captain will find the face of #2 drift. The captain must D&I the face and a gas check must be made.

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of*



  
O<sub>2</sub> = 16%  
CO = 1300ppm  
H<sub>2</sub>S = 110ppm

  
CLEAR AIR

 X  
SUMP PUMP CONTROL (OFF)

DAY 2 VENTILATION MAP

*rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

At this point, a ventilation change is necessary to clear the areas in front of the barricade in Drift #3 and barricade between CX D-1 and D-2. The team must confer with the mine manager through their fresh air base coordinator by using the communication line, or by returning to the fresh air base.

The team must explain the necessary ventilation changes prior to implementing them. For the purposes of this problem solution. The following steps will be discussed to accomplish re-ventilation;

- 1) Open door at aux fan in #2 Drift.
- 2) Build temporary stopping on north side of water over knee deep in #3 Drift.
- 3) Build a diagonal stopping using two brattice materials with frames from the northeast corner to the southwest corner of pillars in CX B-2.
- 4) Convert the check curtain inby CX B-2 to a temporary stopping.
- 5) Remove the air lock curtain to allow air flow inby #2 Drift
- 6) Build a temporary stopping west of the fresh air base.

These six changes will allow fresh air to flow inby at #2 Drift, through the door at the aux fan, flowing east into #3 Drift at the diagonal stoppings in CX B-2, north to the barricade in #3 Drift, flowing west to Barricade between CX D-1 and CX D-2, south and then to the west into #1 Drift where it will exit the mine.

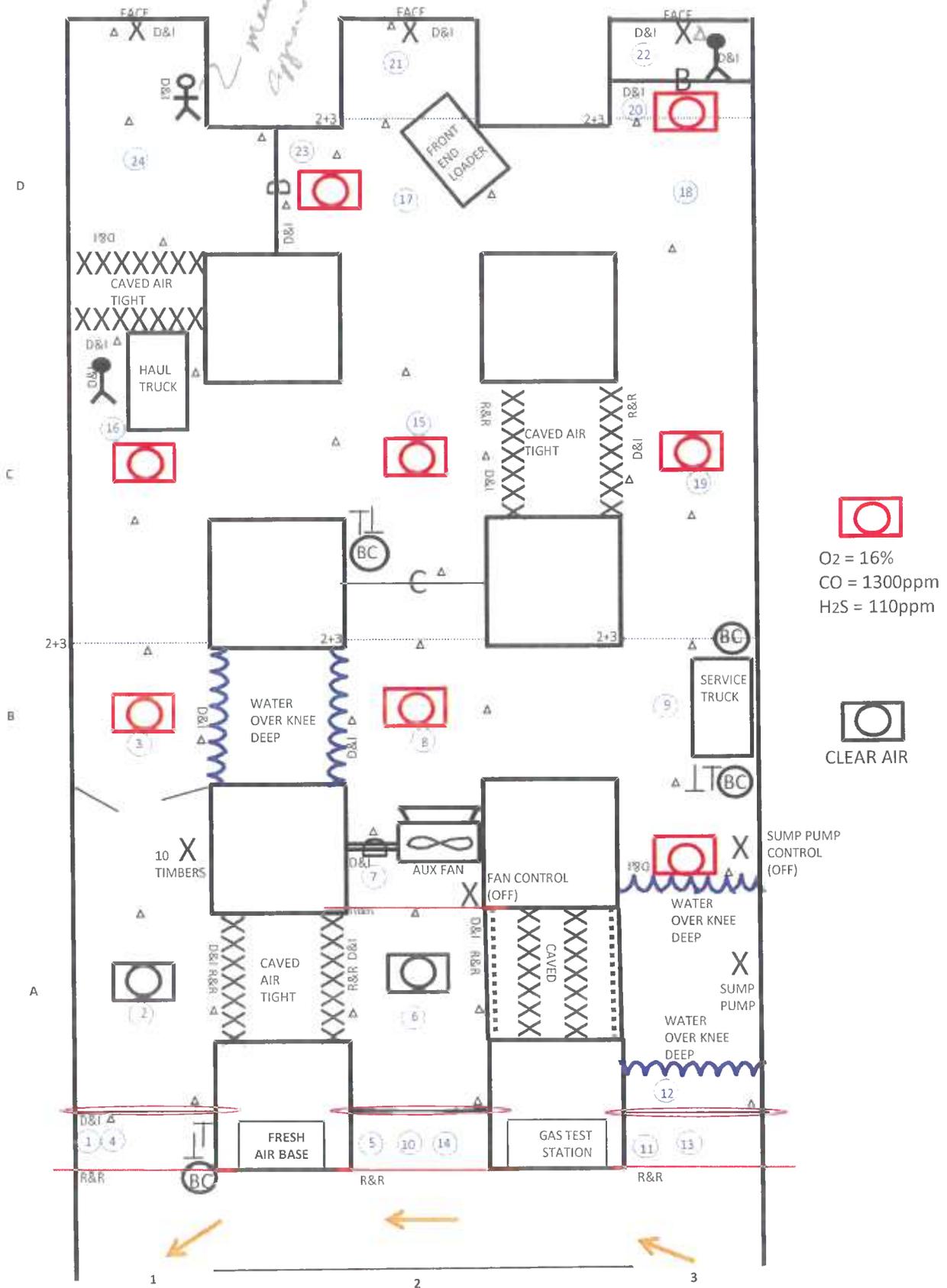
**Note: If the team implements these changes, the gas placards will quickly revert to “clear air” in the drifts and crosscuts.**

### **See Ventilation Map.**

Using the brattice cloth found north of the service truck in #3 drift the team can now sweep the gas found in front of the barricade in #3 drift and the barricade between CX D-1 and CX D-2.

### **Team Stop No. 22 Barricade #3 Drift**

The team may air lock into the barricade in #3 drift. The team must check roof before building airlock. The captain must D&I the stopping build for



DAY 2 EXPLORATION MAP

the airlock. A gas check must be made when the barricade is breached. The captain will find a body and the face. The captain must D&I the body and face. A gas test must be made at the face.

*Failure of the captain to verbally indicate he/she is checking the back or roof at all points of farthest advance: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)2*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to mark the date and his/her initials at the point of farthest advance of the team in any direction such as at stoppings, faces of rooms and drifts, water over knee deep, impassable falls, barricades, fires out of control, and at the location of any live persons or bodies, will result in discounts (5 x each infraction) (max 10) per Judge 1 – UG Rule #9*

### **Team Stop No. 23 Barricade between CX D-1 and D-2**

The team may air lock into the barricade. The team must check roof before building airlock. The captain must D&I the stopping build for the airlock. A gas check must be made when the barricade is breached.

*Failure of the captain to verbally indicate he/she is checking the back or roof before building or erecting any structure: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)3*

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

### **Team Stop No. 24 CX D-1**

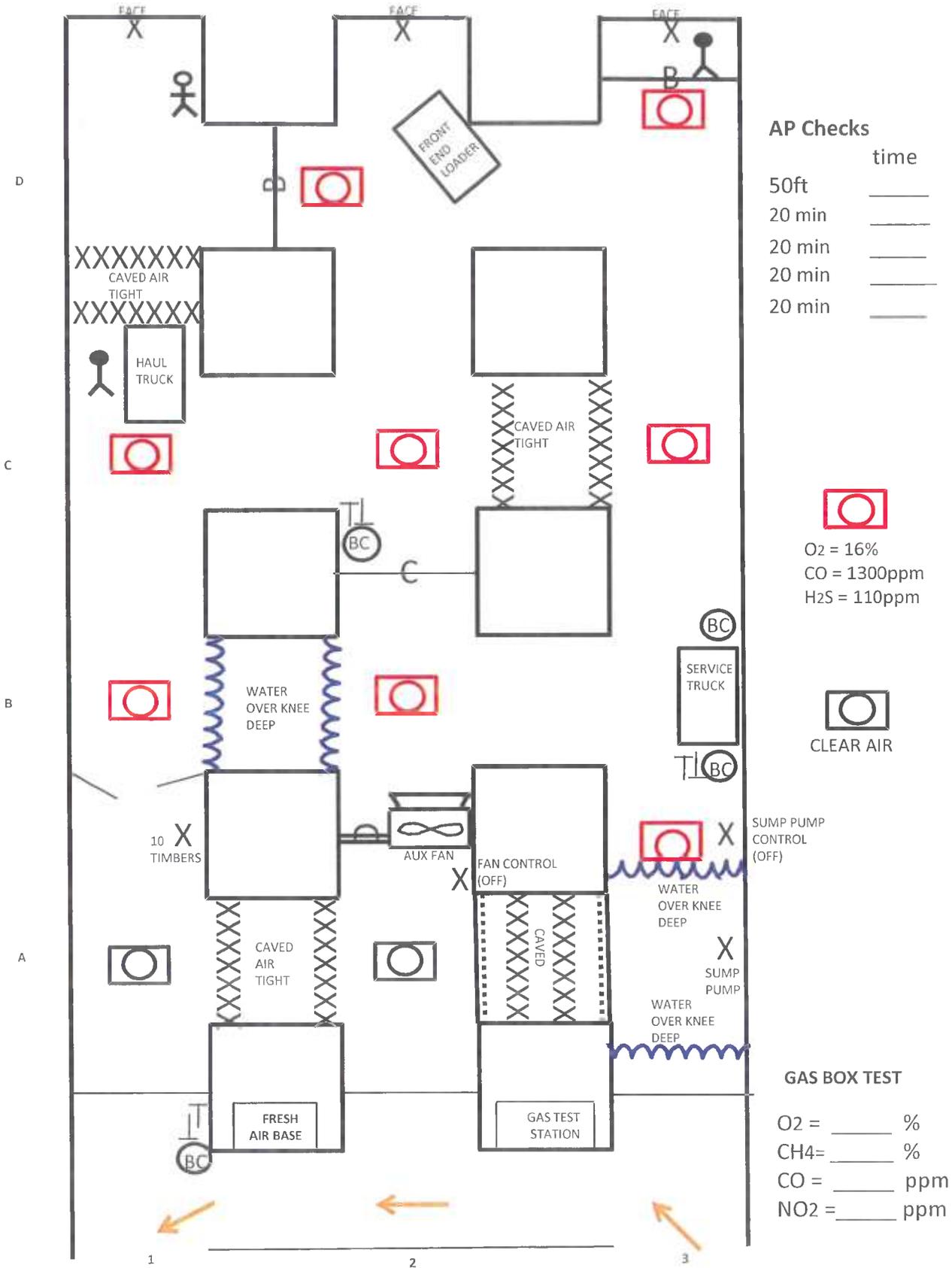
The captain will break all planes to the intersection and enter each opening and verbally indicate he is checking the back. Gas test will be made in each opening to the intersection. To the south the captain will find caved air tight and must D&I the cave air tight. To the north the captain will find an unconscious miner, and the face. The captain must D&I the survivor and the face. The team must transport the survivor to the fresh air base.

*Failure to make necessary gas tests where required, will result in discounts (1 x each gas, each omission) per Judge 2 – UG Rule #1*

*Failure of the captain to verbally indicate he/she is checking the back or roof at all points of farthest advance: will result in discounts (5 x each infraction) per Judge 1 – UG Rule #8(b)2*

*Failure to properly secure survivor to stretcher; failure to cover survivor with blanket (unless first aid procedures indicate otherwise); or placing*

TEAM # \_\_\_\_\_  
 #2 JUDGE \_\_\_\_\_



**AP Checks**

	time
50ft	_____
20 min	_____
20 min	_____
20 min	_____

**AP Check Results:**  
 O<sub>2</sub> = 16%  
 CO = 1300ppm  
 H<sub>2</sub>S = 110ppm

**AP Check Results:**  
 CLEAR AIR

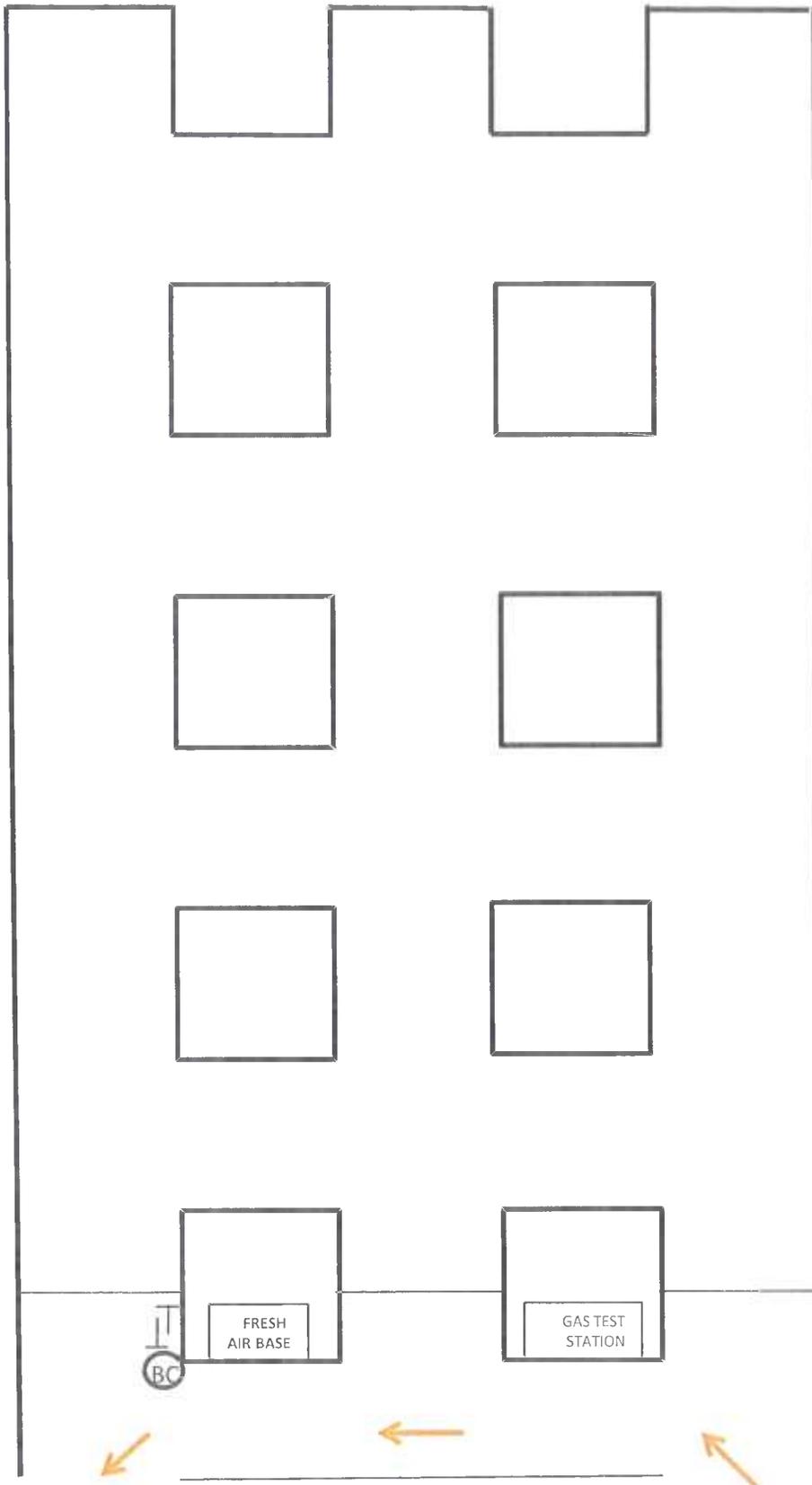
SUMP PUMP CONTROL (OFF)

**GAS BOX TEST**

O<sub>2</sub> = \_\_\_\_\_ %  
 CH<sub>4</sub> = \_\_\_\_\_ %  
 CO = \_\_\_\_\_ ppm  
 NO<sub>2</sub> = \_\_\_\_\_ ppm

TEAM # \_\_\_\_\_

#2 JUDGE \_\_\_\_\_



#2 JUDGES VENTILATION DAY 2 MAP