2014 National Metal and Nonmetal Mine Rescue Contest

JUDGES' PACKET
Day #1

August 5, 2014
Lexington, Kentucky

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Introduction

Welcome to the 2014 National 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 this 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 very 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 discounts 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, the 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.

Day 1- Mine Map

Mine Information Sheet
Bluegrass Mining, Inc. – Blue Stallion Mine

Mining & Equipment:
The single-level mine uses a conventional room and pillar method to extract ore. The broken ore is loaded into rock trucks by face loaders and then transported to the feed hopper for the primary crusher. Conveyor belts are used to transport the ore to the surface via the Slope. The entries are initially driven 8 feet high and 10 feet wide. Typical pillar dimensions are 15 feet by 20 feet (W x L). All underground mobile equipment (including the loaders, rock trucks, scaling machines, face drills, roof bolting machines, and transport jeeps) is diesel-powered.

Recovery:
No recovery work (or second mining) has been performed.

Gas and Oil:
In accordance with Title 30 CFR Part 57.22003, the mine was classified as a Category IV mine, that is, any methane concentrations liberated are not explosive and are not capable of forming explosive mixtures with air, based on the geological area in which the mine is located. Historical hygiene data from the mine, both MSHA and Company's samples, have indicated the presence of methane in trace amounts. Presently, MSHA is reviewing this classification due to several reported methane feeders and two minor ignitions in the face areas. In addition, crude oil is now oozing from the face and side walls in the active workings. Although, to date, it has been only a nuisance, the inflow rate is increasing in the Northern Panel. The accumulating oil is more of a safety hazard, due to its combustible characteristics, than a health hazard from any associated organic components.

Water:
The ore body dips toward the North; therefore, standing water is typical in the northern panels. However, although a nuisance, the water has never caused any significant production problems.

Pumps:
Portable pumps and discharge lines are used to remove water from the working faces to several underground containment ponds. Larger pumping stations have been installed at these locations to keep the water level to a minimum. Permanent discharge lines had been installed to remove the water from the mine via the Slope.

Mine Openings:
The 16-feet wide, arched Slope is 423-feet in length and houses the main line conveyor belt. The slope is also used to transport personnel and supplies and is designated as the primary escape way from the mine. The 480-feet deep, 16-feet diameter Return Shaft is equipped with a 5-man escape hoist and is designated as the secondary escape way from the mine.

Day 1- Mine Map

Mine Information Sheet (continued)
Bluegrass Mining, Inc. – Blue Stallion Mine

Ventilation:
The Main Fan is located on the surface and is not reversible. The fan produces approximately 350,000 cfm and operates in the stable portion of its performance curve at the lowest available blade setting. The electrical power to the fan is on, and the fan is operating. The air enters the mine through the Slope and exhausts from the Return Shaft. Air is directed to the faces using permanent (concrete block) and temporary (brattice cloth) ventilation controls. The normal airflow direction is shown on the mine maps.

Ground/Rib and Roof Control:
The immediate roof or back is supported by 6-foot long roof bolts, installed on 4-foot centers. Wooden timbers or wooden crib blocks are available for additional support in problem areas.

Mine Map:
The mine map was updated on July 21, 2014, by the onsite Engineering Department.

Other Mines:
There are no known mines, active or abandoned, located within a 5-mile radius from the mine.

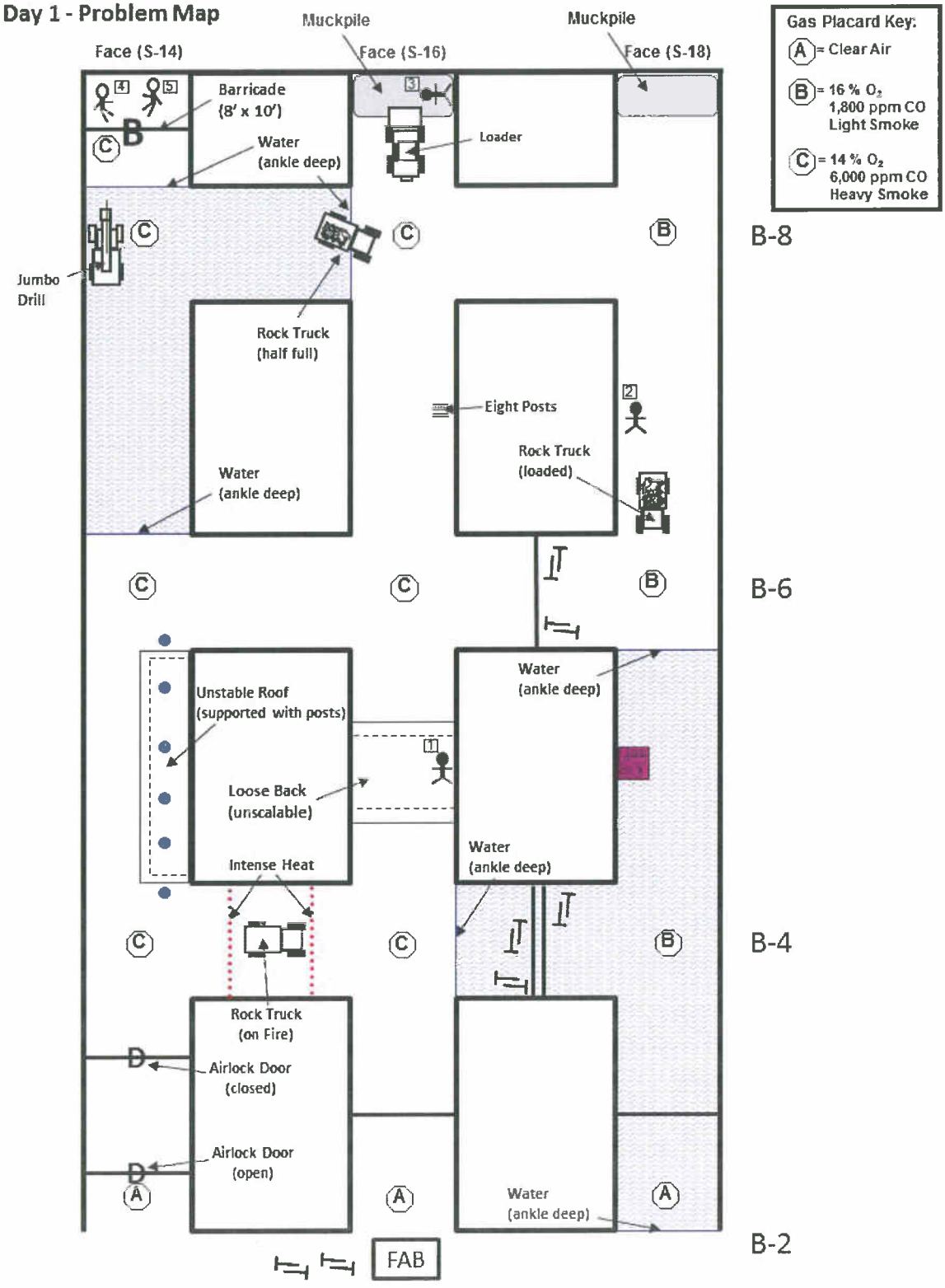
Explosives:
Explosives are available and stored on the surface. They are used during the mining cycle, and blasting is conducted at the end of each shift while all persons are out of the mine. Only enough explosives for a day's use are stored in day boxes on the blaster's jeep.

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

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

Day 1 - Problem Map



Team Briefing Statement

Bluegrass Mining, Inc.'s Blue Stallion Mine started production on March 27, 2008. It is a single-level underground mine opened by a slope and one shaft. The mine is ventilated by a surface-mounted exhausting fan operating at the Return Airshaft. Intake air enters the mine through the Slope. Ore is mined by the traditional room and pillar method. The entries are initially driven 8 feet high and 10 feet wide. Pillar dimensions in the newest developments are typically 15 feet by 20 feet (W x L). The immediate roof, or back, is supported by six-foot rock bolts. The back is fairly competent, but problem areas are supported by wooden posts or stacked crib blocks.

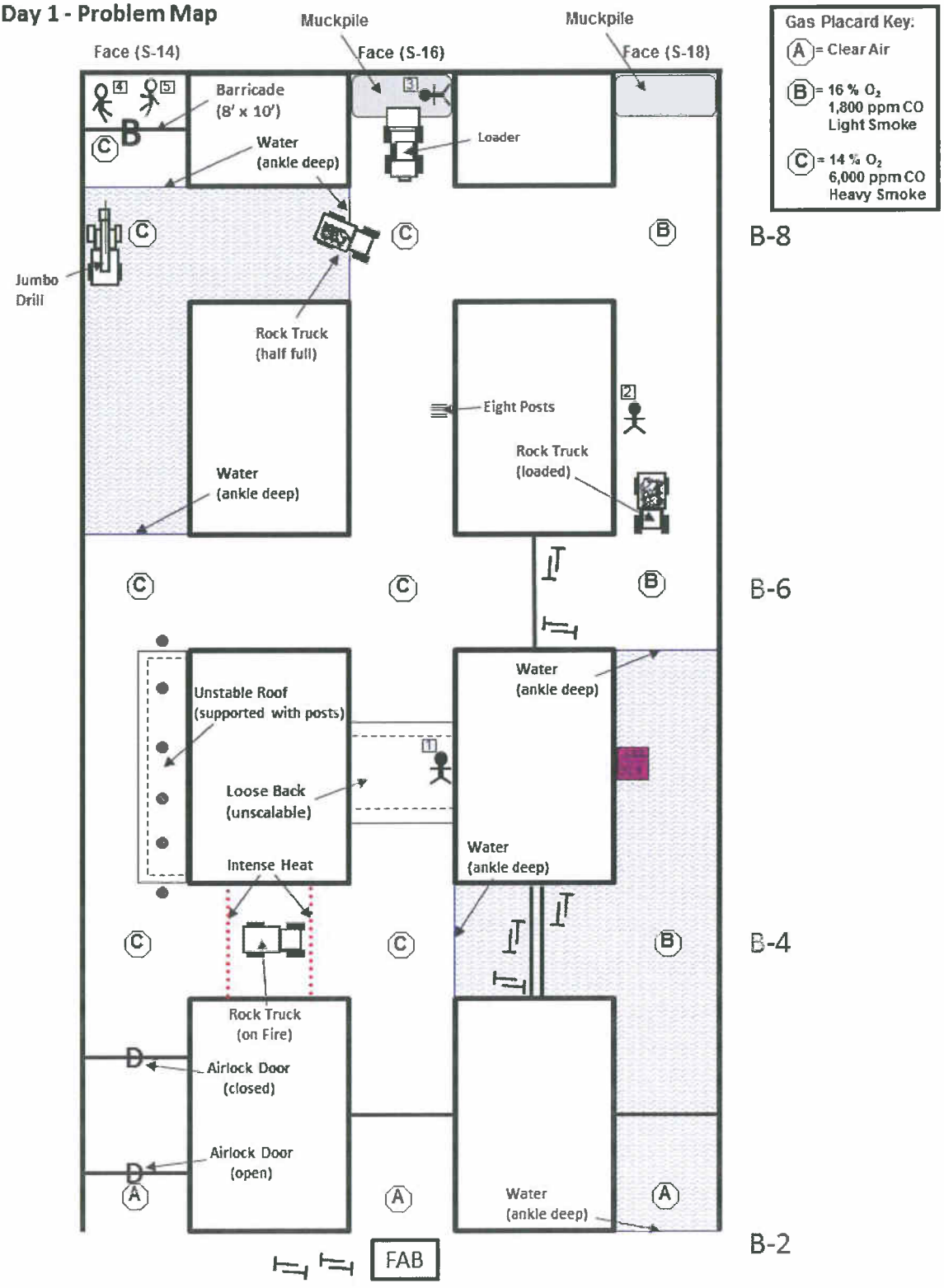
This morning at 5:00 a.m., twelve employees went underground to start their shift. A production crew (one foreman and five crew members) went to each of the northern and southern production panels. At about 6:30 a.m., dark black smoke was observed exiting the Return Shaft. The Mine Manager tried to alert both crews, but could not reach anyone in the South panel. He gave the order to evacuate the mine, and the North panel crew proceeded outside through the slope. After one employee made his way out from the southern panel and reported a large fire with heavy black smoke in the face areas, the mine manager called for help. The employee was confused as to the source of the fire and did not know why the rest of his coworkers had not evacuated the panel. He wore his MSA W-65 filter self-rescuer while traveling the return entries to the Return Airshaft. When he arrived there, he signaled for the automatic escape capsule and was hoisted to the surface.

Currently, you are located at the underground fresh air base established by the company's mine rescue team during the initial exploration of the mine. Ventilation has been re-established to this area and is being intentionally short-circuited to the return entries. All power to the underground has been locked out and guarded. The main fan is operating. Gas monitoring at the Slope and the Return Airshaft indicates clear air: oxygen (O_2) - 20.9 %; carbon monoxide (CO) - 2 ppm; methane (CH_4) - 0.0 %; and nitrogen dioxide (NO_2) - 0.0 ppm.

We are still not able to establish contact with anyone underground. We have called all of the government agencies for help. Guards have been posted at the Slope, at the Return Airshaft, and at the Main Fan. There is a fully equipped mine rescue team located at the Fresh Air Base, and they are ready to serve as your team's backup. **Another team will be sent into the mine to replace you after 75 minutes.**

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

Day 1 - Problem Map



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

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

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

GOOD LUCK!

Team Instructions

- Explore and map all accessible areas of the South Panel;
- Extinguish or seal any fires;
- Account for the five missing miners;
- If necessary, re-ventilate the panel; 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 to the team. **Note:** The team has been briefed on the problem and the mine information, and been provided with the mine maps in isolation.

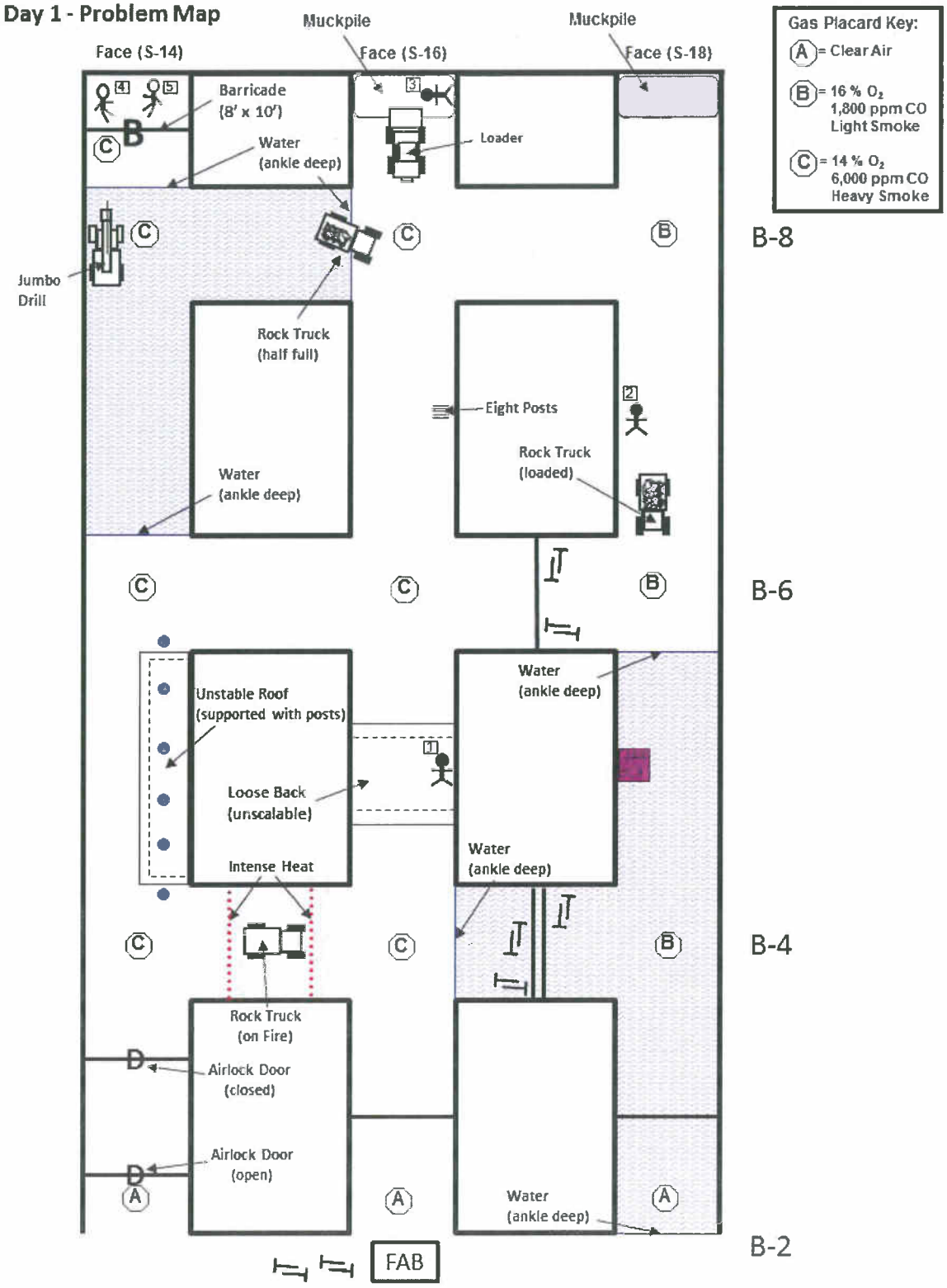
Read the following instructions to the team:

> **At this time, I have no new information to report to you. During the working of the problem, I will answer any question that you may have; however, by problem design, my response may be limited in scope.**
>
> **The fresh air base attendant and mine rescue team alternate, if available, will be required to remain at the fresh air base where they can study their maps and the team briefing information. During the working of the problem, only the attendant can speak with the team via their chosen communication system to discuss the rescue activities performed or proposed. If the team returns to the fresh air base, only the attendant or alternate will be allowed to assist them. However, neither the attendant nor the alternate can physically go beyond the fresh air base to assist the team unless he/she becomes a team member when someone drops out.**
>
> **After the team has completed its 50 foot check, they will not be allowed to physically compare the team map with the fresh air base attendant's map or the team alternate's map. That is, 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 or out of the mine.**
>
> **CAUTION - The fresh air base attendant or mine rescue team alternate is not allowed to communicate with anyone except the team members, the mine manager, or the judging officials.**
>
> **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 whether or not it was used by the team. This map will not be scored, but will be returned to you in your team packet.**
>
> **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!"**

Day 1 - Problem Map



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 prior to arriving at the fresh air base. This will include an identical videotaped version for all teams. At this time, each team will also be allowed to review the team briefing statement, mine information sheet, mine maps, and instructions for rescue teams and fresh air base attendants. However, copies of these documents and maps will be collected at the conclusion of the briefing session.

Upon arrival at the fresh air base, the team will meet the Mine Manager and will be introduced to the judges. The Mine Manager will read the Problem Orientation and update the team with any information obtained since their briefing. Questions will be answered only as required by the rules or to explain the meaning of a term.

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

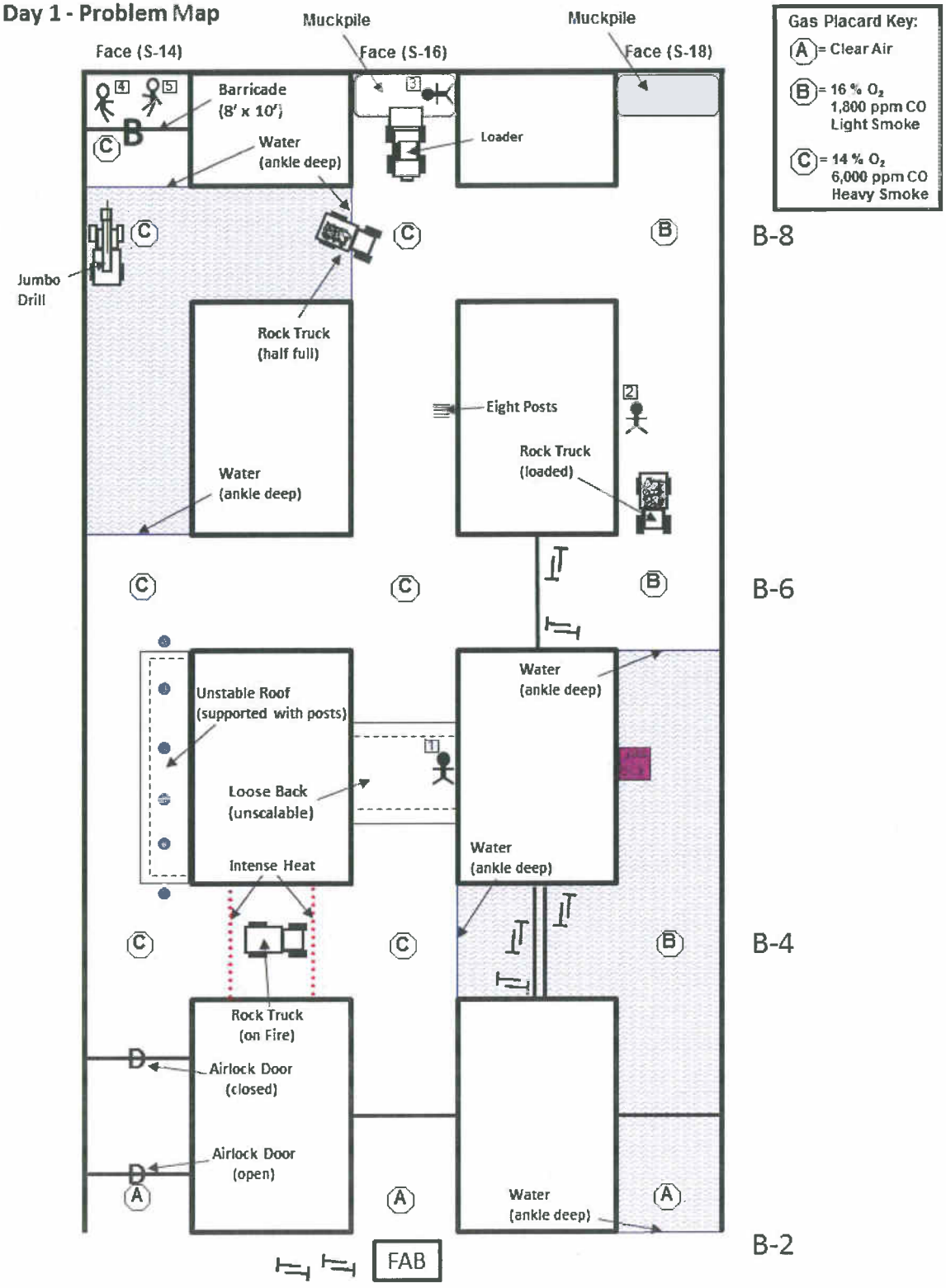
After receiving the information from the Mine Manager, the team may discuss the conditions presented by the problem and the map. The team is not required to check their equipment again. These equipment checks were conducted prior to reporting to the field, and the team is fully equipped, physically fit, and ready to go. However, deficiencies with the team's equipment, identified by the judges during the working of the problem, should be discounted appropriately.

Due to the recent increase of overall methane concentrations and associated ignitions in the face areas of the mine, the team must use non-sparking tools to work the problem. They must notify the judges that they are using such tools. 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. Failure to use and notify or request non-sparking tools will result in a team endangerment discount.

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

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

Day 1 - Problem Map



When ready, the team must examine all openings along the prior mine rescue team's furthest point of advance. The three drifts must be examined while under oxygen. In air clear of smoke, these checks may be made without a lifeline, provided the entire team does not go into the entrance. This examination should not cover more than twenty-five (25) feet.

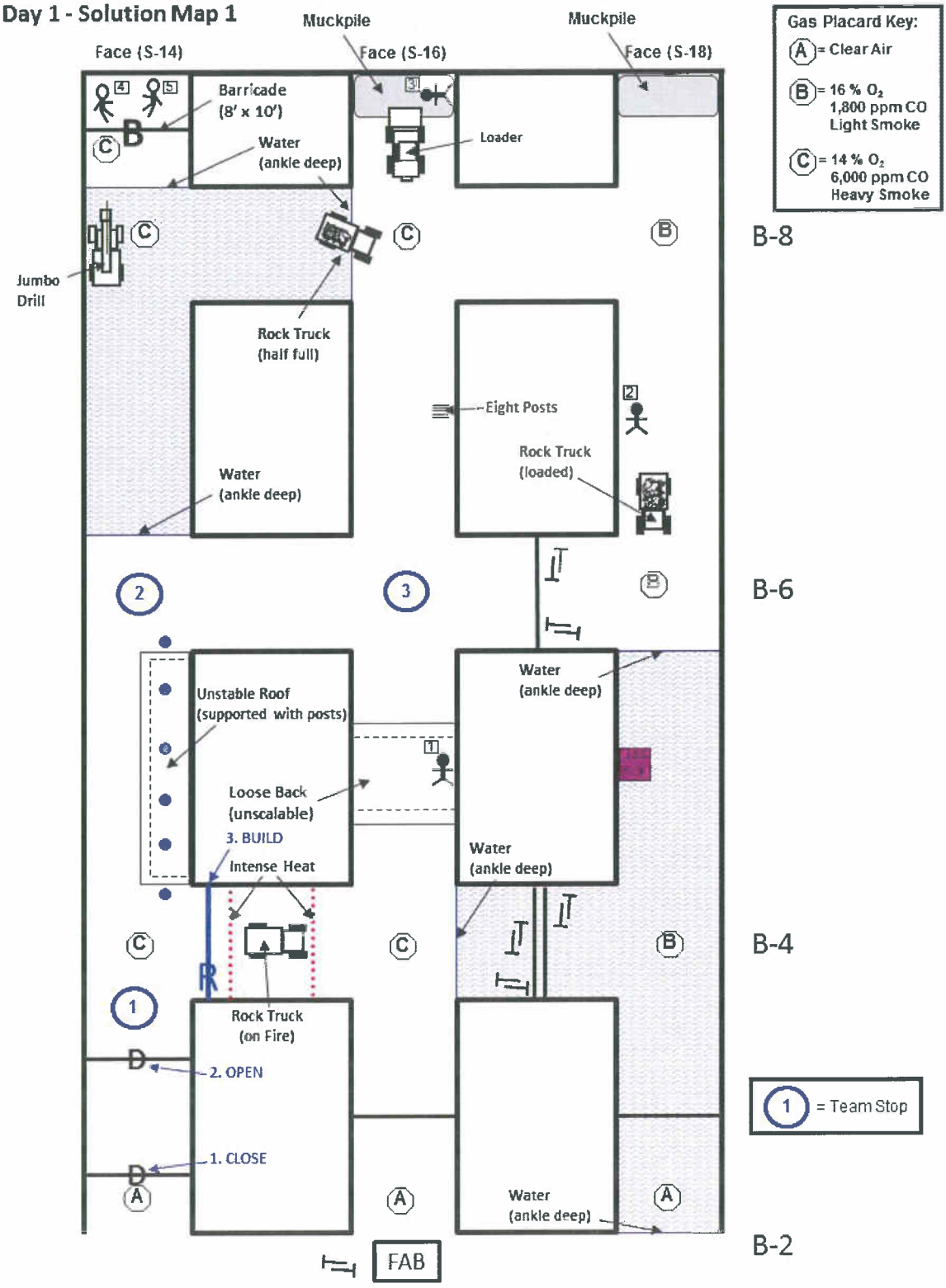
Drift S-14 checks reveal: A placard at the drift shows Clear Air. The southern airlock door is open and the northern airlock door is closed. The captain must date and initial (D&I) the closed airlock door since it is the team's furthest point of advance in Drift S-14.

Drift S-16 checks reveal: A placard at the drift shows Clear Air. The drift to the North is blocked by a temporary stopping which had been erected by the previous mine rescue team.

Drift S-18 checks reveal: A placard at the drift shows Clear Air. The drift to the North is blocked by a temporary stopping which had been erected by the previous mine rescue team. They will note the extent of the ankle deep water in Drift S-18. The team can now travel beyond the fresh air base.

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 team stop, 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.

Day 1 - Solution Map 1



Note: Team Stop Nos. 1 - 3 (see Solution Map 1)

Team Stop No. 1

The team can travel through the existing airlock to access drift S-14. In order to prevent an unintentional ventilation change, the team must travel through the open airlock door and close it behind them. Then, they can open the second airlock door and proceed into the drift. At the intersection with the first crosscut (designated as B-4 on the Team and Fresh Air Base maps) the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find heavy smoke with 14 % oxygen (O_2) and 6,000 ppm carbon monoxide (CO). Beyond the intersection, the captain will acknowledge the "unstable roof (supported with posts)" extending five feet from the left rib of the inby support pillar, D&I the roof, and warn the other team members of the hazard.

Stretching to the right into crosscut B-4, the team will find a rock truck on fire, and they will be stopped by "intense heat." At this time, the team must use one set of brattice material to seal the fire (leaving a regulator because of the possibility of methane in the problem). Before erecting the seal, the captain must check the roof or back above the proposed seal location. After the seal is built, the captain must D&I the seal as their furthest point of advance in this direction. Once this is done, without undue delay, the team must find and seal all other approaches to the fire.

Note: Sealing the fire does not relieve the team of the responsibility of systematic exploration.

Note: The team must perform an apparatus and personnel check before entering smoke at this location. They must also be attached to their lifeline.

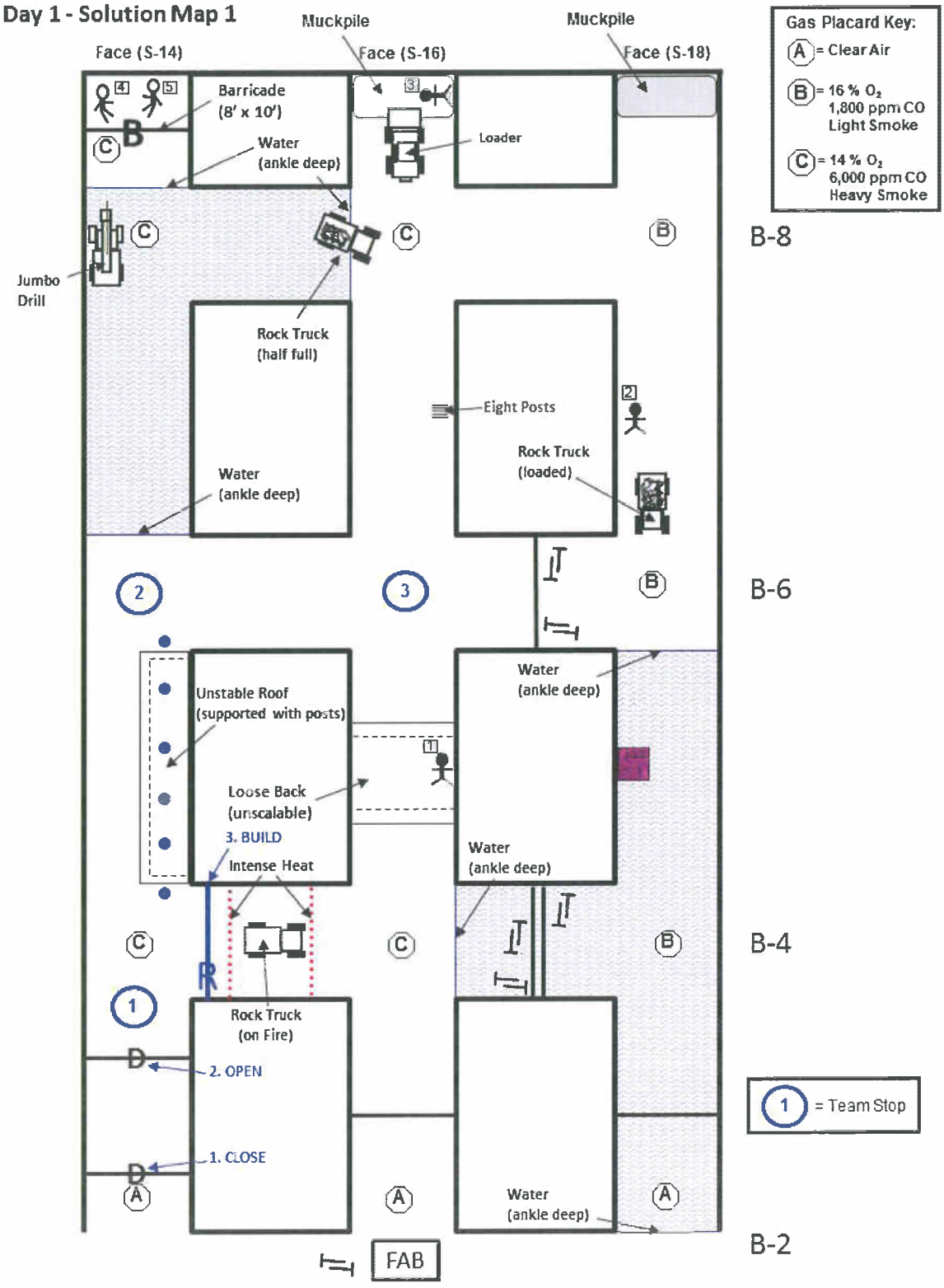
Note: No physical comparison of the team map, fresh air base attendant's map, or the team alternate's map will be allowed after the initial entry into the mine. No changes can be made to any of these maps while the team is at the fresh air base.

Team Stop No. 2

Now, the team can advance inby toward crosscut B-6. As they travel, the captain will acknowledge the "unstable roof (supported with posts)" extending five feet from the left rib of the inby support pillar and warn the other team members to avoid the hazard. At the intersection with crosscut B-6, the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find that the gas concentrations have not changed from their previous location. They will also find that the drift ahead of them and the crosscut to the right are open. They can also note the extent of an area of ankle deep water inby the intersection in drift S-14.

Note: The team cannot advance beyond 3-feet past crosscut B-6 because they have not tied-in the entries behind them.

Day 1 - Solution Map 1

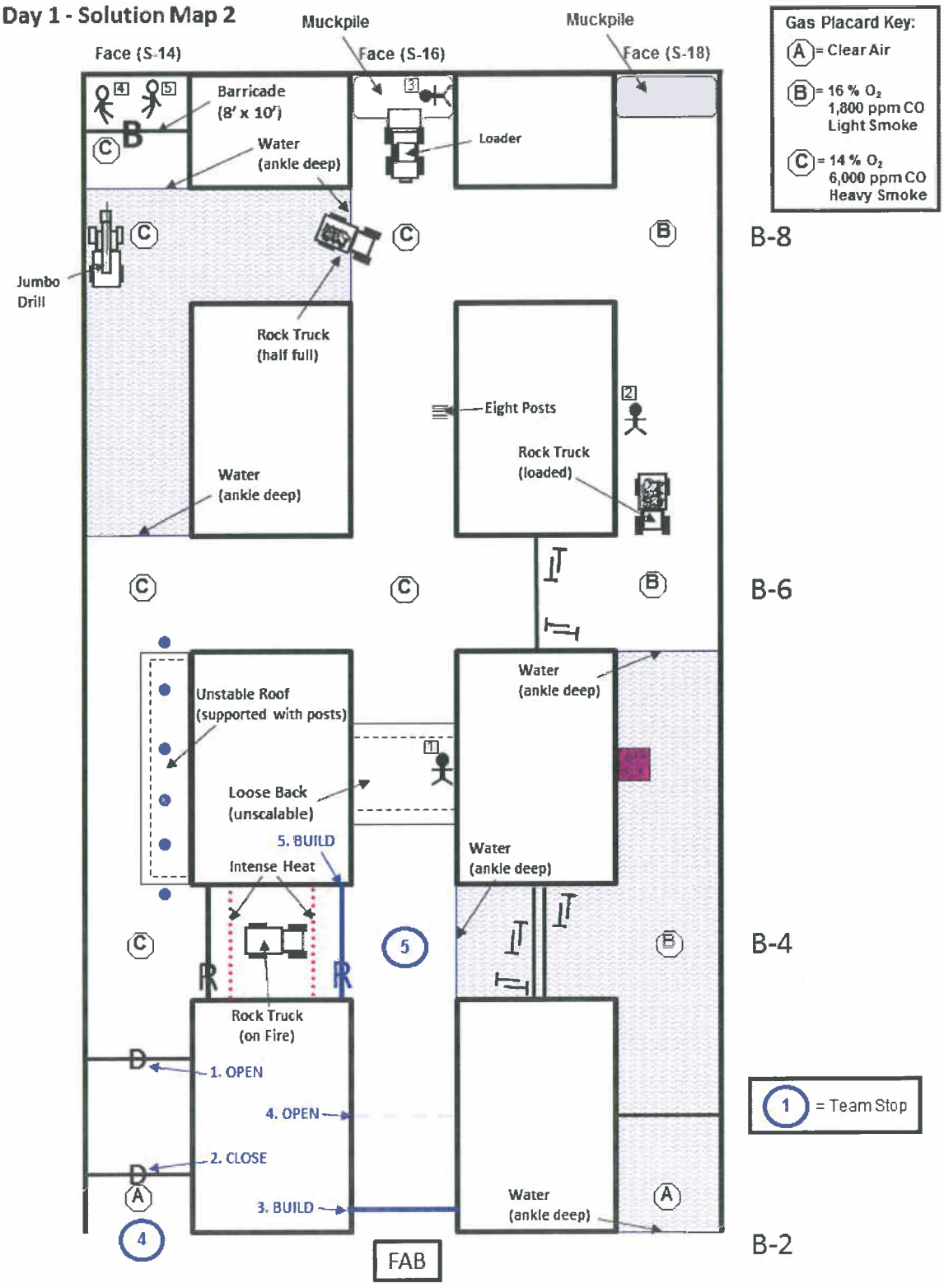


Team Stop No. 3

The team will advance into crosscut B-6 toward drift S-16. At the intersection, the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find that the gas concentrations have not changed from their previous location. The team can advance southward in the drift in search of the fire. About five feet from the intersection, they will find the extent of the area of loose unscalable back stretching rib-to-rib which is blocking their way. At this point, the team has not located any posts to support it. The team can then stretch in the crosscut B-6 to the backside of the temporary stopping looking for posts, but there are none. **If the team asks the mine manager for posts, they will be told that all materials needed to work the problem can be found on the field. If they need additional supplies, it will take about 45 minutes to bring it from the surface warehouse to the fresh air base.** The captain must remember to D&I the loose back and the temporary stopping as their furthest point of advance in these directions.

Note: The team cannot advance beyond 3 feet past crosscut B-6, because they have not tied-in the entries behind them.

Day 1 - Solution Map 2



Note: Team Stop Nos. 4 - 5 (see Solution Map 2)

Team Stop No. 4
The team can retreat through the open airlock door and close it behind them. Then, they can open the second airlock door and proceed through. At this point, the team only has one set of brattice material available for use. **They can ask the mine manager for more; however, the team will be told again that all materials needed to work the problem can be found on the field. However, a shipment of additional supplies has been dispatched from the surface warehouse and will arrive at the fresh air base in about 45 minutes.**

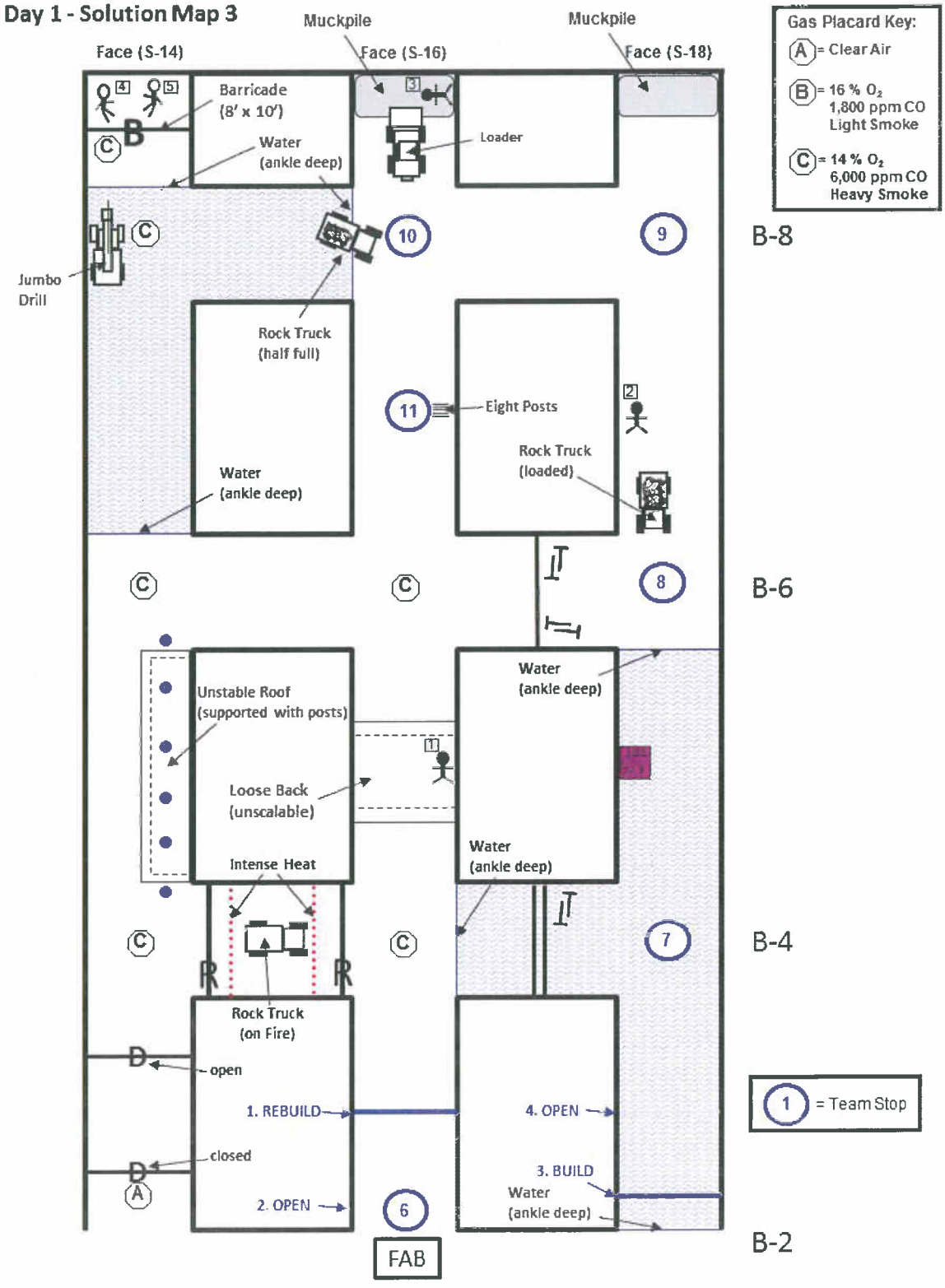
Team Stop No. 5
The team can now travel to the temporary stopping (erected by the previous mine rescue team) located in drift S-16. In order to prevent an unintentional ventilation change, they must erect a temporary stopping behind them before opening the existing stopping. Afterward, the team can travel inby toward the intersection with crosscut B-4. At the intersection, the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find heavy smoke with 14 % O_2 and 6,000 ppm CO.

To the left in crosscut B-4, the team will find the second (and final) approach to the fire, and they will be stopped by "intense heat." Since they do not have any brattice material, they can continue exploring the area to find some. As the team stretches to the right in crosscut B-4 toward the permanent stopping (between drifts S-16 and S-18), they will find the extent of an area filled with ankle deep water and two sets of brattice material. Now, the team must use one set of brattice material to seal the fire (leaving a regulator). Again, before erecting the seal, the captain must check the roof or back above the proposed seal location. After the seal is built, the captain must D&I the seal as their furthest point of advance in this direction. Once this is done, the fire has been controlled. The team can now continue systematic exploration of the mine. However, the captain must remember to D&I the permanent stopping as their furthest point of advance in this direction. They can bring the extra brattice material (one set) with them for future use.

Now, the team can attempt to advance further in the drift toward crosscut B-6. About five feet inby the intersection of drift S-16 and crosscut B-4, the team will encounter an area of loose unscalable back stretching rib-to-rib. The captain must warn the team members to stay clear of the hazard. **If the team asks for posts to support the area, they will be told that a shipment of additional supplies has been dispatched from the surface warehouse and will arrive at the fresh air base in about 40 minutes.** Before leaving the area, the captain must D&I the loose roof as their furthest point of advance in this direction.

Note: The team must perform an apparatus and personnel check before entering smoke at this location. They must also be attached to their lifeline.

Day 1 - Solution Map 3



Note: Team Stop Nos. 6 - 11 (see Solution Map 3)

Team Stop No. 6
The team can retreat from drift S-16 by rebuilding the temporary stopping that they had opened previously. Then, they can remove the temporary stopping that they had erected to gain access to the drift. They can take this brattice material with them. At this point, the team has two sets of brattice material available for use.

Team Stop No. 7
They can now travel to the temporary stopping (erected by the previous mine rescue team) located in drift S-18. Again, in order to prevent an unintentional ventilation change, the team must erect a temporary stopping behind them before opening the existing stopping. Afterward, they can travel into the drift to the intersection with crosscut B-4. At the intersection, the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find light smoke with 16 % O_2 and 1,800 ppm CO. The team can stretch to the left in the crosscut to the permanent stopping. They will find additional brattice material (one set), and the captain must D&I the stopping as their furthest point of advance in this direction. They can take this brattice material with them. At this point, the team has two sets of brattice material available for use.

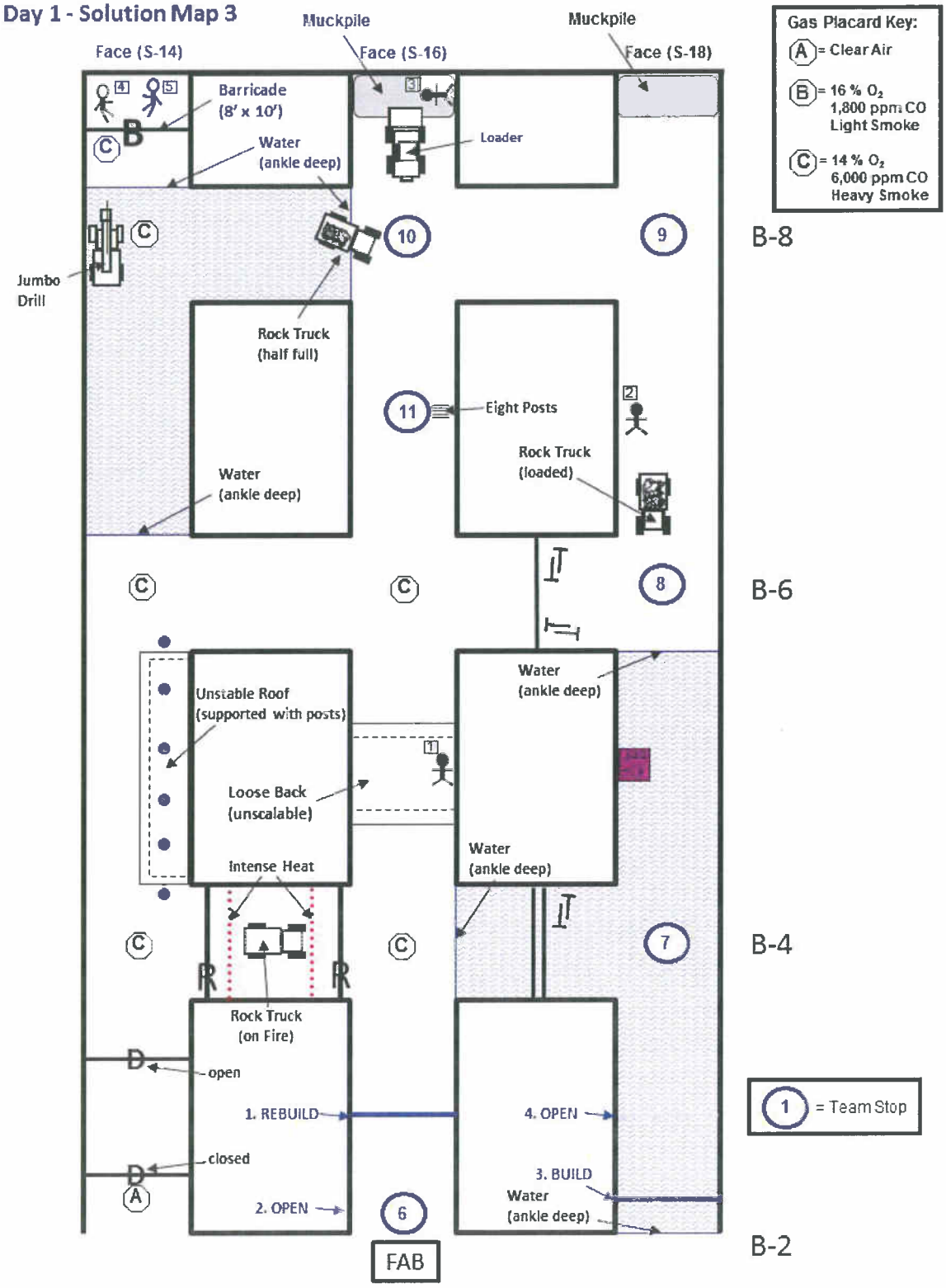
Note: The team must perform an apparatus and personnel check before entering smoke at this location. They must also be attached to their lifeline.

Team Stop No. 8
The team can advance further in the drift toward the intersection with crosscut B-6. As they travel, the team will find the gas testing box to their left along the rib of the support pillar half way between crosscut B-4 and crosscut B-6. **A team member must use the team's multi-gas instrument to determine the gas concentrations in the unknown mixture. Judge No. 2 will assess the team's measurements and, if warranted, apply appropriate discounts (Judge 2 – UG Rule #4).**

Now, the team can continue to advance. At the intersection with crosscut B-6, the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find that the gas concentrations have not changed from their previous location. They can also note the extent of the ankle deep water behind them. They will also find a loaded rock truck parked near the right rib of the inby support pillar. The team can stretch to the left in the crosscut to the temporary stopping. They will find additional brattice material (two sets), and the captain must D&I the stopping as their furthest point of advance in this direction.

Note: The team must leave the extra brattice material at this location since they already have two sets onboard.

Day 1 - Solution Map 3



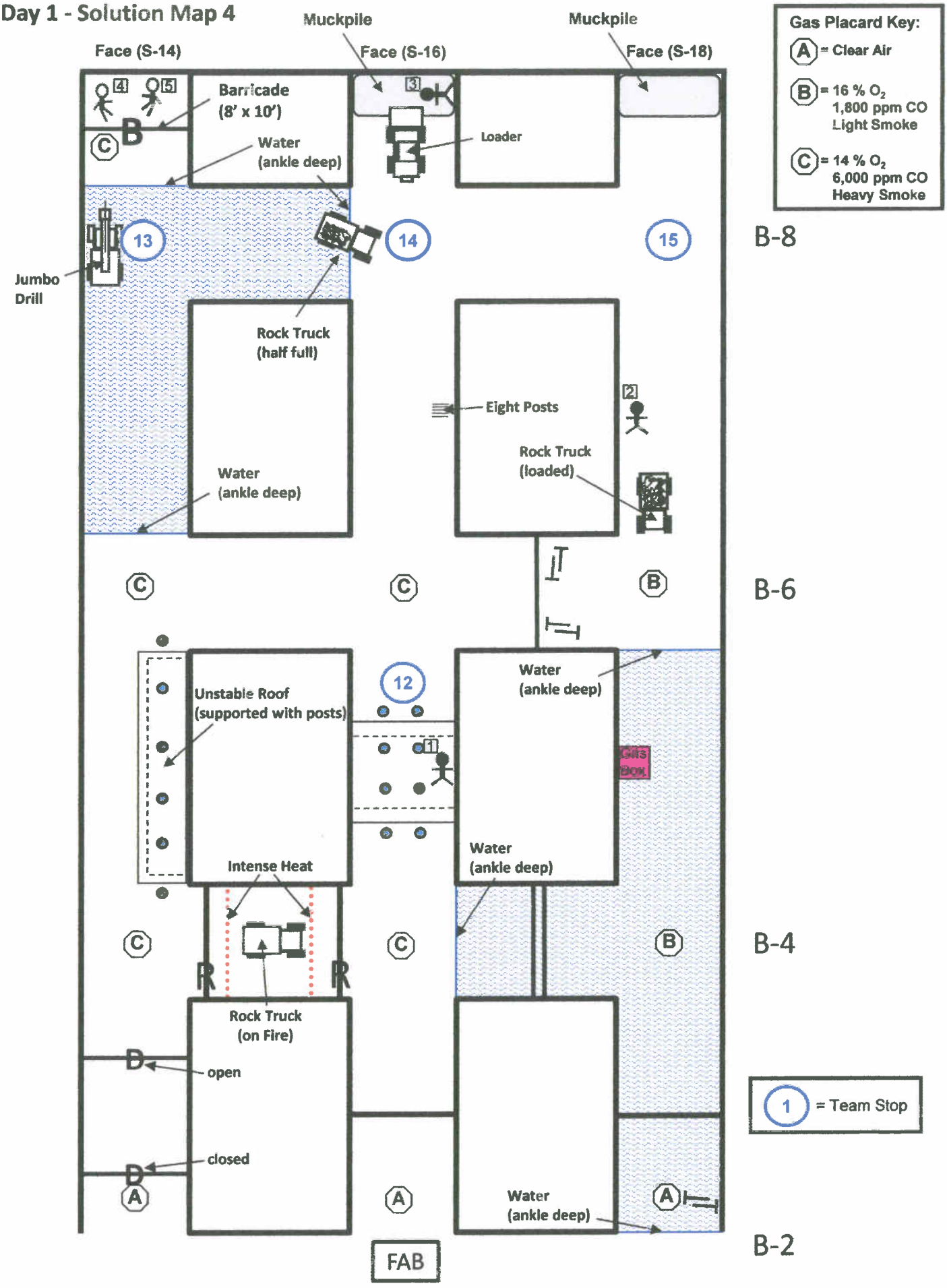
Team Stop No. 9
The team can then travel further into the drift toward crosscut B-8. As they travel, the team will find the first missing miner (Miner #2) on the ground behind the loaded rock truck. The miner is unresponsive. The team captain must perform necessary roof or back checks over the miner. After a primary assessment, the #1 Judge will hand the team member a placard which reads: **"The miner exhibits no vital signs. The miner is dead."** The captain must D&I the location of the body.

At this point, the team can continue exploration of the drift. At the intersection with crosscut B-8, the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find that the gas concentrations have not changed from their previous location. They will find that the drift is open ahead of them, and the crosscut is open to the left of the intersection. The team must advance through the open crosscut toward drift S-16.

Team Stop No. 10
At the intersection of drift S-16 and crosscut B-8, the captain performs roof or back checks, and the team will conduct necessary gas checks. The team will find heavy smoke with 14% O_2 and 6,000 ppm CO. The team will also find the back end of a loader parked in the middle of the drift pointed toward the face area. Ahead in crosscut B-8, they will find a rock truck that is partially loaded (denoted on the corresponding placard as "half full"). They can also note the extent of the ankle deep water in this area.

Team Stop No. 11
The team can stretch outby in drift S-16 to tie-in. About 10-feet from the intersection, they will find 8 posts. At this point, they have finally found the materials needed to support the area of loose unscalable roof further down the drift between crosscuts B-6 and B-4.

Day 1 - Solution Map 4



Note: Team Stop Nos. 12 - 15 (see Solution Map 4)

Team Stop No. 12
At this time, they can advance to the area and use the posts to support the loose unscalable back.

Note: The team should follow the example shown in Figure 2 on page 35 of the 2014 Metal and Nonmetal Mine Rescue Contest Rules booklet.

As they post their way through the area, the team will find the second missing miner (Miner #1) on the ground and unresponsive. The team captain must perform necessary roof or back checks over the miner. After a primary assessment, the #1 Judge will hand the team member a placard which reads: **"The miner exhibits no vital signs. The miner is dead."** The captain must D&I the location of the body.

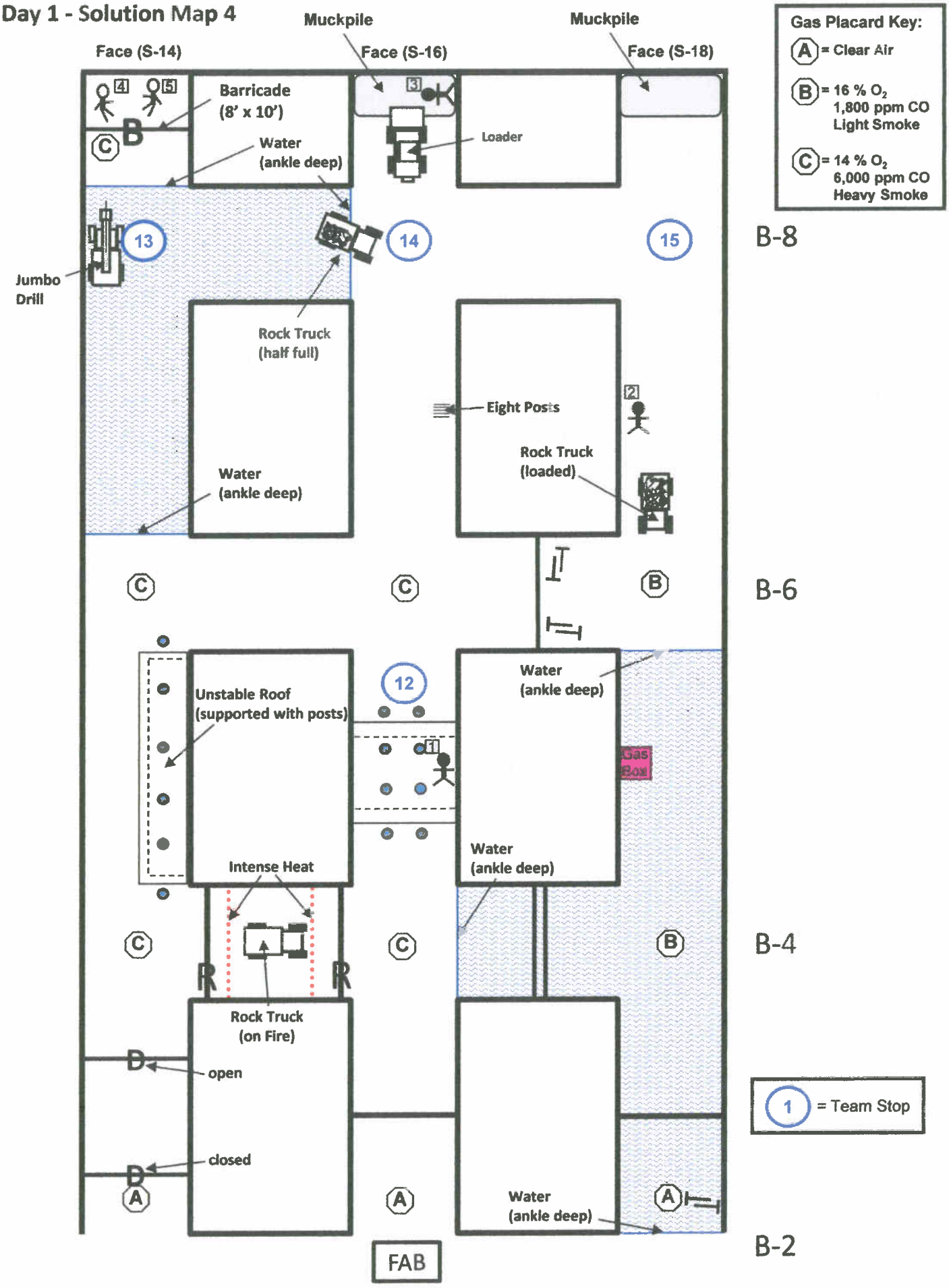
Team Stop No. 13
To continue systematic exploration, the team can retreat in drift S-16 to crosscut B-8 and then advance through the crosscut toward drift S-14. At the intersection, the captain can perform roof or back checks, and the team will conduct necessary gas checks. The team will find that the gas concentrations have not changed from their previous locations. They will also find a jumbo drill parked in the intersection. The team can stretch outby in the drift to tie-in. Now that all areas have been tied-in behind, they can retreat to crosscut B-8 and advance toward the face of drift S-14.

As they travel, they can note the extent of the ankle deep water in the area. Five feet inby the intersection, the team will find an 8-foot by 10-foot brattice cloth barricade stretching from rib-to-rib. A placard near the barricade will show the same gas concentrations exist immediately in front of the curtain. They can communicate with the two persons inside (Miner #4 and Miner #5). **The miners can relate the following facts (as revealed through a placard handed to the team captain):**

> *"We are Miner #4 and Miner #5. We were trying to repair the jumbo drill when the whole place filled with heavy smoke. We attempted to alert the rest of the crew, but only found Miner #3 lying next to his loader in the face area of drift S-16. When we tried to revive him, he was stone cold dead. It was too hard to see in the thick black smoke, so we returned here to drift S-14 and barricaded. For a while, smoke was coming under the barricade, so we tightened the curtain and piled dirt around the bottom. Now, the air in here seems to be O.K. There is a solid face behind us. We are tired, but feeling O.K. Please get us out of here!"*

The team cannot open the barricade due to the dangerous gas concentrations in the vicinity. The team will instruct Miner #4 and Miner #5 to stay inside the barricade and wait. They will return and get them out as soon as possible. The captain must D&I the barricade before leaving the area.

Day 1 - Solution Map 4



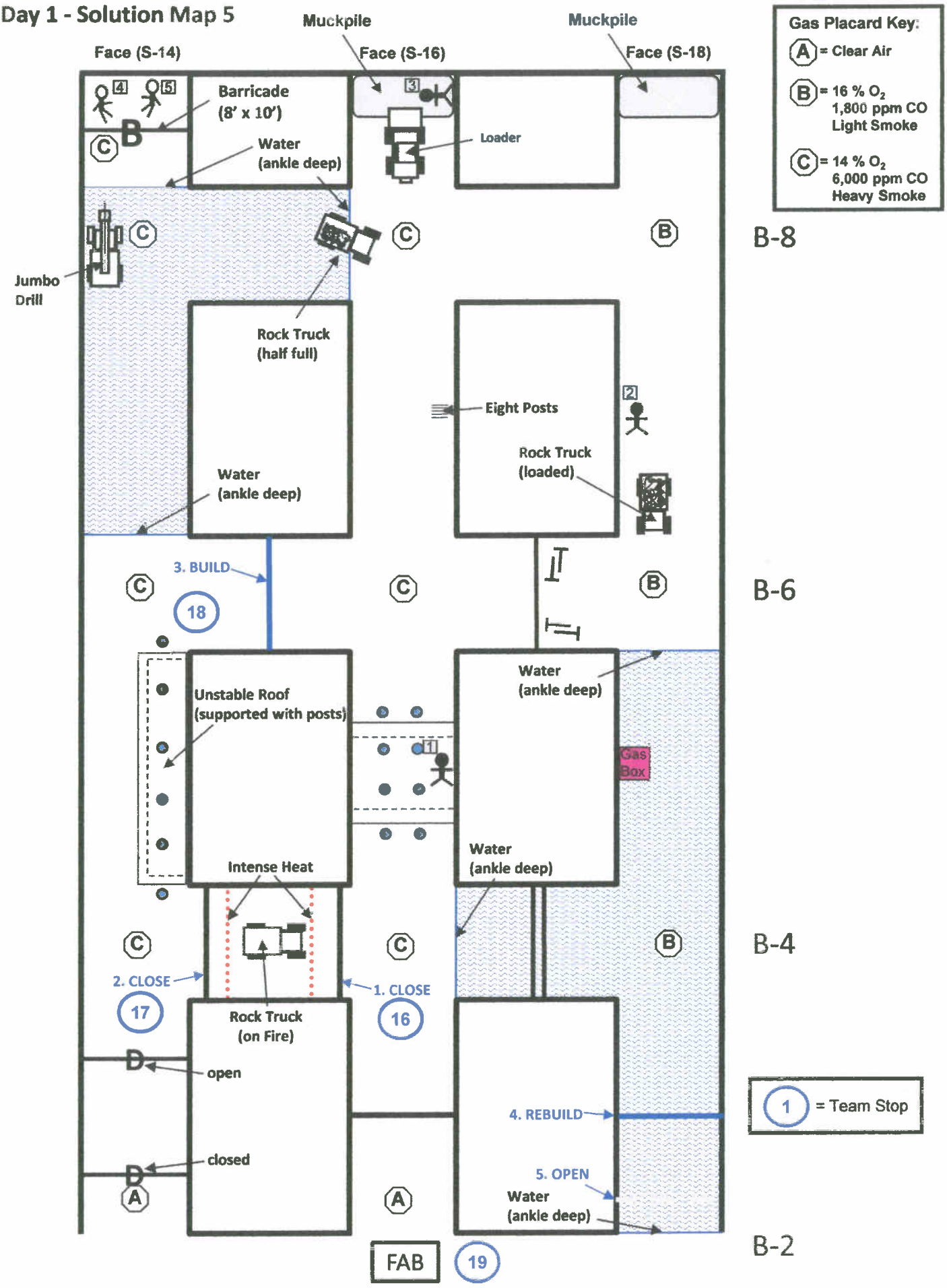
Team Stop No. 14

Now, the team can return through crosscut B-8 to drift S-16. When they reach the intersection, they can turn and advance toward the face area. The team will find a muckpile stretching rib-to-rib and extending four feet outby the face. They will also find the fifth missing miner (Miner #3) lying on the muckpile. The miner is unresponsive. The team captain must perform necessary roof or back checks over the miner. After a primary assessment, the #1 Judge will hand the team member a placard which reads: **"The miner exhibits no vital signs. The miner is dead."** The captain must D&I the location of the body. At the face, the captain can perform roof or back checks, and the team will conduct necessary gas checks. The team will find that the gas concentrations have not changed from their previous location. The captain can traverse the muckpile to D&I the face as their furthest point of advance in this direction.

Team Stop No. 15

The team can now advance into crosscut B-8 toward drift S-18. When they reach the intersection, they can turn and stretch to explore the face area. They will find a muckpile stretching rib-to-rib and extending four feet outby the face. The captain can perform roof or back checks, and the team will conduct necessary gas checks. The team will find that the gas concentrations have not changed from their previous measurements at the intersection of drift S-18 and crosscut B-8 (light smoke, 16% O_2, and 1,800 ppm CO). The captain can traverse the muckpile to D&I the face as their furthest point of advance in this direction.

Day 1 - Solution Map 5



Note: Team Stop Nos. 16 - 19 (see Solution Map 5)

The team has now completed the exploration of the entire South Panel and found all five missing miners, but they must re-ventilate in order to bring the two survivors (located behind the barricade) to the fresh air base.

In order to do this, a ventilation change must be made to move the high concentrations of CO from the panel, including the area directly in front of the barricade in drift S-14. Now, the team must propose to ventilate the mine with fresh air to remove toxic gas concentrations, so that this area can be safely entered. The team must confer with the mine manager through their fresh air base coordinator by using their communication system, or by returning to the fresh air base. In either case, they must explain the necessary ventilation changes prior to implementing them. They outline the following changes to the mine manager:

1) Close the fire seal regulators in crosscut B-4 between drifts S-14 and S-16; and
2) Construct a temporary stopping in crosscut B-6 between drifts S-14 and S-16.

Once these changes are made, additional measures will need to be taken before fresh air can be introduced to the South Panel inby crosscut B-2. These will be addressed in the next section of this packet.

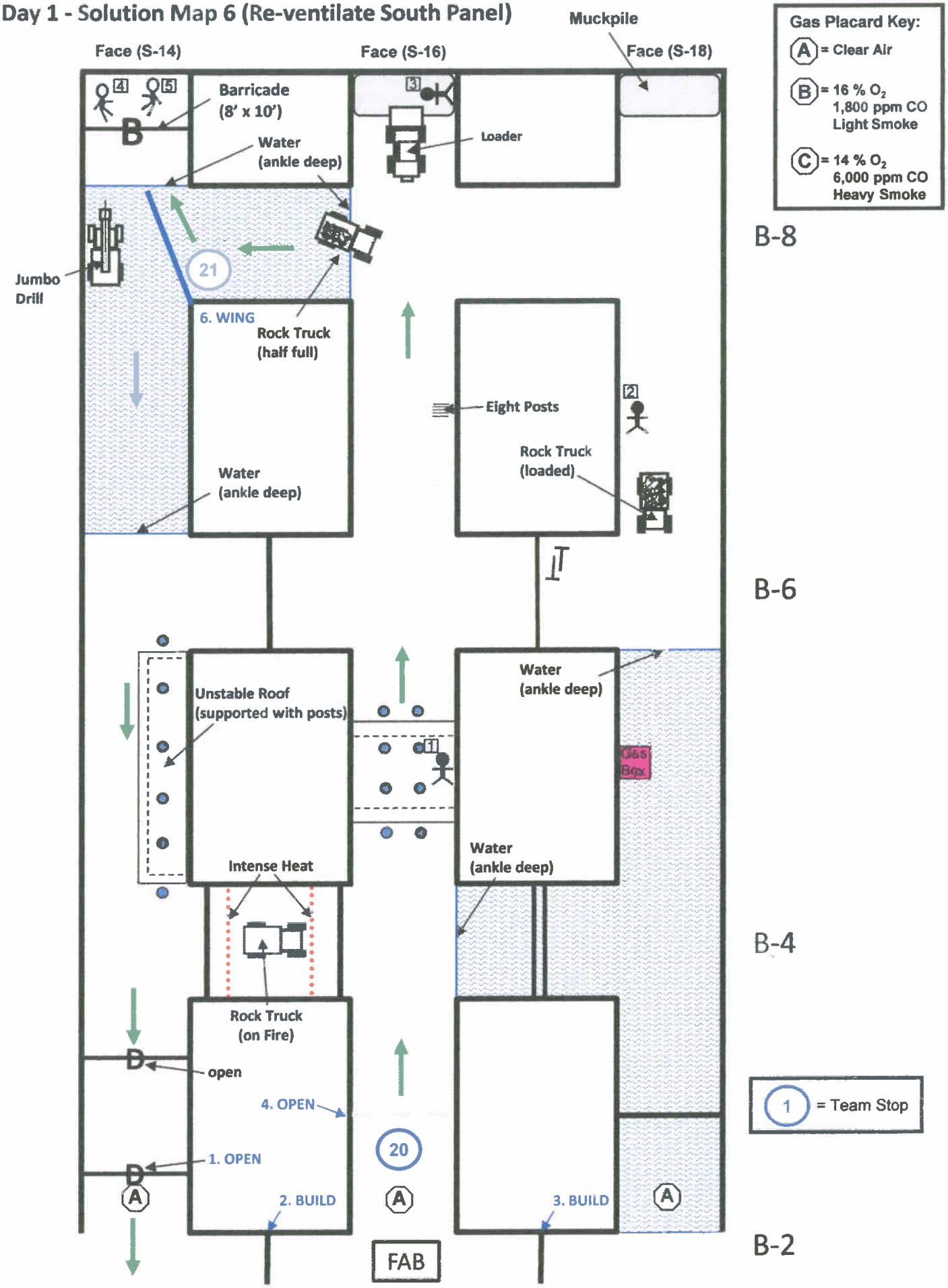
Team Stop No. 16
The team can advance to drift S-16. Then, they can travel to crosscut B-4 and close the regulator in the fire seal.

Team Stop No. 17
The team can retreat to crosscut B-6 and advance to the intersection of drift S-14 and crosscut B-4. Once there, they can close the regulator in the fire seal in crosscut B-4 between drifts S-14 and S-16.

Team Stop No. 18
The team can retreat to crosscut B-6 and and erect a temporary stopping between drifts S-14 and S-16.

Team Stop No. 19
Now that they have completed the preliminary construction activities listed above, they can exit the mine. In order to avoid making an unintentional air change, the team can rebuild the temporary stopping erected by the previous team and open the one that they had previously erected to gain access to crosscut B-2. Then, they can return to the fresh airbase.

Day 1 - Solution Map 6 (Re-ventilate South Panel)



Note: Team Stop Nos. 20 - 21 (see Solution Map 6 (Re-ventilate South Panel))

Now that the preparatory changes have been made, the team must confer with the mine manager and explain the necessary ventilation changes prior to implementing them. They outline the following changes to restore ventilation to the South Panel:

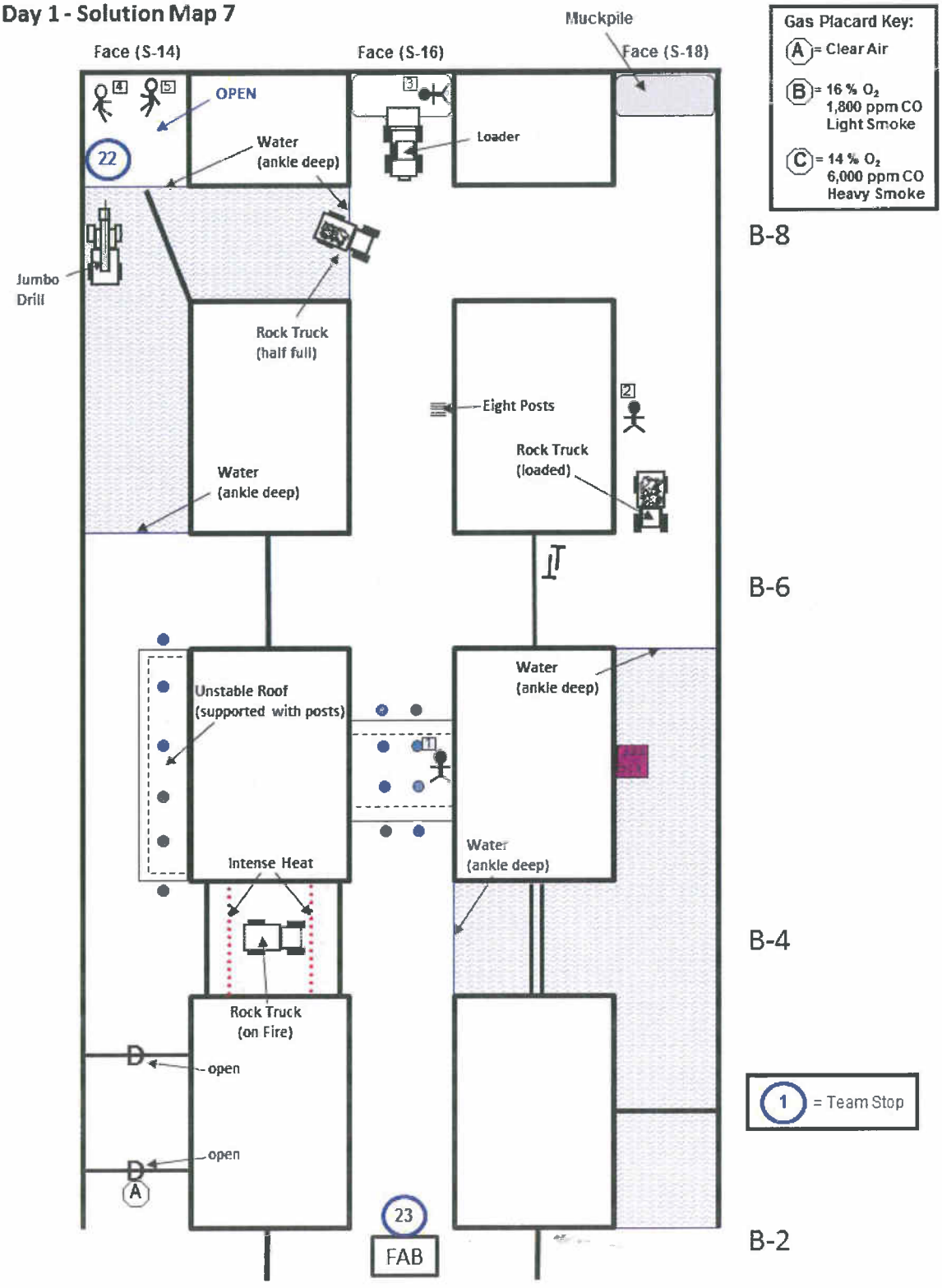
1) Open both airlock doors in drift S-14;
2) Build a temporary stopping in crosscut B-2 between drifts S-14 and S-16;
3) Build a temporary stopping in crosscut B-2 between drifts S-16 and S-18; and
4) Open the temporary stopping in drift S-16 (erected by the previous mine rescue team.

Team Stop No. 20
If the itemized actions are taken as shown on **Solution Map 6**, smoke will clear drifts S-14 and S-16. The field attendants will promptly flip the two-sided placards to show "Clear Air" (reverse side of each gas placard).

Note: If any of these actions are omitted, then the placards and the corresponding gas concentrations will not clear.

Team Stop No. 21
The team can then advance to the barricade in the face of Drift S-14, checking the air as they go to ensure that the air has cleared. At this point, the placard near the barricade will not change and the barricade cannot be opened. In order to flush the smoke and toxic gas concentrations from this area, the team must erect a wing curtain in crosscut B-8 to direct airflow toward the barricade. Afterward, the placard will revert to "clear air."

Day 1 - Solution Map 7



Note: Team Stop Nos. 22 - 23 (see Solution Map 7)

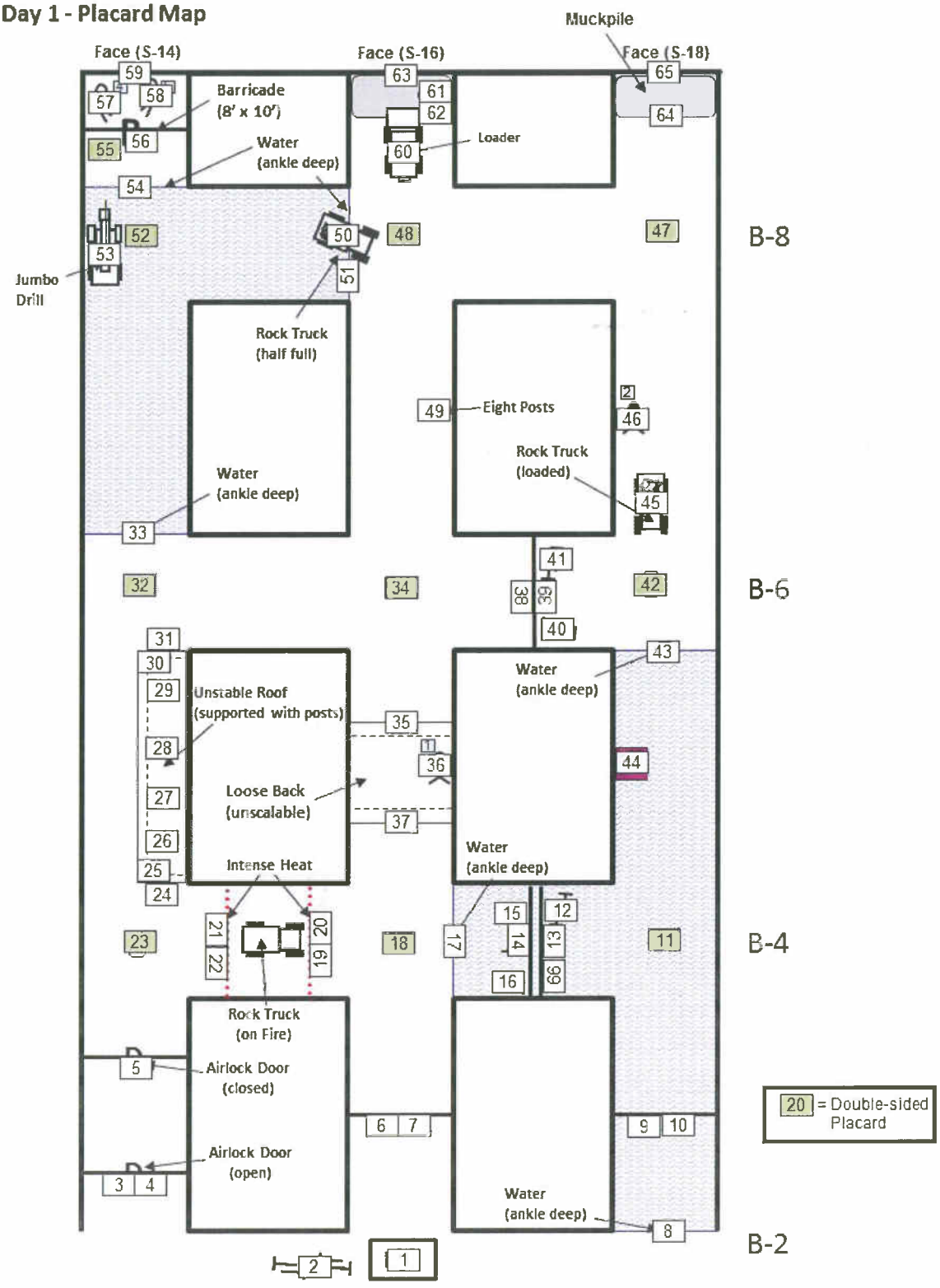
Team Stop No. 22
Now, the team can open the barricade. Inside they will find Miner #4 and Miner #5. Team members can assess their condition and find that they are not injured and able to walk out with the team. Before leaving the area, the captain can perform back checks, and the team can conduct necessary gas tests. The captain must D&I the face as the team's furthest point of advance in this direction as well as the location of the miners.

Team Stop No. 23
The team will escort Miner #4 and Miner #5 to the fresh air base. Since the ventilation has been restored and the air is clear, the survivors will not need to wear apparatuses. Once at the fresh air base, the team can arrange for any follow-up medical treatment. Afterward, the captain can state that the team has completed their mission. That is, they have explored all accessible areas of the mine, sealed the fire, located the five missing miners, and brought two of them out alive.

Note: To ensure the safety of the survivors, all areas that have been cleared of smoke or toxic or dangerous gases must be gas tested along the route that they had travel.

***** THE END *****

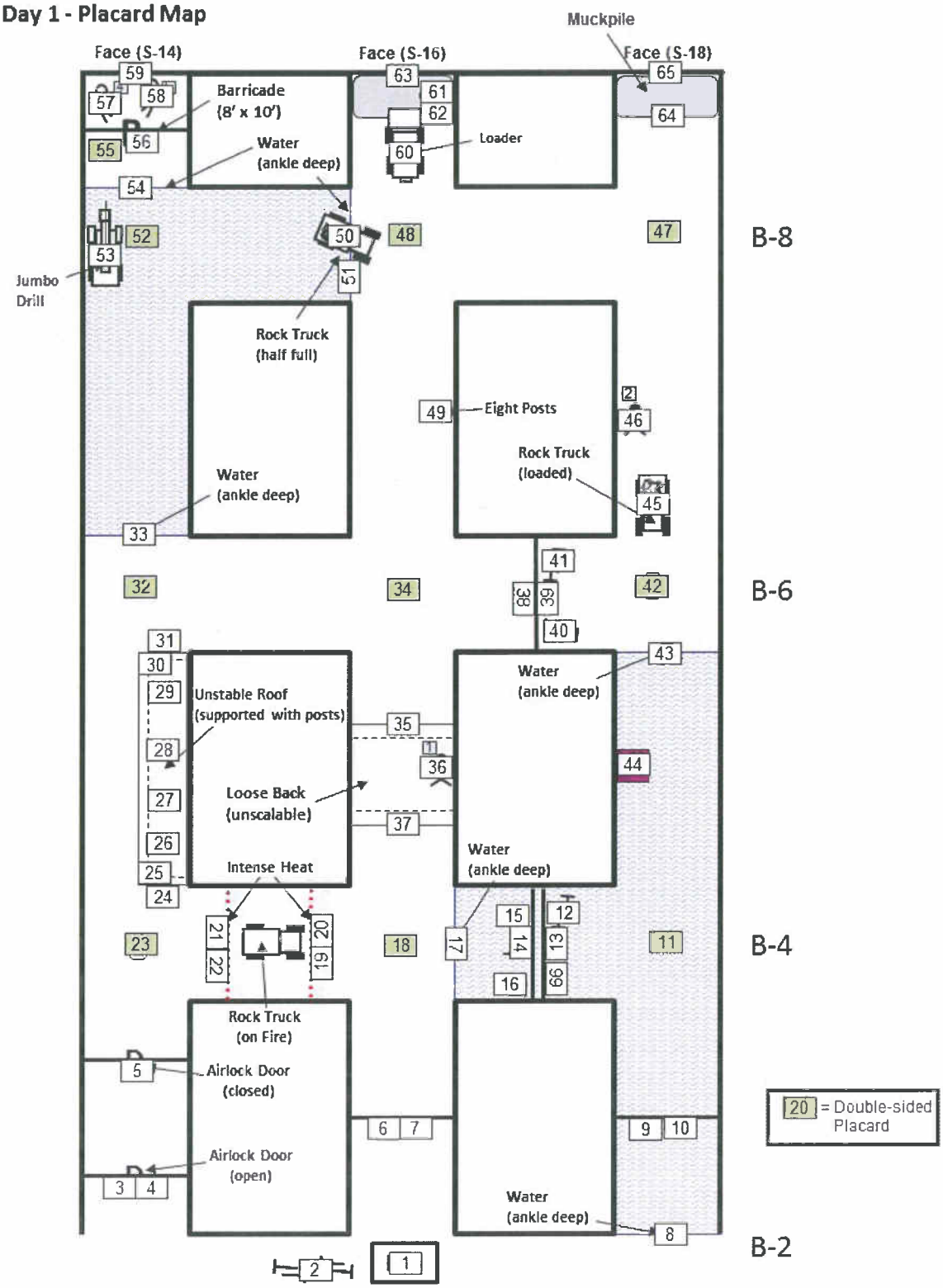
Day 1 - Placard Map



Placard Key

1. Fresh Air Base
2. Brattice Material (two sets)
3. Clear Air
4. Airlock Door (open)
5. Airlock Door (closed)
6. Clear Air
7. Temporary Stopping
8. Water (ankle deep)
9. Clear Air
10. Temporary Stopping
11. 16 % O_2
    1,800 ppm CO
    Light Smoke
12. Brattice Material (one set)
13. Permanent Stopping
14. Permanent Stopping
15. Brattice Material (one set)
16. Brattice Material (one set)
17. Water (ankle deep)
18. 14 % O_2
    6,000 ppm Co
    Heavy Smoke
19. Intense Heat
20. Rock Truck (on fire)
21. Intense Heat
22. Rock Truck (on fire)
23. 14 % O_2
    6,000 ppm CO
    Heavy Smoke
24. Post
25. Unstable Roof
    (supported with posts)
26. Post
27. Post
28. Post
29. Post
30. Unstable Roof
    (supported with posts)
31. Post
32. 14 % O_2
    6,000 ppm CO
    Heavy Smoke
33. Water (ankle deep)
34. 14 % O_2
    6,000 ppm CO
    Heavy Smoke
35. Loose Back (unscalable)
36. Miner #1
37. Loose Back (unscalable)
38. Temporary Stopping

Day 1 - Placard Map



39. Temporary Stopping

40. Brattice Material (one set)

41. Brattice Material (one set)

42. 16 % O_2
    1,800 ppm CO
    Light Smoke

43. Water (ankle deep)

44. Gas Box Test Station

45. Rock Truck (loaded)

46. Miner #2

47. 16 % O_2
    1,800 ppm CO
    Light Smoke

48. 14 % O_2
    6,000 ppm CO
    Heavy Smoke

49. Eight Posts

50. Rock truck (half full)

51. Water (ankle deep)

52. 14 % O_2
    6,000 ppm CO
    Heavy Smoke

53. Jumbo Drill

54. Water (ankle deep)

55. 14 % O_2
    6,000 ppm CO
    Heavy Smoke

56. Barricade (8' by 10')

57. Miner #4

58. Miner #5

59. Face (S-14)

60. Loader

61. Miner #3

62. Muckpile (can be traversed)

63. Face (S-16)

64. Muckpile (can be traversed)

65. Face (S-18)

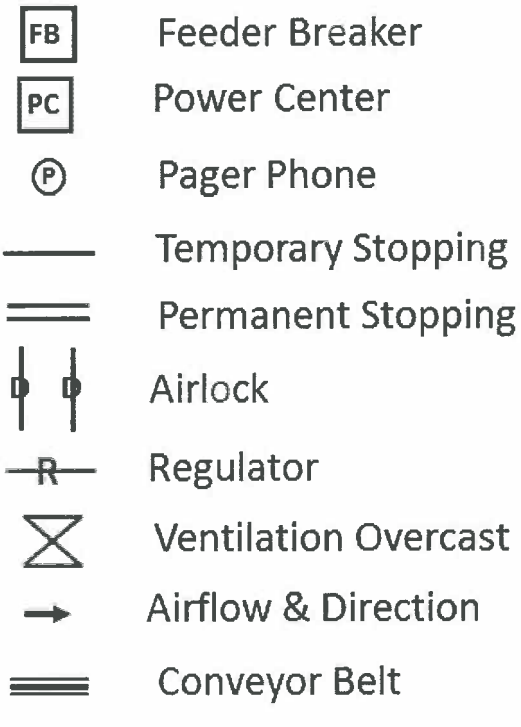
66. Water (ankle deep)

Note:
Nine gas placards (11, 18, 23, 32, 34, 42, 47, 48, and 52) are double-sided. The backside will indicate "Clear Air" when changes have been made by the team to successfully ventilate these areas.

A tenth gas placard (55) is also double-sided and the backside indicates "Clear Air." However, this placard will not be turned over until the team erects a "wing" curtain to divert fresh air toward the barricade and clear away the toxic contaminants.

Bluegrass Mining Inc.
Blue Stallion Mine
I.D. No. 15-02014
Lexington, KY

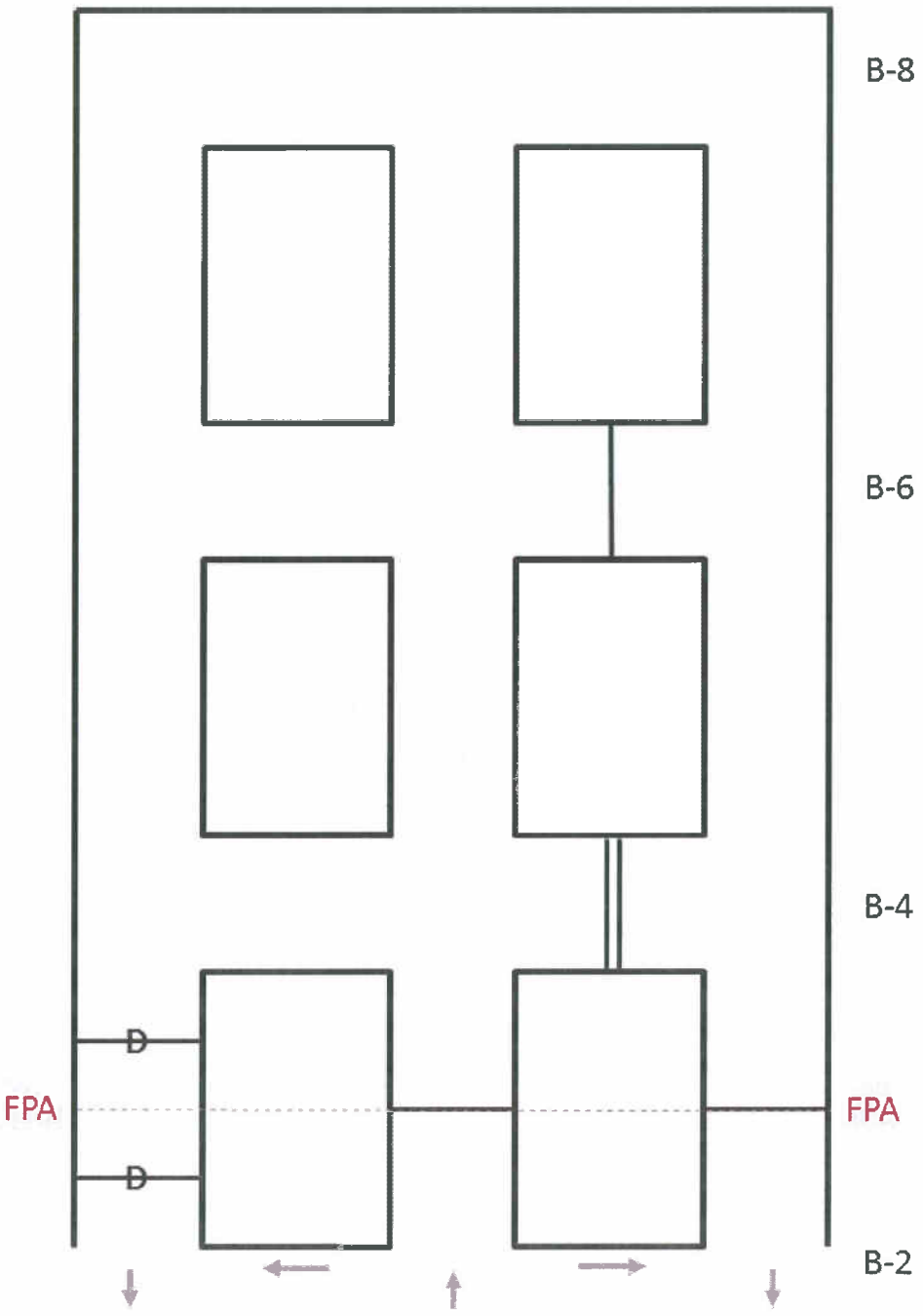
Map Legend:



Updated July 21, 2014
Approx. Scale 1 in . = 10 ft.

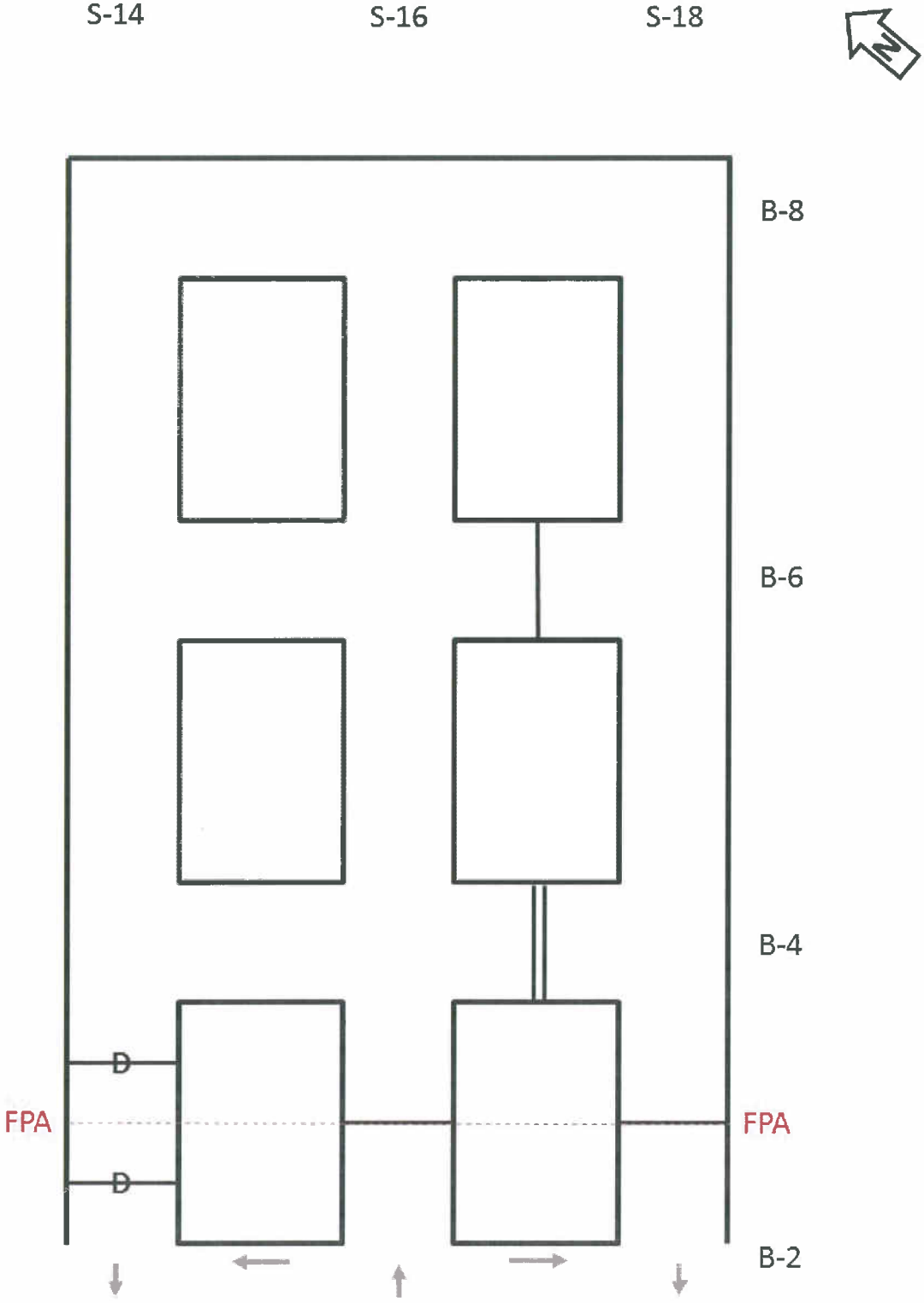
Day 1 - Team Map

S-14 S-16 S-18



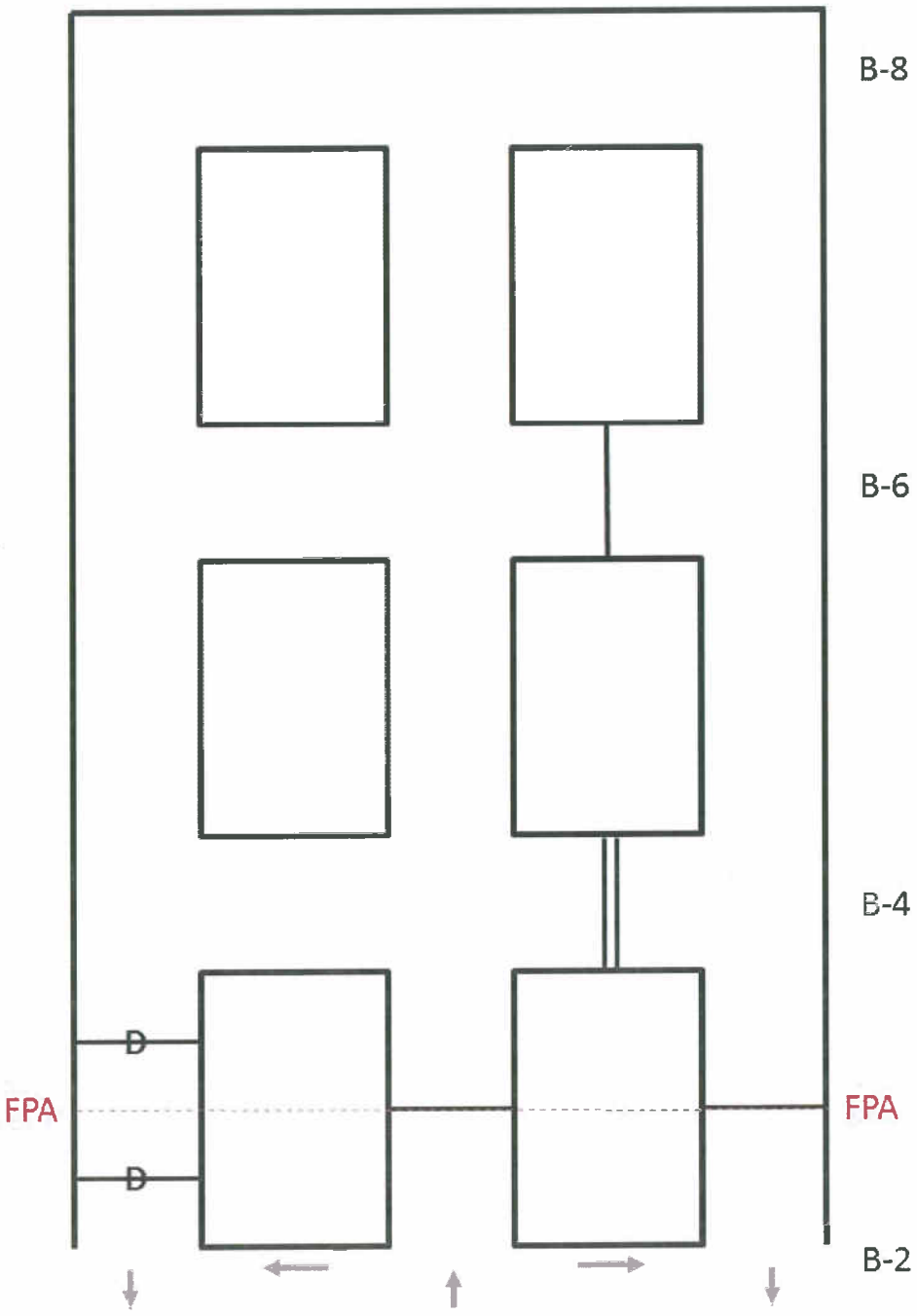
Day 1 – Fresh Air Base Map

S-14 S-16 S-18



Day 1 – Fresh Air Base Map (Alternate – Do not score)

S-14 S-16 S-18



Day 1 – Field Construction Map