



2011

**NATIONAL MINE RESCUE  
COMPETITION**

**Day 1 Contest Problem**

Greater Columbus Convention Center  
October 3 - 6, 2011

**SUPERINTENDENT'S STATEMENT**  
**National Mine Rescue Contest**  
**October 4, 2011**

Hello. My name is \_\_\_\_\_. I am the superintendent of the Columbus Mining Company, Ohio No. 1 Mine. Thank you for coming to help us.

This is a three section mine. You are located at the fresh air base at the mouth of the 3 North Section. This section is driving three entries toward another one of our mines. We plan to cut the mines together to provide shorter travel time for men and supplies. We believe we are still several hundred feet apart.

Last night, a four man maintenance crew went to this section to complete repair work on the continuous miner and to get the section ready to run this morning. At about five am, the maintenance crew foreman called out from the section and said they had a power cable smoking on the section and asked the outside man to get the power to the section shut off. The outside man got an outby foreman to knock the power at the section splitter. The outside man tried to get back in touch with the section, but could not raise anyone. He called the other two sections and all outby personnel and had them come outside, just in case. He called me and I called federal and state authorities.

We sent our two company mine rescue teams inside to see what they could find out. We also called for other mine rescue teams. When our company teams got to the mouth of this section, they ran into bad roof and could not advance any further without roof support. They set up this fresh air base. They also established power back to the pump switch that is in the fresh air base, just in case you need it. There is not any power inby the fresh air base at this time.

This mine has experienced some problems with water. We have had a lot of bad roof, and this mine is on a 5 day spot for methane.

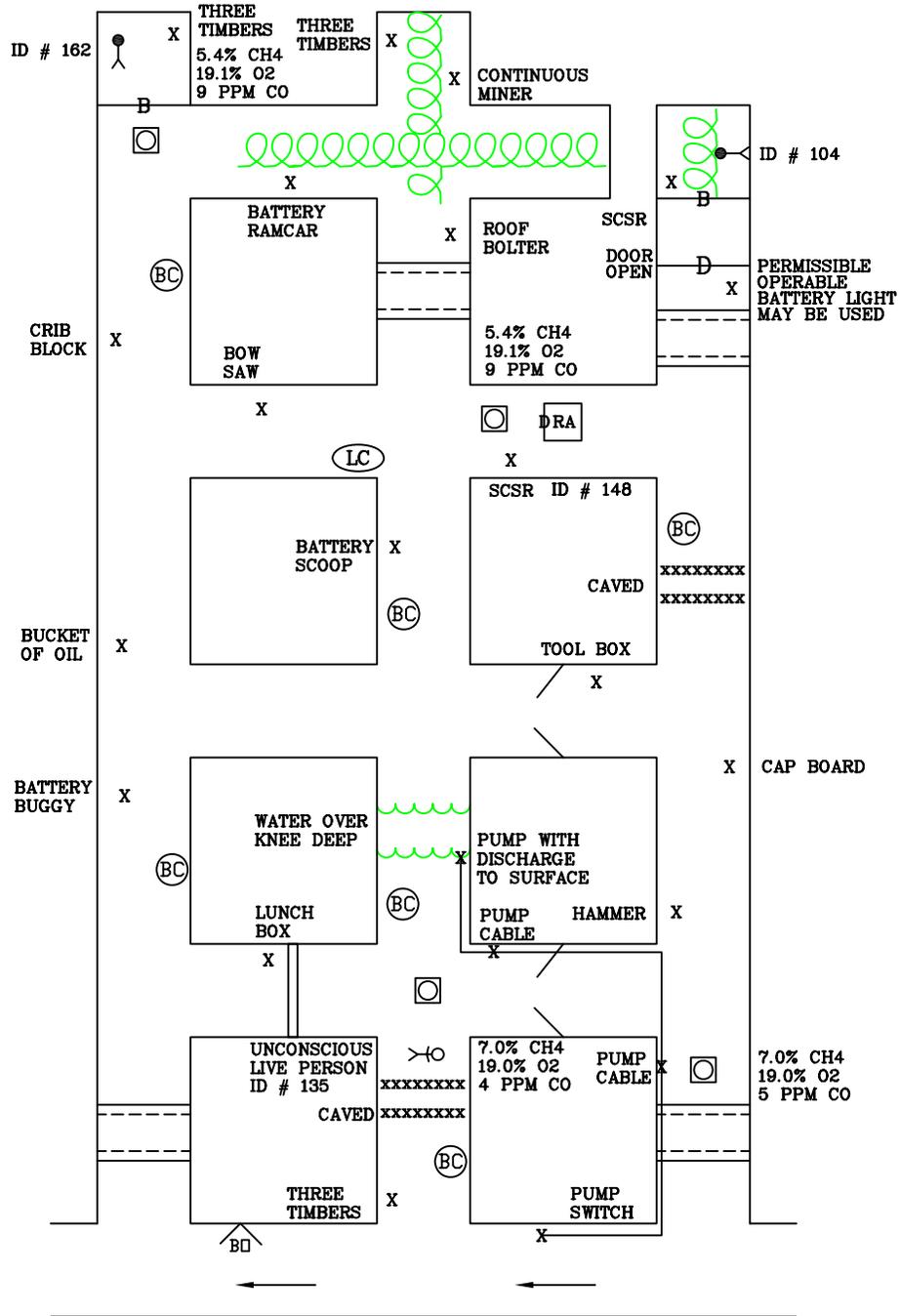
The mine fan is exhausting, and cannot be stopped, stalled, or reversed. The fan is being sampled and monitored. There is a competent lifeline person to assist you as you explore. The mine maps are up-to-date. There are back-up teams available. All outby areas have been explored.

As you explore, the captain must turn over every face-down placard before he/she passes that placard.

This is all the information I have for you at this time. Thank you for your help, and good luck!

# NMR DAY #1

Scale: 1 inch = 20 feet



# **PROBLEM**

**ACCOUNT FOR ALL MISSING MINERS  
AND BRING SURVIVORS TO THE FRESH  
AIR BASE**

**EXPLORE ALL AREAS OF THE MINE IF  
SAFE TO DO SO**

**TEAM CAN ONLY CARRY THREE SETS OF  
BUILDING MATERIAL AT A TIME**

**CALL THE ID NUMBER OF THE  
SURVIVORS TO THE BRIEFING OFFICER  
BEFORE BRINGING THEM TO FRESH AIR  
BASE**

**EQUIPMENT AND MATERIALS  
NECESSARY TO WORK THE PROBLEM  
WILL BE PROVIDED ON THE FIELD AND  
MUST BE USED IF NEEDED BY TEAM**

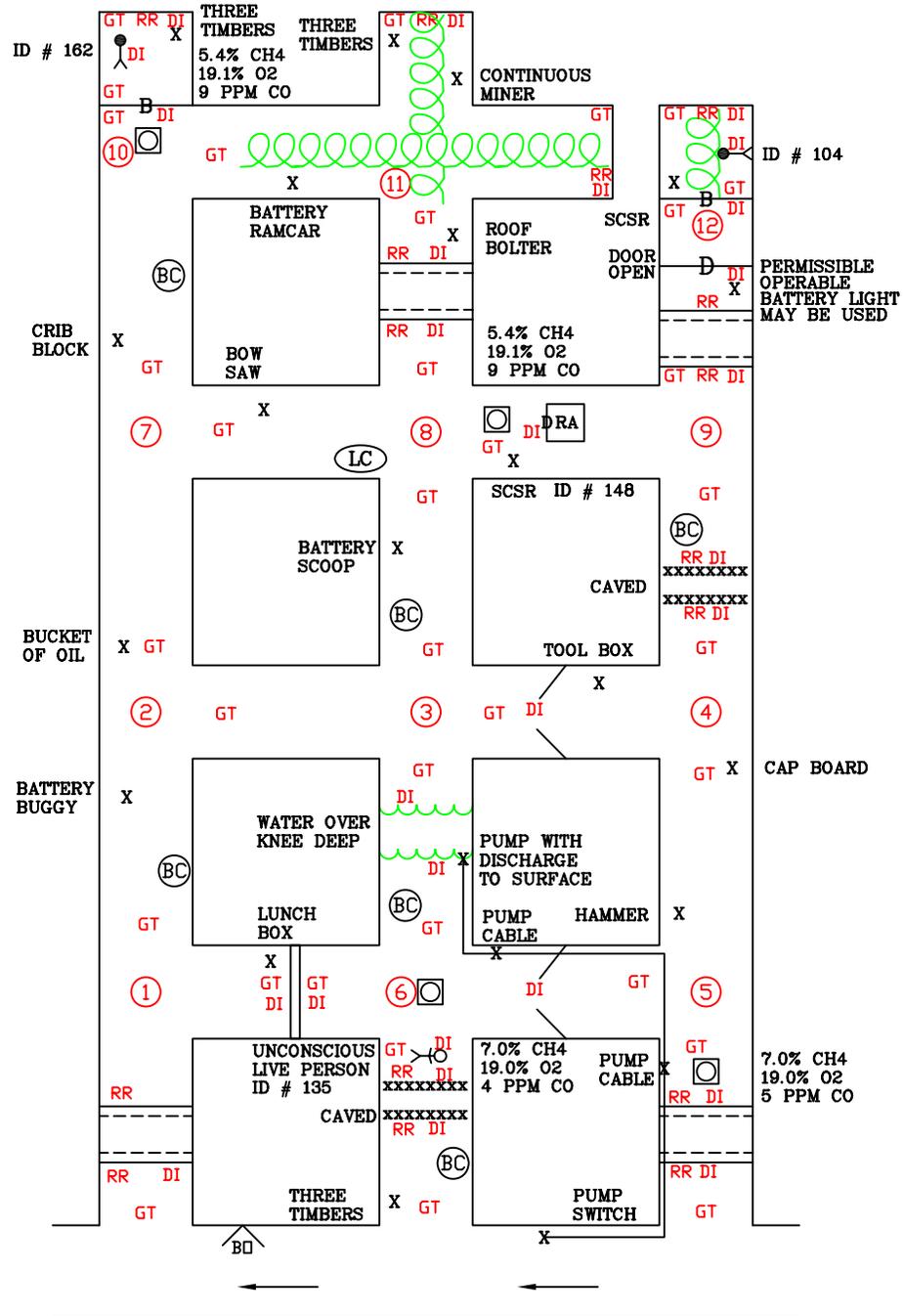
**YOUR TEAM HAS 70 MINUTES TO WORK  
BEFORE YOU ARE REPLACED BY A  
BACKUP TEAM**

**REFUGE ALTERNATIVE  
STATEMENT**

**GET ME OUT OF HERE!!  
HURRY!!**

# TEAM STOP (Opt.1)

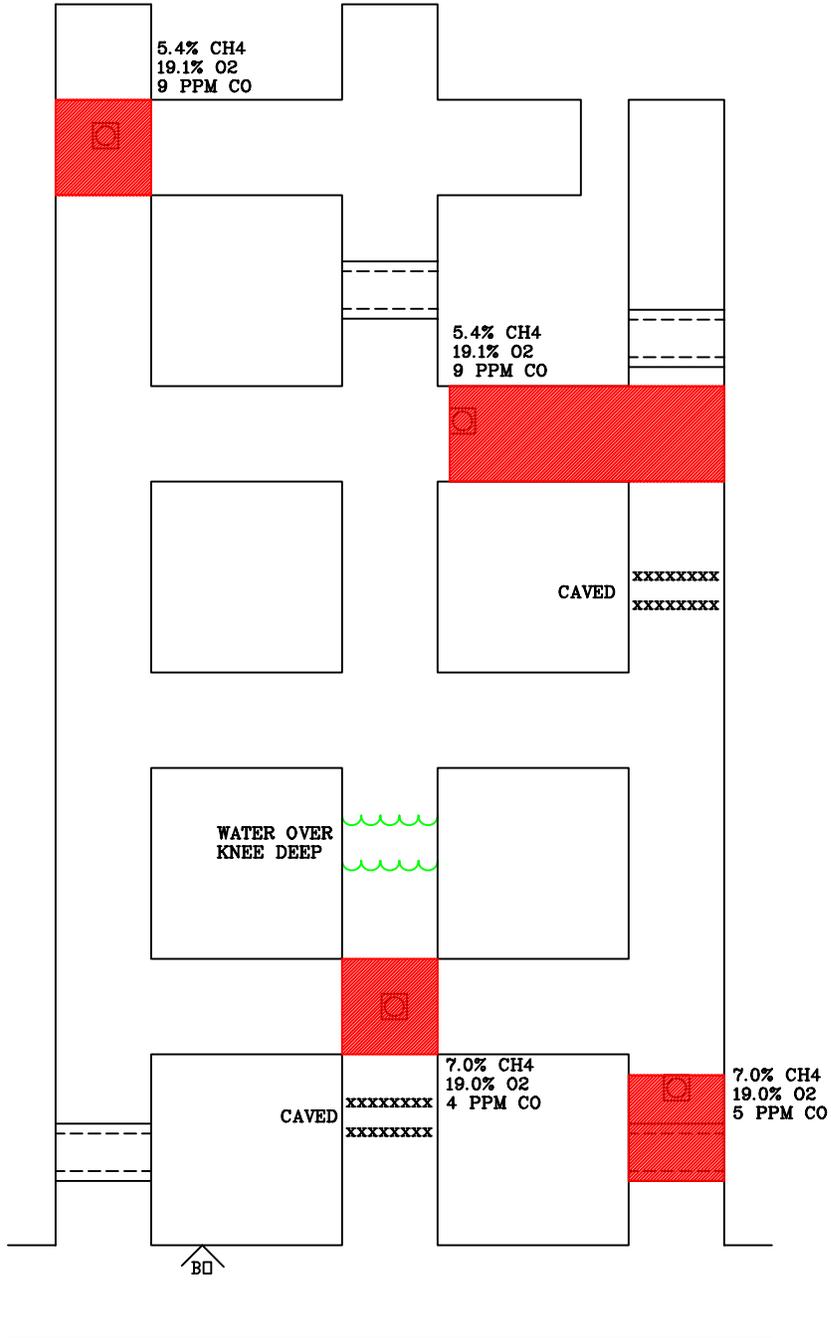
Scale: 1 inch = 20 feet



# National Mine Rescue Contest

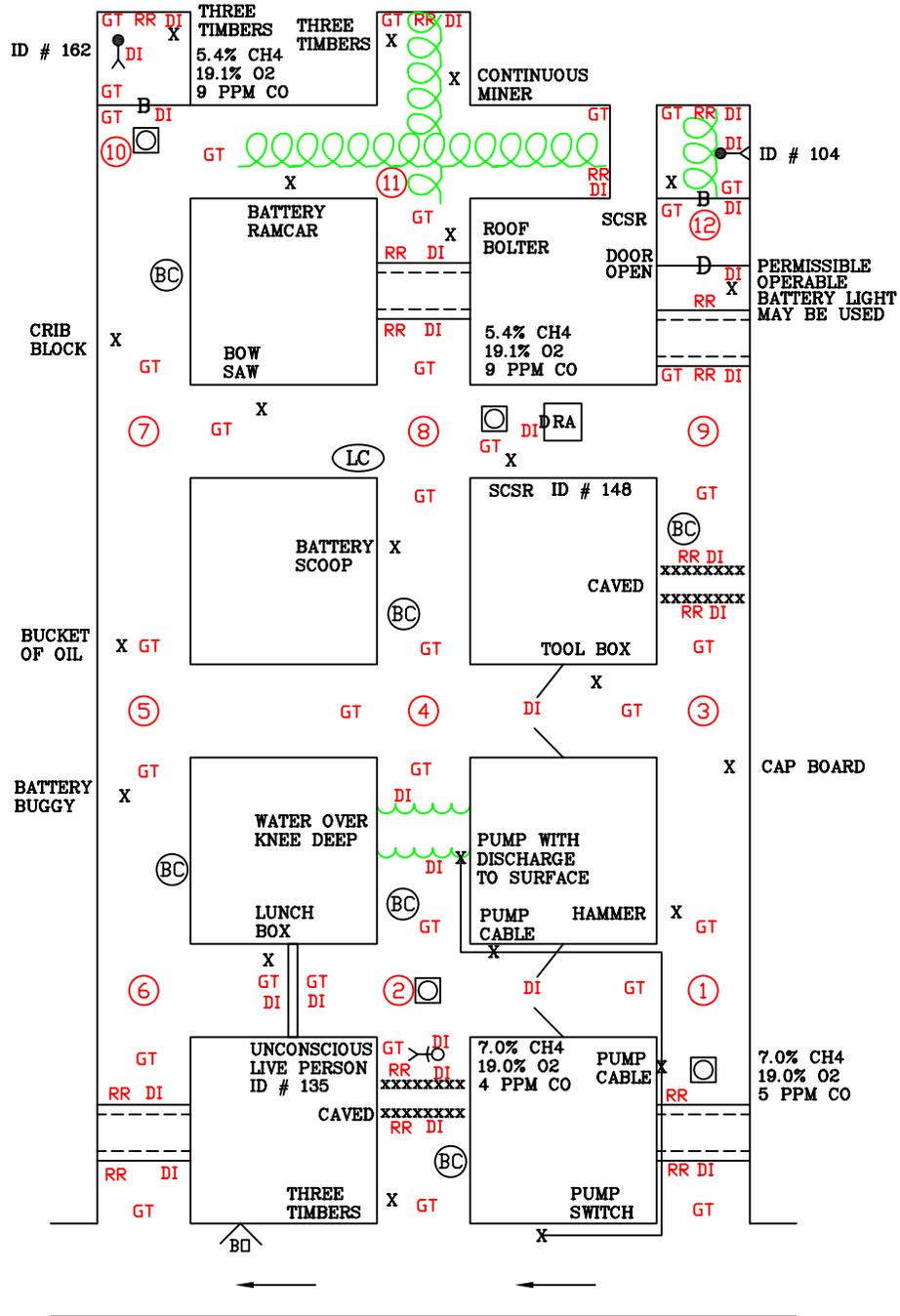
## Day #1 Problem (Extent of Gases)

### OPTION 1

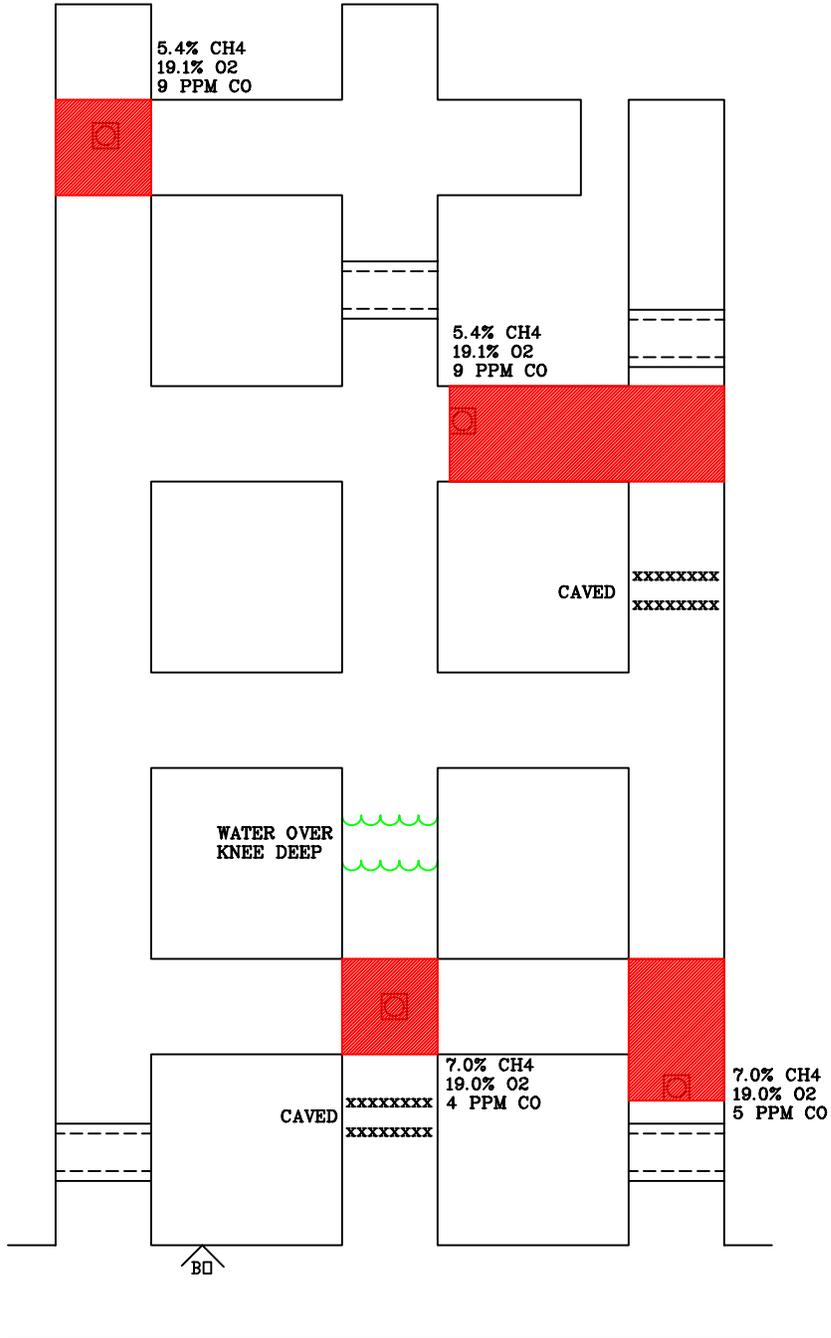


# TEAM STOP (Opt.2)

Scale: 1 inch = 20 feet



National Mine Rescue Contest  
Day #1 Problem (Extent of Gases)  
OPTION 2



**2011 National Mine Rescue Contest  
October 4, 2011  
Judges' Briefing**

**Note: The captain must turn over all face-down placards before he/she passes them. Discount the team 2 points under Rule 50 for each placard not turned over as described.**

**After the captain starts the clock, team will explore all three openings to the section. Team will find an area of unsafe roof in the # 1 entry. The captain must do a Roof and Rib test (RR) at the unsafe roof, and must Date and Initial (DI) at the unsafe roof. A Gas Test (GT) must be made inby the opening.**

**Team will find a caved area in the # 2 entry. The captain must do a RR test at the caved area, and must DI at the caved area. A GT must be made inby the opening. The team will find three timbers in this opening.**

**Team will find an area of unsafe roof in the # 3 entry. The captain must do a RR test at the unsafe roof, and must DI at the unsafe roof. A GT must be made inby the opening.**

**At this point, the teams will have two options. The areas of unsafe roof in the # 1 and # 3 entries are equal, so three timbers will get through either area. Once inby the unsafe roof, teams must explore the mine systematically based on the conditions found.**

**OPTION # 1 (ADVANCE IN # 1 ENTRY)**

**Since the unsafe roof has already been tested on the outby side, the captain will timber through the unsafe roof. On the inby side, the captain must conduct a RR test before any other team member enters the area. Note: If the entire team enters the mine and gives the signal to "stop" outby the unsafe roof, the 50 foot apparatus check must be made before leaving this team stop.**

**Team Stop # 1**

**The team will advance up to the first intersection. The team will find a permanent stopping in the crosscut toward the # 2 entry. The captain must DI at the permanent stopping. A GT must be made at the permanent stopping and in the entry inby the intersection. The team must do the 50 foot apparatus check before leaving this team stop, unless they did the check outby the unsafe roof.**

### **Team Stop # 2**

The team will advance in the # 1 entry to the intersection in the second line of crosscuts. The teams must make a GT in the entry inby the intersection and the crosscut toward the # 2 entry.

### **Team Stop # 3**

The team will advance across to the intersection in the # 2 entry in the second line of crosscuts. The team will find an area of water over knee deep in the entry outby the intersection. The captain must DI at the water over knee deep. A GT must be made in the openings inby, outby, and to the right of the intersection. The captain must DI at the partially destroyed temporary stopping in the crosscut toward the # 3 entry.

### **Team Stop # 4**

The team will advance across to the intersection in the # 3 entry in the second line of crosscuts. The team will find a caved area in the entry inby the intersection. The captain must do a RR test at the caved area, and must DI at the caved area. A GT must be made in the openings inby and outby the intersection.

### **Team Stop # 5**

The team will travel outby to the intersection in the # 3 entry in the first line of crosscuts to tie behind them. The team will find an explosive mixture and irrespirable atmosphere and the back side of the unsafe roof in the entry outby the intersection. The captain must do a RR test at the unsafe roof, and must DI at the unsafe roof. The team will find a partially destroyed temporary stopping in the crosscut toward the # 2 entry. The captain must DI at this temporary stopping. A GT must be made in the openings outby and to the left of the intersection.

### **Team Stop # 6**

The team will tie across to the intersection in the # 2 entry. The team will find an explosive mixture and irrespirable atmosphere in the intersection, the back side of the permanent stopping in the crosscut toward the # 1 entry, the backside of the water over knee deep in the entry inby the intersection (there is also a pump set at the water), and an unconscious live person and the back side of the caved area in the entry outby the intersection. The captain must stop and touch the unconscious live person before any team member passes the patient, and the captain must DI at the patient. The captain or any other team member can perform the initial assessment of the patient. Since there is an irrespirable atmosphere in the intersection, the patient must be protected by a breathing apparatus. The team must load the patient onto a stretcher before bringing him/her to the FAB. The team must call out the survivor's ID number to the Briefing Officer (BO) before bringing the patient to the fresh air

base. The team may perform the following functions at this team stop before bringing the patient out, or they must come back and do them before advancing anywhere else in the mine. The captain must DI at the back side of the permanent stopping and a GT must be made at the permanent stopping. The captain must DI at the backside of the water over knee deep, and a GT must be made in the opening inby the intersection. The captain must do a RR test at the caved area and must DI at the caved area. A GT must be made in the opening outby the intersection.

#### **OPTION # 2 (ADVANCE IN # 3 ENTRY)**

Since the unsafe roof has already been tested on the outby side, the captain will timber through the unsafe roof. On the inby side, the captain must conduct a RR test before any other team member enters the area. Note: If the entire team enters the mine and gives the signal to "stop" outby the unsafe roof, the 50 foot apparatus check must be made before leaving this team stop. The team will find an explosive mixture and irrespirable atmosphere in the entry inby the unsafe roof.

#### **Team Stop # 1**

The team will advance to the intersection in the first line of crosscuts inby the FAB. The team will make a GT in the openings inby and to the left of the intersection. The team will find a partially destroyed temporary stopping in the crosscut toward the # 2 entry. The captain must DI at this temporary stopping.

#### **Team Stop # 2**

The team will tie across to the intersection in the # 2 entry. The team will find an explosive mixture and irrespirable atmosphere in the intersection, a permanent stopping in the crosscut toward the # 1 entry, water over knee deep in the entry inby the intersection (there is also a pump set at the water), and an unconscious live person and the back side of the caved area in the entry outby the intersection. The captain must stop and touch the unconscious live person before any team member passes the patient, and the captain must DI at the patient. The captain or any other team member can perform the initial assessment of the patient. Since there is an irrespirable atmosphere in the intersection, the patient must be protected by a breathing apparatus. The team must load the patient onto a stretcher before bringing him/her to the FAB. The team must call out the survivor's ID number to the Briefing Officer (BO) before bringing the patient to the fresh air base. The team may perform the following functions at this team stop before bringing the patient out, or they must come back and do them before advancing anywhere else in the mine. The captain must DI at the permanent stopping and a GT must be made at the permanent stopping. The captain must DI at the water over knee deep, and a GT must be made in the opening inby the intersection. The captain must do a

RR test at the caved area and must DI at the caved area. A GT must be made in the opening outby the intersection.

#### **Team Stop # 3**

After the team brings the patient to the FAB, and if the team has already done all required RR tests, GTs, and DIs at the team stop where they found the patient, the team may advance in the # 3 entry to the second line of crosscuts inby the FAB. The team will find a caved area in the entry inby the intersection and a partially destroyed temporary stopping in the crosscut toward the # 2 entry. The captain must do a RR test at the caved area and must DI at the caved area and the partially destroyed temporary stopping. A GT must be made in the openings inby and to the left of the intersection.

#### **Team Stop # 4**

The team will tie across the second line of crosscuts to the intersection in the # 2 entry. The team will find the backside of the water over knee deep in the entry outby the intersection. The captain must DI at the water, and a GT must be made in the openings inby, outby, and to the left of the intersection.

#### **Team Stop # 5**

The team will tie across to the intersection in the # 1 entry. The team will take a GT in the openings inby and outby the intersection.

#### **Team Stop # 6**

The team will tie behind in the # 1 entry to the intersection in the first line of crosscuts. The team will find the backside of the permanent stopping in the crosscut toward the # 2 entry, and the backside of the unsafe roof in the entry outby the intersection. The captain must do a RR test at the unsafe roof, and must DI at the unsafe roof. The captain must DI at the permanent stopping, and a GT must be made at the permanent stopping. A GT must also be made in the entry outby the intersection.

**(NOTE: TEAM STOPS 8 AND 9 CAN BE MADE BEFORE TEAM STOP 7. JUDGES SHOULD OBSERVE DIRECTION OF TEAM TRAVEL)**

#### **Team Stop # 7**

The team will probably advance in the # 1 entry to the intersection in the third line of crosscuts. The team will take a GT in the openings inby and to the right of the intersection. The team will find a line curtain in the crosscut to the right.

#### **Team Stop # 8**

The team will tie across to the intersection in the # 2 entry in the third line of crosscuts. The team will find an area of unsafe roof in the entry inby the intersection, and an explosive mixture and irrespirable atmosphere and a

refuge alternative (RA) in the crosscut toward the # 3 entry. The captain must do a RR test at the unsafe roof, and must DI at the unsafe roof. The captain must also DI the door of the RA. A GT must be made in the openings inby, outby, and to the right of the intersection. The patient inside the RA will read a statement when the captain breaks the imaginary rib line to the crosscut. Because of the irrespirable atmosphere, the team cannot open the RA to remove the patient at this time. The team must continue to explore.

#### **Team Stop # 9**

The team will tie across to the intersection in the # 3 entry in the third line of crosscuts. The team will find an area of unsafe roof in the entry inby the intersection, and the back side of the caved area in the entry outby the intersection. The captain must do a RR test at the unsafe roof and the caved area, and must DI at the unsafe roof and the caved area. A GT must be made in the openings inby and outby the intersection. Team still cannot ventilate the RA, so the team must continue to explore.

#### **Team Stop # 10**

The team must advance in the # 1 entry to the intersection in the fourth line of crosscuts inby the FAB. The team will find an explosive mixture and an irrespirable atmosphere in the intersection, a barricade on the imaginary rib line in the heading inby the intersection, and the beginning of smoke in the crosscut to the right of the intersection. If any team member goes into the smoke, the team must be on a life line or link line. There is a clear air separation between the explosive mixture and the smoke. There will be no response from behind the barricade. The captain must DI the barricade, and a GT must be made at the barricade and in the crosscut to the right of the intersection. Team must continue to explore.

#### **Team Stop # 11**

The team must tie across to the intersection in the # 2 entry in the fourth line of crosscuts. Team will be in smoke, so the team must use a life line. The team will find the end of smoke and the backside of the unsafe roof in the entry outby the intersection, a face inby the intersection, and a face in the crosscut to the right of the intersection. The captain must do a RR test at both faces and at the unsafe roof, and must DI at both faces and at the unsafe roof. A GT must be made at both faces and in the opening outby the intersection. The team will find three timbers at this team stop. The team now has the means to ventilate the RA.

#### **Ventilation # 1**

The team must pump the water over knee deep in the # 2 entry. The team must first clear the explosive mixtures in the intersection outby the water over knee deep and in the # 3 entry. The team must set timbers in the #1 or the # 3

entry, depending on which entry they chose to enter the mine. See Ventilation # 1 drawing. The team will make the appropriate builds. The last build should be the one in the FAB. After the explosive mixtures are cleared, the teams can start the pump. After five seconds, turn the placards over. After the pump is stopped, the water will remain pumped down.

#### **Ventilation # 2**

The team can now ventilate the RA. See Ventilation # 2 drawing. After the explosive mixture and irrespirable atmosphere is removed from in front of the RA, the captain can open the door and the patient can come out. The captain must touch the patient and DI at the patient. The captain or any team member can do the initial assessment. The patient can be brought out barefaced. The team must call out the survivor's ID number to the BO before starting out. The team will then bring the patient to the FAB.

#### **Ventilation # 3**

Teams can now ventilate the barricade to try to locate the other two missing miners. See ventilation # 3. If team moves smoke over the team, they must be on a life line or link line. After the barricade is cleared of the explosive mixture/irrespirable atmosphere, the team must airlock to enter the barricade. The team must build two airlocks, one in the entry outby the intersection, and the other in the crosscut to the right of the intersection. After the barricade is breached, the captain must take a GT inby the barricade before any other team member enter the area. The team will find a body, a face, and three timbers inside the barricade. The captain must stop and touch the body before any team member passes the body, and the captain must DI at the body. The captain must do a RR test at the face and DI at the face, and a GT must be made at the face.

#### **Team Stop # 12**

There is one miner still missing, and only one other area to explore. The team will take the three timbers from inside the barricade and travel back to the intersection in the # 3 entry in the third line of crosscuts. The captain will timber through the area of unsafe roof, and then will do a RR test on the backside of the unsafe roof before any other team member enters the area. The team will find a temporary stopping with a door open in the entry inby the unsafe roof. The team will find also find a barricade farther up the entry. The captain must DI at the temporary stopping and at the barricade. A GT must be made at the barricade. To reach the farthest depths of the entry inby the unsafe roof, the # 5 man must advance inby the intersection.

The team will also find a permissible, operable battery light that may be used. When the team airlocks into the barricade as described below, it will be too dark to see without the use of a light. If the teams choose to use their own

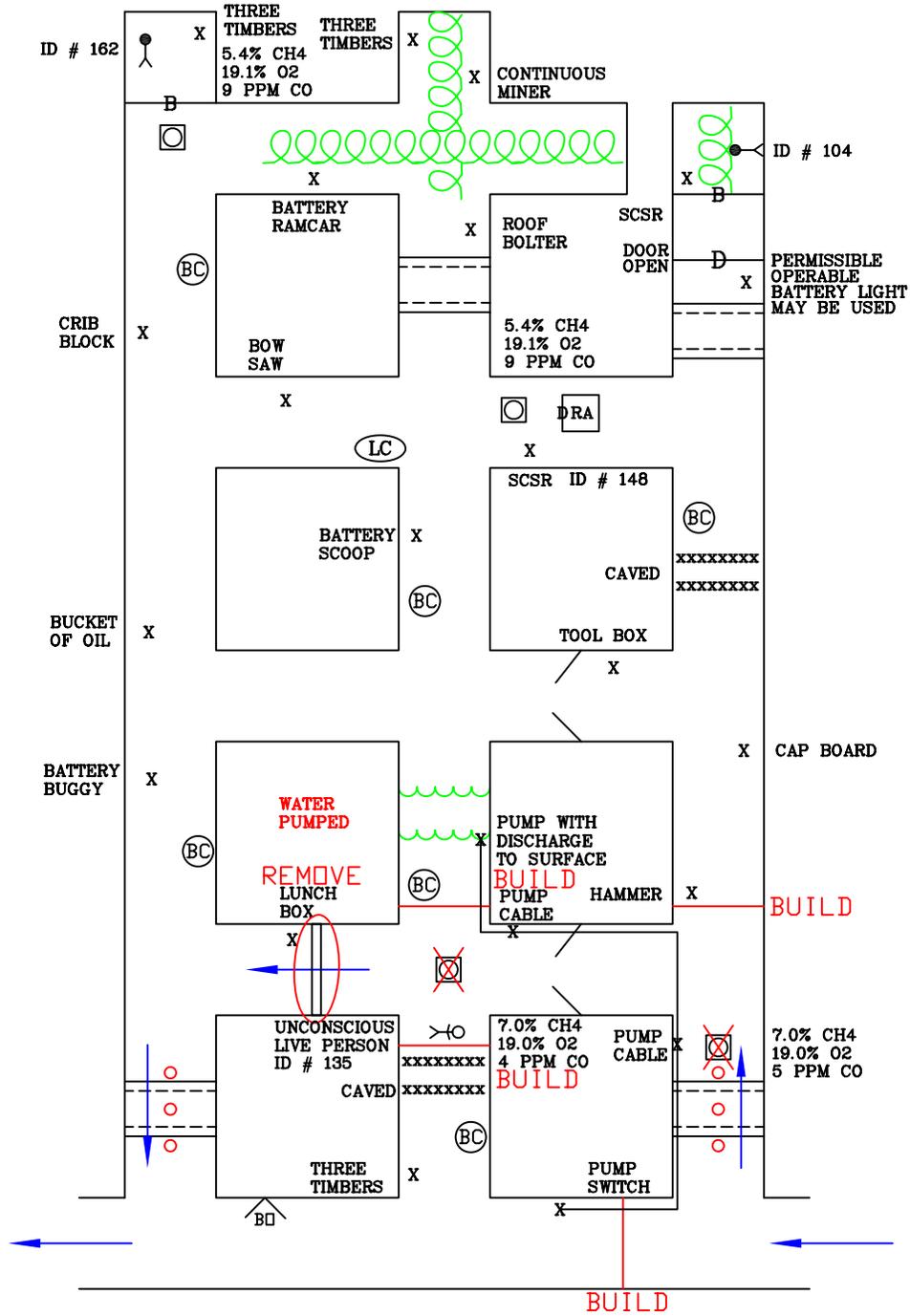
lights, they can. If they choose to use the light provided, they can do that also. If the team does not use the light provided and their lights do not work, discount the teams under Rule 51 for failure to follow instructions written in the problem.

The team must airlock to enter the barricade. The team can do this by simply closing the door in the temporary stopping. After the barricade is breached, the captain must take a GT before any other member enters the area. The team will find smoke inside the barricade, so they must remain on the life line or link line. The team will find a body inside the barricade. The captain must stop and touch the body before any team member passes the body. The captain must also DI the body. The captain must do a RR test at the face, and must DI at the face. A GT must be made at the face.

When the team leaves this area, they do not have to airlock back. The team will travel to the FAB, and the captain can stop the clock.

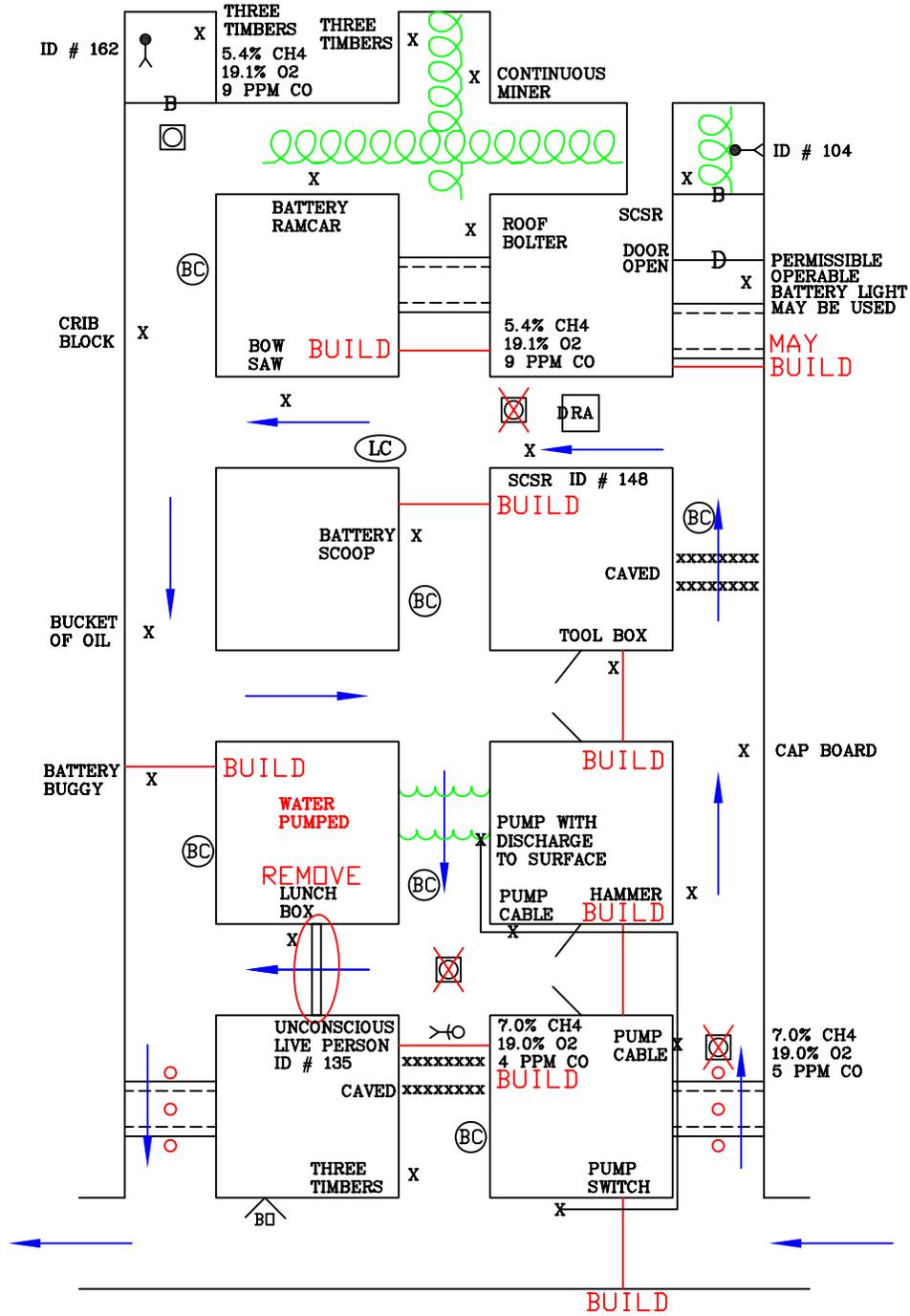
# Ventilation #1

Scale: 1 inch = 20 feet



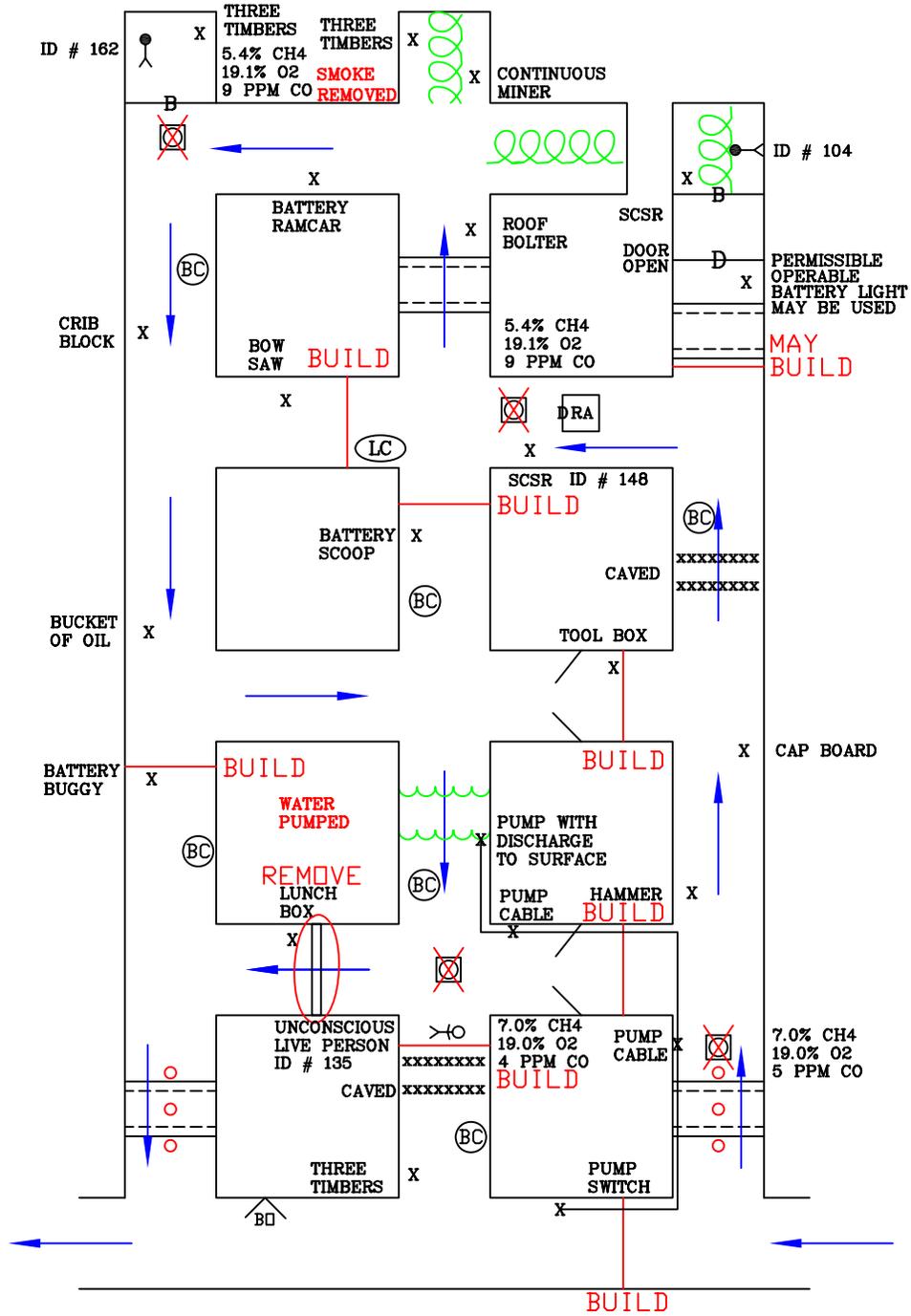
# Ventilation #2

Scale: 1 inch = 20 feet



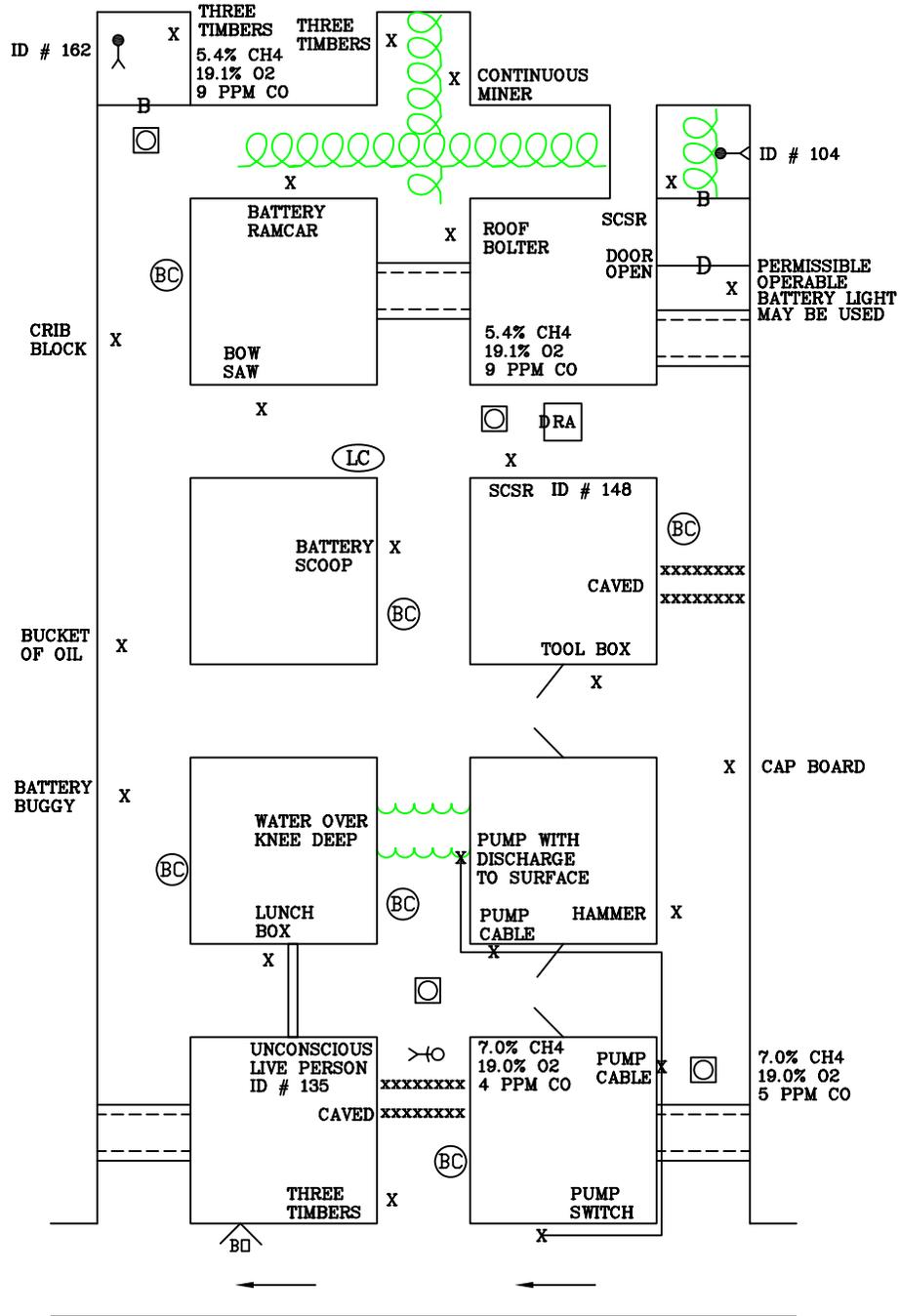
# Ventilation #3

Scale: 1 inch = 20 feet



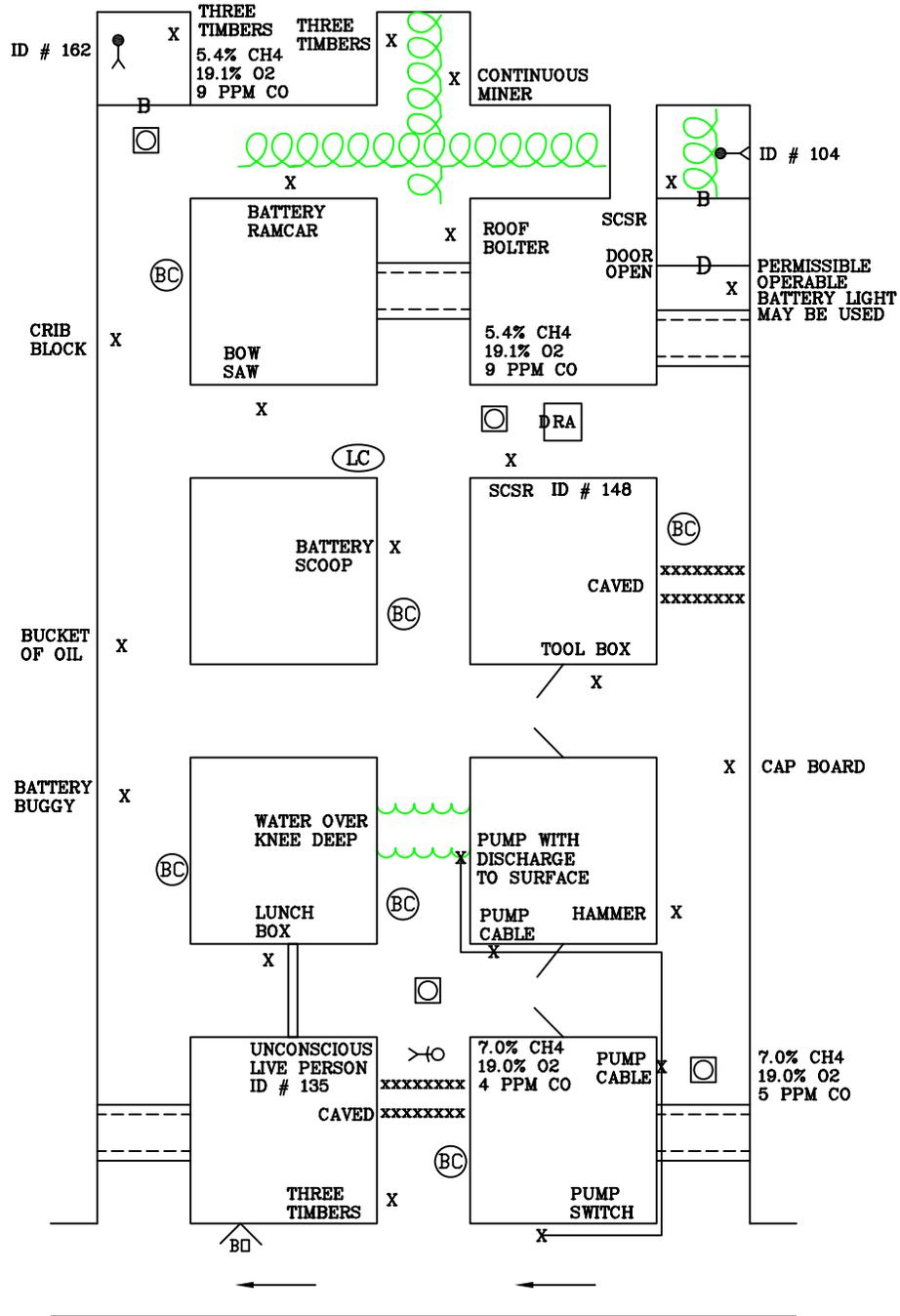
# NMR DAY #1

Scale: 1 inch = 20 feet



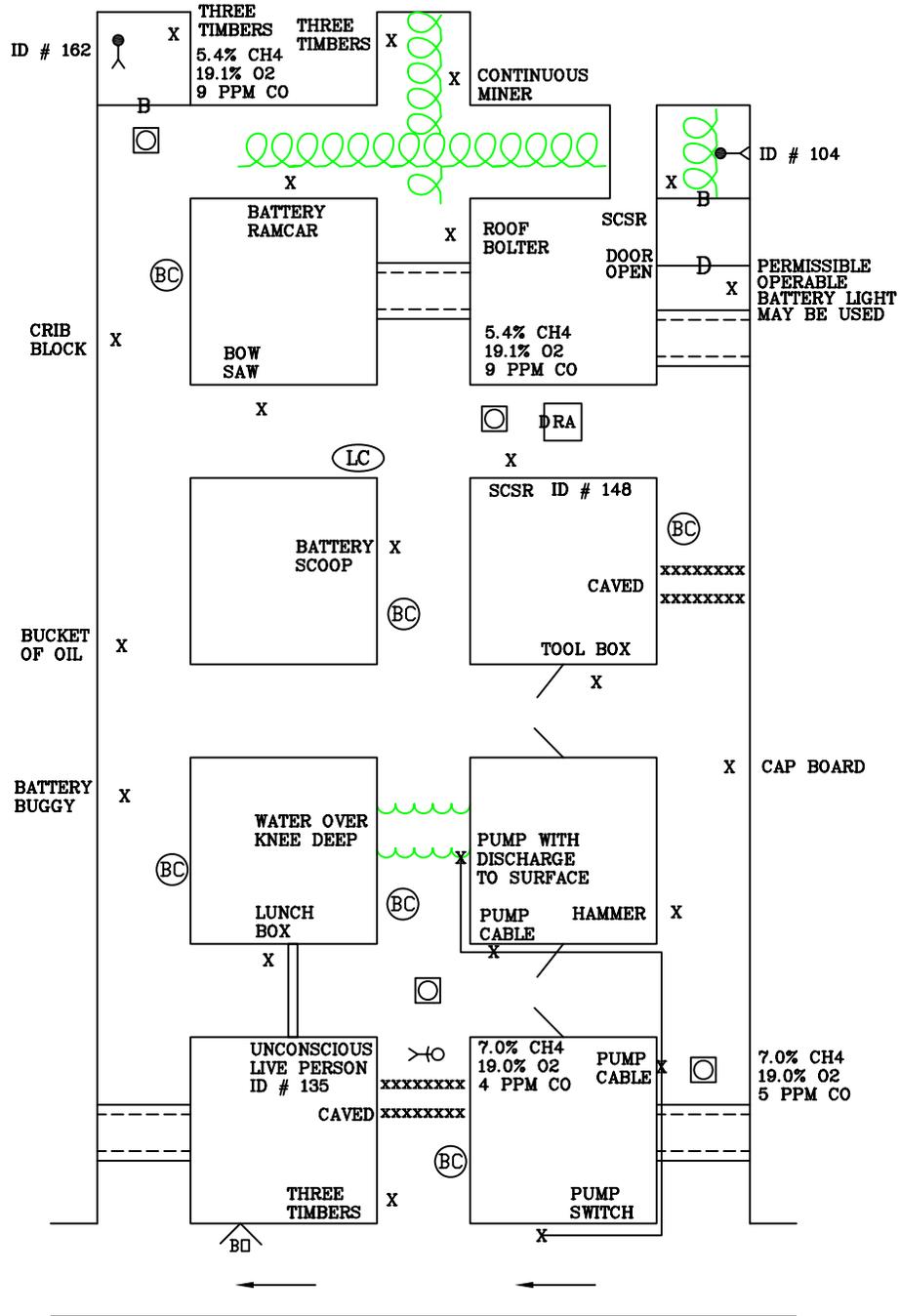
# NMR DAY #1

Scale: 1 inch = 20 feet



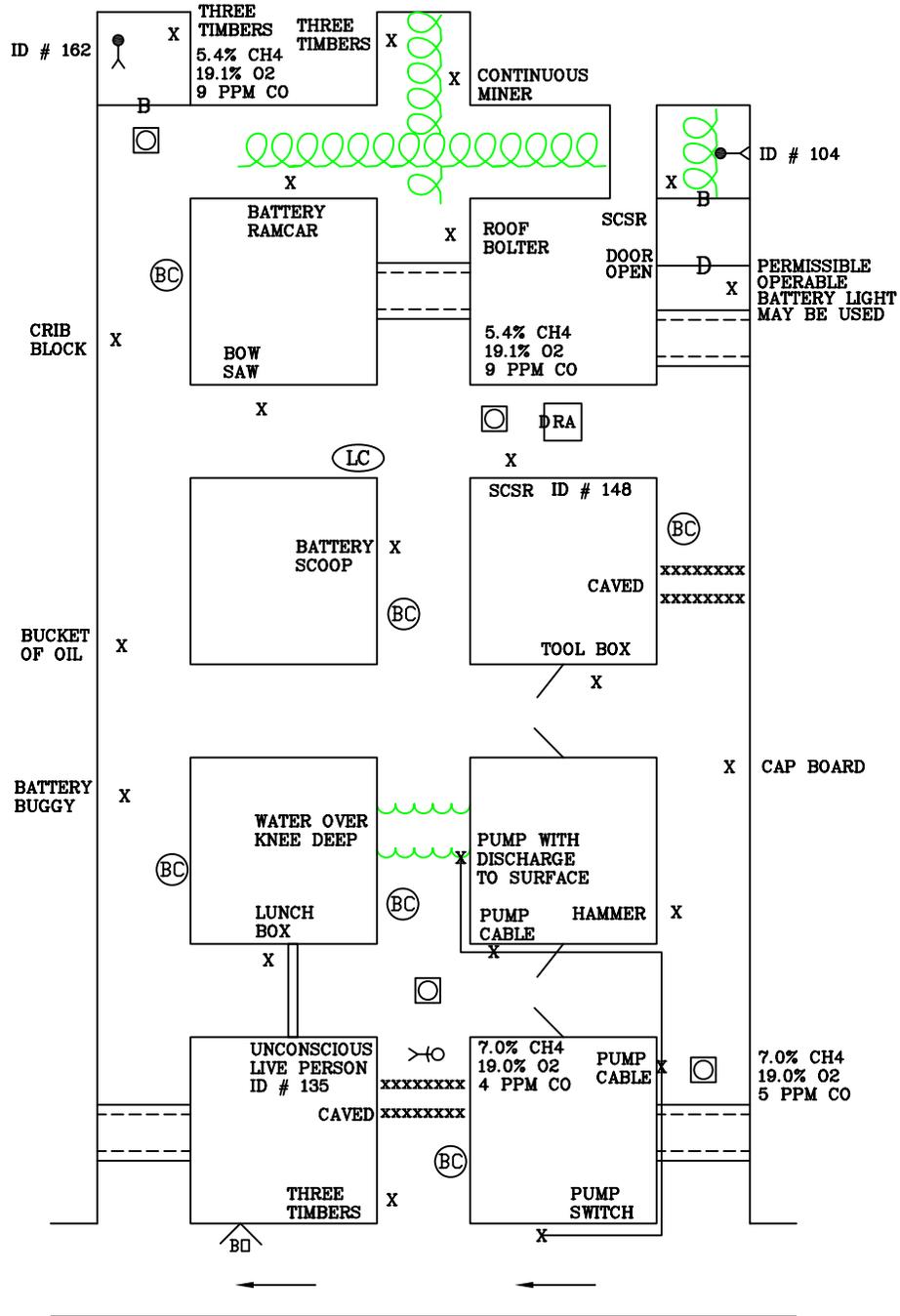
# NMR DAY #1

Scale: 1 inch = 20 feet



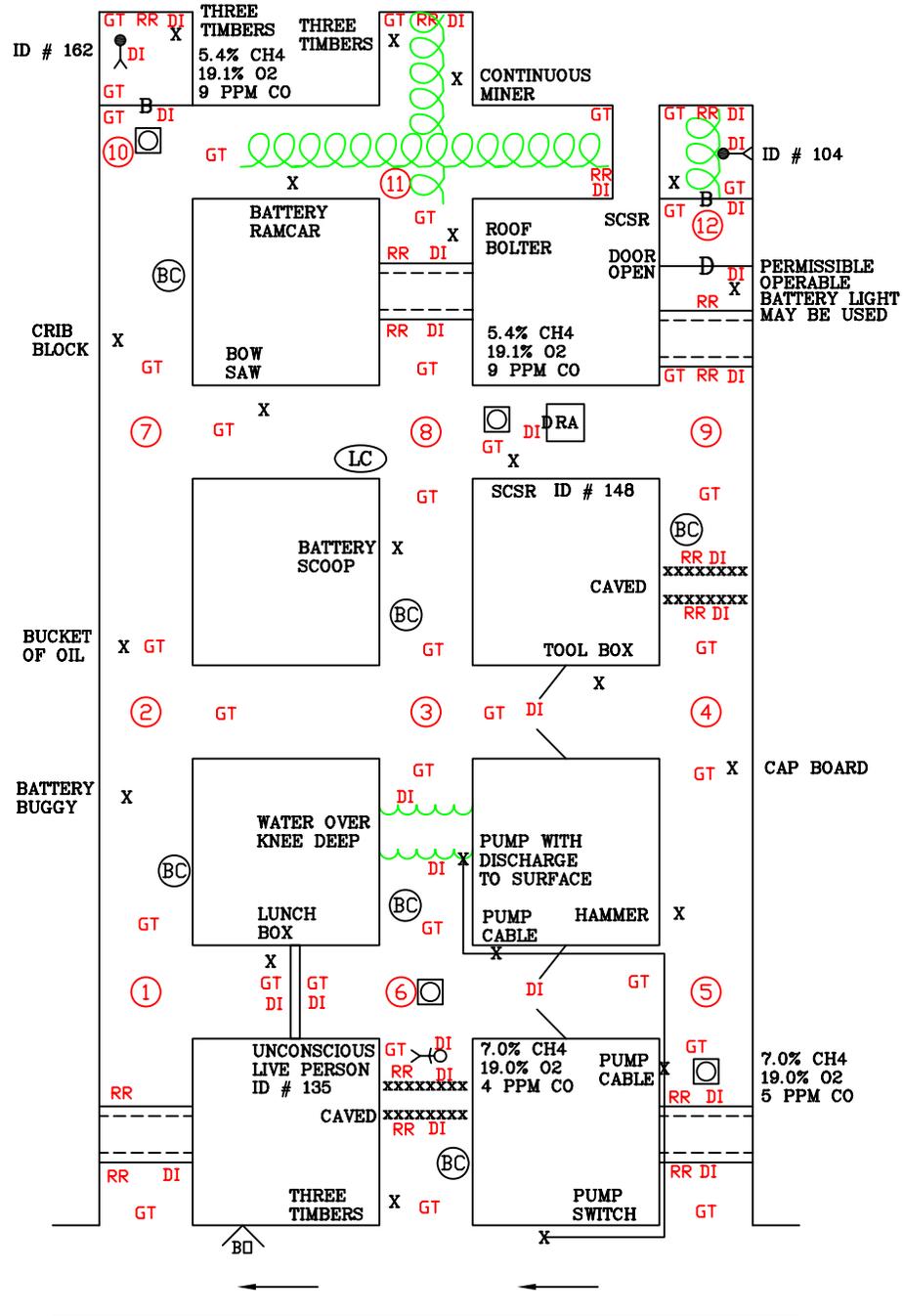
# NMR DAY #1

Scale: 1 inch = 20 feet



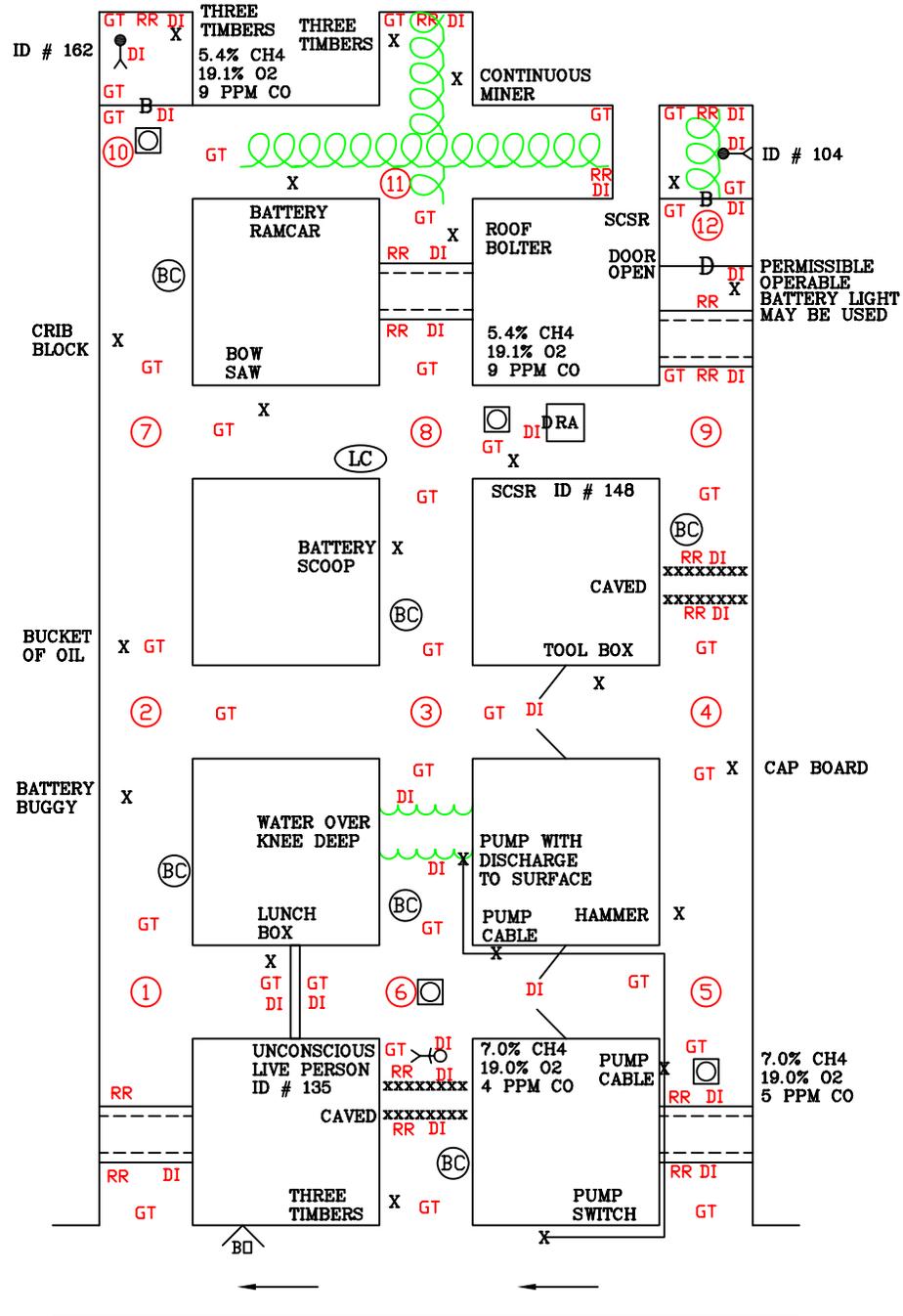
# TEAM STOP (Opt.1)

Scale: 1 inch = 20 feet



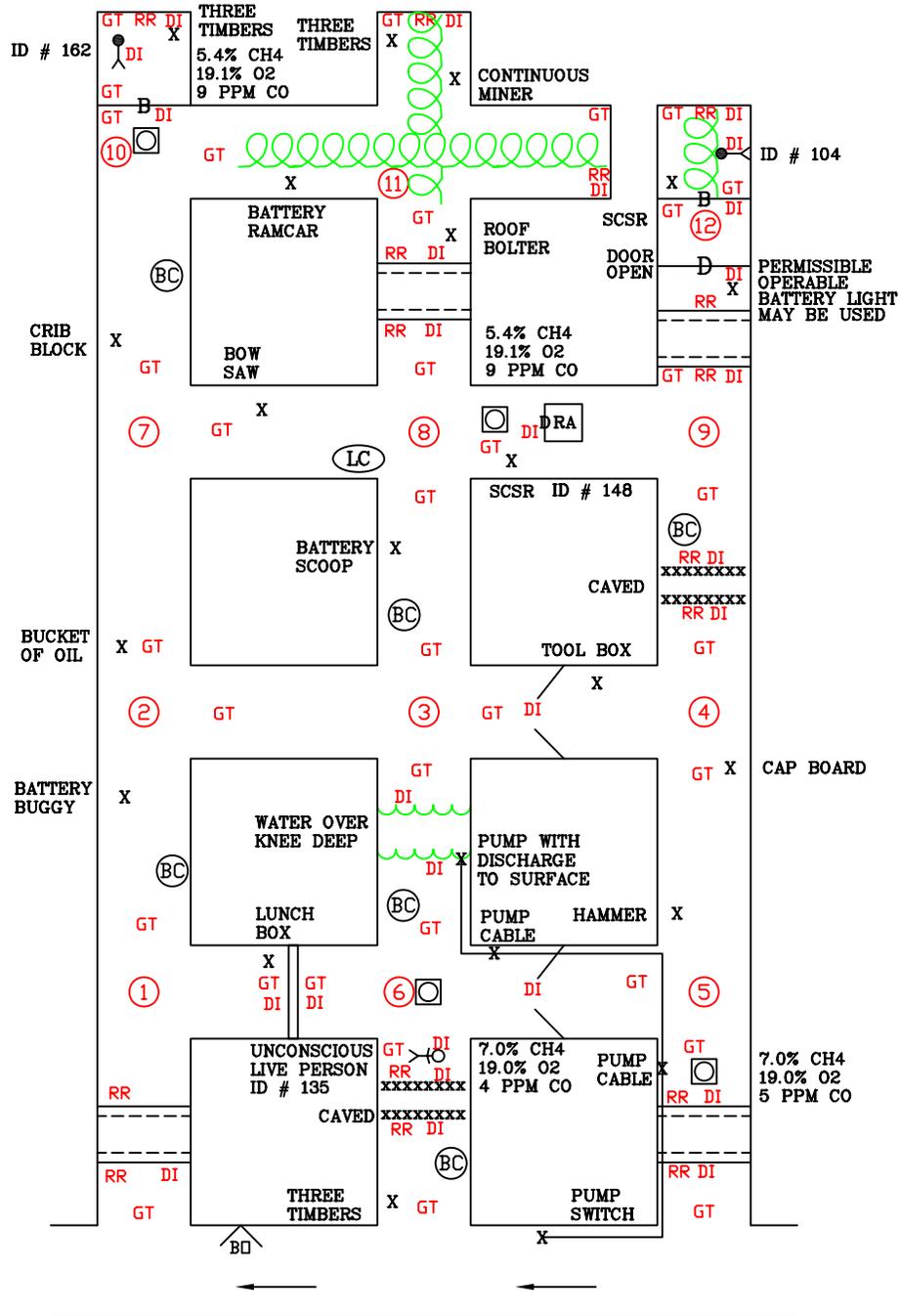
# TEAM STOP (Opt.1)

Scale: 1 inch = 20 feet



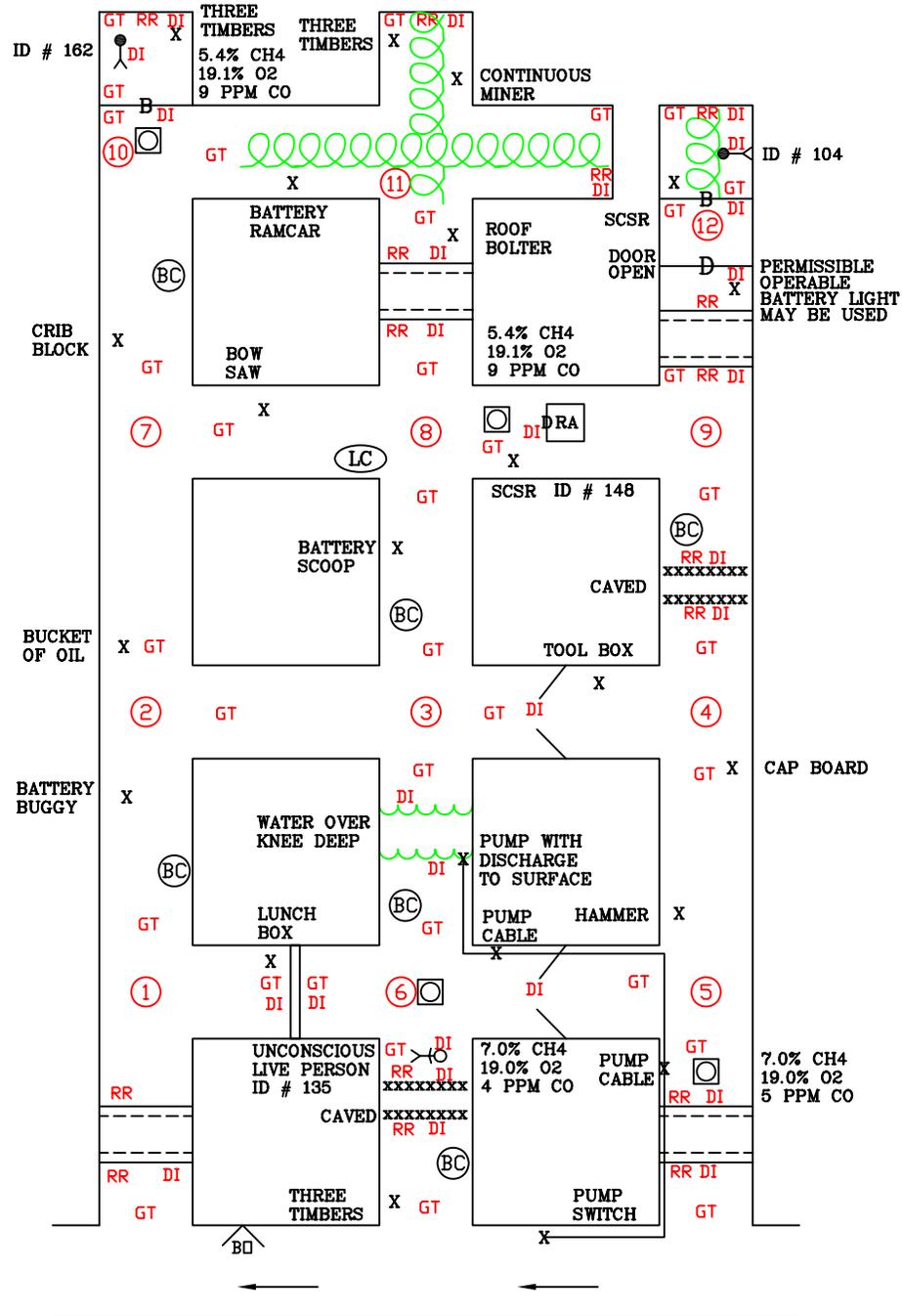
# TEAM STOP (Opt.1)

Scale: 1 inch = 20 feet



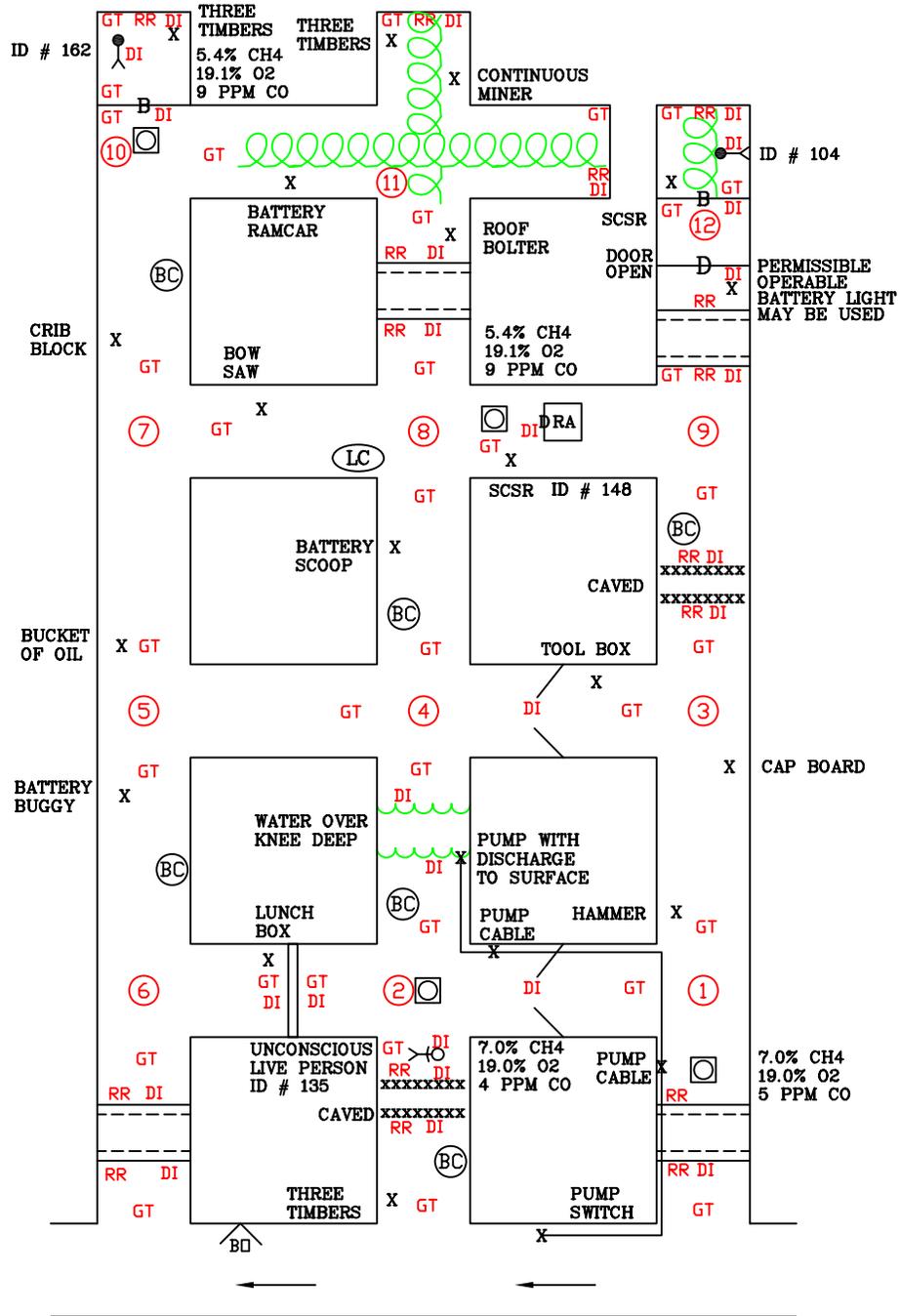
# TEAM STOP (Opt.1)

Scale: 1 inch = 20 feet



# TEAM STOP (Opt.2)

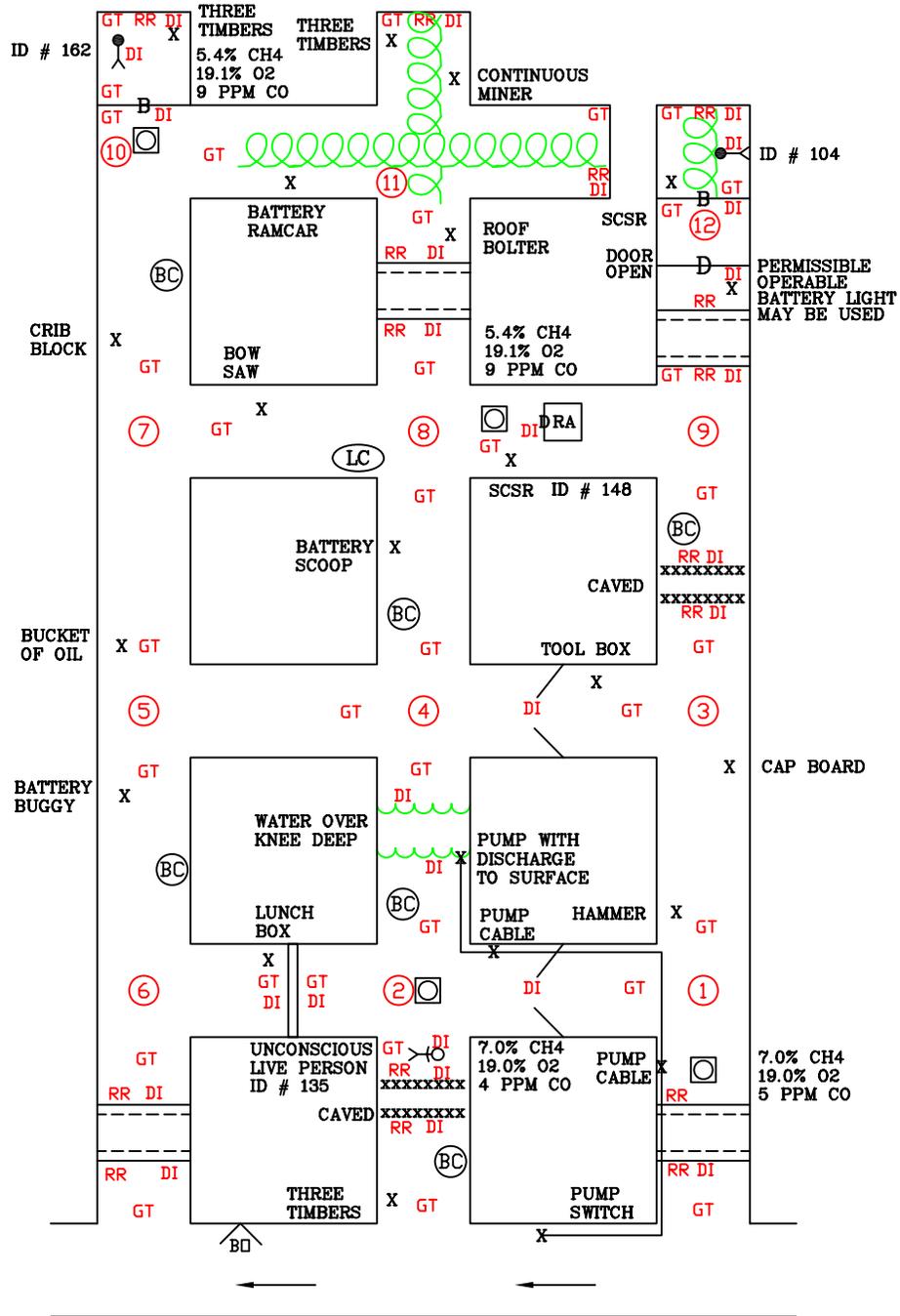
Scale: 1 inch = 20 feet





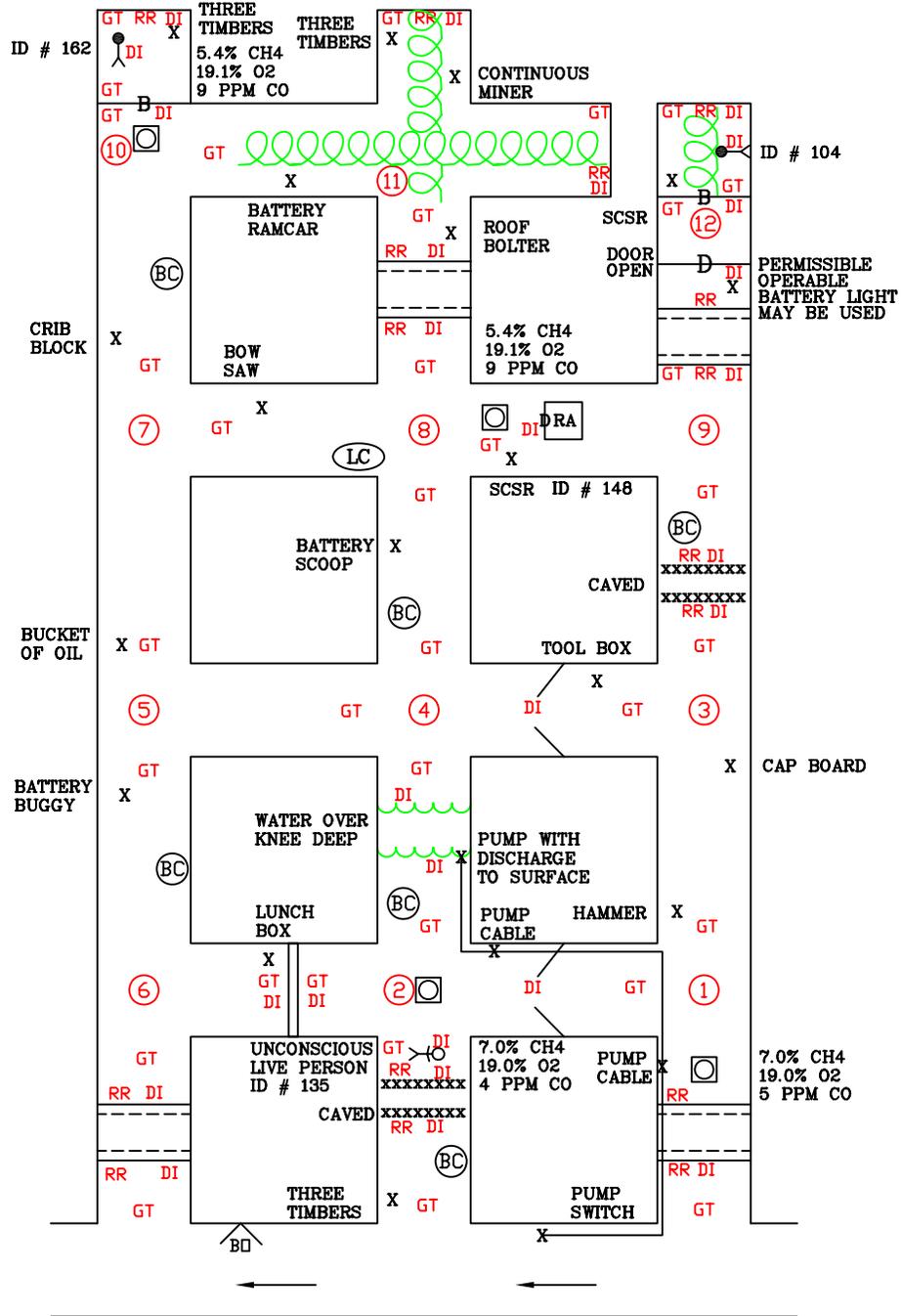
# TEAM STOP (Opt.2)

Scale: 1 inch = 20 feet



# TEAM STOP (Opt.2)

Scale: 1 inch = 20 feet



Final Ventilation  
Scale: 1 inch = 20 feet

