2009
National Mine Rescue Contest
September 1, 2009

STATEMENT

I am _____, Superintendent of the Davidson Collieries No. 6 Mine. Last night the nightshift maintenance/production crew traveled to the Northwest Mains Section to work on equipment and produce coal when they finished the maintenance work. About shift change this morning a rush of air followed by a loud noise was noticed by a beltman. Of the 31 people that entered the mine 20 came out immediately, 6 came out a few minutes later. I don't know where the mine foreman is. He said he was going back inside to look for his men. I've tried to call inside but no one answers.

A mine rescue team has already explored the areas around the Northwest Mains Section. Ventilation has been established to that point.
The mine fan is exhausting and is still running. The fan can be reversed. There are no other fans. Whatever happened knocked the power outside. The power was put back in to the fresh air base. All power breakers outside and the fan are being guarded.

You will begin working at the fresh air base, set up in the No. 1 entry of the Northwest Mains, just outby the section.
I believe that area is around seven foot high, but it does make water. We're going under a creek, and the top is not real good in some places. We bolted it with 6 foot bolts.

There is one mine rescue team available for backup, and one team on standby.

We are asking you to find all missing persons, and explore all areas that can be safely accessed to find them.

You will have 75 minutes to work the problem after the clock has been started until the power company disconnects the power.

We have two blank maps and two maps of what we have already shown you that we will give you when you start working. The mine maps are solid line maps. We have a competent lifeline judge.

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PROBLEM

Account for all missing persons.

Explore all areas that can be safely accessed.

The Mine Fan cannot be stopped.

You have 75-minutes to work the problem after the clock has been started until the power company disconnects the power to repair a transformer.

Thank You
Good Luck!

NATIONAL MINE RESCUE CONTEST
SEPTEMBER 1, 2009
NASHVILLE, TN

TEAM EXPLORATION

Teams will examine all openings, conduct gas tests, and the captain will date and initial (D&I) the **caved air tight** area in No. 1 entry and the **water over knee deep** in No. 3 entry.

Team must travel in the No. 2 entry.

Team Stop No. 1

The team will stop in the first crosscut of the No. 2 entry. Team will have an **apparatus check** at this location. The captain can travel to the **water over knee deep** between the No. 2 and No. 3 entries. The captain will place the correct date and his initials (D&I) at the **water over knee deep**, and the required gas test will be made.

The captain will D&I and make a roof and rib (R&R) test at the **caved** area in the No. 2 entry and the required gas test will be made.

Team Stop No. 2

The team will then travel to the No. 1 entry and stop in the intersection. The required gas test will be made in the openings. The captain will D&I and R&R the **caved air tight** area at the intersection. The captain will travel to the backside of the **caved air tight** area in the No. 1 entry. The captain will D&I and R&R test the **caved** area**.**

Team Stop No. 3

The team will continue to travel inby in the No. 1 entry and stop at the 2nd crosscut intersection. The captain will D&I and roof test the **caved air tight** area and the required gas tests will be made in the openings. The captain will D&I and R&R test the **unsafe roof** in the No. 1 entry. The captain will find a **contaminant** (**1.9% CH4** and **18.3% O2**) just outby the unsafe roof.

Team Stop No. 4

The team will travel across to the No. 2 entry intersection and stop there. The captain will D&I and roof test the **caved air tight** area. The captain will travel to the backside of the caved area in the No. 2 entry. The captain will D&I and R&R test the **caved area**, and the required gas test will be made.

The team will be required to pump the water before continuing exploration.
The pump in the No. 3 entry will be **energized** to pump the water.

The team may not come to the FAB to continue their exploration.

Team Stop No. 5

After **pumping** the water the team will travel into the first crosscut No. 3 entry. The captain will D&I the **seal**. The required gas tests will be taken across the opening.

The team may have come through the crosscut into the first intersection in the No. 3 entry. This will require the captain to travel back to the "**WATER OVER KNEE DEEP / WATER 6 INCHES DEEP**" placard to tie in. If the team travels this direction, a gas test will have to be taken at the outby opening of the No. 1 entry.

Team Stop No. 6

The team will continue to the 2nd crosscut intersection in the No. 3 entry and stop. The captain will do a R&R test and D&I the **caved air tight**. The required gas tests will be made in the openings.

Team Stop No. 7

The team can now travel across to the 2nd crosscut intersection in the No. 2 entry. The team will stop there the captain will D&I and R&R test the **caved air tight** area. Required gas tests will be taken in the opening of the No. 2 entry.

Team Stop No. 8

The team will travel the No. 2 entry (Entry adjacent to the known contaminant (**1.9% CH4** and **18.3% O2**) in the No. 1 entry). Team will find the overcast in the 3rd crosscut. When the captain breaks the imaginary line at the overcast, the patient located in the crosscut from the No. 1 – 2 entries, adjacent to the overcast, will tell the team, "**Help, help. Get me out. I'm injured and I cannot move**." Gas tests will be made at the walls of the overcast. The captain will D&I the walls of the overcast.

The team cannot ventilate the barricade and must continue to explore.

Team Stop No. 9

The team will travel to the 4th crosscut in the No. 2 entry. All required gas tests will be made at the openings. The captain can reach the contaminant in the crosscut between No. 2 – 3 entries. The captain can reach the face of the No. 2 entry. When the captain enters the **smoke**, **all team members must be on the lifeline**. The captain will D&I the body. The captain must make a R&R examination prior to extinguishing the **fire**, (the fire can be extinguished) and before he reaches the face. The captain will D&I the face.

The captain will most likely travel toward the No. 1 entry, as the **contaminant** still exists in No. 1 and continued exploration is necessary.

The captain will find an area of **unsafe roof** with a **person** placard. The captain will be required to make a R&R test.

Team Stop No. 10

The team will travel to the 4th crosscut in the No. 1 entry. All required gas tests will be made at the openings. The captain can reach **temporary stopping built by a previous team**. The captain will D&I the stopping.

Team Stop No. 11

The captain will check the openings and all the required gas tests will be made. The captain will travel to the back-side of the **unsafe roof**, where he will D&I and make a R&R test at the **unsafe** roof. The captain will then travel into the crosscut between No. 1 – 2 entries.

The captain will find a barricade with no contaminant outside the barricade. The captain will D&I the barricade.

The team can now enter the **1st barricade** to rescue the patient. The team must build an **airlock** in front of the barricade to enter.

When the captain touches the **2nd barricade**, the patient will tell the team, **"Help! Help! Get me out. I'm injured and I cannot move."** The captain will D&I the barricade.

The captain will take a gas test immediately inby the **barricade**. Inside the barricade is a **contaminant** and **three timbers**, and another barricade.

The captain now has two options:

Option No. 1: The captain may choose to timber into the area of unsafe roof to the person/body in the last open crosscut between Nos. 1 and 2 entries.

Option No. 2: The captain may choose to timber across the unsafe roof in the No. 1 entry to enable the team to ventilate the barricade.

If the captain chooses **Option 1**, the team will be required to continue exploration in search of additional timbers to set across the **unsafe roof** in the No. 1 entry. The timbers are necessary to ventilate the barricade and remove the patient.

If the captain chooses **Option 2**, the team will travel to the 3rd crosscut in the No. 1 entry when the team re-enters the mine and begin exploration of the No. 3 entry at that point.

OPTION NO. 1

The captain may choose to timber into the area of unsafe roof to the person/body in the last open crosscut between Nos. 1 and 2 entries.

Team Stop No. 12

Once the timbers have been set and the captain has identified the person as a **body**, the captain will D&I the **body**. The team will then travel across the last open crosscut to the No. 3 entry and stop there.

(This is the most likely course of action, however the team may travel outby in the No. 2 entry to enter the No. 3 entry from outby, seeking a means to ventilate the 2nd barricade.) (**See Exploration for Option 2**)

At the intersection in No. 3 entry, the team will make the necessary gas tests and the captain can reach the inby side of the **caved area** the captain will D&I and R&R test the **caved area**. The team will find **three timbers** in the No. 3 entry. The captain will make R&R and D&I the **caved air tight** area. The captain will find a barricade across the No 3 entry inby the crosscut. There is a contaminant just inby the crosscut, at the barricade. The captain will D&I the barricade, and there will be no response from inside.

The team will now return to the unsafe roof in the No. 1 entry and set the timbers through the unsafe roof to be able to ventilate the barricade.

1st Ventilation

The **air** must move **toward the FAB** because of the **explosive mixture** in the No. 1 entry outby the **unsafe roof**. The team will erect the necessary temporary stoppings and remove the **temporary stopping** at the head of the No. 1 entry and ventilate the front of the barricade using the **line curtain**.

See Ventilation Error map.

After the contaminant has been removed, the team can airlock to enter the **2nd barricade.** The captain will take a gas test immediately inby the barricade. There they find the **live conscious talking person**. The captain will D&I the **live conscious talking person.** The captain can D&I the overcast wall and the other gas test can be made while the patient is being placed on the stretcher. The patient is loaded on the stretcher and taken to the FAB.

Team Stop No. 13

The team will re-enter the mine and travel to the 3rd crosscut intersection in the No. 3 entry, and stop there to continue exploration.

The team will make the necessary gas tests, and the captain will D&I and R&R test the **caved area** in the No. 3 entry.

The captain can reach the overcast wall if the No. 5 man is within one foot of the imaginary line, or the captain stops the team when he enters the left crosscut.

Note: The blocks are **20 feet** in the **entries** and **24 feet** in the **crosscuts**.

If the captain cannot reach the overcast wall he will have to advance the team and have another team stop at the overcast.

At the overcast the captain will find a body. The captain will **D&I** the **body** and the **overcast** wall.

The team will then return to the barricade in the No. 3 entry. At this time the 3rd barricade can be ventilated. The team will erect the necessary stoppings and use the line curtain to ventilate the barricade.

Ventilation No. 2

To get all of the air current in the split to the barricade, the team must block the No. 1 – 2 entries at or inby the 2nd crosscut. The **fan** will be c**hanged to blowing**. The air current will travel up the No. 3 entry, **sweep the barricade** using the line curtain, and exit out the No. 1 entry.

The team can now enter the barricade where as the captain will make a gas test immediately inby the barricade. The captain will find and D&I the **body**. The captain will R&R the **face**.

Ventilation of the Area Under the Overcast

The team can ventilate the overcast area while they are retreating with the patient provided certain conditions have been met. (This will be necessary if the patient is brought to the FAB “bare faced.”)

The team can remove the temporary stopping in the No. 2 entry, inby the overcast. This will allow the air current to course through the No. 2 entry and out the No. 3 entry.

OPTION NO. 2

The captain may choose to timber across the unsafe roof in the No. 1 entry to enable the team to ventilate the barricade.

The team will use the timbers found inby the first barricade to timber across the unsafe roof area in the No. 1 entry. The team can now ventilate the barricade.

The team will travel to the barricade adjacent to the overcast.

1st Ventilation

To ventilate the barricade, the **air** must move **toward the FAB** because of the **explosive mixture** in the No. 1 entry outby the **unsafe roof**. The team will erect the necessary temporary stoppings and remove the **temporary stopping** at the head of the No. 1 entry.

The team will return to the 2nd barricade and use the **line curtain** to remove the contaminant.

After the contaminant has been removed, the team can airlock to enter the **2nd barricade.** The captain will take a gas test immediately inby the barricade. There they find the **live conscious talking person**. The captain will D&I the **live conscious talking person.** The captain can D&I the overcast wall and the other gas test can be made while the patient is being placed on the stretcher. The patient is loaded on the stretcher and taken to the FAB.

The team will re-enter the mine and travel to the 3rd crosscut intersection in the No. 3 entry, and stop there to continue exploration.

Team Stop No. 12

The team will make the necessary gas tests, and the captain will D&I and R&R test the **caved area** in the No. 3 entry.

The captain can reach the overcast wall if the No. 5 man is within one foot of the imaginary line, or the captain stops the team when he enters the left crosscut.

Note: The blocks are **20 feet** in the **entries** and **24 feet** in the **crosscuts**.

If the captain cannot reach the overcast wall he will have to advance the team and have another team stop at the overcast.

At the overcast the captain will find a body. The captain will **D&I** the **body** and the **overcast** wall.

The team will travel to the last crosscut (No. 4) in the No. 3 entry.

Team Stop No. 13

At the intersection in No. 3 entry, the team will make the necessary gas tests and the captain can reach the inby side of the **caved area** the captain will D&I and R&R test the **caved area**. The team will find **three timbers** in the No. 3 entry. The captain will make R&R and D&I the **caved air tight** area. The captain will find a barricade across the No 3 entry inby the crosscut. There is a contaminant just inby the crosscut, at the barricade. The captain will D&I the barricade, and there will be no response from inside.

The team must now return to the **unsafe roof** where the **body/person** is located and set the necessary timbers to access the **body/person.**

Once the timbers have been set and the captain has identified the person as a **body**, the captain will D&I the **body**. The team will then travel across the last open crosscut to the No. 3 entry and stop there.

At this time the 3rd barricade can be ventilated. The team will erect the necessary stoppings and use the line curtain to ventilate the barricade.

Ventilation No. 2

To get all of the air current in the split to the barricade, the team must block the No. 1 – 2 entries at or inby the 2nd crosscut. The **fan** will be c**hanged to blowing**. The air current will travel up the No. 3 entry, **sweep the barricade** via the line curtain, and exit out the No. 1 entry.

The team can now enter the barricade where as the captain will make a gas test immediately inby the barricade. The captain will find and D&I the **body**. The captain will R&R the **face**.

The team can now return to the FAB.

End of Problem.

PATIENT STATEMENT

HELP, HELP

GET ME OUT

I'M INJURED AND

I CANNOT MOVE

Superintendent’s Statement to Briefing Officer
Upon Request for Outby Ventilation.

There is no team available for outby ventilation.

Contestant _____ Team No. _____

2009
National Mine Rescue Contest
WRITTEN EXAMINATION

(Circle your answer) **Discounts (1 ea.) _____**

1. Hydrogen can be liberated when water or steam comes in contact with hot _____ _____. (MSHA 2105, p. 31)
A. coal embers B. roof material C. carbon materials

2. Before going underground to explore for a fire or to fight a fire, the team should know about any possible ignition sources that may exist in the _____ _____. (MSHA 2105, p. 23)
A. fire area B. affected area C. exploration area

3. The specific gravity of _____ _____ is 1.5291. (MSHA 2102, p. 29)
A. nitrogen dioxide B. carbon monoxide C. carbon dioxide

4. Regulators are used in mine ventilation to regulate airflow to meet the _____ _____ of each air split. (MSHA 2103, p. 20)
A. individual needs B. oxygen requirement C. map readings

5. Overcasts are used to permit two _____ _____ to cross without the intake air short circuiting to the return. (MSHA 2103, p. 18)
A. air currents B. air courses C. ventilating currents

6. Coking or _____ _____, if encountered, should be reported in location and size. (MSHA 2104, p. 47)
A. coke flags B. coke streamers C. coke tags

7. It is much easier to remove a concentration of a light gas like methane by ventilation than it is to remove the _____ _____ of a heavier gas like carbon dioxide. (MSHA 2102, p. 14)
A. equal amount B. same concentration C. same amount

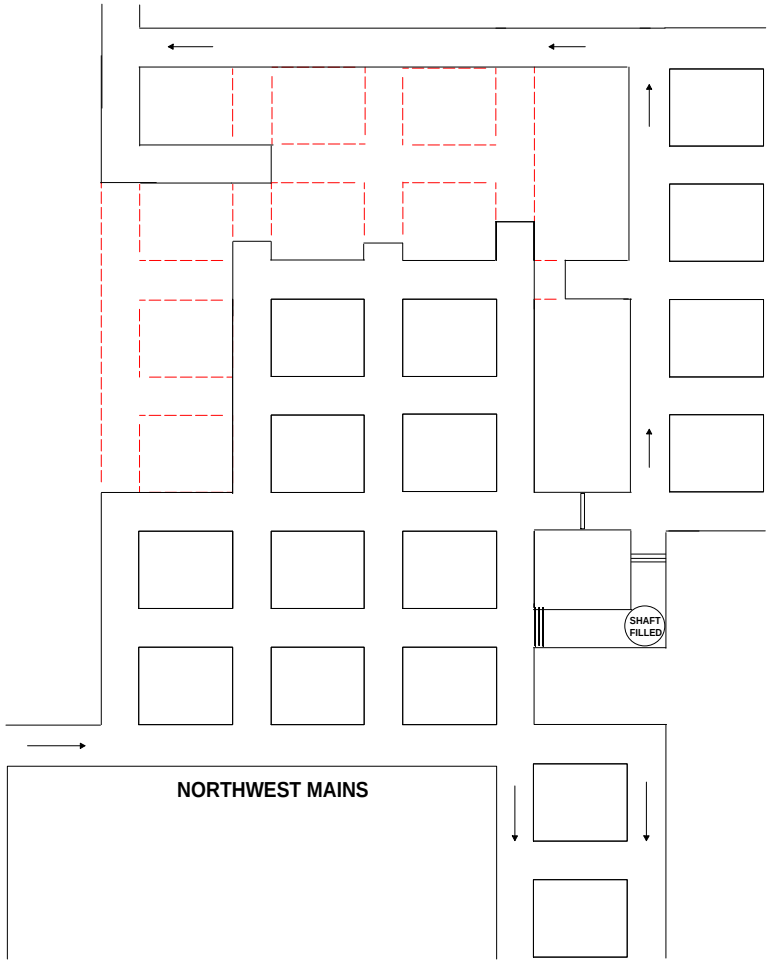
8. _____ is formed when methane is burned or heated in air having a low oxygen content. (MSHA 2102, p. 45)
A. Acetylene B. Carbon C. Monoxide

9. Specific gravity is the weight of a gas compared to an equal volume of _____ _____ under the same temperature and pressure. (MSHA 2102, p. 13)
A. pure air B. pure oxygen C. normal air

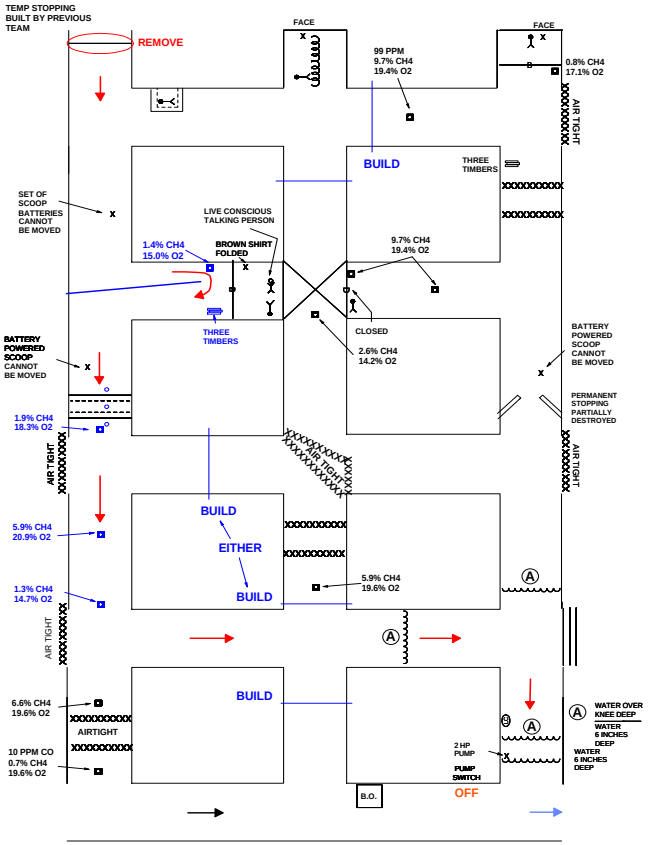
10. Gas readings must be taken in the _____ near the fire area to determine if the mine atmosphere is potentially explosive. (MSHA 2105, p. 25)
A. areas B. returns C. entries

When scoring the contestant's written exam, please write the statement number beside the incorrect answer so that the team can easily review the test during team appeals.

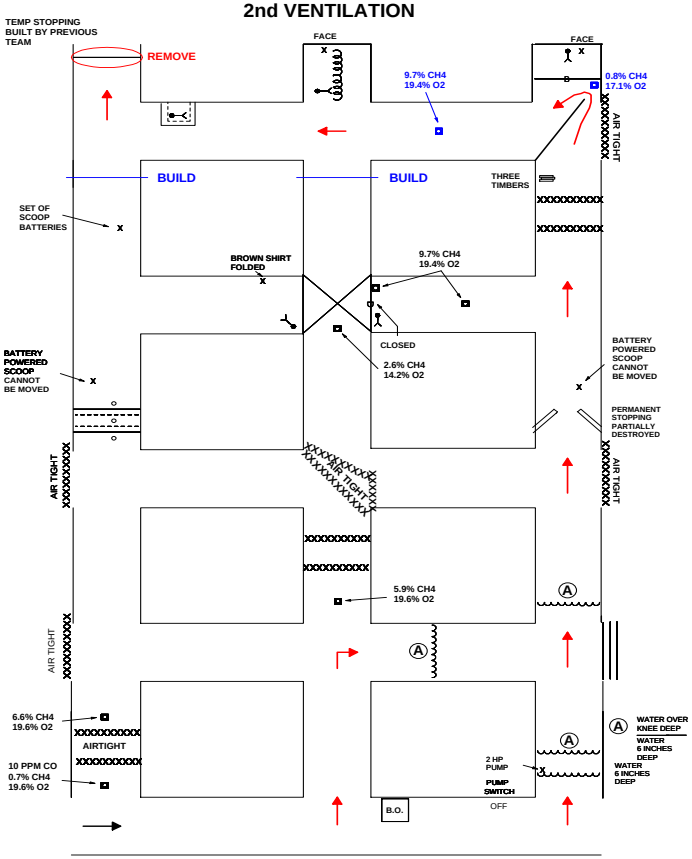
Answers		Statement No.
1.	C	10
2.	B	18
3.	C	32
4.	A	44
5.	A	45
6.	B	50
7.	B	39
8.	A	29
9.	C	26
10.	B	14


SHAFT
FILLED
NORTHWEST MAINS

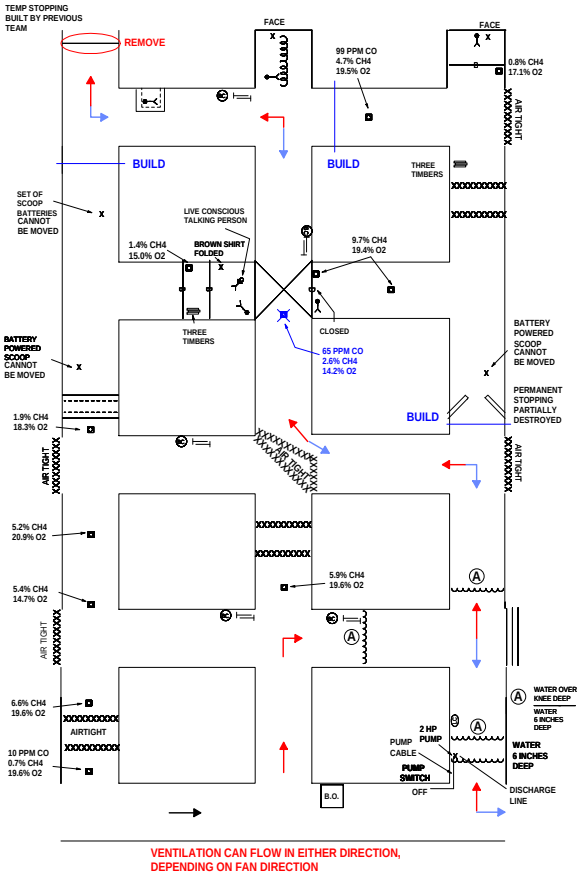
1st VENTILATION



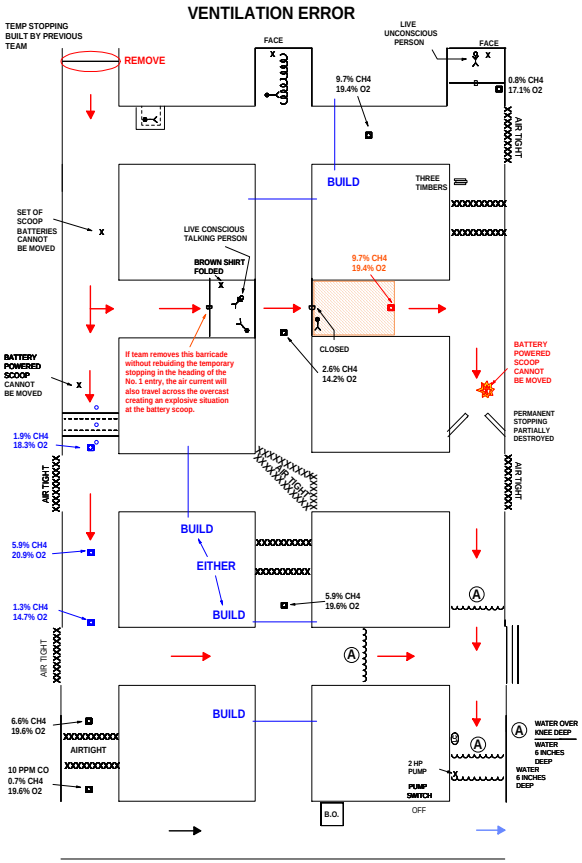
2nd VENTILATION



OVERCAST VENTILATION



VENTILATION CAN FLOW IN EITHER DIRECTION, DEPENDING ON FAN DIRECTION


VENTILATION ERROR
TEMP STOPPING BUILT BY PREVIOUS TEAM
REMOVE
FACE
LIVE UNCONSCIOUS PERSON
FACE
9.7% CH4
19.4% O2
0.8% CH4
17.1% O2
AIR TIGHT
BUILD
THREE TIMBERS
SET OF SCOOP BATTERIES CANNOT BE MOVED
LIVE CONSCIOUS TALKING PERSON
BROWN SHIRT FOLDED
9.7% CH4
19.4% O2
CLOSED
2.6% CH4
14.2% O2
If team removes this barricade without rebuiding the temporary stopping in the heading of the No. 1 entry, the air current will also travel across the overcast creating an explosive situation at the battery scoop.
BATTERY POWERED SCOOP CANNOT BE MOVED
BATTERY POWERED SCOOP CANNOT BE MOVED
PERMANENT STOPPING PARTIALLY DESTROYED
1.9% CH4
18.3% O2
AIR TIGHT
AIR TIGHT
BUILD
EITHER
BUILD
5.9% CH4
20.9% O2
1.3% CH4
14.7% O2
5.9% CH4
19.6% O2
A
AIR TIGHT
BUILD
6.6% CH4
19.6% O2
AIRTIGHT
10 PPM CO
0.7% CH4
19.6% O2
2 HP PUMP
PUMP SWITCH
OFF
B.O.
A
WATER OVER KNEE DEEP
WATER 6 INCHES DEEP
WATER 6 INCHES DEEP