

## 2021 Price Utah Day 2 Written Statement

Thank you for responding to our mine emergency.

You are located in the Fresh Air Base we have established at crosscut 60. The entries are numbered from left to right 1, 2 and 3.

Fresh air is sweeping across the FAB from # 3 to # 1 then going out to the EXHAUSTING mine fan on the surface, which is running, guarded and cannot be reversed or turned off. The # 2 entry has a stopping outby so no air will come in or go out it.

A Command Center has been set up outby.

A raise bore air shaft to the surface has just been completed inby crosscut 64 in 1 entry. It is open and there is air coming into the mine through it. We have a guard monitoring it.

Last night, 4 mechanics were working in the mine.

They called out reporting a fire. We have had no contact with them since.

This mine has some difficult roof conditions, and water. We have detected methane, hydrogen sulfide, carbon monoxide and sulfur dioxide.

All power into the mine is locked out.

If power is required to energize any equipment in the mine, switches will be available at the command center.

All officials and backup teams are present.

The mine map we have for you is up to date.

Price Utah 2021 Day 2  
Written Problem

Explore all of the mine necessary to account for the 4 missing miners if it can be done safely.

Bring any live miners to the FAB.

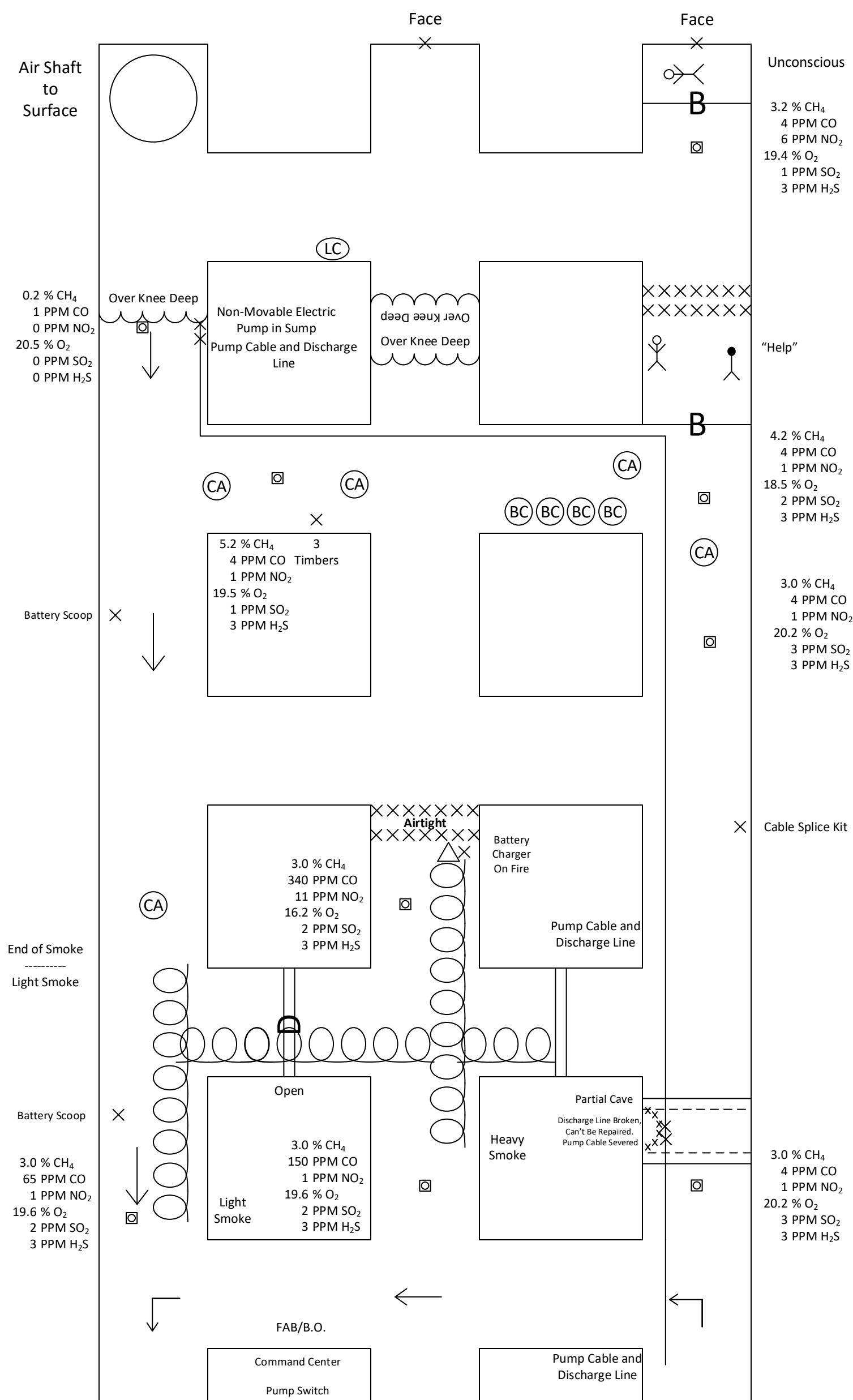
Your team has 100 minutes to complete this problem.

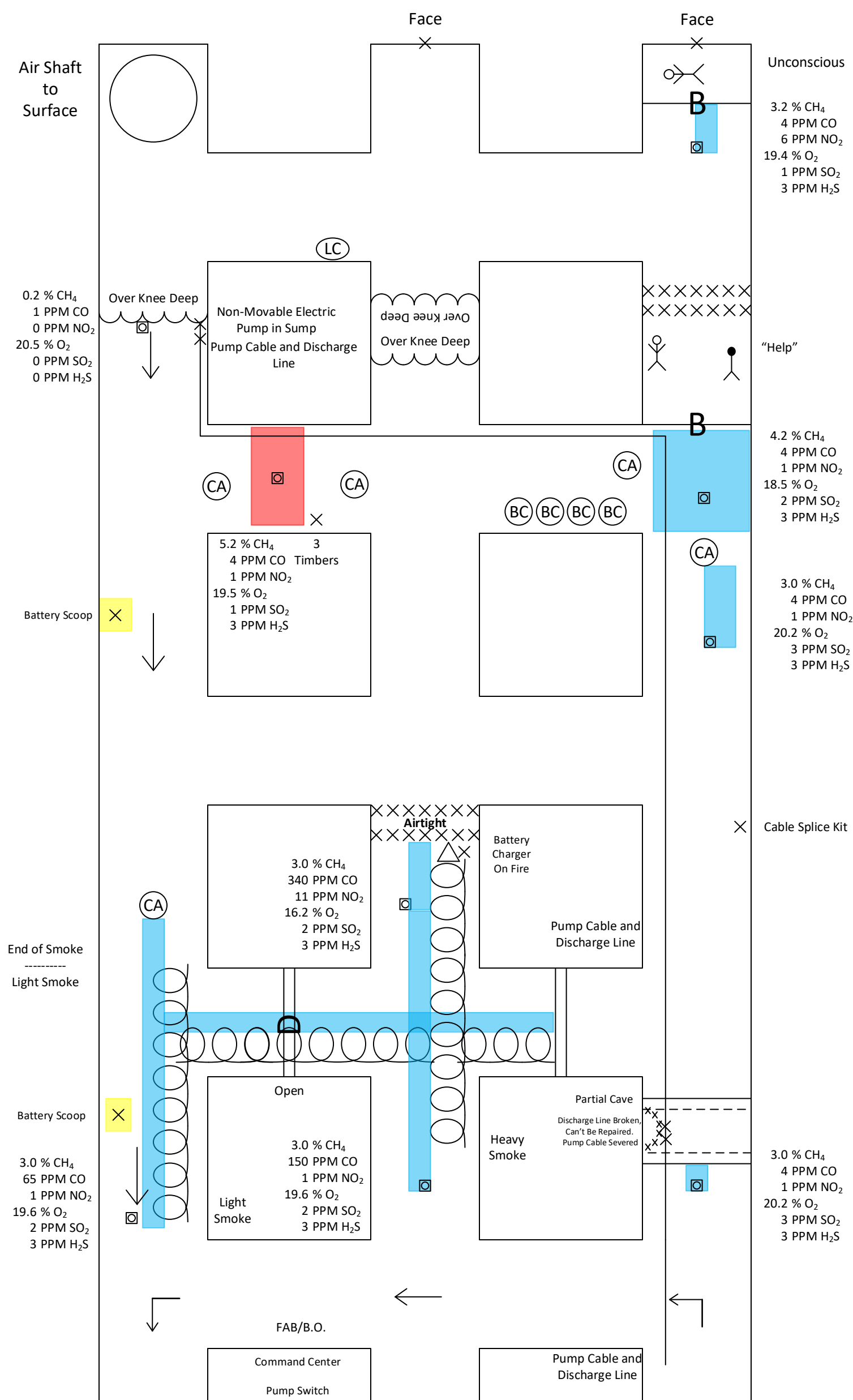
# Price Utah 2021 Day 2 Judges Instructions

Initial openings' checks of entries at FAB. 1 E has smoke and CO, 2 E has smoke and CO, 3 E has SO2 and unsafe roof. Team can advance in 1 or 2 entries - (50' apparatus check required at stop).

1. Team stop 1, 2 - in 1E at XC 1 – IN SMOKE, air movement coming outby in 1 E, ignition source found, end of smoke inby intersection, stopping with door open in XC to right. Team must tie across.
2. Team stop 2, 1 - in 2E at XC 1 – IN SMOKE, CO and NO2 found inby intersection AND extinguishable fire and airtight cave. Stopping found in XC to right. Team can advance in 1E.
3. Team stop 3 – in 1E at XC 2 – air movement coming outby in 1 E, Ignition source found inby intersection, open XC to right. Team must tie across.
4. Team stop 4 – in 2E at XC 2 - Caved across outby plane at intersection, Zig-zag RR test required. Inby open, XC to right open. Team must tie across to 3E.
5. Team stop 5 – in 3 E at XC 2 – SO2 found inby intersection, open outby. Team must tie outby.
6. Team Stop 6 – in 3 E at XC 1 – back of stopping in XC made, unsafe roof found outby. XC's 1 and 2 are tied in. Team can advance in 3 or 2 entries (contaminant in 3).
7. Team Stop 7,8 – in 3 E at XC 3 – low O2 in intersection, barricade with response of “help” inby intersection (on intersection plane), Open XC to left WITH 4 BC found. TEAM DOES NOT HAVE ENOUGH INFORMATION TO BREACH BARRICADE YET.
8. Team Stop 8 – in 2 E at XC 3 – open outby, OKD water found inby, 3 timbers found AND explosive mixture in XC to left. Team can tie across to 1 E.
9. Team Stop 9 – in 1 E at XC 3 – open outby, water OKD with non-movable electric pump in sump AND good air moving outby in 1 E, TEAM HAS ENOUGH MATERIALS AND INFORMATION TO VENT BARRICADE IN 3E.  
SEE VENT 1 OR ALT VENT 1 (ALT VENT 1 requires 3 timbers to be set through unsafe roof in 3 entry)  
Team must airlock into barricade by building temps in 3 entry outby intersection and in XC 3 between 2 and 3 entries. In Barricade, One BODY found and One Live miner, who can be taken to FAB barefaced out 1 E.  
Team must pump water inby XC 3 in 1 E in order to continue exploring but in order to energize pump, must ventilate explosive mixture in XC 3 and repair severed cable in unsafe roof in 3 E.  
SEE VENT 2  
SEE PUMP – PUMP WILL NOT ENERGIZE UNTIL SEVERED CABLE IS REPAIRED IN 3 ENTRY IN UNSAFE ROOF  
WHEN WATER PUMP IS ENERGIZED, THE UNSAFE ROOF IN 3 E BECOMES ROOFED WATER. (broken discharge line) **judges – remove water in 1 E.** Pump can be de-energized and water remains pumped.
10. Team Stop 10 – in 1 E at XC 4 – shaft bottom made inby intersection, LC found in XC to right.
11. Team Stop 11 – in 2 E at XC 4. inby side of water OKD found outby face found inby, open to right.
12. Team Stop 12 – in 3 entry at XC 4 – inby side of cave found outby intersection, Barricade with no response found inby with NO2 and Low O2 inby intersection.  
TEAMS HAVE MATERIALS AND CAN VENT AND BREACH BARRICADE in 3 E. Must airlock into barricade.  
See VENT 3  
Teams can breach barricade in 3 entry with airlock, must assess Pt. and place on stretcher to remove to FAB W/O respiratory protection. Face 3 made.

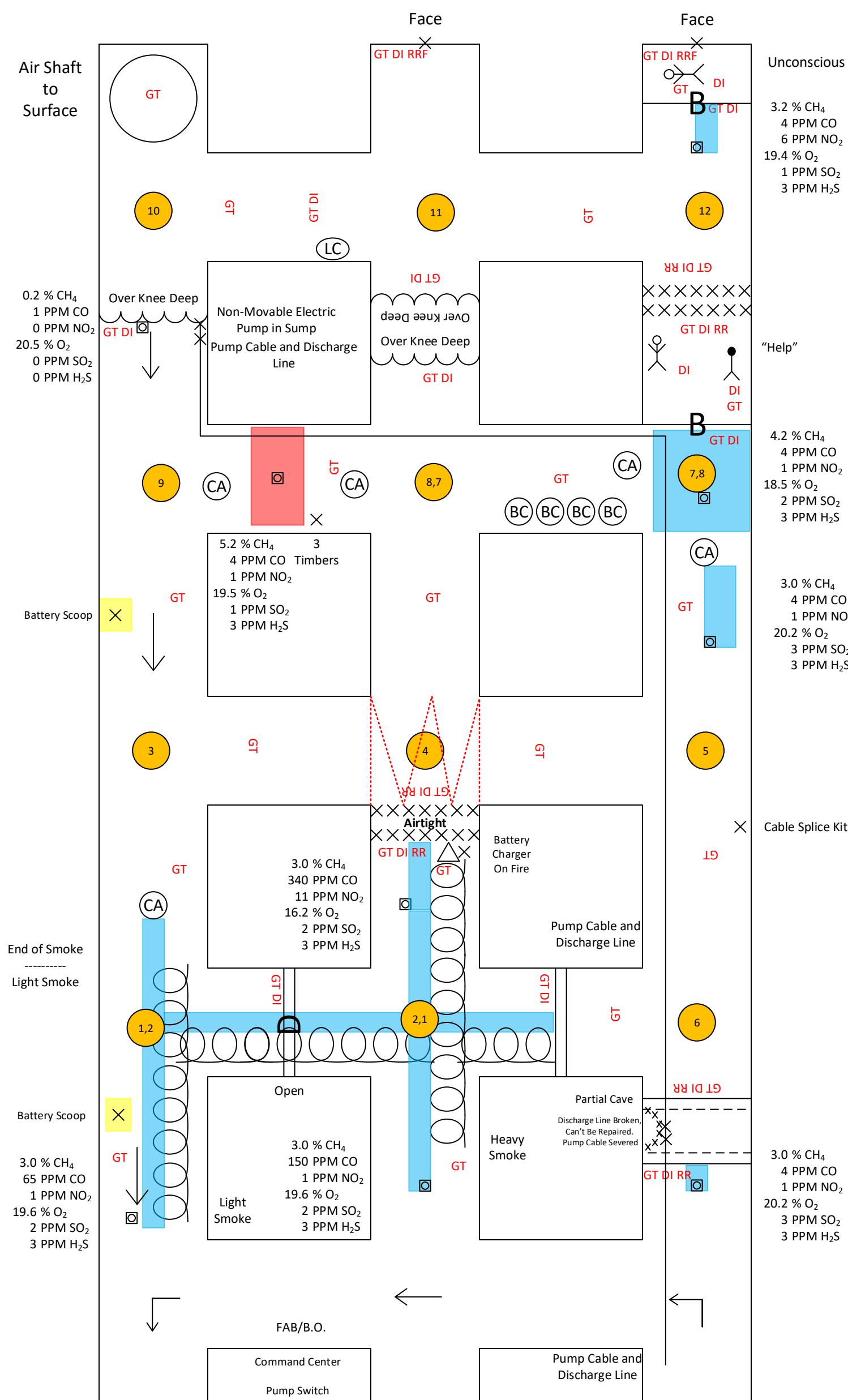
End of Problem





Rules: 34 & 44

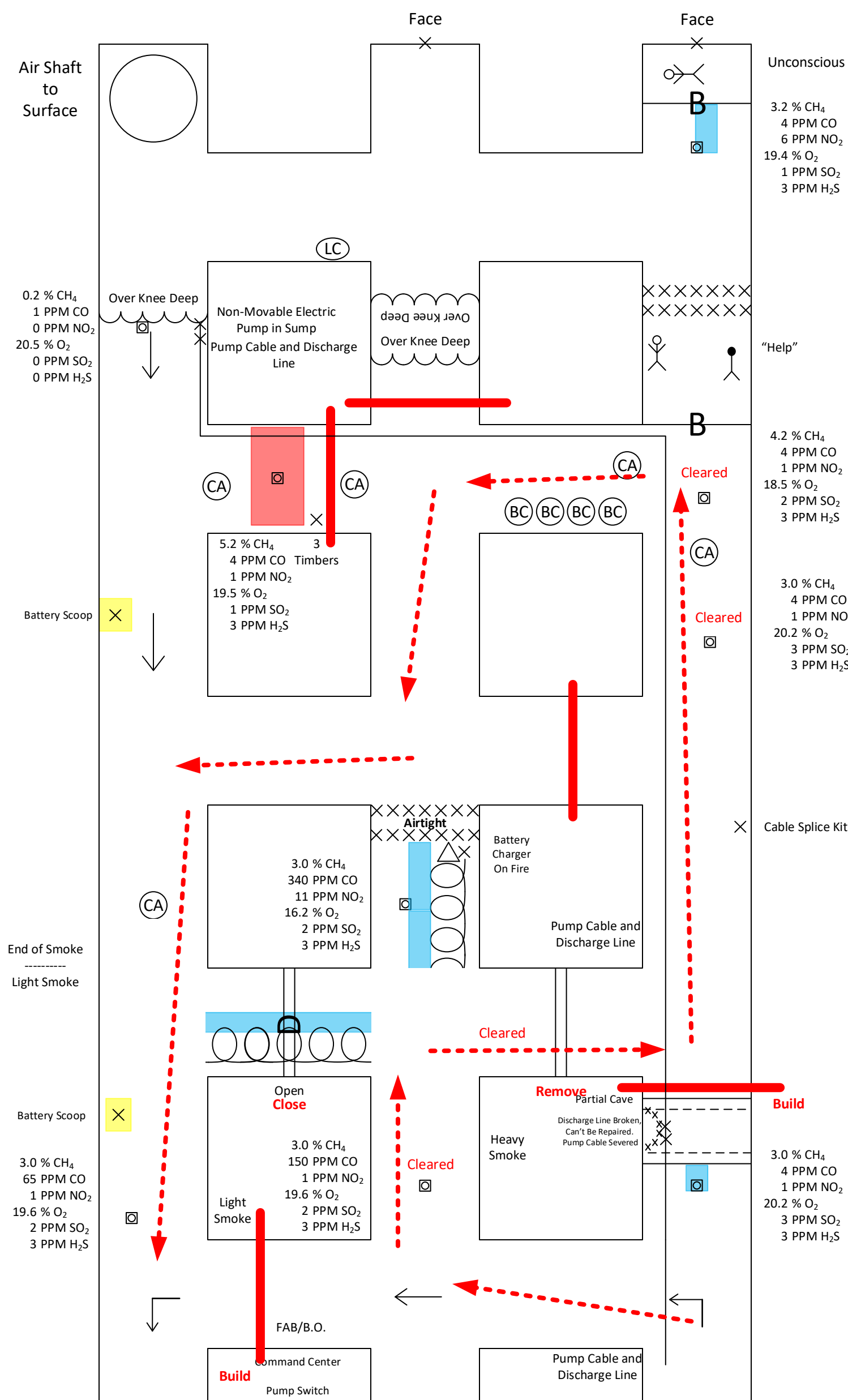
	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	> 2	> 2
% O <sub>2</sub>	----	< 19.5	< 19.5
PPM SO <sub>2</sub>	--	> 2	> 2
PPM H <sub>2</sub> S	4.3-45.5	--	-10
PPM CO <sub>2</sub>	--	> 5000ppm	"



Rules: 34 & 44

	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	> 2	> 2
% O <sub>2</sub>	----	< 19.5	< 19.5
PPM SO <sub>2</sub>	--	> 2	> 2
PPM H <sub>2</sub> S	4.3-45.5	--	>10
PPM CO <sub>2</sub>	--	> 5000ppm	"

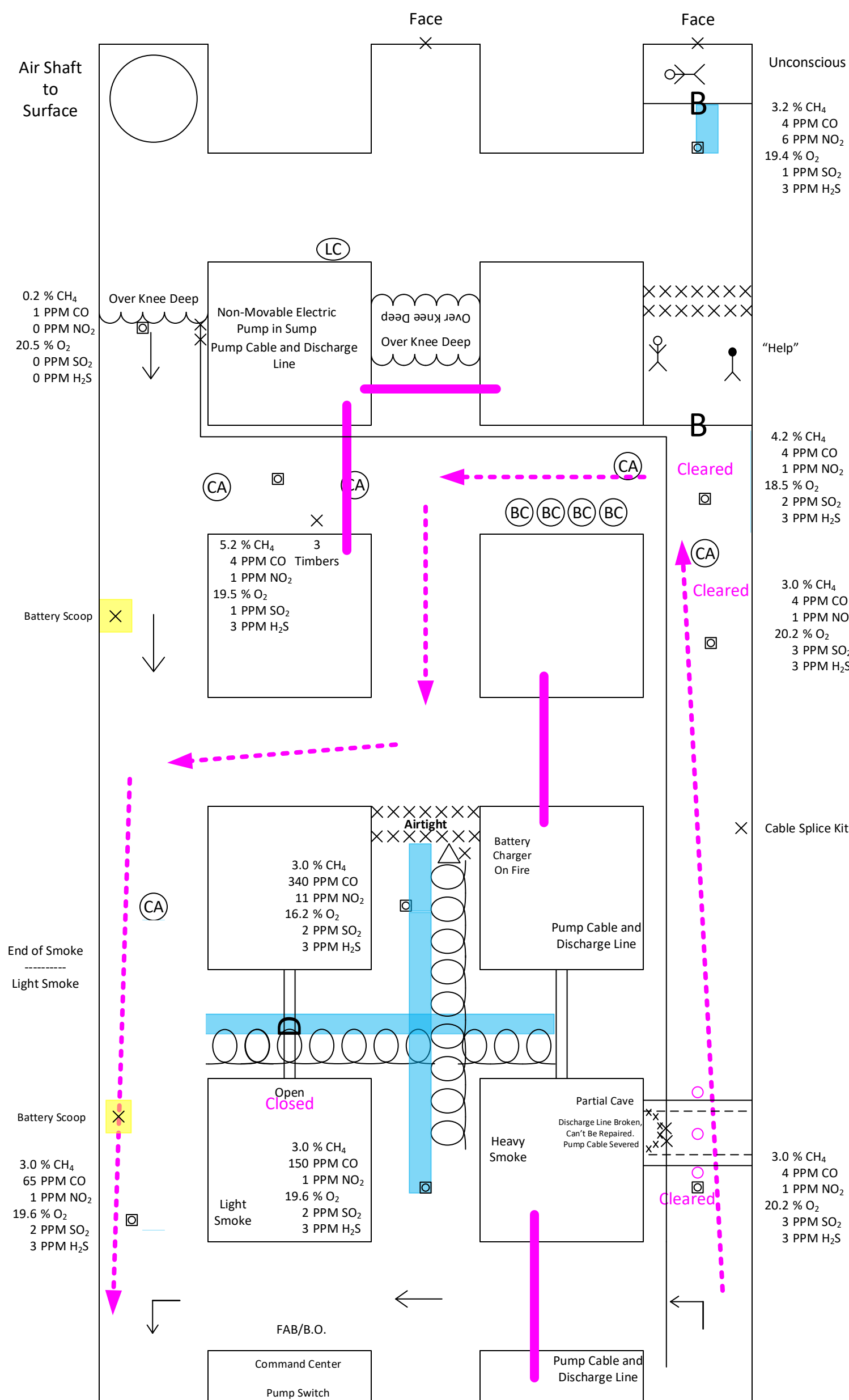
# VENT 1



Rules: 34 & 44

	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	>2	>2
% O <sub>2</sub>	----	<19.5	<19.5
PPM SO <sub>2</sub>	--	>2	>2
PPM H <sub>2</sub> S	4.3-45.5	--	-10
PPM CO <sub>2</sub>	--	>5000ppm	"

VENT 1 ALT

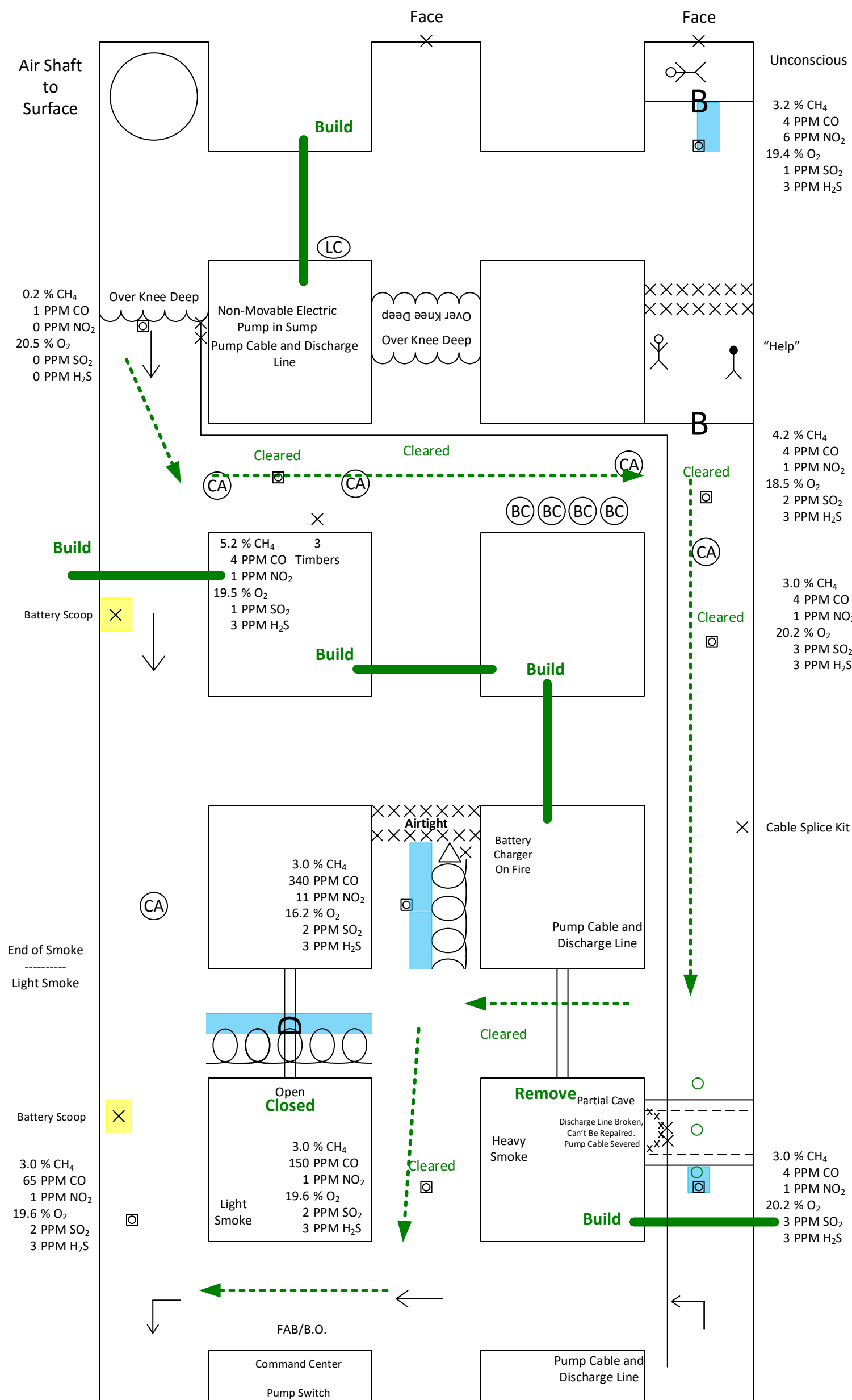


Rules: 34 & 44

	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	>2	>2
% O <sub>2</sub>	----	<19.5	<19.5
PPM SO <sub>2</sub>	--	>2	>2
PPM H <sub>2</sub> S	4.3-45.5	--	-10
PPM CO <sub>2</sub>	--	>5000ppm	"



# Vent 2



Unconscious  
3.2 % CH<sub>4</sub>  
4 PPM CO  
6 PPM NO<sub>2</sub>  
19.4 % O<sub>2</sub>  
1 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

"Help"  
4.2 % CH<sub>4</sub>  
4 PPM CO  
1 PPM NO<sub>2</sub>  
18.5 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

3.0 % CH<sub>4</sub>  
4 PPM CO  
1 PPM NO<sub>2</sub>  
20.2 % O<sub>2</sub>  
3 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

Cable Splice Kit

3.0 % CH<sub>4</sub>  
4 PPM CO  
1 PPM NO<sub>2</sub>  
20.2 % O<sub>2</sub>  
3 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

0.2 % CH<sub>4</sub>  
1 PPM CO  
0 PPM NO<sub>2</sub>  
20.5 % O<sub>2</sub>  
0 PPM SO<sub>2</sub>  
0 PPM H<sub>2</sub>S

5.2 % CH<sub>4</sub> 3  
4 PPM CO Timbers  
1 PPM NO<sub>2</sub>  
19.5 % O<sub>2</sub>  
1 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

3.0 % CH<sub>4</sub>  
340 PPM CO  
11 PPM NO<sub>2</sub>  
16.2 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

Open Closed  
3.0 % CH<sub>4</sub>  
150 PPM CO  
1 PPM NO<sub>2</sub>  
Light Smoke  
19.6 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

3.0 % CH<sub>4</sub>  
65 PPM CO  
1 PPM NO<sub>2</sub>  
19.6 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

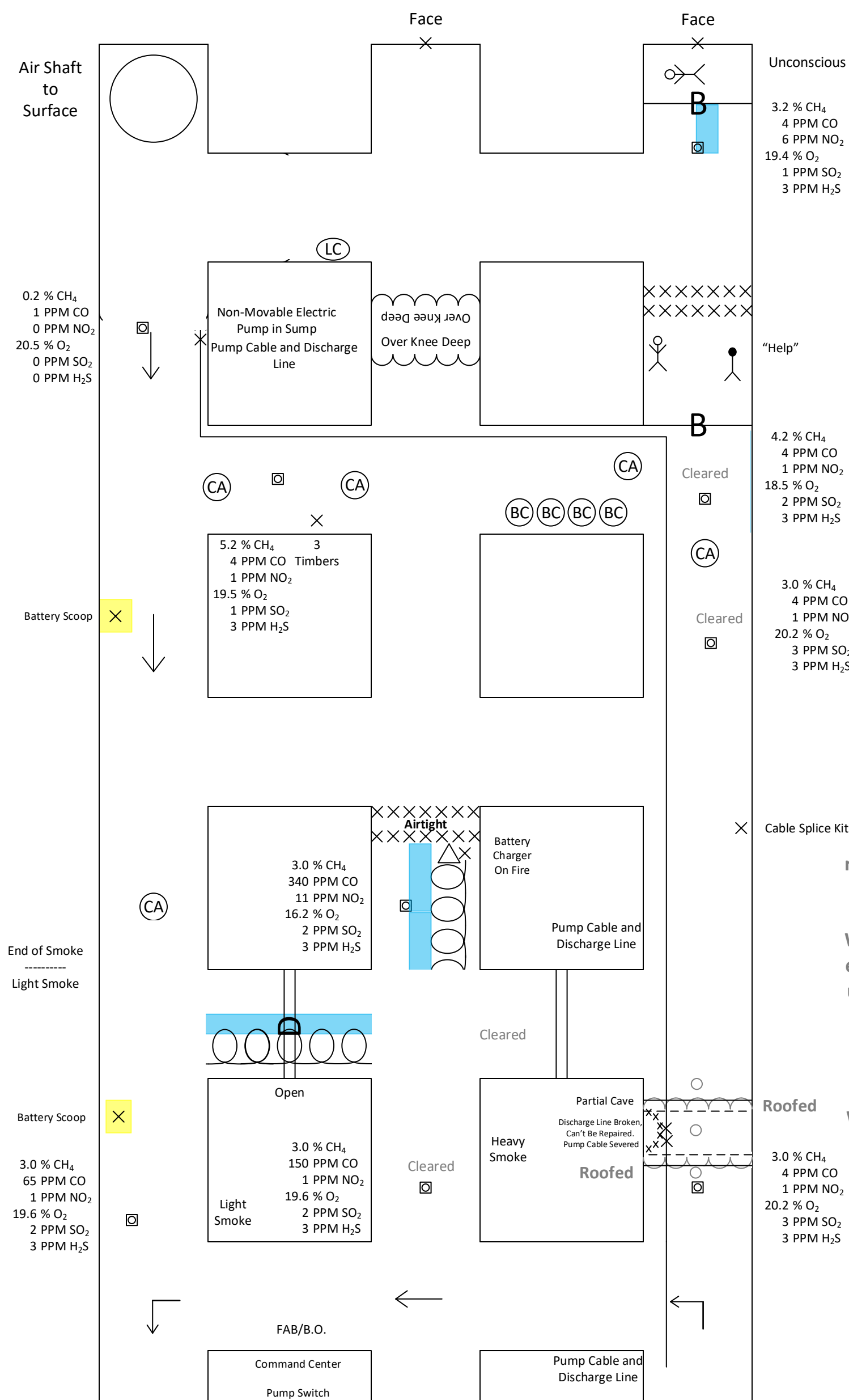
### Rules: 34 & 44

	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	>2	>2
% O <sub>2</sub>	----	<19.5	<19.5
PPM SO <sub>2</sub>	--	>2	>2
PPM H <sub>2</sub> S	4.3-45.5	--	-10
PPM CO <sub>2</sub>	--	>5000ppm	"

# Pump

**NO Airlocks  
required to  
pump water.**

**When pump is  
energized,  
water in LOXC  
AND in 1 Entry  
is gone.**



Unconscious  
3.2 % CH<sub>4</sub>  
4 PPM CO  
6 PPM NO<sub>2</sub>  
19.4 % O<sub>2</sub>  
1 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

0.2 % CH<sub>4</sub>  
1 PPM CO  
0 PPM NO<sub>2</sub>  
20.5 % O<sub>2</sub>  
0 PPM SO<sub>2</sub>  
0 PPM H<sub>2</sub>S

"Help"  
4.2 % CH<sub>4</sub>  
4 PPM CO  
1 PPM NO<sub>2</sub>  
18.5 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

Battery Scoop

5.2 % CH<sub>4</sub> 3  
4 PPM CO Timbers  
1 PPM NO<sub>2</sub>  
19.5 % O<sub>2</sub>  
1 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

3.0 % CH<sub>4</sub>  
4 PPM CO  
1 PPM NO<sub>2</sub>  
20.2 % O<sub>2</sub>  
3 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

End of Smoke  
-----  
Light Smoke

3.0 % CH<sub>4</sub>  
340 PPM CO  
11 PPM NO<sub>2</sub>  
16.2 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

Cable Splice Kit  
**Team MUST  
repair severed  
pump cable.**

Battery Scoop

3.0 % CH<sub>4</sub>  
65 PPM CO  
1 PPM NO<sub>2</sub>  
19.6 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

Open  
3.0 % CH<sub>4</sub>  
150 PPM CO  
1 PPM NO<sub>2</sub>  
19.6 % O<sub>2</sub>  
2 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S  
Light  
Smoke

Roofed  
3.0 % CH<sub>4</sub>  
4 PPM CO  
1 PPM NO<sub>2</sub>  
20.2 % O<sub>2</sub>  
3 PPM SO<sub>2</sub>  
3 PPM H<sub>2</sub>S

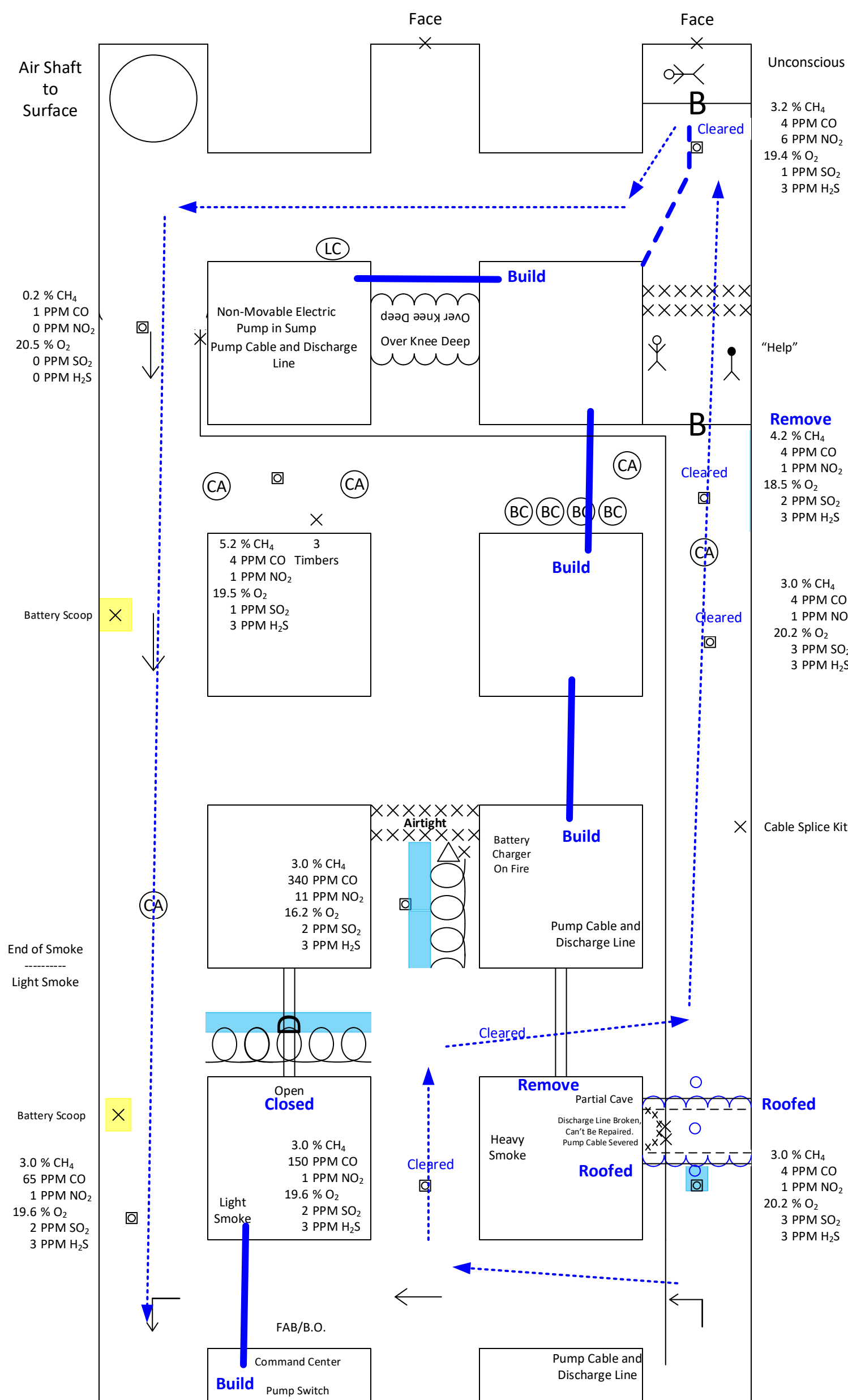
FAB/B.O.  
Command Center  
Pump Switch

Pump Cable and  
Discharge Line

Rules: 34 & 44

	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	> 2	> 2
% O <sub>2</sub>	----	< 19.5	< 19.5
PPM SO <sub>2</sub>	--	> 2	> 2
PPM H <sub>2</sub> S	4.3-45.5	--	>10
PPM CO <sub>2</sub>	--	> 5000ppm	"

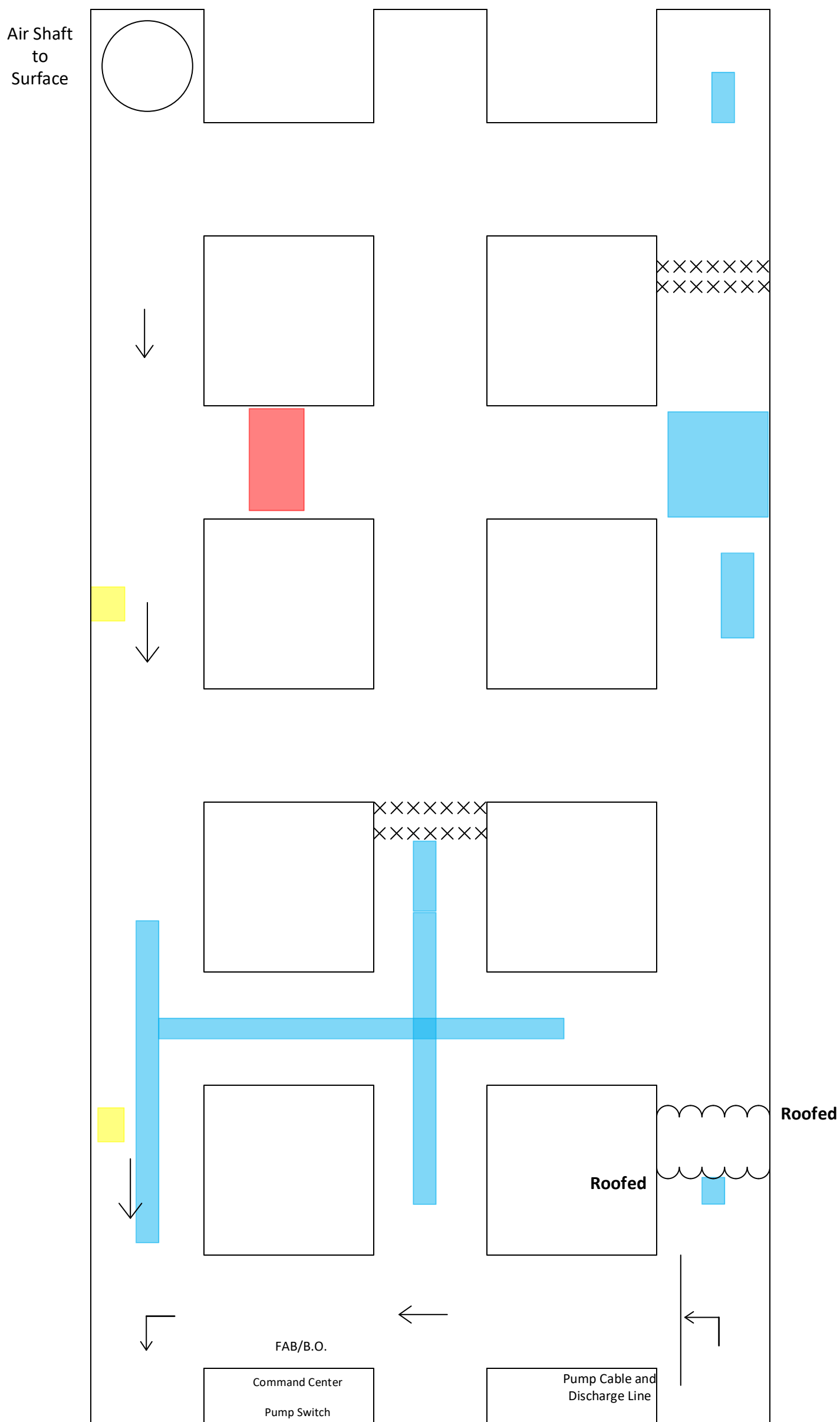
### VENT 3



Rules: 34 & 44

	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	>2	>2
% O <sub>2</sub>	----	<19.5	<19.5
PPM SO <sub>2</sub>	--	>2	>2
PPM H <sub>2</sub> S	4.3-45.5	--	-10
PPM CO <sub>2</sub>	--	>5000ppm	"

Judges Vent Map



Rules: 34 & 44

	Ex	Cont	Irr
% CH <sub>4</sub>	5-15	>1.0	--
PPM CO	--	>10	>50
PPM NO <sub>2</sub>	--	>2	>2
% O <sub>2</sub>	----	<19.5	<19.5
PPM SO <sub>2</sub>	--	>2	>2
PPM H <sub>2</sub> S	4.3-45.5	--	-10
PPM CO <sub>2</sub>	--	>5000ppm	"

Final Vent

Team Name

---

Judge Name

---

Captain Sig

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Air Shaft  
to  
Surface

