

37th Annual Missouri Mine Rescue Contest

JUDGE PACKET

Field Competition Day 2

Wheeler Mine



October 2, 2019

Rolla, MO

Missouri Mine Rescue Contest 2019

Team Briefing

Day #2

Thank you for your assistance yesterday and for your willingness to assist us again today. There have been a few changes since you left yesterday.

At 2:00 am this morning smoke was again observed coming out of the portal. The fan was again shut down and is locked out and guarded.

Overnight a rescue team went underground to the upper level to check the seals and found them to be intact. The team closed one of the airlock doors on the upper level.

Lee Trevino regained consciousness and asked if they had found the three miners working in the lower level who failed to brass in. George confirmed that the three miners were not at home and must still be in the mine.

There has been no communication with the three miners underground.

Power is on to the hoist and air door.

A hoist man is stationed in the hoistroom underground and the hoist is available for use.

It is now 7:00 am and you are the first team to go underground today. A back up team is on site and available should you need them.

If you are ready and willing, the services of your mine rescue team is needed. We would like for you to accomplish the following objectives.

Field Problem Objectives:

- Explore all accessible areas of the mine
- Extinguish or seal all fires
- Locate all missing miners
- Bring all survivors to the surface

Missouri Mine Rescue Contest 2019

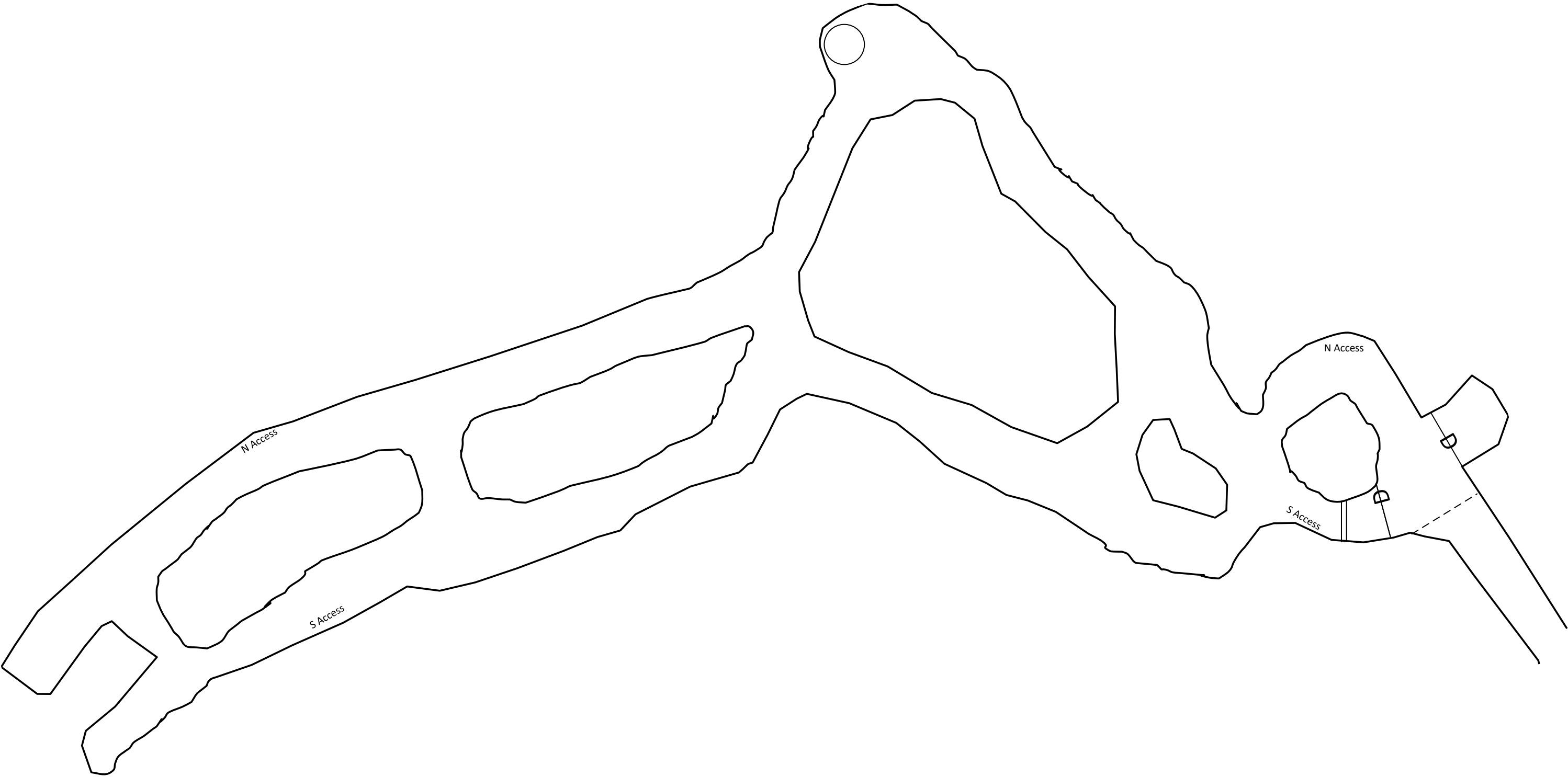
Mine Information

MINE ACCESS	The Taylor Par Three Mine, is a multi-level underground cobalt-lead-zinc operation, located adjacent to State Highway 14, six miles north of Ely, Missouri. A portal serves as the main entry into upper level of the mine. The lower level is accessed by an underground hoist.
BACKUP TEAM(S)	Additional mine rescue teams are in-route.
EXPLOSIVES	Explosives are available and stored on the surface.
ELECTRICITY	A 4160 Volt power line enters the mine into the hoist room. The line feeds power to hoist. The fan is powered by a separate line on the surface.
GAS	The mine has a category VI classification.
Mining Method	Taylor Mining began production in 1970 on the upper level. An underground shaft and hoist was installed in 2005 to begin mining the lower level. The Par Three Mine is a room and pillar mine. The drifts are 10' wide with a back height of 8'
MATERIALS	All materials to work the problem are located underground or on the surface at the fresh air base and are identified by placards.
MINE MAPS	The mine map was last updated on September 24, 2019.
MINING EQUIPMENT	Small diesel powered scoops, drilling rigs; roof bolters, charging rigs, and side by sides are used underground.
NOTIFICATION	All federal, state, and local officials have been notified.
OTHER MINES	No other mines are located in the area.
PHONES	Mine phones underground is located in the shop and hoistroom.
REFUGE CHAMBERS	None available at this time.
ROOF SUPPORT	Fully grouted resin bolts are used in varying lengths for primary roof support. Timbers are used for secondary support.
VENTILATION	One 60 inch diameter Joy axi-vane fan capable of moving 50,000 cfm is used to ventilate the mine. The fan is intaking and is located on the surface along with the controls. The fan is non-reversible. The portal serves as the exhaust for the ventilation. The shaft and fan are guarded and are inaccessible. The fan controls can be operated by the personnel guarding the fan. A winze (raise) was developed to assist in ventilation between the two levels and additional raises are strategically placed from level to level throughout the mine.
WATER	A portable diesel pump is located underground and is used when needed for problem water spots.

Team Map Day 2

Team Name: _____

Team Draw # _____



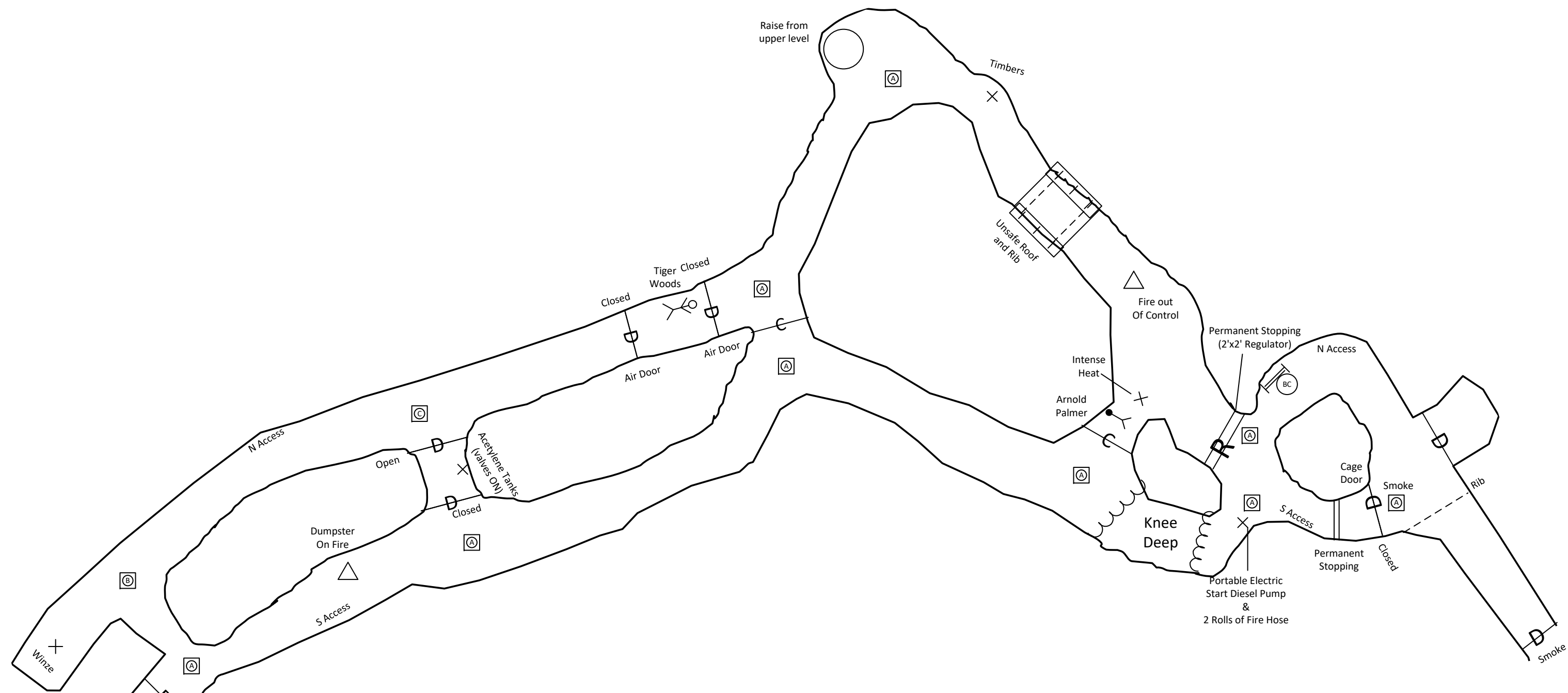
Wheeler Mine



Problem Map Day 2

Team Name: _____

Team Draw # _____



Gas Placard Key		
CA = Clear Air		
<div>A</div> = O ₂ - 16%	<div>B</div> = O ₂ - 17.5%	<div>C</div> = O ₂ - 16%
CO - 0.9321%	CO - 0.1190%	CO - 0%
NO ₂ - 0%	NO ₂ - 0%	NO ₂ - 0%
CH ₄ - 0%	CH ₄ - 0%	C ₂ H ₂ - 4%
Heavy Smoke	Light Smoke	



Missouri Mine Rescue Contest 2019
Day #2 Underground Solution
(See Solution Maps)

Fresh Air Base

The teams will arrive at the FAB and have introductions, the team will be informed that they are permitted to string out their communication line but will not be able to check functionality until they have started the clock. Once the clock has been started the team will receive all of their maps and information.

Note: Throughout the field problem, while advancing and at the intersections the team will check for loose ground (loose roof or rib).

Team Stop #1

Teams will explore and check the portal to the mine, they will identify “Smoke” and the “Mine Door (open)”. The team will count of entering the mine/smoke and likely conduct a 50’ check. The team will be entering the mine on the upper level and explore up to the underground hoist. Mine information stated that the hoist operator is underground and the hoist is available for use.

Team Stop #2

The team will arrive at the cage entrance and identify a “Smoke” placard and the “Cage Door”. The team must conduct necessary gas tests. The conveyance will be at the top of the shaft. The team will place combustible material on the cage and send it down, using the posted shaft signal codes. The team will then signal the cage to return to surface. When the material is checked, it will be intact and dry. The team will enter the cage and travel to the lower level. When the team reaches the shaft bottom, before exiting the cage, the captain must check for loose in front of the cage. Just outside of the cage the team will identify an “A” gas placard (see map for concentrations). The team will also identify a “Rib” on the right side.

Note: There will be no delay for the conveyance to travel in each direction, each time the shaft conveyance is used.

Team Stop #3

The team will continue exploration west in the N. Access until they reach the next intersection. Examining the intersection the team will identify an “A” gas placard, “Brattice Cloth and Brattice Frames (1 set)” on the rib, and “Permanent Stopping (2’x2’ Regulator)”.

Team Stop #4

The team will continue exploration south until they reach the intersection of the S. Access. Examining the intersection the team will identify an “A” gas placard, “Water Knee Deep”, and “Electric Start Diesel Pump & 2 Rolls of Fire Hose”. The team will explore east until they reach the “Permanent Stopping”.

Team Stop #5

The team will continue exploration west in the S. Access, through the water knee deep until they reach the next intersection. Examining this intersection the team will identify an “A” gas placard. Stretching north the team will identify a “Check Curtain”. The team will continue north through the check curtain and identify “Arnold Palmer”, examining the miner the team will identify that the miner is deceased. The team will also identify “Intense Heat”, the team will likely convert the check curtain into a temporary stopping with a regulator. The team will now seek to find the other approach to the fire.

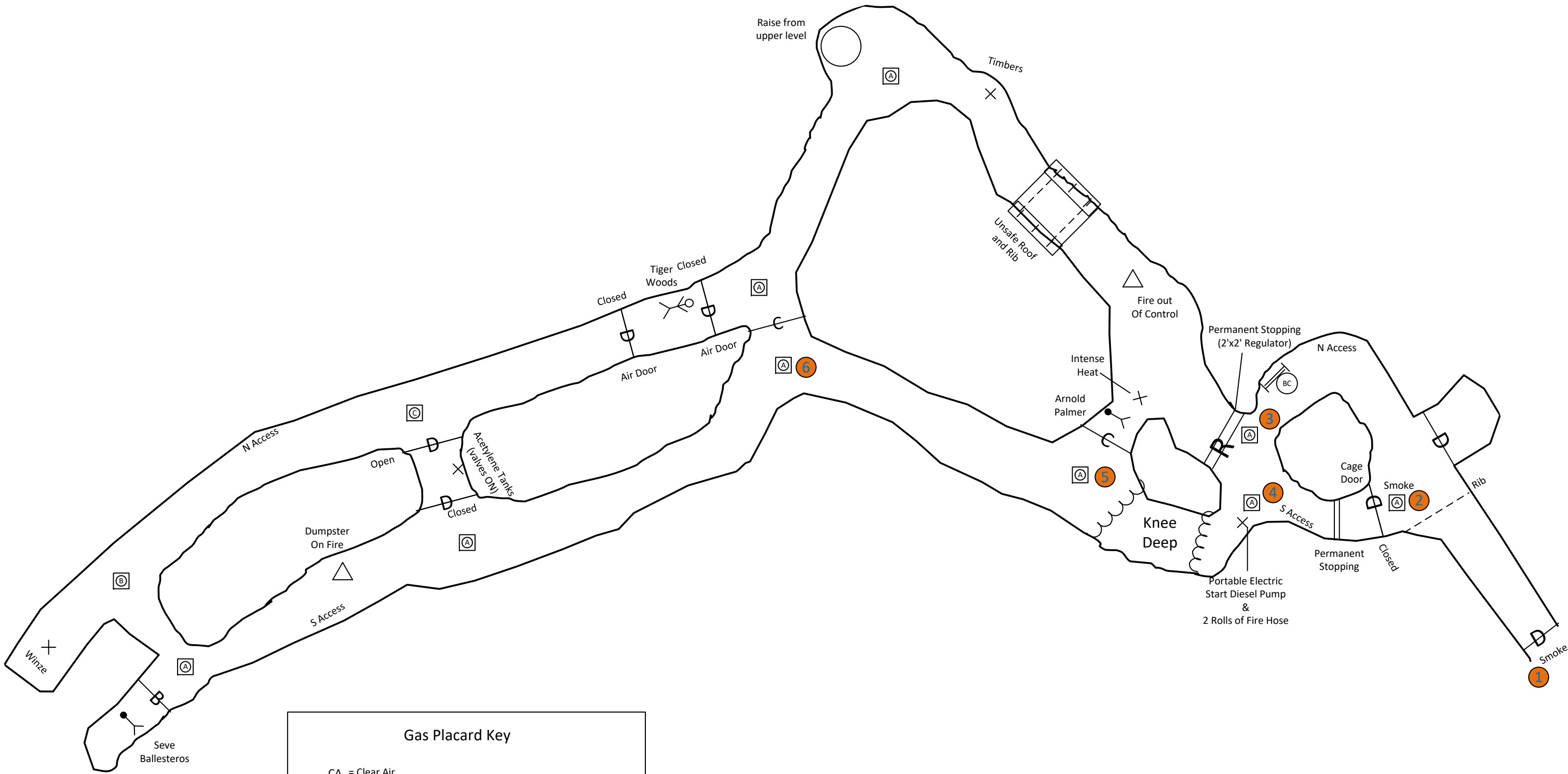
Team Stop #6

The team will return to the S. Access and continue exploration west until they reach the next intersection. Examining this intersection they will identify an “A” gas placard.

Solution Map Day 2

Team Name: _____

Team Draw # _____



Gas Placard Key

CA = Clear Air

A

= O₂ - 16%

CO - 0.9321%

NO₂ - 0%

CH₄ - 0%

Heavy Smoke

B

= O₂ - 17.5%

CO - 0.1190%

NO₂ - 0%

CH₄ - 0%

Light Smoke

C

= O₂ - 16%

CO - 0%

NO₂ - 0%

C₂H₂ - 4%



Team Stop #7

The team will continue exploration identifying a “Check Curtain” on their way to the next intersection of the N. Access. Examining this intersection they will identify an “A” gas placard. The team will also identify an “Air Door”, knocking on the door the team will make contact with “Tiger Woods” the miner will provide the following statement: “My name is Tiger Woods, I barricaded myself in here after seeing smoke when I was trying to escape. I’m completely enclosed, there is a closed air door on the other side of me, I am not hurt and the air in here is good. Get me out of here!” Due to the gas concentrations outside of the air door the team will not be permitted to erect an airlock to enter and rescue Tiger Woods.

Team Stop #8

The team will continue exploration north until they reach the next intersection. Examining the intersection the team will identify an “A” gas placard, “Raise from upper level”, and “Timbers”. The team will also identify “Unsafe Roof and Rib”. Utilizing the roof support techniques outlines in the rule book, it will be necessary for the team to install a total of 6 timbers to support the entire area. The team examine the other side of the unsafe roof and rib and identify “Fire (out of control)”, the team must regulate or seal the fire. The team will utilize the building materials that they have to seal this approach to the fire.

Note: Now that the team has identified all approaches to the fire, they will likely return and seal the other two regulators to completely seal the fire.

Team Stop #9

The team will return to the S. Access and continue exploration south until they reach the next intersection. Examining the intersection the team will identify an “A” gas placard and “Shop Door (closed)”, knocking on the door the team will receive no response. The team will continue exploration and identify “Dumpster on Fire”. The team will attempt to extinguish the fire utilizing hand-held fire extinguishers and will be unsuccessful no matter how many units they use. The team will need to drop the pump in the water knee deep, attach the hose, roll out the fire hose, start the pump, and use the hose to fill the dumpster with water in order to properly extinguish the fire.

Team Stop #10

The team will continue exploration until they reach the next intersection. Examining the intersection the team will identify an “A” gas placard” and a “Barricade”. Knocking on the barricade the team will get no response.

Team Stop #11

The team will continue exploration to intersection of the N. Access. Examining the intersection the team will identify a “B” gas placard (see map for concentrations). Stretching south the team will identify a “Winze to upper level”.

Team Stop #12

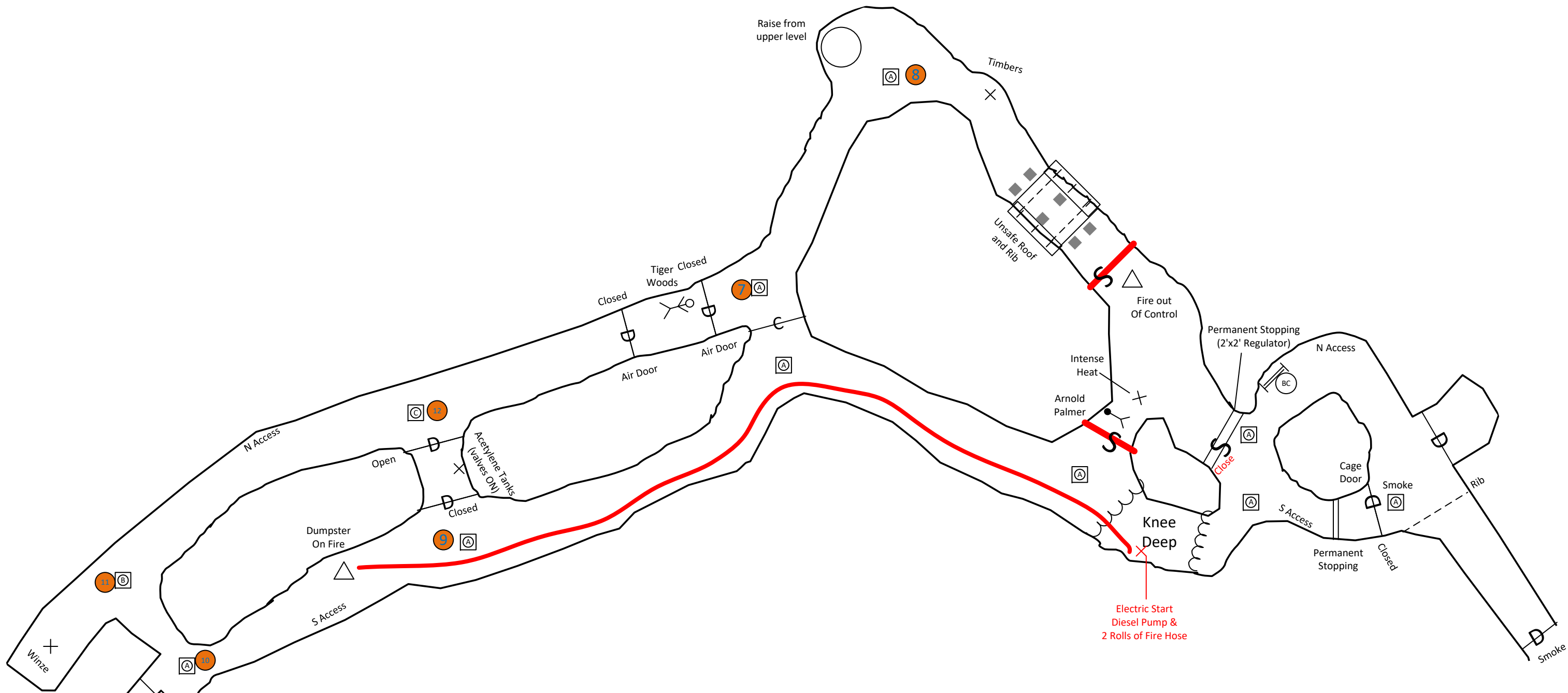
The team will continue exploration north until they reach the next intersection, examining the intersection the team will identify a “C” gas placard (see solution map for concentrations), “Air Door (closed)”, and “Shop Door (open)”. Knocking on the Air Door the team will make contact with Tiger Woods and he will provide the same response as he did prior. **This gas placard will contain an explosive air/gas mixture, the team must notify the fresh air base immediately. The team will be permitted to continue exploration, since they have identified and isolated both fires.** The team will explore inside the shop and identify “Acetylene Tanks (valves ON)”, the team will immediately close the valves.

The team has now explored all accessible areas of the mine to this point and will have the means to execute the first ventilation change.

Solution Map Day 2

Team Name: _____

Team Draw # _____



Gas Placard Key		
CA = Clear Air		
<div>A</div> = O ₂ - 16%	<div>B</div> = O ₂ - 17.5%	<div>C</div> = O ₂ - 16%
CO - 0.9321%	CO - 0.1190%	CO - 0%
NO ₂ - 0%	NO ₂ - 0%	NO ₂ - 0%
CH ₄ - 0%	CH ₄ - 0%	C ₂ H ₂ - 4%
Heavy Smoke	Light Smoke	



Ventilation Change #1 to enter the Air Doors to rescue Tiger Woods (See attached map)

The team will request a ventilation change, once granted the following steps will be required to clear the area in front of the Air Door.

- Move the pump assembly to isolate the ignition source
- Relocate and convert the check curtain into a temporary stopping
- Open both Shop Doors
- Utilize the guard on surface to start the fan

Note: Ventilation path is indicated by blue arrows. The ventilation air flow will enter the upper level and travel down the Winze to the lower level, through the mine, back up the shaft, and then out of the portal entrance.

Note: Upon reentry into areas cleared of smoke and toxic or dangerous gasses, teams shall make gas tests rib to rib at all openings along the route they travel.

Team Stop #13

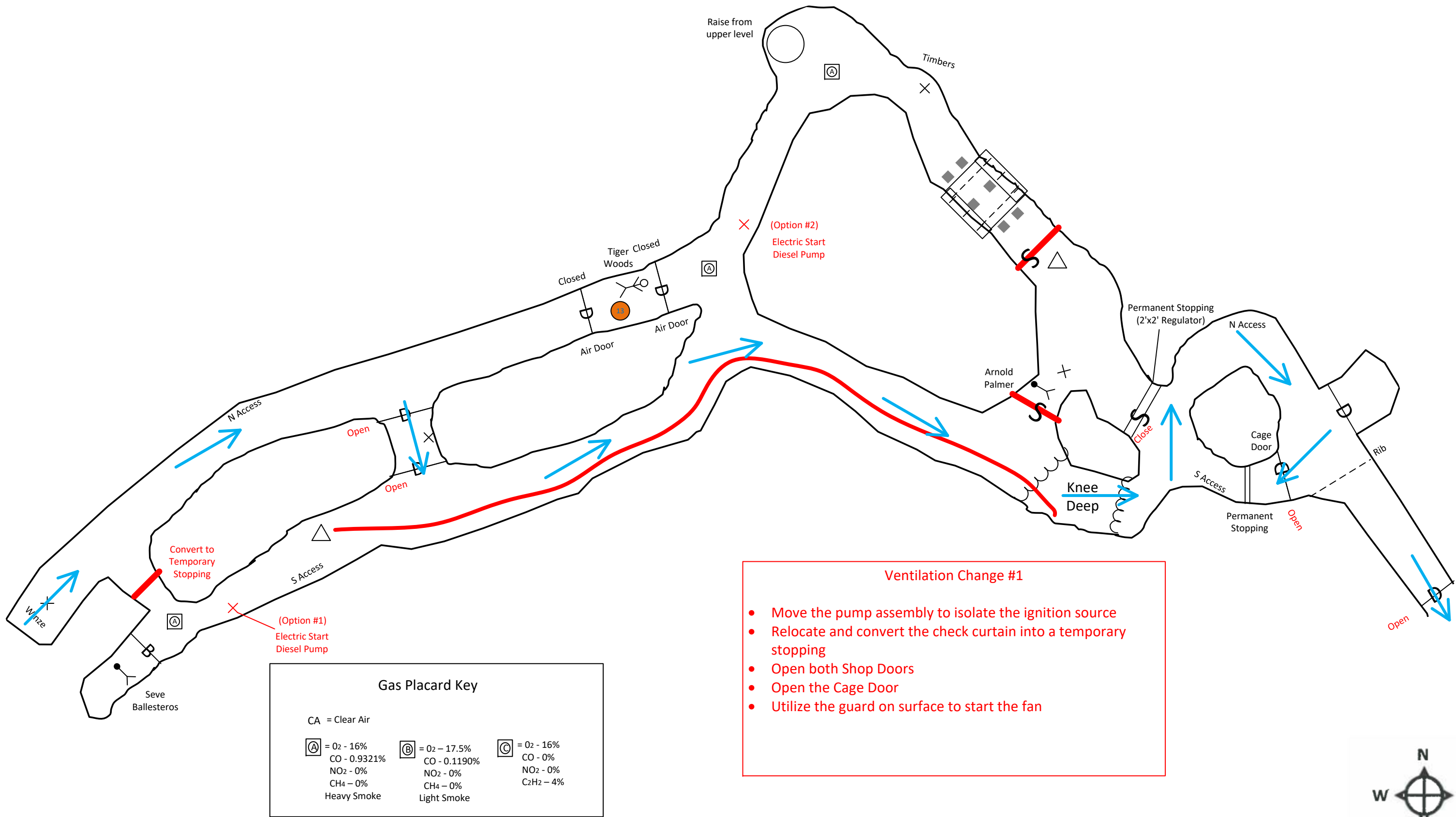
The team will know the condition behind the air door and will be permitted to open the air door and rescue Tiger Woods. The miner is not injured and can walk out with the team.

The team will have the means to execute ventilation change #2 in order to enter the barricade.

Ventilation Change #1
Map Day 2

Team Name: _____

Team Draw # _____



Ventilation Change #2 to enter the Barricade (See attached map)

The team will request a ventilation change, once granted the following steps will be required to clear the area in front of the Barricade.

- Fan still “ON”
- Take down the temporary stopping in the crosscut
- Close at least one Shop Door
- Maintain at least one Air Door closed

Note: Ventilation path is indicated by blue arrows. The ventilation air flow will enter the upper level and travel down the Winze to the lower level, through the mine, back up the shaft, and then out of the portal entrance.

Note: Upon reentry into areas cleared of smoke and toxic or dangerous gasses, teams shall make gas tests rib to rib at all openings along the route they travel.

Team Stop #14

The team will not know the conditions behind the barricade. The team can utilize the temporary stopping and build the air lock at the entrance to the barricade. When the team enters, they will identify “Seve Ballesteros”, upon examining the miner, they will identify that the miner is deceased.

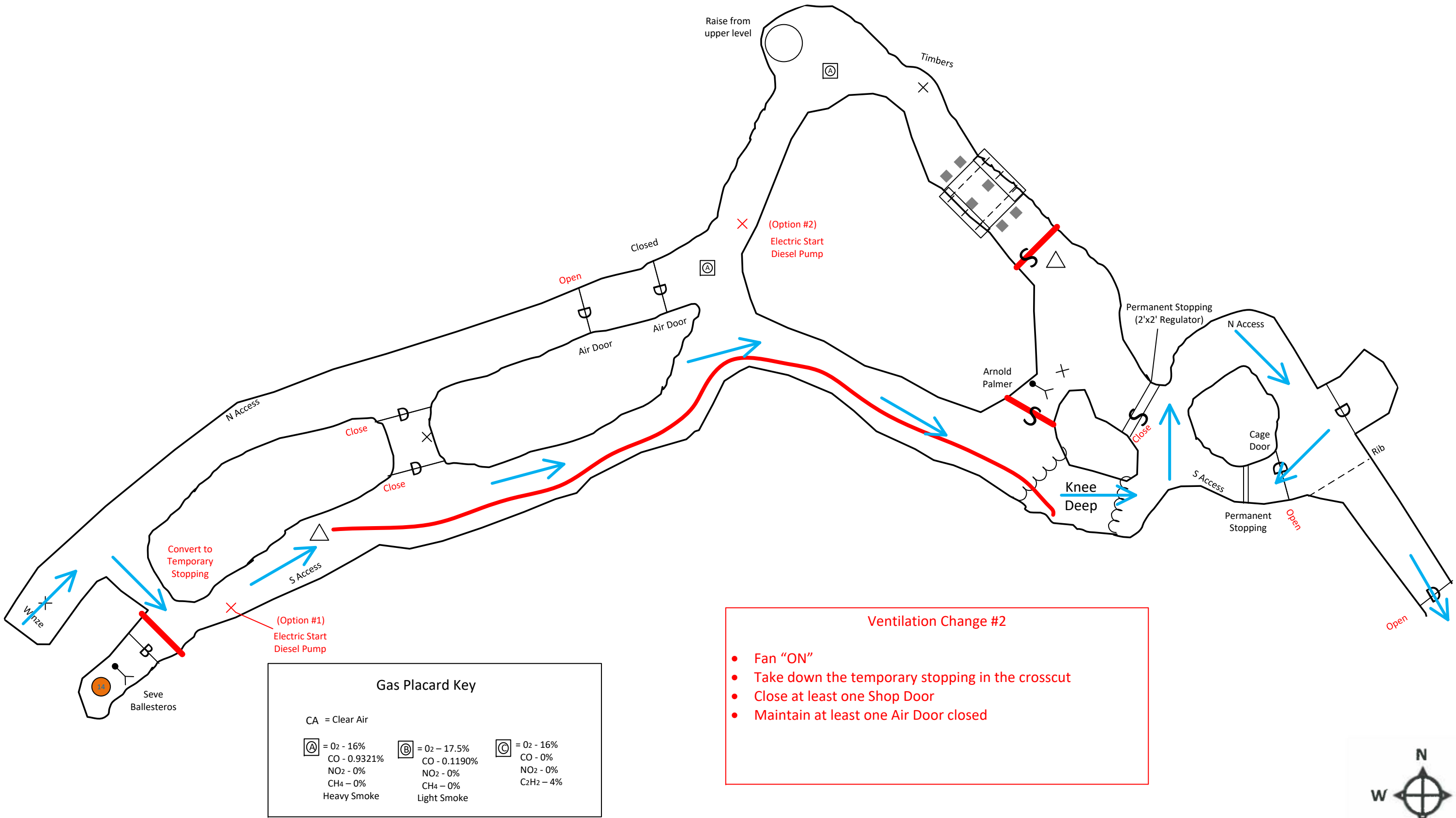
The team will has explored all accessible areas of the mine, sealed and extinguished all fires, and brought all survivors to surface. The team will relay any information necessary to the mine manager, turn in all maps and stop the clock. THE END!

Ventilation Change #2

Map Day 2

Team Name: _____

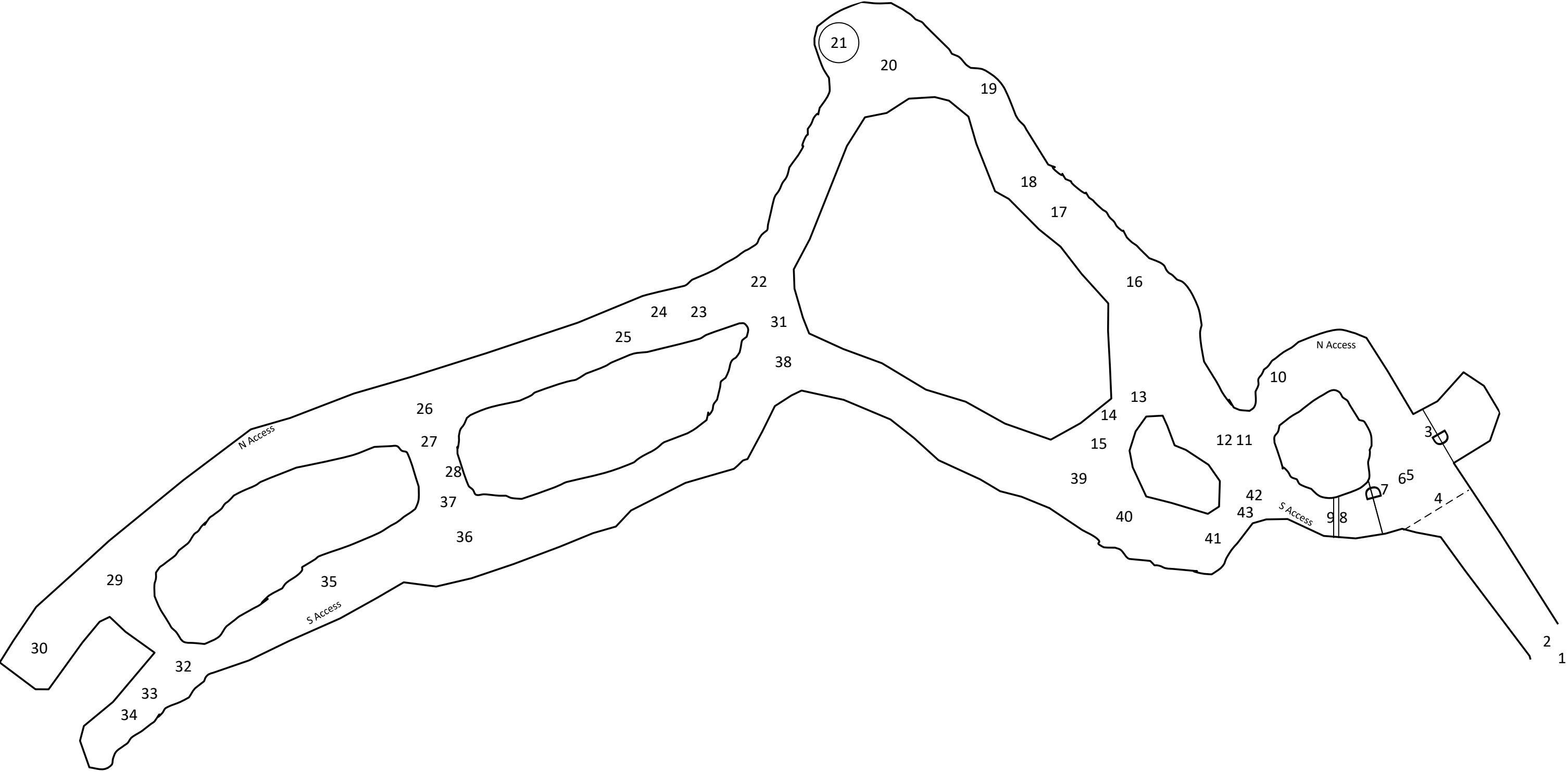
Team Draw # _____



Placard Map Day 2

Team Name: _____

Team Draw # _____



Wheeler Mine

