

37th Annual Missouri Mine Rescue Contest

JUDGE PACKET

Field Competition Day 1

Surface Mine



October 1, 2019

Rolla, MO

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	The only mine phones underground are 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.

Missouri Mine Rescue Contest 2019

Team Briefing

Day #1

You have arrived at the Taylor Par Three Mine, an underground cobalt-lead-zinc operation. Thanks for responding to our emergency situation.

Six miners are employed underground on one 8-hour shift per day, 6 days a week. The 6 miners work from 07:00 – 15:00. Ore production averages approximately 100 tons a day. Principal products are cobalt, galena, and sphalerite.

Five production miners and their foreman, George Jones, went underground at 7:00 am. Jones handed out work assignments and then came back to the surface for a corporate planning meeting.

At approximately 10:30 am this morning Jones looked out his office window and saw smoke coming from the portal.

Foreman Jones instructed maintenance man Erick Williams to shut the fan off.

At 10:35 am, Williams reported to Jones that the fan was shut off, the controls were locked out and he is guarding the controls and awaiting further instruction.

The brass board shows that two miners are still underground.

It is now 12:45 pm and you are the first mine rescue team to arrive.

All government (federal, state and local) agencies have been notified and are on site. If you are ready and willing, the service of your mine rescue team is needed. A backup mine rescue team has just arrived and is available should you need them. Good Luck!

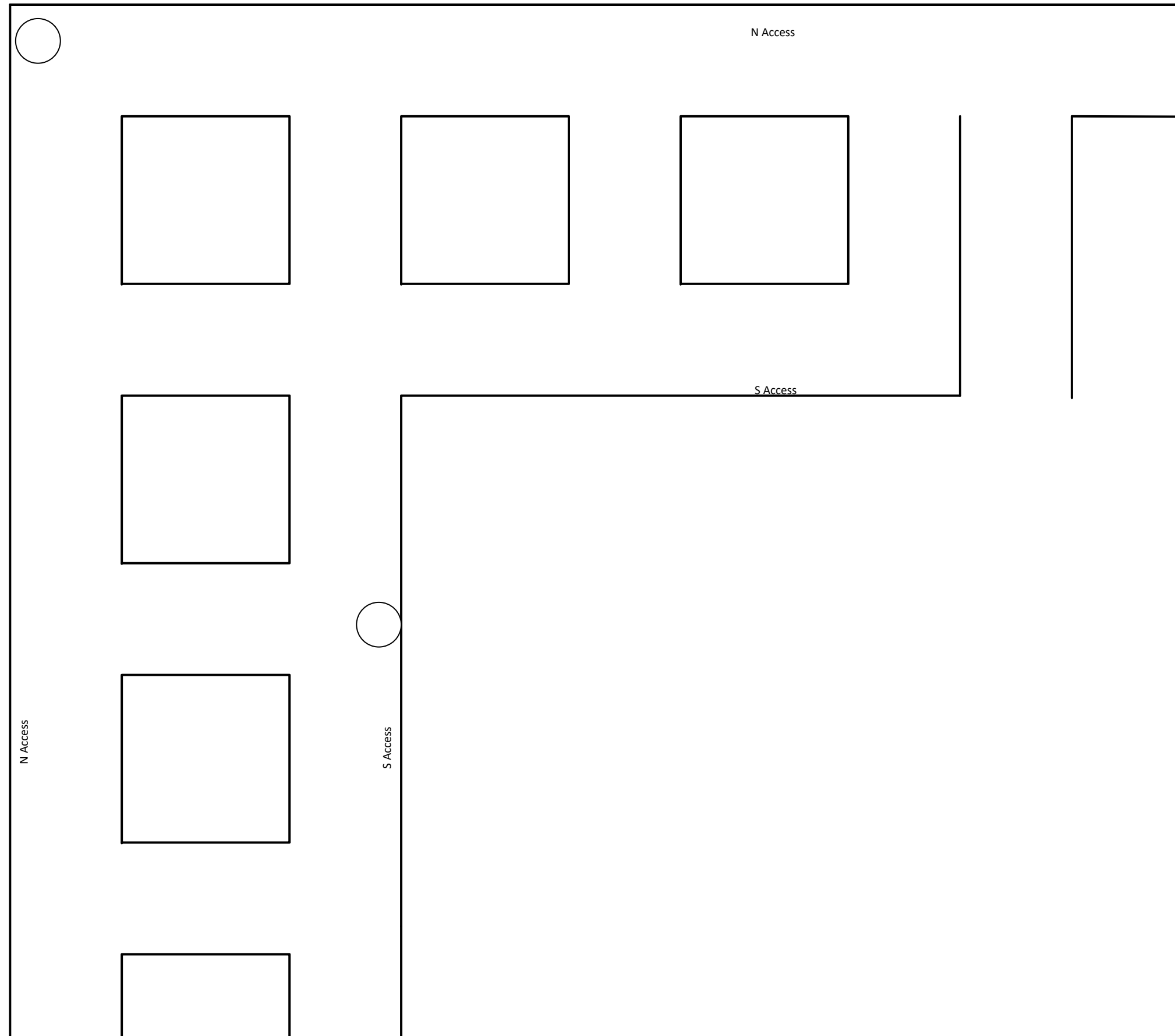
Field Problem Objectives:

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

Team Map Day 1

Team Name: _____

Team Draw # _____



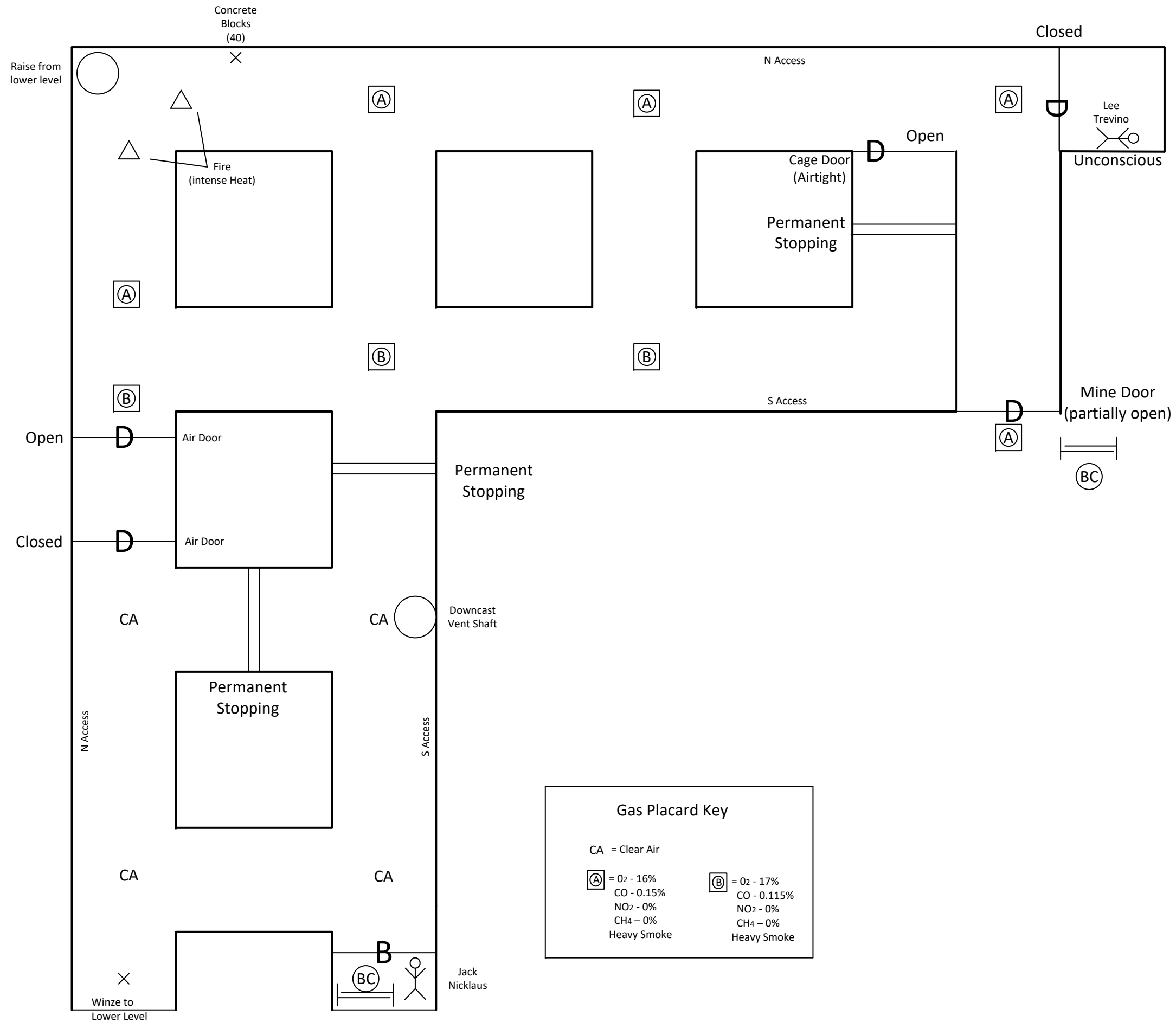
Surface Mine



Problem Map Day 1

Team Name: _____

Team Draw # _____



Gas Placard Key	
CA = Clear Air	
(A) = O ₂ - 16% CO - 0.15% NO ₂ - 0% CH ₄ - 0% Heavy Smoke	(B) = O ₂ - 17% CO - 0.115% NO ₂ - 0% CH ₄ - 0% Heavy Smoke

Surface Mine



Missouri Mine Rescue Contest 2019
Day #1 Surface 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 the FAB area and identify “Brattice Cloth and Brattice Frames (1 set)”. The team will examine up to the portal entry and identify an “A” gas placard (see solution map for concentrations). The team will identify a “Mine Door (partially open). The hydraulic air doors are stuck (no power), requiring the team to utilize a 10 lb. hammer to drive a 4’ railroad tie 4’ down a plywood track in order to open the door.

Team Stop #2

The team will count off entering the mine/smoke and perform a 50’ team check. The team will continue exploration to the intersection of the N Access. Examining this area the team will identify an “A” gas placard and a “Hoistroom Door (closed)”, knocking on the door the team will receive no response. The team will also identify “Cage Door (airtight)” in the open position but will not be able to check the cage due to not having any power.

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.

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 “B” gas placard. Examining east the team will explore until they reach a “Permanent Stopping”

Team Stop #5

The team will continue exploration west in the S. Access until they reach the next intersection. Examining this intersection the team will identify an “B” gas placard. Stretching south the team will identify a “Permanent Stopping”.

Team Stop #6

The team will continue exploration north until they reach the intersection of the N. Access. Examining this intersection they will identify an “A” gas placard. The team will stretch east to tie-in their exploration.

Team Stop #7

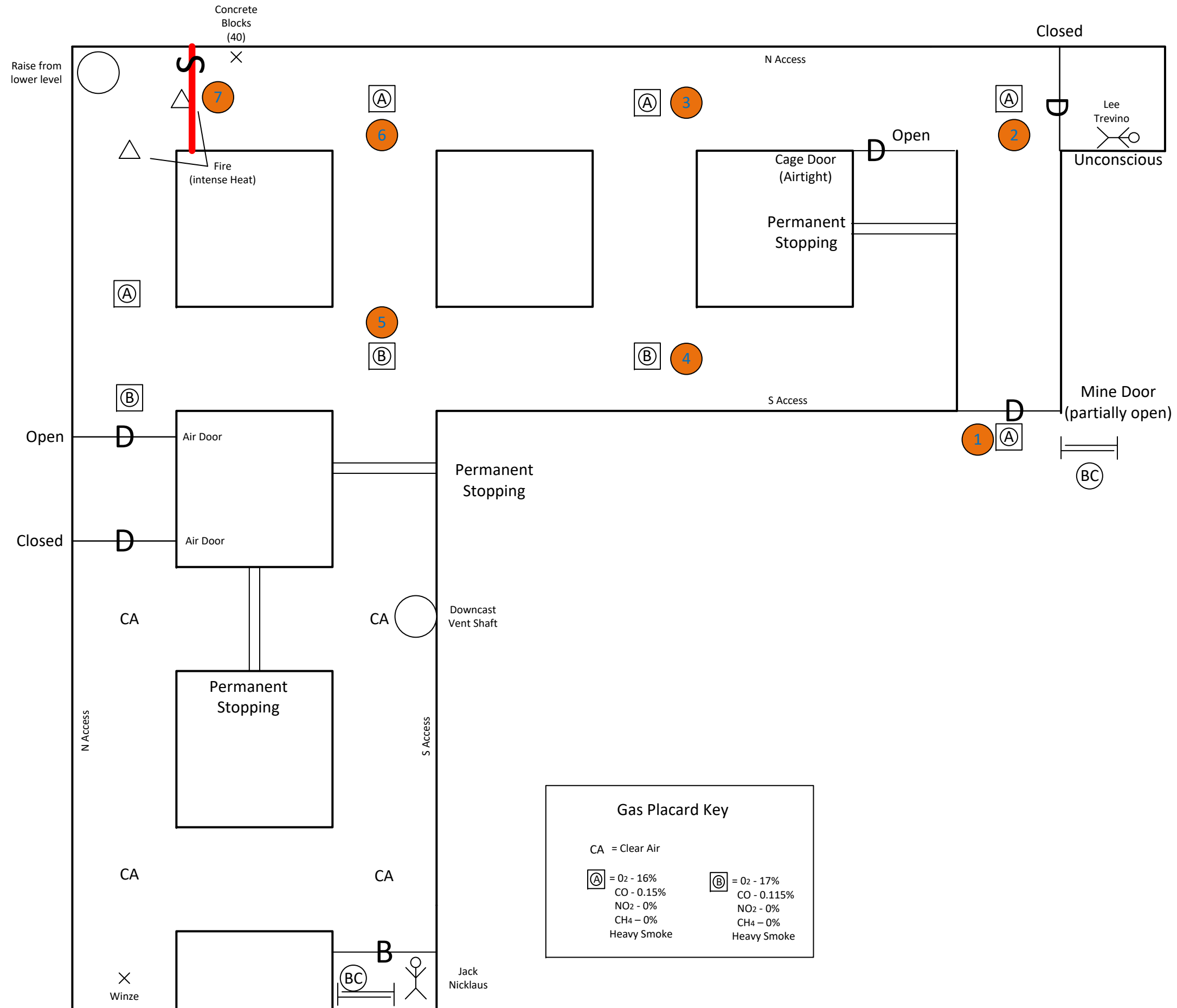
The team will continue exploration west in the N. Access, along their travel the team will identify “Concrete Blocks (40)” on the rib. The team will also identify a “Fire (intense heat)”, the team shall, without undue delay, seal or regulate the fire. The team will have one set of building materials and the concrete block to choose from to construct the temporary stopping. The team must then, without undue delay find all other approaches to the fire and seal or regulate them.

Note: If the team chooses to use the concrete block, the seal will be considered completely installed when all 40 concrete blocks are installed. If the team elects to install a regulator, the team can remove a block to show the regulated side of the temporary stopping.

Solution Map Day 1

Team Name: _____

Team Draw # _____



Surface Mine

Gas Placard Key	
CA = Clear Air	
(A) = O ₂ - 16%	(B) = O ₂ - 17%
CO - 0.15%	CO - 0.115%
NO ₂ - 0%	NO ₂ - 0%
CH ₄ - 0%	CH ₄ - 0%
Heavy Smoke	Heavy Smoke



Team Stop #8

The team will return to the S. Access and continue exploration to identify the other approach to the fire. Examining this intersection the team will identify a “B” gas placard (see solution map for concentrations), stretching south the team will identify a set of “Air Doors”, with the first air door open and the second air door closed. North of the intersection the team will identify an “A” gas placard.

Team Stop #9

The team will continue exploration north until they reach “Fire (intense heat)”. The team must seal or regulate this approach to the fire. Once complete the team will likely return to the other approach and close the regulator to completely seal the area.

Note: If the team chose to use the building materials at the other approach to the fire, they will need to return to gather the concrete block to build the temporary stopping.

Team Stop #10

The team will continue exploration south in the N. Access, due to the concentration in front of the air doors, the team will be permitted to use the air doors to create an air lock to continue exploration south by closing one air door and opening the other. The team will examine this intersection and identify “Clear Air”. Stretching east the team will identify a “Permanent Stopping”.

Team Stop #11

The team will continue exploration south in the N. Access to the next intersection. Examining the intersection the team will identify “Clear Air”, stretching south the team will identify a “Winze” to the lower level.

Team Stop #12

The team will continue exploration east to the intersection of the S. Access, examining the intersection the team will identify “Clear Air”. Stretching south the team will identify a “Barricade”, knocking on the barricade the team will make contact with “Jack Nicklaus” the miner will provide the following statement: “My name is Jack Nicklaus, I barricaded myself in here after seeing smoke when I was trying to escape. I’m completely enclosed, I am not hurt and the air in here is good. Get me out of here!”. The team knows the condition behind the barricade and they are in clear air, the team will be permitted to enter the barricade to rescue the survivor. Examining the area the team will identify “Brattice Cloth and Brattice Frames (1set)”.

Note: The team will need to provide respiratory protection for the survivor since they will travel through IDLH atmosphere. This can include an approved 1-hour oxygen generating unit.

Team Stop #13

The team will return to the area they last explored and continue north in the S. Access until they reach the next intersection. Examining the intersection the team will identify “Clear Air” and a “Downcast Vent Shaft” overhead. Stretching west the team will identify the backside of the “Permanent Stopping” in the crosscut. Stretching north the team will identify a “Permanent Stopping”.

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

Ventilation Change to enter the Hoistroom (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 Hoistroom.

- Build a temporary stopping in front of the Winze
- Open both air doors
- Close the shaft door
- Utilize the guard on surface to start the fan

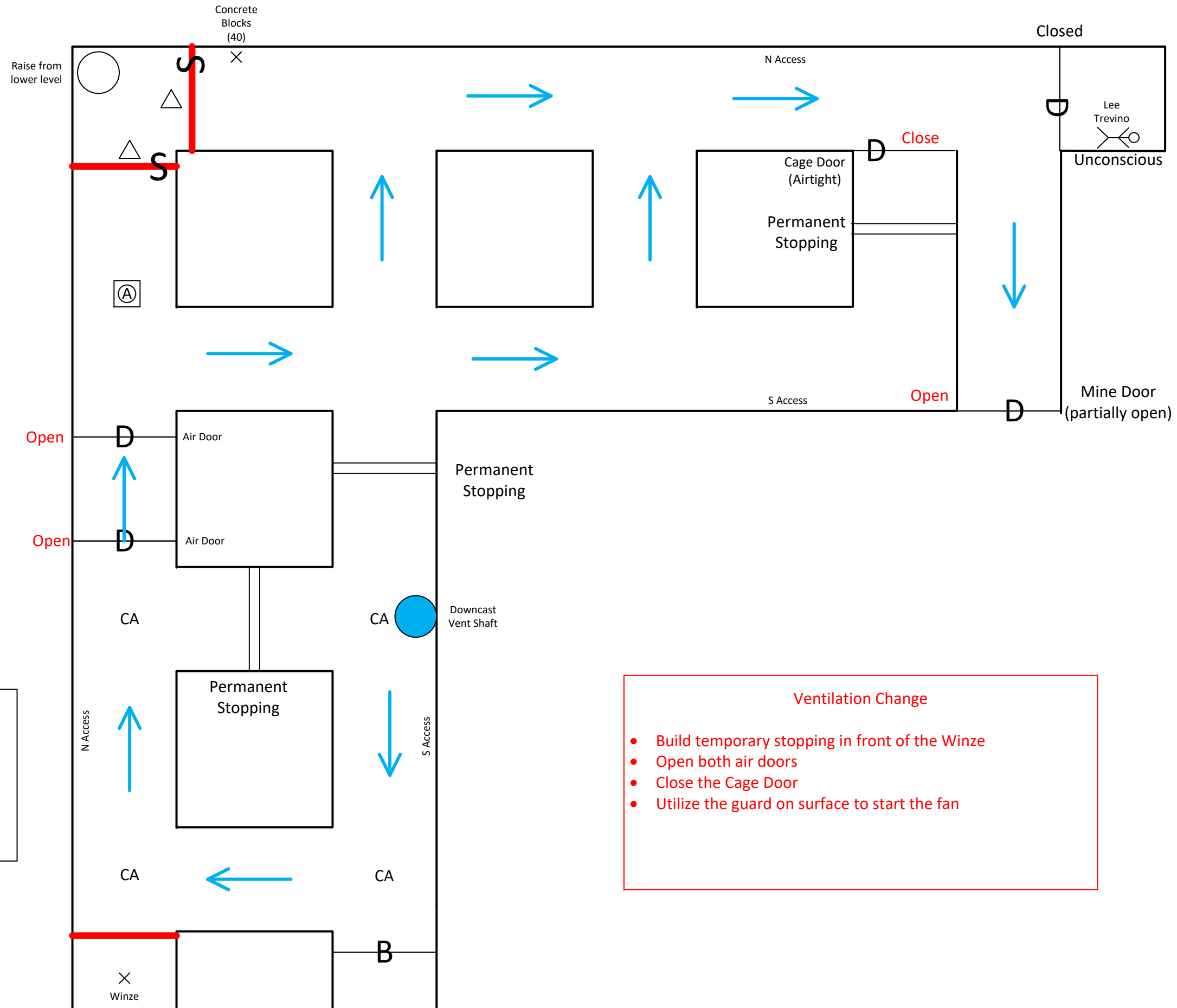
Note: Ventilation path is indicated by blue arrows on the map and will clear gases in front of the Hoistroom.

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.

Ventilation Change Map Day 1

Team Name: _____

Team Draw # _____



Gas Placard Key	
CA = Clear Air	
Ⓐ = O ₂ - 16% CO - 0.15% NO ₂ - 0% CH ₄ - 0% Heavy Smoke	Ⓑ = O ₂ - 17% CO - 0.115% NO ₂ - 0% CH ₄ - 0% Heavy Smoke

- Ventilation Change**

 - Build temporary stopping in front of the Winze
 - Open both air doors
 - Close the Cage Door
 - Utilize the guard on surface to start the fan

Surface Mine



Team Stop #14

The team will request that the guard on surface turn “OFF” the fan. The team will need to utilize a set of building materials and the barricading materials to build in front of the Hoistroom due to the not knowing the conditions behind the Hoistroom door. The team can now enter the hoistroom, where they will identify the final missing miner. The team will identify “Lee Trevino” the miner is unconscious and has no visible signs of injury. The team will need to use an approved 4-hour oxygen breathing apparatus equipped with a full face-piece to properly rescue the miner.

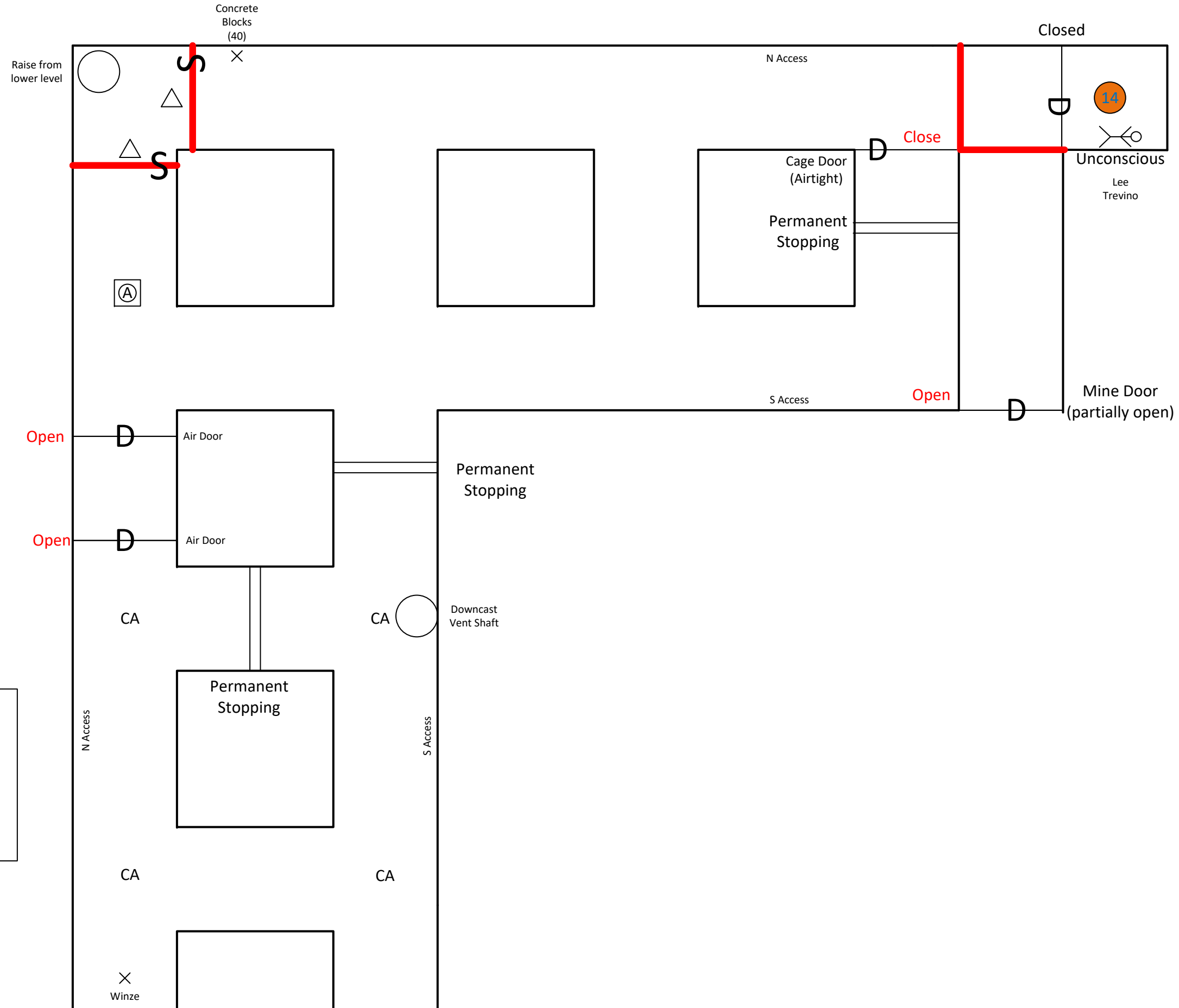
Note: There will be no simulation, the team will have to demonstrate proper donning procedures, once the team is ready for transport, the #2 Judge will acknowledge the team and they can disconnect the breathing hoses and turn off the unit. The face mask must remain on and the breathing apparatus must be kept in close proximity (as if it were used) to the patient during transport out of the mine.

The team will transport the final missing miner to surface, relay any information necessary to the mine manager, turn in all maps and stop the clock. THE END!

Enter Hoistroom Map Day 1

Team Name: _____

Team Draw # _____



Gas Placard Key	
CA	= Clear Air
Ⓐ	= O ₂ - 16% CO - 0.15% NO ₂ - 0% CH ₄ - 0% Heavy Smoke
Ⓑ	= O ₂ - 17% CO - 0.115% NO ₂ - 0% CH ₄ - 0% Heavy Smoke

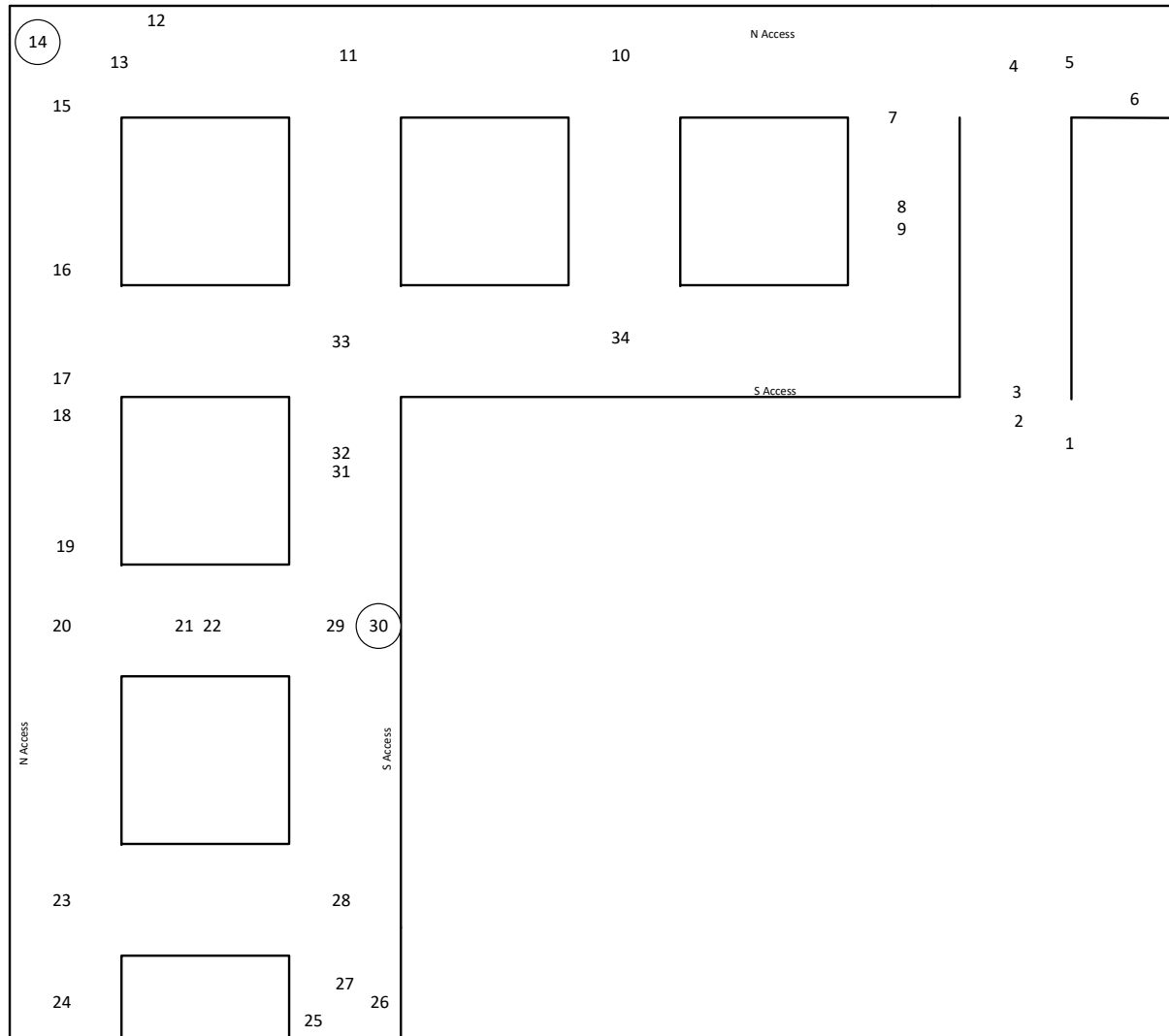
Surface Mine



Placard Map Day 1

Team Name: _____

Team Draw # _____



Surface Mine

