

THE POWER OF COPPER

Bagdad Hazardous Gas

Mill, CLP, SX
2023

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Expectations

“We start with looking after our workers’ welfare.”

~Richard C. Adkerson

President and CEO,
Freeport-McMoRan

Before we start:

Evacuations

Breaks / Restrooms

Phones on vibrate please

Participation

Hazardous Gas Awareness Training

- **Training Requirements**
 - All handlers of hazardous substances
 - All individuals entering the controlled access process area
 - Must be repeated annually (refresher)

- **Personal Monitors**
 - Worn in breathing zone (18" circumference around head); worn on top of clothing (not covered or obstructed); not on helmet
 - Worn by each entrant into the controlled process area
 - Bump- tested daily prior to use; maintained/calibrated in accordance with manufactures specifications
 - All monitors are to be returned clean and in good repair—the responsibility of the last user

Hazardous Gas Awareness Training

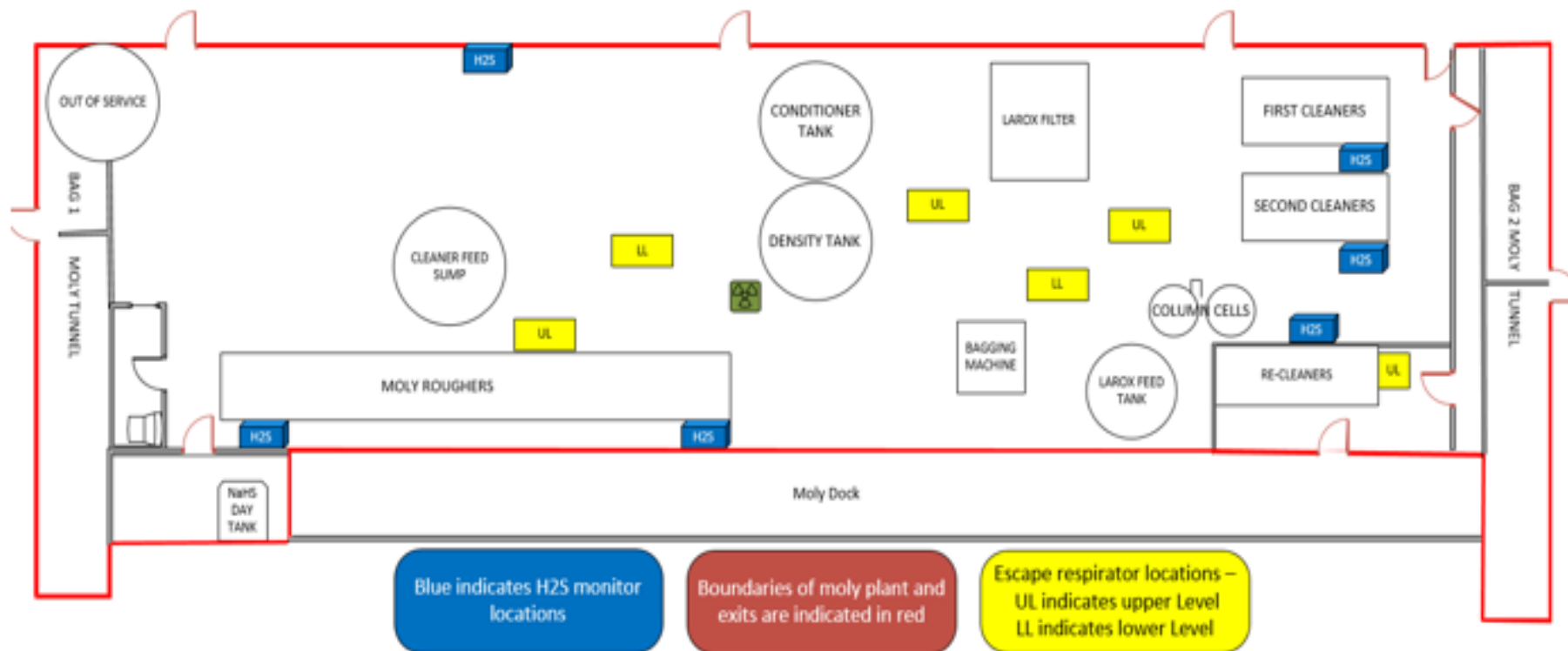
- **Respiratory Protection**
 - NH15 Escape Hood



- NH15 Escape Hoods are available in designated areas in the Moly Plant and kiln area at the CLP.
 - These come into two sizes, so you need to measure the circumference of your neck
 - Regular 21" and below
 - Larger bigger than 21"

Moly Plant H₂S Map

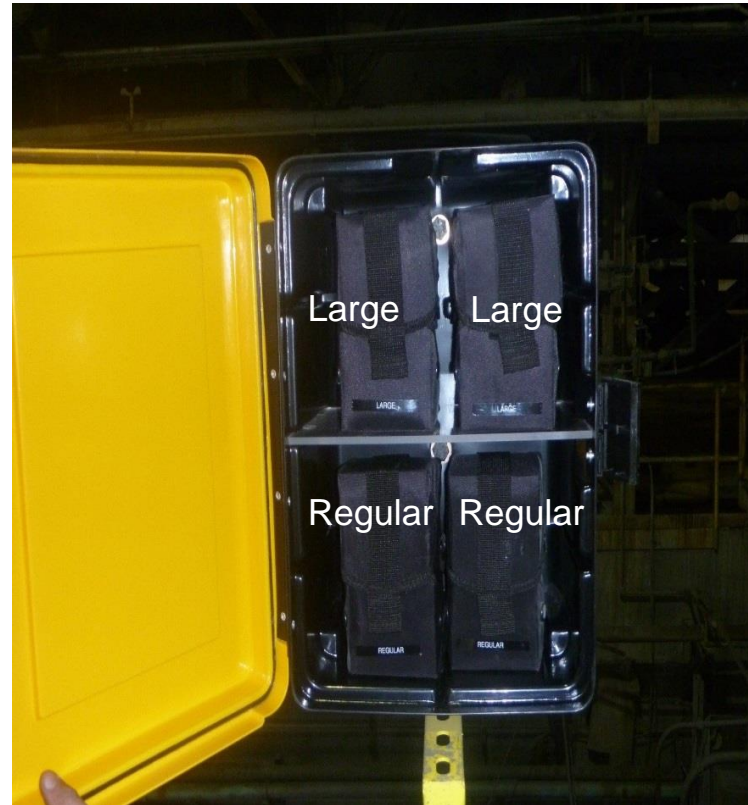
Moly Plant Reference Map



Note: NaHS day tank, access stairs/decking and moly tunnels are included in the boundaries of the moly plant.

Moly Plant escape hoods Storage Boxes

Check the condition of the NH15 escape hoods at the CLP and Moly Plant monthly.



Mill H₂S and N₂ Gas Awareness Training



- There are 5 locations in the moly plant that has H₂S/O₂ stationary monitors.
- Each monitor has a 2 lights and 2 alarms.
- Red light that will flash when there is an O₂ alarm.
- Blue light that will flash when there is a H₂S alarm.
- Horn that will have an audible alarm.

CLP Restricted Area

The Kiln area has a chain with a sign indicating the restricted area.



CLP Escape hoods

- Escape hoods are located on the north side of Kiln at the CLP on the upper and lower levels
- Make sure the size of respirator you need is in the respirator box



Continuous Air Monitoring

- CLP has continuous air monitors to alert personnel of gases possibly lurking in other areas of the Kiln.
- If those alarms, go off personnel shall still evacuate the area.



SX Hazardous Gas Map

- SX Settlers
- SX Leach Fields
- SX does not provide escape hoods



Mill, CLP, SX H₂S and N₂ Gas Awareness Training



Hydrogen Sulfide - PPE

- NH15 Escape Hoods are only suitable for escape purposes
- Hoods provide wearer protection for a maximum 15 minutes to allow sufficient time to evacuate
- Escape Hoods are Not suitable to continue work during H₂S evacuations or returning to the plant during evacuations
- NH15 Escape Hoods Not suitable for oxygen deficient environments

Respiratory Protection

- **Respiratory Protection**
 - The neck seal must contact your skin all the way around.
 - Run fingers around ensure seal is not tucked under.
 - Tuck long hair up underneath the seal. Hair must not cross the seal barrier.
 - Necklaces must not cross the seal barrier: tuck inside or pull outside the seal.



Mill, CLP, SX H₂S and N₂ Gas Awareness Training

Hydrogen Sulfide - Properties

- Chemical formula - H₂S
- Colorless
- Heavier than air (accumulates in low areas with little air movement)
- Rotten egg odor – but sense of smell is dulled at higher exposures
- Fatally toxic

Health Effects of Hydrogen Sulfide

- H₂S is classed as a ***chemical asphyxiant***, like carbon monoxide and cyanide gases.
- It inhibits cellular respiration and uptake of oxygen, causing biochemical suffocation.

Mill, CLP, SX H₂S and N₂ Gas Awareness Training

- If your Personal gas meters alarms for H₂S:
 - **Low level alarm 10 ppm** – Slowly evacuate the immediate area where the gas is present until your personal monitor is reading lower than 10 ppm.
 - Moving too fast can stir up the gasses. Be prepared to use your escape hood in the event of a high-level alarm.
 - Notify the moly plant operator of the alarm.
 - **High alarm of 20 ppm** then you will need to put on your escape hood and evacuate the moly plant and signal a mayday evacuation when it is safe to do so and report to a designated area.
- Procedure to shut down NaHS flow – controlled by control room.
- Do not re-enter unless safe to do so (After emergency personal clear the area and your supervisor okay's you to return to your work area).



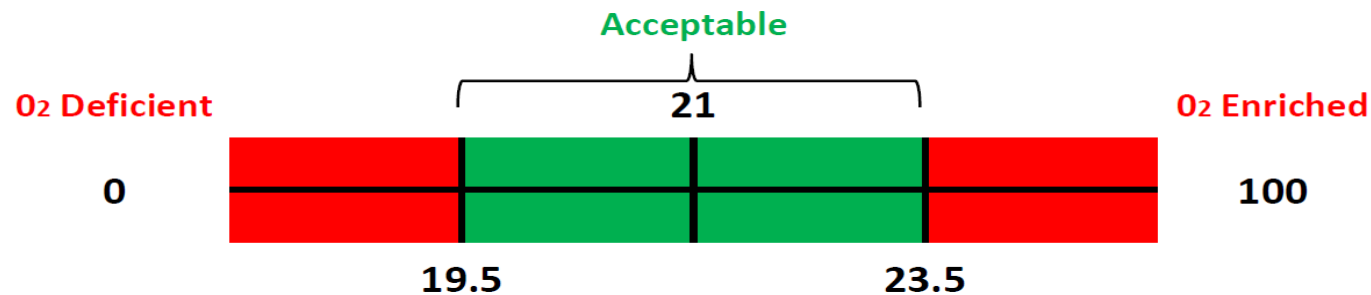
Mill, CLP, SX H₂S and N₂ Gas Awareness Training

Hydrogen Sulfide – Formation

- Formed by chemical reaction of NaHS with an acid or water that has a pH lower than 10:
- Amount generated depends on pH:
 - High pH = very low H₂S (safe)
 - Low pH = very high H₂S (unsafe)
 - **Safe pH = 10 or above**

Mill, CLP, SX H₂S and N₂ Gas Awareness Training

- Oxygen-Enriched Air (greater than 23.5%)
 - Not a hazard by itself
 - More prone to accelerated and explosive combustion
- Oxygen Deficient (less than 19.5%)
 - Inadequate for a person to breathe
 - Result of consumption or displacement



CO Carbon Monoxide Data (CLP)

- **Properties**: Colorless, odorless, byproduct of incomplete combustion
- **Hazard**: Flammable, LEL 12.5%
- **Health**: **Very Toxic (can be absorbed 200-300 times faster than oxygen by the Blood)**

Effects of CO

35 ppm Alarm set point (Initial Alarm)

- Occupational exposure limit

- Flu like symptoms begin to develop
- Nausea, headaches, fatigue or drowsiness, vomiting
- Evacuate the immediate area and let someone know about your alarm

70 ppm Alarm Set Point (Evacuation Alarm)

- Frontal Headache in 2-3 hours

- Headache, Fatigue, and nausea
- Put escape hood on evacuate and call mayday when its safe to do so.

SO₂ Sulfur Dioxide (CLP, SX)

Properties: colorless gas,
pungent odor, irritating

Non-Flammable

Highly Toxic: Forms sulfuric acid when combined with water

Will burn respiratory tract upon inhalation and can cause death quite rapidly.

Found: Areas of acid unloading, leach pad areas, Kiln Area

Effects Of SO₂

0.3-1 ppm

- Initially detected by taste

2 ppm Alarm set point

- Occupational Exposure Limit

4 ppm High Alarm Set Point

- Irritation of nose, throat, and burning & watering of the eyes

CO2 Carbon Dioxide

Properties: colorless gas,
Odorless gas, incombustible gas,
slightly toxic, denser than air.

Health Effects

Headaches, increased heart rate

Dizziness, elevated blood pressure

Restlessness, coma, asphyxia

A tingling or pins or needles feeling

Difficult breathing, convulsions

Sweating, tiredness

Effects Of CO2

400 ppm

- Average outdoor air

5000ppm=0.5% Volume **Initial Alarm set point**

- Associated with Headaches, sleepiness, stagnant, stuffy air. Toxicity or oxygen deprivation could occur. High levels of other gas's could be present.

10,000ppm=1.0% Volume **High Alarm set point**

- **Immediately harmful due to oxygen deprivation**

40,000ppm=4% Volume **IDLH**

- **Immediate Danger to Life and Health**

NOX Nitrogen Dioxide

Health Effects

Breathing High Levels can cause rapid burning

Spasm's, and swelling of tissues in the throat and upper respiratory tract.

Reduced oxygenation of body tissues

A build-up of fluid in your lungs

Death

Properties: colorless gas,

- Noncombustible but accelerates the burning of combustible material
- Heavier than air
- very toxic by inhalation and skin absorption.

Effects Of NOX

2 PPM Initial Alarm set point

- Induce an acute inflammatory response in healthy human airways.

6 PPM High Alarm set point

- **Interfere with the ability of the blood to carry Oxygen causing headache, fatigue, dizziness, and a blue color to the skin and lips.**

IDLH

- Higher Levels can cause trouble breathing, collapse and even death.

LEL Lower Explosive Limit (SX)

Definition: Defined as the lowest concentration (by percentage) of a gas or vapor in air that is capable of producing a flash of fire in presence of an ignition source (arc, flame, heat).



Mill H₂S and N₂ Gas Awareness Training

Evacuation

- If you are evacuating out any of the dock doorways, make sure to pay attention to wind direction by looking at the windsocks located on the B1 and B2 thickeners.
- If you are on the upper level of the moly plant, do not evacuate downstairs. Stay up hill from any settling gases and report to the mill control room.



Mill H₂S and N₂ Gas Awareness Training

Moly Plant Evacuation Procedure

- If the Stationary/Personal H₂S alarm sounds:
 - EVACUATE
 - Make sure to put your escape hood on and leave the moly area.
 - Call a MAYDAY immediately after leaving the area if the stationary alarm sounds.
 - Report to one of the designated assembly areas:
 - Assembly point #11
 - Assembly point #15
 - Mill control room until you are accounted for.



CLP Windsocks

- Located on the south side of the kiln, on the second level

Evacuation

- If you are evacuating the kiln area, make sure to pay attention to wind direction by looking at the windsock.



CLP Evacuation points

New Office Building



Entrance to the CLP



**Down below
Oxygen plant**



Control Room



SX Wind Socks

Kimberly 3950 Level



Copper Creek Dump



Niagara Dump Ramp



SX Evacuation Points

Wade's Warehouse Building



Wash Rack Building



Maintenance Shop



Mill H2S and N₂ Gas Awareness Training

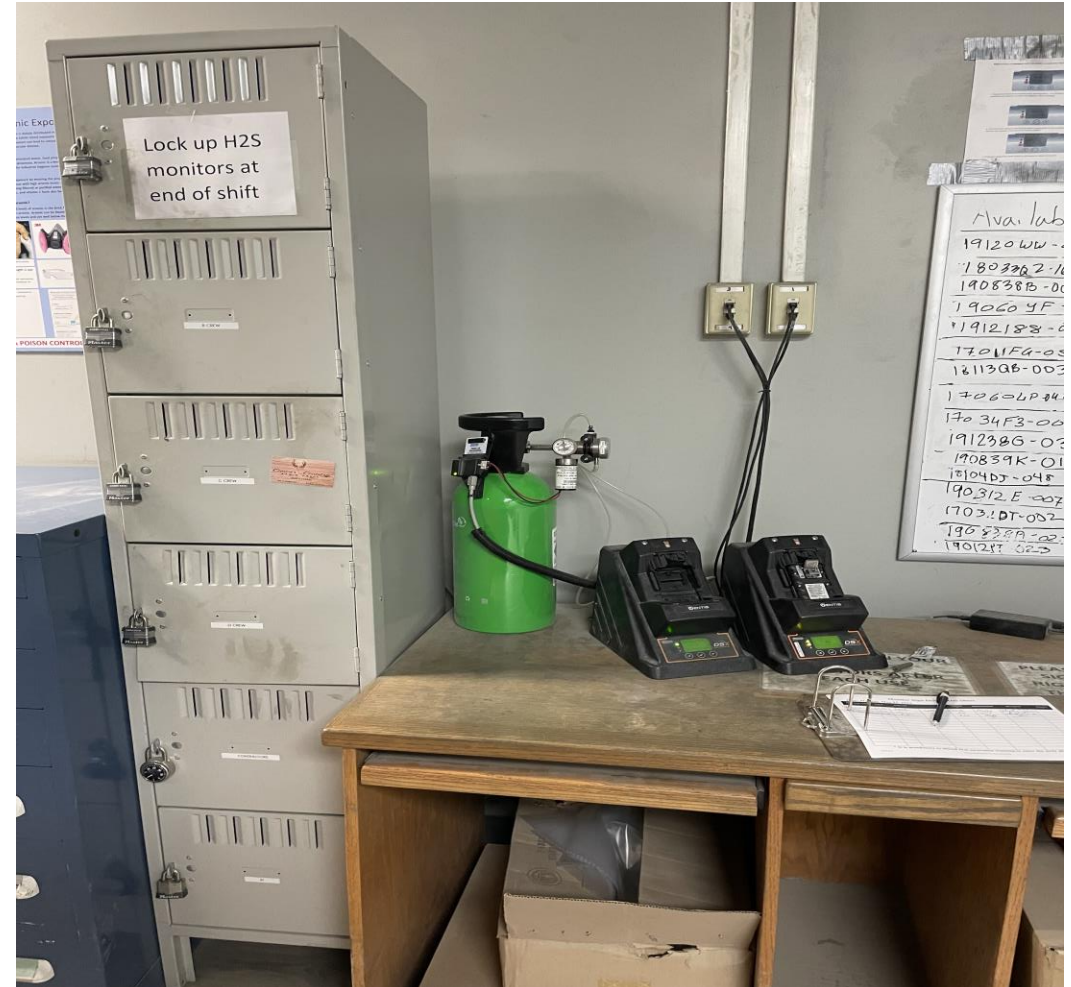
This is the moly plant sign in sheet that is in the main mill control room where the monitors are stored.

Monitor Sign In/Sign Out Sheet

Date: _____


<i>PRINT YOUR NAME</i>	<i>TIME IN</i>	<i>EMPLOYER</i>	<i>H₂S AWARENESS TRAINING COMPLETION DATE</i>	<i>PERSONAL MONITOR #</i>	<i>DESTINATION</i>	<i>SIGNATURE</i>	<i>TIME OUT</i>

* It is mandatory to attend H₂S awareness training to enter the moly plant area!



Monitors

- If at any time your H₂S monitor alarms at the Moly Plant, please fill out this form.
- Safety uses it to identify if we have any new areas of concern.



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Concentrator Gas Alarm Tracking

Record all alarms you experienced while using a personal monitor or sniffer.

PRINT YOUR NAME	DATE AND TIME	MONITOR OR SNIFFER NUMBER	DESCRIBE WHAT YOU WERE DOING AND WHAT ACTION YOU TOOK

Mill H₂S and N₂ Gas Awareness Training

- The only time a monitor may not be needed when entering the moly plant, is on a scheduled moly plant down day (currently the 1st Thursday of the month).
- But what you will still need to do is, put a lock on the ECC lock box that will be located on the moly dock.
- This does not cover LOTOTO for any other work period.



CLP Hazardous Gas Awareness Training

This is the CLP kiln area sign in sheet that is in the CLP Control room where the monitors are stored

[illegible]

CLP Hazardous Gas Awareness Training

- The CLP uses the lockbox when the kiln is down.
- This is the only time you are not required to get a monitor but must put a lock on the lockbox.
- The lockbox is in the control room.



Turn on your Ventis Pro 5 after Calibration

- Hold power button down until blue lights flash and an alarm sounds.

Power Button



Assign your Pro 5 monitor to you

- Place your Pro 5 I Button on the assign tab on your screen.
- Once registered you will see your name on the screen.



Clearing the Peaks



End of Shift

These ports need to be clean for the Pro 5 to monitor the atmosphere. _____→

- When you are signing out in the control room make sure you clean the monitor. Ask the control room operator if you need assistance.
- Then place monitor back on charging station so it is ready for the next person that needs to use it.
- Do not use wet cloths to clean. Use only dry towels.
- The Ventis Pro 5 will turn off automatically when placed in the charger and will un assign you from the monitor.



Hazardous Gas Awareness Training



QUIZ!!!

Hazardous Gas Awareness Training

1. **True or False:** High level of H₂S exposure can cause you serious damage or even death?

TRUE

2. **True or False:** The personal monitor displays the high-level reading for the H₂S gas and the high and low reading for O₂.

TRUE

Hazardous Gas Awareness Training

3. What is the normal Oxygen range on the monitors?
- a) 17.5%-25.5%
 - b) 20.5%-28.5%
 - c) 19.5%-23.5%
 - d) none of the above
4. If your personal monitor alarms with a H₂S reading of 10 ppm you should:
- a) Run around screaming “we’re all going to die”.
 - b) Slowly evacuate the immediate area where the gas is present until your personal monitor is reading lower than 10 ppm and be prepared to use your escape hood.
 - c) Breathe in as many vapors as you can to see if you would be affected by the H₂S gases.
 - d) Call the security gate and let them know there is an emergency and to send help.

Hazardous Gas Awareness Training

5. **True or False:** If you get an O₂ alarm on your personal monitor you should put your escape hood on immediately.

FALSE

6. What is the initial alarm setpoint for NOX?

- a) 1PPM
- b) 10PPM
- c) 6PPM
- d) 2PPM

Hazardous Gas Awareness Training

7. What is the Volume % CO₂ that you need to evacuate the leach fields and tank house?

- a) 1.0%
- b) 1.5%
- c) .3%
- d) 3.0%

8. When is it okay to go back into these areas following an emergency evacuation?

- a) After emergency personal clear the area and your supervisor okay's you to return to your work area.
- b) When you get tired of waiting for someone to clear the area.
- c) If you hear a moly bag going off and need to change it.
- d) After an emergency evacuation you can never go back into the area again.

Hazardous Gas Awareness Training

9. What do you do after bump testing monitor?
- a) Turn it on and put it on your vest and go to work
 - b) Tap your I-assign and clear the peaks then put it within 18" of your breathing zone and go to work
 - c) Put monitor within 18" of your breathing zone and go to work

Hazardous Gas Awareness Training

SUMMARY

- To Enter the Moly Plant, Kiln area, SX Leach Fields & SX Tank Farm you must:
 - Sign in is **Required!**
 - Hazardous Gas training must have been completed
 - Annually
 - Bump test monitor, iassign button and zero the peaks
 - Personal gas monitor must be always working and worn in plant
 - Escape hoods are available in designated areas throughout the Moly plant, kiln area, **but not the SX Leach & SX plant**
- Sign in sheet will be used by supervision in the event of evacuation to make a head count of all employees signed into the area.
- Sign out is required for employees and contractors leaving all areas for an extended period or when work for the day is completed.
 - **Contractors must sign in and out at Control Rooms and when checking out or in a monitor.**

Conclusion

What Questions do you have?



- I assign sticker must be affixed to a flat surface
- On your hard hat
- or
- Employee badge.
- If your I assign sticker is not working, do not enter plant. You must get a new I assign sticker before entering.

How to Bump Test

