



Hazardous Gas Policy

Health and Safety FCX-HS17 | Release 03/26/2021 | Version 1

POTENTIAL FATAL RISKS

Exposure to Hazardous Substances – Acute
 Exposure to Hazardous Substances – Chronic
 Underground Hazardous Atmosphere

CRITICAL CONTROLS

Access Control
 Alarm Systems
 Engineered Controls (pH range, Ventilation, cell voltage, operating temperature, concentrations)
 Handling Requirements
 Loading and Unloading Protection
 PPE
 Mechanical Integrity of Storage and Distribution

TRAINING REQUIREMENTS

Site Specific Training
 Task/Technical Training

TECHNICAL SUPPLEMENTS

Hazardous Gas Generation on Leach Stockpiles
 Site Specific Hazardous Gas Program
 Industrial Hygiene Technical Supplement

POLICY

OVERVIEW

This policy applies wherever a hazardous gas release event or an oxygen deficient atmosphere may be created (i.e. labs, confined spaces, leach pads, plant operations). This policy will also outline the requirements for a site-specific Hazardous Gas Program.

ACTIONS TO STAY SAFE

- Wear personal monitor in designated areas; bump test according to manufacturer specifications and regulatory requirements.
- Operate within required parameters, such as pH, temperature, etc.
- Be mindful of potential cross-sensitivities with gas sensors.
- Report any damage to ducting, fans, or entrainment.
- Inspect work area for signs of unintended releases or conditions where unintended mixing of chemicals/reagents can occur.
- Review SDS of chemicals being used to ensure compatibility and that hazardous gases will not be generated.
- Evaluate any process changes or equipment changes through a risk assessment process, such as Management of Change (MOC).
- Hoods/Ventilation should be utilized when possible while handling chemicals, especially within laboratory settings.

SITE REQUIREMENTS

Working with divisional leadership and the Industrial Hygiene/Health and Safety Departments, each site will develop a site-specific Hazardous Gas Program. The following information should be included in the program for each department/area:

- Gases of concern, including potential sources and methods of generation
- Specific details on site-specific Critical Controls clarifying; Access controls, handling requirements, PPE (including respiratory protection) and engineering controls

- Area Specific SOP requirements
- Area and Personal Monitor Alarm set points and locations- consideration of alarm set points should ensure employees:
 - know to take immediate action in response to upset conditions

PROCESS AREA REQUIREMENTS

- Use a combination of stationary monitors and/or personal monitors in areas where there are potentials for hazardous gas exposures to occur.
 - Consider areas near release/discharge points, along chemical delivery lines, and perimeter of process areas.
- Maintain legible labels of contents on lines, tanks, vessels, containers, etc.
- Install visual warning lamps with audio and gas-specific signage near fixed sensors. Further controls or procedures should be in place if all of these are not able to be present.
- Follow manufacturer’s recommendations for fixed sensor life and preventative maintenance.
- Install windsocks in locations visible throughout the area in case evacuation is required.
- Demarcation of areas where potential upset conditions can occur.
- Maintain a PM schedule for alarms and equipment that distributes, stores, or entrains hazardous gases.

LEACH STOCKPILE AREA REQUIREMENTS

- Leach stockpiles require site-specific leach hazard recognition training and controlled access.
- Wear personal monitors in breathing zone at all times on active leach fields according to site specific policies.
- Stationary and Personal monitors should have sensors to detect the site identified/specified gases.
 - Any changes to this sensor array will require a MOC. The MOC approval should be routed to the Manager of Processing Operational Improvement for review by the Hydromet Managers Team.
- Install air relief valves at high point elevations and at the end of the main feed pipeline.
- Sites will develop and maintain a list of potential leach hazardous gas generation locations and activities. This list will be readily available and included as part of the site-specific leach hazard recognition training.
- Personal monitors should be carried by individuals in the vicinity of an acid dilution/delivery system that is open/vented to atmosphere.
- Additional information on leach best practices can be found in the “Hazardous Gas Generation on Leach Stockpiles” document.
- Information on requirements for inactive leach stockpiles can be found in site specific Haz Gas Program.