1.0 PURPOSE

The purpose of this Plan is to establish procedures for evaluating and controlling routine and/or intermittent employee and contractor exposure to hydrogen sulfide (H_2S).

2.0 SCOPE

This procedure applies to all employees, contractors, and visitors on site**.**

3.0 PROCEDURE

3.1 H_2S HAZARD ASSESSMENT

3.1.1 H_2S Area/Task Identification

3.1.1.1 Each Area Team shall establish the locations where H_2S may be present or tasks that may lead to exposure to H_2S using the following sources of information:

3.1.1.1.1 Process Safety Management (PSM) Process Hazard Assessment (PHA) data

3.1.1.1.2 PSM Process Safety Information (PSI)

3.1.1.1.3 Area H_2S monitoring results

3.1.1.1.4 Personal H_2S monitoring results

3.1.1.1.5 Historical injury and illness data on H_2S in the plant

3.1.1.2 The Area Team is responsible to ensure that controls are in place to mitigate H_2S Exposures. See section 3.2 for more information.

3.1.1.3 “Mitigation Lists” must be maintained to identify when respiratory protection is required to mitigate potential exposure:

3.1.1.3.1 RSW-SAF-070-Form04-DT Mitigation List - Complex 1

3.1.1.3.2 RSW-SAF-070-Form05-DT Mitigation List - Complex 2

3.1.1.3.3 RSW-SAF-070-Form06-DT Mitigation List - Complex 3

3.1.1.3.4 RSW-SAF-070-Form07-DT Mitigation List - Complex 4

3.1.1.3.5 RSW-SAF-070-Form08-DT Mitigation List - Complex 5

3.1.1.3.6 RSW-SAF-070-Form09-DT Mitigation List - Complex 6

3.1.1.4 The Risk Assessment Matrix (RAM) must be utilized prior to performing invasive work when a procedure, guideline or mitigation list does not apply. See RSW-SAF-078-DT Invasive Work Standard Practice for more information.

. Industrial Hygiene Monitoring

3.1.1.5 Determine the need for respiratory protection by performing the Marathon IH Exposure Assessment Methodology (EXAM) process or similar exposure assessment process on job assignments, routine tasks, or emergency response activities to determine where there is reasonably foreseeable employee exposure to airborne contaminants above the applicable Occupational Exposure Limits (OELs) or potentially Immediately Dangerous to Life or Health (IDLH) atmospheres.

3.1.1.6 The refinery conducts air monitoring in compliance with MIOSHA Standards and the MPC Measurement Procedures Manual. Surveys of work area atmospheres must be conducted during routine and turn-around operations in work areas where H_2S might be present. Surveys include area and source measurements with direct reading instruments and other air monitoring instruments and techniques as determined appropriate by the refinery Industrial Hygienist.

3.1.1.7 Personal air monitoring is performed to evaluate full-shift, short-term and peak exposures. Representative work shift and peak exposure concentration monitoring is conducted on each job classification in each work area.

3.1.1.8 The purpose of these surveys is to determine if there are work operations or job tasks where there is the potential for regular or intermittent exposure to H_2S, and to identify any locations where H_2S is present at concentrations above the published exposure limits.

3.1.1.9 If full-shift, short-term or peak monitoring results occur above exposure limits, areas of concern must be surveyed to identify the source.

3.1.1.9.1 Any observed problems must be corrected and additional personal monitoring (follow-up) must be performed to confirm that exposures above the exposure limit do not persist.

3.1.1.10 This survey and personal monitoring must be conducted in the same areas during the same job activities as those which were performed during the initial monitoring which resulted in the elevated exposures.

3.1.2 Employee Exposure Limits

H_2S Concentration (ppm)	Type of Limit	Source
10	PEL-TWA	MIOSHA
15	PEL-STEL	MIOSHA
20	PEL Ceiling	OSHA
50	PEL Maximum Peak	OSHA
100	IDLH	NIOSH

Note: In 1989, federal OSHA revised its PELs under 1910.1000, which Minnesota OSHA and Michigan OSHA adopted. Although federal OSHA has since reverted to the pre-1989 PELs and Michigan OSHA still enforce the 1989 PELs for substances that are not covered by separate standards.

3.2 Exposure Mitigation Controls

3.2.1 Where exposures cannot be maintained below the published exposure limits, the refinery uses controls to reduce exposures to the lowest practical level and provides employees with appropriate respiratory protection.

3.2.2 Examples of engineering controls include, but are not limited to

3.2.2.1 Ventilation/Exhaust hoods

3.2.2.2 Eductor Systems

3.2.2.3 Vapor collection systems

3.2.2.4 Closed loop sample systems

3.2.2.5 Sewer enclosure

3.2.2.6 Relocation of control valves remote from draining sites

3.2.3 Examples of Administrative Controls include, but are not limited to:

3.2.3.1 Operations Procedures establishing safe work practices. (For more information, consult Operations Procedures in the information center).

3.2.3.2 Use of the Risk Assessment Matrix (RAM)

3.2.3.3 Equipment preparation by Operations (purging, etc) (For more information, consult RSW-SAF-002-DT Energy Isolation and Operations Procedures in the Information Center).

3.2.3.4 Limiting access (See RSW-SAF-039-DT Removal of Non-Essential Personnel)

3.2.3.5 Training (See Section 3.5)

3.2.3.6 Portable Ventilation

3.2.3.7 Fixed H_2S monitors & SolarRaes

3.2.3.7.1 A list of H_2S fixed monitors and their locations can be found in Drawing #D42-1893 and RMP-M-088-DT MSA H_2S Gas Detector Calibration Preventative Maintenance List

3.2.3.7.2 See RMP-M-088-DT MSA H_2S Gas Detector Calibration Preventative Maintenance List for calibration and maintenance procedures.

3.2.3.7.3 A list of SolarRaes and their location can be found in Drawing # D25-2550.

3.2.3.7.4 SolarRae's are calibrated and maintained according to the manufacturer recommendations by a third party vendor.

3.2.3.8 Signs and Labels

3.2.3.8.1 Warning signs and/or labels are posted in areas of operations where there could be exposure to airborne concentrations of H_2S exceeding 10 PPM

3.2.3.8.2 Additional signage should be considered in certain areas or near specific tasks where additional H_2S PPE will be required.

3.2.3.9 PPE (see next section)

3.2.4 Respiratory Protection Requirements

3.2.4.1 Self-Contained Breathing Apparatus (SCBA) or Supplied Air Respirators (SAR) are required during emergency operations and in unknown H2S environments or in atmospheres where the concentration of H2S could change rapidly. At least one back-up person equipped with a respirator specified above must be present and remain on stand-by at a safe distance when supplied air is worn.

3.2.4.2 Respiratory Protection for H_2S exposures or anticipated exposures during non-emergency operations greater than 10ppm is limited to SCBAs or SARs with at least a 5-minute escape pack unless listed on the Mitigation Lists as a Level 2 Air Purifying Respirator (APR) Approved task. Safety will make the determination if the task is approved for APR use per the requirements listed below.

3.2.4.2.1 APRs (half-face or full-face) with the appropriate cartridges may be used to prevent potential incidental H2S exposures in certain circumstances (e.g. RAM level 2 or 3 tasks). APRs will be used for ***escape only*** purposes and personal monitors set at 10 ppm must be worn when APRs are used in this manner.

3.2.4.2.2 For tasks where supplied air is currently required or APRs are intended to be worn for the duration of the task in the presence of potential H_2S levels between 10-50 ppm, statistical analysis must be performed until sufficient data has been collected for that specific task to ensure that the APR provides adequate protection in accordance with RSW-SAF-057-DT Industrial Hygiene Program and MPC corporate Exposure Assessment Methodology (EXAM) Industrial Hygiene Policy HLT-2001. Full-face APRs are required for these tasks.

Requirement	
Number of samples	6
Range of peak values	NA
Exceedance Fraction	<0.05 (5%) when compared to 50 ppm reference level

UTL 95/95	Ideally <100 ppm Never to exceed 500 ppm

3.2.4.2.3 Contractor use of APRs is only approved if the company has met the following requirements:

3.2.4.2.3.1 Have a formal respiratory protection program that includes medical surveillance, fit testing for the full-face mask to be utilized, and training requirements for affected employees.

3.2.4.2.3.2 Submit manufacturer's documentation of the mask and cartridge to be utilized. The documentation for the cartridge must specifically state that the cartridge is approved for H_2S.

3.2.4.2.3.3 Submit documentation of training for current employees and documentation of addition to onboarding detailing work practices of the APR to be utilized (must, at a minimum, meet all the requirements of this procedure).

3.2.4.2.3.4 All approved contractor tasks will be documented on the mitigation lists for the applicable complexes.

3.2.4.2.4 Section 3.3 of this procedure must be followed for alarm events that occur while full-face APRs are utilized.

3.2.4.2.5 See 3.2.5 for information on monitor requirements and 3.3.3.2 for area re-entry requirements after an alarm event while utilizing a full-face APR.

3.2.4.2.6 Approved and conditionally approved tasks are documented on each area's mitigation list. See RSW-SAF-070-DT Respiratory Protection Plan for additional requirements.

3.2.5 Personal H_2S Monitors

3.2.5.1 Personal monitors are required for every employee, contractor, and visitor who will enter a process unit, tank dike, loading or unloading area, laboratory, or into any other area with suspected H_2S. Refer to RSW-SAF-034-DT Portable Gas Detector Care for full requirements for personal monitors.

3.2.5.2 Personal monitors must be worn within the breathing zone, which is defined as a radius of about 10" from the worker's nose from the ears forward.

3.2.5.3 Contractors Companies shall provide their own personal H_2S monitors to their employees.

3.2.5.4 Personnel who are utilizing a full-face APR for approved or conditionally approved tasks should wear a red Tango monitor (ISN case part number 17153951-3) with an alert set at 10 ppm and a low alarm set at 50 ppm. If a red Tango monitor is not worn, personnel are required to wear their standard monitor and follow normal alarm response procedures.

3.2.5.4.1 RSW-SAF-071-Form03-DT APR Tracking Log is required to be completed when red tango monitors set at 50 ppm are worn for data collection and tracking.

3.2.5.4.2 Maintenance or Operations supervision are responsible for control of the red Tango monitors and their use.

3.2.5.4.3 The use of red Tango monitors outside of approved or conditionally approved tasks may result in disciplinary action due to the alarm set point of 50 ppm.

3.2.5.5 Personnel who are entering the area or performing work where the concentration of H_2S is known to be 10 ppm or greater AND are wearing a Pressure Demand SCBA or SAR are NOT required to wear their personal H_2S detector.

3.2.5.6 All other personnel in the surrounding area OR stand-by/rescue personnel that have NOT yet donned their Pressure Demand SCBA or SAR are required to wear their personal H_2S detector.

3.2.6 Interim measures may be required while engineering controls are being developed and implemented or during upset operations. For example:

3.2.6.1 Respiratory protection will be used in the interim when engineering controls and work practices are being installed or implemented or during upset operations.

3.2.6.2 The Industrial Hygienist/Safety Department must be involved during the hazard assessment of the design process to ensure all H_2S control measures are adequately implemented.

3.2.6.3 The Industrial Hygienist/Safety Department must be notified when new H_2S control equipment is installed or old H_2S control equipment is modified that could affect the employee's exposure levels.

3.3 Alarm Event Requirements

3.3.1 Initial Response

3.3.1.1 If an MPC employee or contractor employee personal H_2S monitor alarms, or a fixed H_2S monitor alarms:

3.3.1.1.1 personnel in the immediate area **MUST** evacuate immediately to a safe distance,

3.3.1.1.2 contact operations for that Area/Complex,

3.3.1.1.3 and notify their supervisor. Contractors must also notify their Contractor Coordinator.

3.3.1.2 MPC employees, whose personal monitors alarmed, **must** place their personal monitors in the docking station after an alarm occurs before the end of their shift.

3.3.1.3 For more information on responses to fixed H_2S monitor alarms, see RSW-ERP-021-DT Fixed Air Monitoring Alarms

3.3.2 Owning Department Field Investigation

3.3.2.1 Air monitoring for H_2S shall be conducted following the guidelines below whenever a personal H_2S monitor or fixed H_2S detector has alarmed:

3.3.2.1.1 A trained employee wearing proper PPE (See Section 3.2.4.1) shall conduct initial air monitoring immediately after the alarm to determine:

3.3.2.1.1.1 airborne concentrations of H_2S,

3.3.2.1.1.2 the source of the H_2S,

3.3.2.1.1.3 the level of PPE that must be worn by employees when responding to a possible incident,

3.3.2.1.1.4 perimeter establishment (barricading) to regulate access to personnel, and

3.3.2.1.1.5 clearance monitoring to determine when the event is over or a false alarm has been determined due to cross interference, etc.

3.3.2.2 Air monitoring shall be conducted during the response activities to assess changing conditions as well as employee exposure.

3.3.2.3 Small incidental releases where the source of the H_2S is readily apparent (e.g. sample station, opening a bleeder) may not require all the steps in section 3.3.2.1 (i.e., establishment of exclusion zones).

3.3.3 Area Re-entry

3.3.3.1 For re-entry after an alarm, the area atmospheric conditions must be verified by Operations, Product Control or Safety personnel wearing proper PPE and approved for re-entry before personnel can return to the area where the alarm occurred.

3.3.3.2 Personnel wearing full-face APRs may only re-enter the area utilizing the same level of protection if the alarm event was less than 50 ppm.

3.3.4 Employees who experience a greater than 50 ppm H_2S alarm (without respiratory protection) or greater than 100 ppm if wearing a full-face APR during any work shift must be protected by using one of the following measures:

3.3.4.1 Reassignment for the remainder of the shift to a job that would have limited exposure to H_2S

3.3.4.2 Replacement by another protected qualified worker with the appropriate PPE

3.3.4.3 Continuation of normal duties with the requirement that any job that has the potential for H_2S exposure must be done in a Pressure Demand SCBA or SAR

3.3.4.4 In the unlikely event that multiple personnel are exposed above the 50ppm because of an abnormal occurrence the protection methods above shall apply. Operations or Product Control must determine the most appropriate method(s) to ensure that the personnel who were exposed to 50 ppm or greater are protected from additional H_2S exposure for the remainder of that work shift.

3.3.5 Individuals who experience an alarm greater than 100 ppm should be advised to go to medical to evaluation, regardless of presentation of symptoms.

3.4 Concentrations Less than Exposure Limits

3.4.1 In the event that routine air monitoring performed for hot work and confined space permitting reveals H_2S concentrations less than 10ppm, the employee must determine the source of the H_2S and inform their supervisors so that it may be proactively controlled to avoid exposures greater than 10ppm. This could include the use of an eductor and/or full-face APR with barricading.

3.5 Reporting and Investigation

3.5.1 Every occurrence of an alarm on a personal or fixed H_2S monitor (regardless of respiratory protection) must be documented in the incident tracking database.

3.5.1.1 For all personal H_2S monitor alarms the H_2S Investigation Form must also be completed. The H_2S Investigation Form will either be scanned to DetroitPSM@mgrouproot.com or mailed via Intracompany mail to the HESS Department Administrative Assistant in the Main Office Building.

3.5.1.1.1 The owning department supervisor is responsible for ensuring that all personal monitor alarms in their area are entered into the incident tracking database. The following information must be entered:

a) Serial number

b) Date, time, and location of event

c) Peak concentration

d) Company involved

e) Brief description of the incident

3.5.1.2 For fixed monitors, the supervisor of the area where the alarm occurred is responsible to ensure that the alarm is entered into the incident tracking database. The PI tag number and peak concentration must be included.

3.5.2 Every personal H_2S monitor alarm event must be investigated as follows:

3.5.2.1 In the event a personal H_2S detector alarms with the use of proper respiratory protection, or if a personal H_2S detector alarms due to a known interference or cross-sensitivity issue, it may be entered as a Category 0 (document and close) incident.

3.5.2.1.1 Proper respiratory protection includes use of an APR only if the alarm event is less than 50 ppm.

3.5.2.1.2 Only alarm events that match the specifications RSW-SAF-071-Form02-DT Known Interferences for H2S Alarm Events may be labeled interference alarms with no further investigation. Any additional suspected interferences and the associated tasks and/or equipment must be investigated and documented prior to labeling as such.

	10-49 ppm	**50-99 ppm**	**100+ ppm**
No Respiratory Protection	Category 1	Category 2	Category 2
APR	Category 0 Not on metrics	Category 1 Not on metrics	Category 2
Supplied Air/SCBA	Category 0 Not on metrics	Category 0 Not on metrics	Category 0 Not on metrics

3.5.2.2 If it is found that an alarm event was already investigated as a Category 2 incident or if the alarm event was due to a known interference, then the affected refinery supervisor and HESS Supervisors may choose to reduce the level of investigation (e.g., Category 2 to Category 1, Category 1 to Category 0, etc.). This is provided that a thorough explanation is provided to explain the reduction. In all cases, measures must be taken to mitigate any future employee exposures.

3.5.2.3 H_2S alarm events without the use of proper respiratory protection are counted in the refinery data/metrics for tracking and metrics to measure progress of H_2S alarm event mitigation and to identify areas for improvement.

3.5.3 See RSW-SAF-071-P002-DT H_2S Reporting

3.6 Training and Information

3.6.1 MRD Employees

3.6.1.1 Training is conducted according to the HESS Training Matrix.

3.6.1.2 Training records are maintained by the Learning and Development Services.

3.6.2 Contractor Employees

3.6.2.1 H_2S Hazards are communicated to contractors and visitors through Safety Orientation, Process Safety Pamphlets, Safety Data Sheets, signs and labels, and the Safe Work Permitting Process. See RSW-SAF-023-DT Safety Orientation Procedure, RSW-SAF-012-DT Hazard Communication Program, RSW-SAF-004-DT Safe Work Permit for more information.

3.6.2.2 All contractor and sub-contractor employees who could be required to enter or work in an area where H_2S may be present must be included in their employers'

Respiratory Protection Program if the employee will be expected to utilize respiratory protection to limit exposure to H_2S.

3.6.2.3 Contractors and sub-contractors must have an H_2S training program which effectively communicates the hazards of H_2S to their employees who have the potential to be exposed to H_2S, the means the contractor firm will use to provide personal protection, and the correct response to and reporting of alarm events.

3.6.2.4 Training must be conducted prior to the time of their initial assignment at the refinery and training records are to be made available upon request.

3.6.2.5 Contractors and sub-contractors will be reviewed periodically for compliance with the above requirements.

3.7 Recordkeeping

3.7.1.1 Industrial Hygienist and the Medical Department maintain files of employee exposure and medical records for the retention periods required by the Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

3.7.1.2 The following files are maintained at the refinery according to the MPC records retention policy:

- Employee Exposure Monitoring records (Industrial Hygiene)
- Personal & Fixed H_2S Alarm and Investigation Reports (incident tracking database)
- Employee Exposure Notification (Health Services)

3.8 Auditing

3.8.1 Detroit Refinery periodically audits its H_2S Exposure Control Program. The audit program contains at least the following elements:

3.8.2 Review of the MPC employee compliance with bump testing/calibration requirements.

3.8.3 Review of all reported incidents of H_2S personal monitor and fixed monitor alarms to determine if certain areas or activities have a greater potential for H_2S exposure.

3.8.4 Review of the written exposure control plan.

3.9 Roles and Responsibilities:

3.9.1 Detroit Leadership Team (DLT)

3.9.1.1 Ensure that this H_2S Exposure Control Plan is implemented.

3.9.1.2 Ensure compliance to the procedures defined in this H_2S Exposure Control Plan.

3.9.1.3 Review Decision Support Packages (DSPs) associated with H_2S engineering controls and approve as appropriate.

3.9.1.4 Administer an adequate budget for needed H_2S exposure controls and additional funding for the requirements in this program.

3.9.2 Safety Department

3.9.2.1 Administrator for the H_2S Exposure Control Program.

3.9.2.2 Develop and maintain an H_2S Exposure Control Program in compliance with the RSP 1701 H_2S Exposure Control Program Refining Standard Practice.

3.9.2.3 Audit the effectiveness of the H_2S Exposure Control Program annually and communicate audit findings as appropriate.

3.9.2.4 Periodically audit personal H_2S monitors for compliance in bump checking and calibration (if applicable).

3.9.2.5 Develop training on this H_2S Exposure Control Program and exposure controls.

3.9.2.6 Conduct or direct air monitoring for H_2S during routine and turnaround operations.

3.9.2.7 Conduct and review PPE Hazard Assessments in accordance to MIOSHA requirements.

3.9.2.8 Audit contractor H_2S Exposure Control Plans and related documents as necessary.

3.9.3 Learning and Development Services

3.9.3.1 Ensure that all employees covered by the H_2S Exposure Control Program are trained with the work practices and procedures in this H_2S Exposure Control Program.

3.9.3.2 Ensure that information regarding the hazards of H_2S is readily available to all MPC employees and Contractor employees.

3.9.4 Engineering Department

3.9.4.1 The Engineering Department shall design or coordinate the design of H_2S exposure engineering controls as needed when prompted by the Area Team.

3.9.5 Operations (by Area Teams)

3.9.5.1 Identifying and mitigating H_2S exposures in their respective areas.

3.9.5.2 Creating and maintaining mitigation lists periodically.

3.9.5.3 Area Teams shall review H_2S exposure reports periodically but at least yearly to ensure H_2S exposures are properly mitigated.

3.9.5.4 Communicate possible hazards to servicing group employees during permitting process and Joint Job Site Visit.

3.9.5.5 In the event of an H_2S release, Operations shall conduct air monitoring for H_2S.

3.9.5.6 Develop and ensure applicable employees are trained on Operations Procedures relating to H_2S Exposure Control.

3.9.6 Supervisors/Contractor Coordinators

3.9.6.1 Ensure that exposures to H_2S are properly documented as defined in section 3.3.2.1.

3.9.7 Employees and Contactors

3.9.7.1 Report H_2S exposures as defined in section 3.3.1.1.

3.9.7.2 Properly use and follow all H_2S exposure controls.

4.0 DEFINITIONS

Approved APR Task: Sufficient data has been collected to determine that specific task meets statistical criteria based on MPC Exam Process.

Breathing Zone: Breathing Zone is the volume surrounding a worker's nose and mouth from which the worker draws breathing air over the course of a work period. This zone can be pictured by inscribing a sphere with a radius of about 10 inches centered at the worker's nose.

Note: Because of this 10-inch distance, it is acceptable for a personal H_2S detector to be worn on the side of a hard hat, but not at the back.

Ceiling Concentration: The OSHA Ceiling Concentration for H_2S has been established at 20 ppm. "An employee's exposure to a substance listed in 29 CFR 1910.1000 Table Z-2 shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the substance in the table, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under 'acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift'." The allowable time period for hydrogen sulfide above the ceiling but below the maximum peak is 10 minutes once only if no other measurable exposure occurs

Conditionally Approved APR Task: A task where initial IH data indicates approval requirements will be met, but more data points are required for statistical analysis.

Immediately Dangerous to Life or Health (IDLH): "An atmospheric concentration of any toxic, corrosive or asphyxiating substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere. The purpose for establishing this IDLH was to determine a concentration from which a worker could escape without injury or without irreversible health effects in the event of respiratory protection equipment failure (e.g., contaminant breakthrough in a cartridge respirator or stoppage of air flow in a supplied-air respirator) and a concentration above which only 'highly reliable' respirators would be required." The IDLH established by NIOSH is 100 ppm.

Occupational Exposure Limit (OEL): A company identified limit on the amount or concentration of a chemical to which workers may be exposed for a predefined time limit. Examples include an 8 hour Time Weighted Average (TWA), Ceiling Limit, and 15 minute Short Term Exposure Limit (STEL). These limits may be derived from the MIOSHA Permissible Exposure Limit (PEL), American Conference of Governmental Hygienists (ACGIH) Threshold Limit Value (TLV), United Kingdom Health and Safety Executive (HSE) Workplace Exposure Limits (WELs), or other sources of exposure criteria developed for the purpose of protecting the health and safety of workers. The Marathon OEL may be same or different than a legally enforceable regulatory limit established by an agency or authority with lawful jurisdiction at a particular location or operation. When they differ, components must use the more stringent of the limits. Marathon has established a H_2S exposure limit of 10 ppm for an 8 hour TWA and 15 ppm for a 15 minute STEL.

Maximum Peak: OSHA Maximum Peak is 50 ppm. "Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift."

Short-term Permissible Exposure Limit (STEL): The 15-minute MIOSHA PEL-STEL for H_2S has been established at 15 ppm. "A 15 minute TWA exposure that should not be exceeded at any time during a day, even if the 8-hour TWA is within the PEL-TWA. The PEL_STEL is the concentration to which it is believed that workers can be exposed continuously for a short period of time without suffering from 1) irritation, 2) chronic or irreversible tissue damage, 3) dose-rate-dependent toxic effects, or 4) narcosis of sufficient degree to increase the likelihood of accidental injury, impaired self-rescue, or materially reduced work efficiency."

Small Incidental Release: A small incidental release is defined as an incident where the source of the H_2S is known and is isolated to a small area (e.g., opening a bleeder on a process line, loading operations such as asphalt or sulfur, etc.).

Parts per Million: The abbreviation used in this document for parts per million is ppm.

Permissible Exposure Limit: The abbreviation used in this document for permissible exposure limit is PEL. In the case of H_2S, the PELs are the PEL-TWA and PEL-STEL.

Time Weighted Average: The eight-hour MIOSHA PEL-TWA for H_2S has been established at 10 ppm. The TLV-TWA concentration is for a "conventional 8 hour workday and a 40 hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, for a working lifetime without adverse effect".

5.0 References

RMP-M-088-DT MSA H_2S Gas Detector Calibration Preventative Maintenance List

RSW-SAF-004-DT Safe Work Permit

RSW-SAF-012-DT Hazard Communication Program

RSW-ERP-021-DT Fixed Air Monitoring Alarms

RSW-SAF-023-DT Safety Orientation Procedure

RSW-SAF-034-DT Portable Gas Detector Care

RSW-SAF-070-Form04-DT Mitigation List - Complex 1

RSW-SAF-070-Form05-DT Mitigation List - Complex 2

RSW-SAF-070-Form06-DT Mitigation List - Complex 3

RSW-SAF-070-Form07-DT Mitigation List - Complex 4

RSW-SAF-070-Form08-DT Mitigation List - Complex 5

RSW-SAF-070-Form09-DT Mitigation List - Complex 6

RSW-SAF-078-DT Invasive Work Standard Practice

RSP-1701-000 H_2S Exposure Control Program

HES Standard 411 Hydrogen Sulfide Exposure Control Plan

6.0 ATTACHMENTS

6.1 RSW-SAF-071-Form01-DT H_2S Investigation Form

6.2 RSW-SAF-071-Form02-DT Known Interferences for H_2S Alarm Events

6.3 RSW-SAF-071-Form03-DT APR Tracking Log

6.4 RSW-SAF-071-P001-DT H2S Alarm Part Stock Numbers

6.5 RSW-SAF-071-P002-DT H2S Reporting

7.0 REVISION HISTORY

Revision #	Description of change	Written by	Checked by	Effective date
23	Added link to H_2S Reporting Bulletin	E. Neubauer	J. Rabideau	07-03-17
24	Added full-face APR requirements	E. Neubauer	J. Rabideau	03-13-18
25	Made updates to reconcile local requirements with the RSP and added Tracking Log Requirements	E. Neubauer	J. Rabideau	08-09-18
26	Annual review, minor formatting updates only	E. Neubauer	A. Morales	08-18-20
27	Changed “fresh air/mitigation list” to “mitigation list and clarified requirement that approved APR tasks require full face masks.	E. Neubauer	A. Morales	10-05-20