2.23.1 Policy

This section is for informational purposes.

This program was mainly developed for cargo transfer operations involving cargoes with high hydrogen sulfide levels. But, in the event that employees must work with cargoes high in benzene content then those workers would be required to be trained and adhere to this program.

2.23.2 Purpose

The purpose of this procedure is to ensure that employees are properly protected when respiratory hazards exist in accordance with the requirements of 29 CFR 1910.134. The Company is aware that vessel employees may be exposed to respiratory hazards during the cargo transfer operations involving certain cargoes. These hazards may include Hydrogen Sulfide (see Section 2.9, H2S Policy and Procedures) or benzene (see Section 2.8, Benzene Policy & Procedures). The Company has established a monitoring program to determine when such hazards may exist and when respiratory protective equipment is required.

Engineering controls, such as vapor control, are the first line of defense; however many facilities do not have a vapor control system installed, or it is not feasible for some operations, or it will not completely eliminate the hazards. In these situations, respiratory protection is required when atmospheric monitoring indicates the need to do so. Work processes requiring respiratory protection are outlined in Table 1 of this program.

Some employees may desire to wear respiratory protection during certain operations that do not require it. The Company will review these requests on a case-by-case basis. If the use of respiratory protection in a specific case will not jeopardize the health or safety of the worker, the Company will provide respirators for voluntary use. Voluntary respirator use is subject to certain requirements of this program.

2.23.3 Responsibility

<table>
<thead>
<tr>
<th>ROLE</th>
<th>RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Administrator</td>
<td>• Responsible for administering the respiratory protection program. Duties of the program administrator include:</td>
</tr>
<tr>
<td></td>
<td>o Identifying work areas, processes, or tasks that require workers to wear respirators, and evaluating hazards.</td>
</tr>
<tr>
<td></td>
<td>o Selection of respiratory protection options.</td>
</tr>
<tr>
<td></td>
<td>o Monitoring respirator use to ensure that respirators are used in accordance with their certifications.</td>
</tr>
<tr>
<td></td>
<td>o Arranging for and/or conducting training.</td>
</tr>
<tr>
<td></td>
<td>o Ensuring proper storage and maintenance of respiratory protection equipment.</td>
</tr>
</tbody>
</table>

46 CFR 140.515 (a)(8)/AWO RCP II-C.3 a b c d
2.23 S RESPIRATOR PROTECTION PROGRAM

Marine Operations Manager & Captain

- Responsible for being knowledgeable about the program requirements for their own protection, supervisors/vessel captains are responsible for ensuring that the respiratory protection program is implemented, adhered to, and understood in their particular areas, if respiratory hazards exist. Duties of the supervisor/vessel captain include:
  - Ensuring that employees under their supervision have received appropriate training, fit testing, and annual medical evaluation.
  - Ensure availability of appropriate respirators and accessories.
  - Being aware of tasks requiring the use of respiratory protection.
  - Enforcing the proper use of respiratory protection when necessary.
  - Ensuring that respirators are properly cleaned, maintained, and stored according to the respiratory protection plan.
  - Ensuring the respirators fit well.
  - Continually monitoring work areas and operations to identify respiratory hazards.
  - Coordinating with the Program Administrator on how to address respiratory hazards or other concerns regarding the program.

All Employees

- Responsibility to wear his/her respirator when and where required and in the manner in which they were trained. Employees must also:
  - Care for and maintain their respirators as instructed, and store them in a clean sanitary location.
  - Inform their supervisor if the respirator no longer fits well, and request a new one that fits properly.
  - Inform their supervisor or the Program Administrator of any respiratory hazards that they feel are not adequately addressed in the workplace and of any other concerns that they have regarding the program.
2.23.4 Definitions

- **APR** - Air Purifying Respirator
- **ESLI** - End of Service Life Indicator
- **H₂S** - Hydrogen Sulfide Gas
- **IDLH** - Immediately Dangerous to Life And Health
- **NIOSH** - National Institute of Occupational Safety and Health
- **OSHA** - Occupational Safety and Health Administration
- **PEL** - Permissible Exposure Limit
- **PPM** - Parts Per Million
- **PAPR** - Powered Air Purifying Respirator
- **QLFT** - Qualitative Fit Test
- **QNFT** - Quantitative Fit Test
- **STEL** - Short Term Exposure Limit

2.23.5 Procedures

Any employee who voluntarily wears a respirator when one is not required is subject to the medical evaluation, cleaning, maintenance, & storage elements of this program and must be provided with certain information specified in this section of the program.

Employees who wear dust masks are not subject to the medical evaluation, cleaning, storage, and maintenance provisions of this program.

### Table 1: Voluntary & Required Respirator Use

<table>
<thead>
<tr>
<th>Respirator</th>
<th>Department/Work Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust mask</td>
<td>Voluntary use when chipping, painting, working in warehouse, or performing yard work.</td>
</tr>
<tr>
<td>Half mask APR with organic vapor cartridge</td>
<td>.5-10 ppm airborne concentration of benzene. Refer to SPM 2.8</td>
</tr>
<tr>
<td>Full facepiece APR with organic vapor cartridges</td>
<td>11-50 ppm airborne concentration of benzene. Refer to SPM 2.8</td>
</tr>
<tr>
<td>Full facepiece PAPR with organic vapor canister.</td>
<td>51-100 ppm airborne concentration of benzene. Refer to SPM 2.8</td>
</tr>
<tr>
<td>SAR with full facepiece in positive pressure mode.</td>
<td>101-1000 ppm airborne concentration of benzene. Refer to SPM 2.8</td>
</tr>
<tr>
<td>SAR with full facepiece in pressure demand mode.</td>
<td>Exposure to greater than 10 ppm H₂S in your breathing area as defined in SPM 2.9.</td>
</tr>
<tr>
<td>SCBA</td>
<td>Must be present while working in IDLH atmospheres.</td>
</tr>
</tbody>
</table>

**Remember when breaking into pipelines or hoses that H₂S or benzene can be present and the proper respiratory protection should be worn when performing this task**
2.23.5.1 Program Elements

Selection Procedures - The Program Administrator will select respirators to be used, based on the hazards to which workers are exposed and in accordance with OSHA standards. The Program Administrator will conduct a hazard evaluation in work areas where airborne contaminants may be present in routine operations. These evaluations will be updated as necessary.

The following page contains the Respiratory Hazard Evaluation Form.

The results of hazard evaluations are as included in the Company Hazard Assessment Table 2:

The proper selection, maintenance and use of respirators can prevent serious injury and death. Selecting the appropriate respirator requires an evaluation of various factors. These include:

**Airborne contaminant:**

The specific airborne contaminant(s) to which workers are exposed and the airborne concentrations measured, or expected, in the work area. The presence of oil in the aerosol is critical when selecting particulate respirators.

**Worker activity and location:**

Is the employee in the hazardous area continuously or intermittently during the work shift? Is the work rate light, medium or heavy?

**Respirator use conditions:**

The period of time that a respirator must be worn is an important factor that should be taken into account when selecting a respirator. Consideration should be given to the type of respirator application, (e.g., routine, nonroutine, emergency or rescue use).

**Location of the potential hazardous area:**

The location of the hazardous area with respect to a safe area having respirable air should be considered. This will permit planning for the escape of workers if an emergency occurs, for the entry of workers to perform maintenance duties and for rescue operations.

**Respirator characteristics, capabilities, and limitations:**

The physical characteristics, functional capabilities and the performance limitations of the various types should be considered.

**Operational limitations:**

Environmental conditions and the level of effort required of the respirator wearer may affect service life. For example, extreme physical exertion can cause the user to deplete the air supply in a SCBA (Self-Contained Breathing Apparatus) such that service life is reduced by half or more.

When selecting any respirator, only NIOSH-approved or certified respirators should be selected. Any change or modification, however minor, may void the respirator approval and significantly affect its performance.
# Respiratory Hazard Evaluation

<table>
<thead>
<tr>
<th>Evaluation By:</th>
<th>Reviewed By:</th>
<th>New</th>
<th>Revised</th>
</tr>
</thead>
<tbody>
<tr>
<td>What type of respiratory hazard is present?</td>
<td>☐ Oxygen Deficiency</td>
<td>☐ Gas/Vapor</td>
<td>☐ Particulate/Aerosol</td>
</tr>
<tr>
<td></td>
<td>☐ Combination</td>
<td>☐ Other:</td>
<td></td>
</tr>
<tr>
<td>Contaminant(s)</td>
<td>TLV?</td>
<td>PEL?</td>
<td>NONE?</td>
</tr>
<tr>
<td></td>
<td>TLV?</td>
<td>PEL?</td>
<td>NONE?</td>
</tr>
<tr>
<td>What is the concentration in the atmosphere?</td>
<td>Is the contaminant above the TLV? PEL?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(provide reasonable estimate if sampling data is not available)</td>
<td>(Indicate ‘TLV’ or ‘PEL’)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td>Relative Humidity: (report ‘typical’ and ‘extreme’)</td>
<td>Temperature: (report ‘typical’ and ‘extreme’)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are IDLH conditions possible?</td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td>Is contaminant an eye irritant?</td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td>Is contaminant absorbed through the skin?</td>
<td>☐ No</td>
<td>☐ Yes</td>
<td></td>
</tr>
<tr>
<td>Is a respirator required?</td>
<td>☐ No</td>
<td>☐ Yes (Based on exposure/potential/protocol)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ Voluntary Use only</td>
<td>☐ SCBA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ PAPR</td>
<td>☐ Air line</td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ Full Face</td>
<td>☐ Filtering Facepiece</td>
<td></td>
</tr>
<tr>
<td>Cartridge type(s) to be issued and approximate weight of respirator + cartridge(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended Change Schedule for Cartridges: (NOTE: For formaldehyde, change cartridges every 3 hours)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional required and/or recommended P.P.E. (personal protective equipment)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected duration and frequency of respirator use:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2: The Company Hazard Assessment

<table>
<thead>
<tr>
<th>Department</th>
<th>Contaminants</th>
<th>Exposure level</th>
<th>PEL/STEL</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loading/unloading aggregate barges</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NIOSH Certification - All respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH) and shall be used in accordance with the terms of that certification. Also, all filters, cartridges, and canisters must be labeled with the appropriate NIOSH approval label. The label must not be removed or defaced while in use.

A sufficient number of respirator sizes and models will be available for employees to choose from. Air purifying respirators with organic vapor cartridges must be equipped with ESLI’s, End of Service Life Indicators, or a cartridge change schedule must be implemented.

Voluntary Respirator Use – The Company will provide respirators at no charge to employees for voluntary use if it is determined that such respirator use will not in itself create a hazard. The program administrator shall authorize voluntary use of respiratory protective equipment on a case-by-case basis. Employees who voluntarily choose to wear respiratory protective equipment must be provided with a copy of Appendix D of the standard. (Appendix D details the requirements for voluntary use of respirators by employees.) Employees choosing to wear a half facepiece air purifying respirator must comply with procedures for medical evaluation, respirator use, cleaning, maintenance, and storage.

Medical Evaluation - Employees who are required to wear respirators, or who choose to wear an air purifying respirator voluntarily, must pass a medical exam before being permitted to wear a respirator on the job. Employees are not permitted to wear respirators until a physician has determined that they are medically able to do so. Any employee refusing the medical evaluation will not be allowed to work in an area requiring respirator use.

A licensed physician at a Medical Center designated by the Director of Safety & Compliance will provide the medical evaluations. Medical evaluations will be conducted using the questionnaire provided in Appendix C of the respiratory protection standard. Medical evaluation procedures are as follows:

All affected employees will be given a copy of the medical questionnaire to fill out. The questionnaire will then be mailed or hand delivered to the Company physician. Employees will be permitted to fill out the questionnaire on Company time.
Follow-up medical exams will be granted to employees as required by the standard and/or as deemed necessary by the Company physician. The Company physician will notify the Company if this is necessary.

Employees will be granted the opportunity to speak with the physician about their medical evaluation, if requested.

The following information is provided to the Company physician before a decision is made about respirator use:

- Type & weight of the respirator.
- Duration & frequency of respirator use.
- Expected physical work effort.
- Additional protective clothing to be worn.
- Potential temperature & humidity extremes.
- Written copies of this program & the Respiratory Protection Standard.

Written recommendations are obtained from the Company physician regarding each employee’s ability to wear a respirator and the employee is given a copy of these recommendations by the Company physician.

Employees who are medically unable to wear a negative pressure respirator will be provided with a powered air-purifying respirator if the Company physician finds them medically able to do so.

Employees will be given additional medical evaluations when:

- The employee reports symptoms related to his/her ability to use a respirator.
- The Company physician, program administrator, or supervisor determine that it is necessary.
- Information from the respiratory protection program suggest a need for reevaluation.
- Workplace conditions have changed in a way that could potentially place an increased burden on an employee’s health.

**Fit Testing** - is required prior to being allowed to wear any respirator with a tight-fitting face piece. It must be done annually and when there are changes in an employee’s physical condition that could affect respiratory fit. The following employees will be fit tested:

- Employees wearing supplied air respirators while loading/unloading cargoes that are above the PEL for hydrogen sulfide.
- Employees using half face piece air purifying respirators in the loading/unloading of cargoes that are above the PEL for benzene.
- Employees voluntarily using respirators.
Employees will be fit tested with the make, model, and size of respirator that they will actually wear. Employees will be provided with several sizes and models of respirators so that they may find an optimal fit.

Fit testing may be performed by a third party. Fit tests are administered using OSHA-accepted Quantitative Fit Test (QNFT) or Qualitative Fit Test (QLFT) protocols.

It has been determined through atmospheric testing that qualitative fit testing can be used for half face piece APR’s that are used for protection from benzene vapors.

Quantitative or qualitative fit testing can be used for employees using supplied air respirators. The respirators will be tested monthly aboard each vessel.

2.23.5.2 Respirator Use

Employees must use their respirators under conditions specified by this program, and in accordance with the training they receive on the use of each particular model. In addition, the respirator shall not be used in a manner for which it is not certified by NIOSH or by its manufacturer.

Employees using tight-fitting respirators must not have any conditions, such as facial hair, that would interfere with a face to face piece seal or valve function.

Employees that wear corrective glasses, goggles, or other protective equipment must do so in a manner that does not interfere with the face to face piece seal or valve function.

Workers must perform a user seal check prior to each use of a tight fitting respirator. Positive and negative pressure checks must be performed, as described below, or the manufacturers recommended user seal check can be used.

**Positive Pressure Check** - Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal.

**Negative Pressure Check** - Close off the inlet opening of the cartridge, for APR’s, or close off the end of the mask hose for SAR’s by covering with the palm of the hand. Inhale gently so that the facepiece collapses slightly and hold the breath for ten seconds. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

The Company will conduct ongoing surveillance of the work area for conditions that affect respirator effectiveness. When there is a change in the work area or other conditions exist steps will be taken to address those situations.
Employees must leave the respirator use area in the following conditions:

- To wash their face or face piece to prevent eye or skin irritation associated with respirator use.
- For respirator maintenance or to replace respirator parts such as cartridges.
- A breakthrough of gas or vapor is detected, there are changes in breathing resistance, or leakage of the face piece. The respirator must be repaired or replaced before returning to the work area.
- When working in IDLH atmospheres the following procedures must be followed:
  - There must be at least one employee, standby personnel, outside the IDLH atmosphere that maintains communication with the employee inside the IDLH atmosphere.
  - Standby personnel must have access to an SCBA and be trained and prepared to render aid if necessary.
  - When standby personnel enter an IDLH atmosphere they must notify their immediate supervisor before doing so in case additional assistance is needed.

If an emergency arises during transfer operations, shut down the transfer and evacuate the area. Employees should have an agreed upon rally point to meet at and review the situation.

### 2.23.5.3 Air Quality

For supplied air respirators, only Grade D breathing air shall be used in cylinders. The Program Administrator will coordinate deliveries of compressed air with an approved Company vendor and require the vendor to certify that the air in the cylinders meets the specifications of Grade D breathing air. Each SAR unit will be supplied with two cylinders. When one of them becomes empty notify your supervisor for a replacement.

### 2.23.5.4 Cleaning & Disinfecting

Respirators are to be regularly cleaned and disinfected. Respirators must be cleaned and disinfected as often as necessary when issued for the exclusive use on one employee, before being worn by different individuals, and after each use for emergency SCBA’s. SAR and SCBA masks can be cleaned with disinfectant spray and clean towels. The following procedure is to be used when cleaning and disinfecting personal use APR’s:

- Disassemble respirator, removing any filters, canisters, or cartridges.
- Wash the face piece and associated parts in a mild detergent with warm water. Do not use organic solvents.
- Rinse completely in clean warm water.
- Wipe the respirator with disinfectant wipes or spray to kill germs.
- Air dry in clean area.
- Reassemble the respirator and replace any defective parts.
- Place in clean dry plastic bag or other air tight container.
2.23.5.5 Storage

Respirators must be stored in an area that will protect them from the elements and from becoming damaged. Emergency respirators must be stored in an area accessible to the work area, in compartments marked as such, & in accordance with the manufacturer’s recommendations. Respirators are stored on Company vessels in the wheelhouse. They are secured and tagged with name, number and size.

2.23.5.6 Inspections

Respirators are to be properly maintained at all times in order to ensure that they function properly and adequately protect employees. Maintenance involves a thorough visual inspection for cleanliness and defects. Worn or deteriorated parts will be replaced prior to use. No components will be replaced or repairs made beyond those recommended by the manufacturer.

Respirators should be inspected before each use and during cleaning. Inspections include the following:
- Check of respirator function.
- Tightness of connections.
- Condition of the face piece, head straps, valves, and cartridges
- Condition of any other elastic parts.

2.23.5.7 Repairs

Respirators that have failed inspection are taken out of service and either disposed of or tagged out of service. Repairs are only made by trained and qualified personnel with NIOSH approved parts.
2.23.5.8 Cartridge Service Life

*Keep In Mind*
- You may not rely on odor thresholds and other warning properties as the primary basis for determining the service life of gas and vapor cartridges and canisters.
- You should account for environmental and user factors and use a conservative approach when evaluating service life testing data.
- You should apply a safety factor to any estimate to account for uncertainty.

Mixtures, intermittent use and concentrations, storage practices and other variables may require the use of an administrative time limit, e.g. one day, even though the estimated life would be longer.

Experimental work can allow for a generalization or "rule of thumb" that broadly defines the service life of cartridges exposed to chemicals. One such Rule of Thumb for estimating organic vapor cartridge service life is found in chapter 36 of the American Industrial Hygiene Association (AIHA) publication "The Occupational Environment - Its Evaluation and Control."

It suggests that:
- **If the chemical's boiling point is > 70 °C and the concentration is less than 200 ppm you can expect a service life of 8 hours at a normal work rate.**

- **Service life is inversely proportional to work rate.**

- **Reducing concentration by a factor of 10 will increase service life by a factor of 5.**

- **Humidity above 85% will reduce service life by 50%.**

These generalizations should only be used in concert with one of the other methods of predicting service life for specific contaminants.

If ESLI’s, End of Service Life Indicators, are available on cartridges then the cartridges must be replaced when the ESLI indicates so.

*The company will follow the manufacturer’s recommendations for estimating the cartridge’s service life.*
2.23.5.9 Training

The Program Administrator will provide training to respirator users on the contents of the Company Respiratory Protection Program and their responsibilities under it, and on the OSHA Respiratory Protection standard. Workers will be trained prior to using a respirator in the workplace. Supervisors will also be trained prior to using a respirator in the workplace or prior to supervising employees that must wear respirators.

The training will cover the following topics:

• The Company Respiratory Protection Program and the OSHA Respiratory Protection standard.
• Why the respirator is necessary and the consequences of improper fit, use, or maintenance.
• Limitations and capabilities of the respirator.
• How to effectively use the respirator in emergency situations.
• How to inspect, put on, remove, use, and check the seal of a respirator.
• Maintenance and storage procedures.
• Recognizing medical signs and symptoms that may limit or prevent the effective use of respirators.

Employees will be trained annually and when changes in the workplace affect respirator use or when retraining appears necessary to ensure safe respirator use.

Program Evaluation - The program administrator will conduct periodic evaluations of the workplace to ensure that the provisions of this program are being followed. The evaluations will include regular consultation with employees who use respirators and their supervisors, site inspections, air monitoring, and a review of records. Any problems identified will be addressed/corrected.

2.23.5.10 Appendix D to 29 CFR 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.
You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

2.23.6 Records

The following records will be maintained in the Program Administrator’s office and are available to affected employees:

- Medical Evaluation Records.
- Fit testing records.
- A copy of the current respiratory protection program.