

OIL SPILL RESPIRATORY PROTECTION

Respiratory protection requirements, compliant with 29 CFR 1910.134, must be included in the Site Specific Health and Safety Plan for oil spills/releases (See SOG #: P103).

This plan outlines the worker health and safety air monitoring strategy for the _____ oil spill/release in _____ and is being conducted by _____ for _____.

Air quality readings for Oxygen (O₂), Hydrogen Sulfide (H₂S), LEL, VOC and Benzene are being monitored both upwind and downwind of _____. The following action levels and actions have been set for the above listed constituents:

O₂: < 19.5%; stop work, evacuate area

H₂S: >=1 ppm for 15 minutes; stop work, evacuate area

>=15 ppm at anytime; stop work, evacuate area

LEL: >=5 ppm for 15 min; stop work, evacuate area

Benzene/VOC:

0.5 - 1.0 PPM; (recommended but not required) that workers don a respirator.

1 PPM for 4 hours; shall don a respirator for the remaining of the shift/work.

2 PPM for 2 hours; shall don a respirator for the remaining of the shift/work.

3 PPM for 1.5 hours; shall don a respirator for the remaining of the shift/work.

4 PPM for 1 hour; shall don a respirator for the remaining of the shift/work.

Exceed 5 PPM at any one time during the shift; shall don a respirator for the remaining of the shift/work.



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Oil Spill Respiratory Protection Recommendations

Respiratory protection often is not necessary at an oil spill; however, the employer is responsible for determining and documenting whether workers need to wear a respirator. If an employee's exposure exceeds a permissible exposure limit, they must wear NIOSH-approved respirators. The respiratory protection requirements, compliant with 29 CFR 1910.134, must be included in the Site Specific Health and Safety Plan. Employee personal air monitoring data must be communicated to the worker. 29 CFR 1910.134 also has specific record management requirements.

Respiratory Health Concerns at Oil Spills

- **Oil (Fresh and Weathered)** - Oil is a mixture of hydrocarbons and consists of light, medium and heavy chemicals. The hydrocarbons in oil are mostly alkanes, cycloalkanes and various aromatic hydrocarbons. The light parts, such as benzene, xylene, toluene and ethyl benzene generally evaporate into the air in the first 24 hours of a spill. Many of the hydrocarbons present in gasoline and diesel fuels are carcinogenic. Inhalation hazards generally associated with oils are inhalation of the toxic volatile hydrocarbon components, such as benzene and oil droplets/oily particles put into the air during cleanup operations.
- **In-situ Burning** – Carbon Monoxide, Nitrogen Dioxide, Sulfur Dioxide and particulate matter are generated during in-situ burning operations and any activity using gasoline, diesel, or propane-powered machinery. Carbon dioxide is a chemical asphyxiant while Nitrogen Dioxide causes pulmonary edema and Sulfur Dioxide cause broncho-constriction.
- **Dispersants and Decontamination Agents** – Often contain petroleum distillates and can cause irritation of the nose and eyes, headache, a metallic taste, or vomiting. When swallowed, the lighter, more volatile distillate products can be sucked into the lungs interfering with the lung's functions and may result in chemical pneumonia. Review the MSDS for each dispersant or decontamination agent to determine the exact contaminants and exposure limits.

Exposure Limits for Common Contaminants at Oil Spills

Chemical	OSHA Permissible Exposure Limit	ACGIH Threshold Limit Value (2012)	Chemical	OSHA Permissible Exposure Limit	ACGIH Threshold Limit Value (2012)
Benzene	TWA – 1ppm STEL – 5ppm	TWA - 0.5 ppm STEL – 2.5 PPM	Particulates (PM2.5)	TWA – 5 mg/m^3	3 mg/m^3
Carbon Dioxide	TWA – 35 ppm Ceiling – 200 ppm	TWA – 25 ppm	Particulates (PM10)	TWA – 15 mg/m^3	10 mg/m^3
Diesel Fuel	--	TWA – 100 mg/m^3	Petroleum Distillates	TWA – 500 ppm	--
Ethyl Benzene	TWA – 100 ppm	TWA – 20 ppm	Sulfur Dioxide	TWA – 5 ppm	STEL – 0.25 ppm
Gasoline	--	TWA – 300 ppm STEL – 500 ppm	Toluene	TWA – 200 ppm Ceiling – 300 ppm	TWA – 20 ppm
Nitrogen Dioxide	Ceiling – 5 ppm	TWA – 0.2 ppm	Xylene	TWA – 100 ppm	TWA – 100 ppm STEL – 150 ppm
Oil Mist	TWA – 5 mg/m^3	--			

Determining if Respiratory Protection if Necessary

Use data from PID/FID and other direct reading Instruments to determine the concentration of known or anticipated contaminants. This evaluation will need to be performed while the work is occurring. Certain tasks, such as pressure washing containment boom and vessels may generate oil mists and particulates in concentrations that warrant respiratory protection. This exposure evaluation may need to be repeated throughout the duration of the work. A worker must wear a respirator if the exposure limit is exceeded. Certain



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situations may require a worker to wear respiratory protection until an assessment can be completed and the data proves a respirator is not required.

If a worker is exposed above a published limit, use this known concentration and the PEL/TLV to determine the **Hazard Ratio**:

$$\text{Hazard Ratio} = \frac{\text{Known Concentration}}{\text{PEL or TLV}}$$

Choose a respirator type where the **Hazard Ratio** is less than the **Assigned Protection Factor (APF)**:

Respirator Type	Assigned Protection Factor (APF)
½ Face Air Purifying	10
Full Face Air Purifying	50
Full Face Powered Air Purifying (PAPR)	1000
Supplied Air (SAR)	1000 (10000 with an escape tank)
Self Contained Breathing Apparatus (SCBA)	10000

If an Air Purifying Respirator (APR) is necessary, choose the cartridge that protects against all of the known/anticipated contaminants.

EPA Emergency Responders have access to the following SCOTT APR Equipment:

SCOTT Multipurpose Cartridges (Part # 7422-SD1):

- good for organic vapors, chlorine, chlorine dioxide, hydrogen chloride, hydrogen fluoride, hydrogen sulfide (escape only), sulfur dioxide, ammonia, methylamine and formaldehyde; 99.97% efficient against solid or liquid particles including oil-based particles.

SCOTT P100 Cartridges (Part# 7422-FP1):

- 99.97% efficient against solid or liquid particles including oil-based particles.

Special Requirements for In-situ Burning - A SCBA Unit must be readily available for each worker performing the in-situ burn. Workers participating in the in-situ burn must be trained and medically qualified to wear a SCBA. The SCBA must be on the vessel during off-shore operations.

Remember:

Do's	Don'ts
<ul style="list-style-type: none">• Do implement Engineering Controls to reduce or control airborne hazard before resorting to Respiratory Protection.• Do get a Medical Evaluation prior to wearing a respirator.• Do get Quantitatively Fit Tested prior to using a respirator and annually thereafter.• Do receive annual training on your respirator• Do read and understand the respirator manufacturer's instructions.• Do understand what contaminants and hazards you may be exposed to.• Do know the capabilities and limitations of your	<ul style="list-style-type: none">• Don't wear a respirator that you have NOT been Fit Tested for and approved to wear.• Don't wear a tight-fitting respirator if you have facial hair growth between the face-to-face piece seal.• Don't use a respirator, filter, cartridge, or canister that has NOT been certified by NIOSH.• Don't wait until you smell a gas or vapor to change your chemical cartridge/canister.• Don't remove your respirator in a contaminated environment.• Don't use a respirator that is damaged or defective.• Don't store a wet respirator in an air tight container. Always thoroughly dry respirator prior to storage.



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respirator and what to do in an emergency situation.

- Do perform user seal checks every time you put on your respirator.
- Do Inspect, Clean, and Sanitize respirator prior to and after each use

- Don't use an Air-Purifying Respirator (APR) in an atmosphere that is oxygen deficient or Immediately Dangerous to Life and Health (IDLH).
- Don't enter an unknown environment without a Self-Contained Breathing Apparatus (SCBA).

For additional information on the Emergency Responder Respiratory Protection Program, go to <http://epaossc.org/hsmanualregion4> (log in required).