

Fire Hazard

One of the main hazards associated with an oil spill response is fire because the oil is highly flammable and doesn't dissolve in water. The oil can be easily ignited by heat, sparks or flames. Fire may produce irritating, corrosive and toxic gases.

Oil vapors may form explosive mixtures with air. Most vapors are heavier than air and will spread along the ground and collect in low or confined areas. Vapors may cause dizziness or suffocation.

Controlled burning operations can result in exposure to nitrogen dioxide which can irritate the respiratory system and may cause fluid to build up in the lungs.

Sulfur dioxide is released when burning crude oil and during degradation. Short-term exposures to sulfur dioxide (5 minutes to 24 hours) can cause respiratory problems including constriction of the airways and increased asthma symptoms. Sulfur dioxide can react with other compounds in the atmosphere to form small particles that can penetrate deeply into the lungs. This can cause or worsen respiratory disease, and can aggravate existing heart disease, leading to increased hospital admissions and premature death.

Non-Fire Response

When the spilled oil is not burning, dikes, natural barriers or oil spill control booms may be used to limit spill travel and keep the oil out of water sources and sewers. Keep sparks, flames, and other sources of ignition away.

Chemical Exposures from Oil

Chemical exposures from the oil may include benzene and other volatile organic compounds (substances which change easily from liquid form to vapor), oil mist, polycyclic aromatic hydrocarbons, and diesel fumes.

- ▶ During an oil spill cleanup, workers may encounter different types of crude oil which contain toxic volatile aromatic compounds like benzene, toluene and naphthalene.
- ▶ The light parts of the oil, such as benzene, xylenes, toluene and ethyl benzene generally evaporate into the air in the first 24 hours of a spill (usually before reaching the shore). Any of these chemicals and

Military Vaccine Requirements

Refer to MILVAX at <http://www.vaccines.army.mil/> for up-to-date vaccine requirements.

Take Away

Avoid breathing oil vapors. Stay upwind. Wear personal protective equipment. Thoroughly wash away any material which may have contacted your body. Be careful when moving debris and walking on oil-slick surfaces.

Additional Training

- ▶ *Army G-1 Personnel Policy Guidance* (<http://www.armyg1.army.mil/MilitaryPersonnel/ppg.asp>) requires that you receive a preventive medicine briefing prior to deployment.
- ▶ The National Institute of Environmental Health Sciences has several products available including a training presentation called *NIEHS Oil Spill Cleanup Initiative: Safety and Health Awareness for Oil Spill Cleanup Workers* available (<http://tools.niehs.nih.gov/wetp/index.cfm?id=2495>).
- ▶ To determine additional Hazardous Waste Operations and Emergency Response (HAZWOPER) training needs for responders, refer to *Training Marine Oil Spill Response Workers under OSHA's Hazardous Waste Operations and Emergency Response Standard* (<http://www.osha.gov/Publications/3172/3172.html>).

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SHG-030-0412



Deployment Health Guide: Oil Spill Response

U.S. Army Public Health Command

This deployment health guide provides information that can help reduce your risk of injury and disease when deployed in response to an oil spill. Oil spills may be caused by damage to oil carriers such as trains, planes, vehicles or ships; or by damage to an oil platform. The damage may be due to an accident, storm damage, equipment failure, or human error. The spilled oil can pollute the surrounding air, water and soil. The effects of the oil depend on the type spilled: some oils are highly toxic to humans, others have low toxicity but their impact on waterfowl and wildlife can be severe.

Oil spill response workers may encounter many health and safety hazards, including fire and explosion; inhalation and skin contact with oil, dispersants and other chemicals; physical injury from slippery surfaces and moving debris; confined spaces; heavy equipment; drowning; heat and cold stress; contact with wildlife, poisonous plants and noise; and stress.

Communication

Oil spill response involves a network of government agencies, community organizations, industry groups, and contractors organized under the Incident Command System. Federal and/or state agencies usually monitor the responsible party and can direct cleanup operations if that party does not respond adequately. For marine oil spills, the ranking Coast Guard officer or EPA official at the spill scene usually functions as the On-Scene Incident Commander and coordinates the efforts. You should communicate and coordinate with the agencies involved and understand how your mission fits into the response efforts.

Site Safety

Before you begin any response efforts, an on-scene safety officer should brief you about site safety and health hazards and the site-specific Health and Safety Plan, as well as the use of personal protective equipment (such as oil-resistant gloves, boots, coveralls, and safety glasses.) As conditions and missions change, the safety officer should provide updated information to allow for adjustments in safety measures. In general:

- ▶ Wash and sanitize skin immediately if exposed to toxic substances.
- ▶ Rubber, steel-toed footwear will protect your feet from oil exposure and injury.
- ▶ Wear oil-resistant gloves when in contact with oil and oil waste and outer durable gloves when handling debris.
- ▶ If in doubt, contact your supervisor!

Oil Spill Types

Petroleum-based oil refers to natural substances and refined petroleum products. Each has a different chemical composition and properties that affect the way the oil spreads and breaks down. Gasoline and kerosene spread on water surfaces and penetrate soil quickly. Fire and toxic hazards are high, but the products evaporate quickly and leave little residue. On the other hand, heavier refined oil products and heavier crude oils are less of a fire and toxic hazard and do not spread on water as readily. Heavier oils are more persistent, though, and may present a greater clean up challenge.

other hydrocarbons can cause irritation to the eyes, skin, and respiratory system. In addition, they can cause dizziness, headache, and other narcotic effects as well as nausea, exhaustion, and loss of appetite. In chronic (long term or very high level) exposures, some of them can damage the liver and kidneys, and benzene and a few other chemicals can cause cancer.

- ▶ Cleanup operations on the land and near shore areas focus on the medium and heavy parts of the oil which have a consistency like motor oil. Heavier oil can become weathered and form tar balls. A key concern is possible irritation from getting weathered oil on the skin or in the eyes. Also, inhaling the oil droplets and oily particles put into the air during cleanup operations can be irritating to eyes, nose, throat and lungs.
- ▶ Oil can rub off dirty hands and contaminate food, drinks or tobacco products. **Follow decontamination procedures before eating, drinking, smoking or using the toilet.**

Hazards from Dispersants

Dispersants may be used to remove oil from the surface of water. Dispersants are usually applied directly to the spilled oil by spraying from an airplane, helicopter, or vessel. Most dispersants contain a detergent and a solvent. The detergent helps to break up the oil on the water surface into very small drops. These tiny oil drops are then able to easily mix with the water and be diluted. Protect yourself from the effects of the dispersants:

- ▶ Mix and load dispersants in well ventilated areas.
- ▶ Use automated spraying systems to apply dispersants when available.
- ▶ Remain upwind of the mists that are generated if spray systems are manned.
- ▶ Wear nitrile gloves during mixing, loading, or spraying of dispersants.
- ▶ Wear protective eyewear when mixing, loading, or spraying dispersants. If there is eye contact, immediately flush the eyes for at least 15 minutes and seek medical assistance.

- ▶ Immediately wash hands and any other body parts exposed to dispersants thoroughly with soap and water.
- ▶ Use a respirator if personal air monitoring indicates the above steps do not reduce exposure below the occupational exposure limits.

Decontamination

Follow procedures established at the site for the decontamination of personnel, PPE, and equipment in order to reduce your exposure and prevent spreading contamination to other areas. Collect and properly dispose of the solutions used for decontamination, as well as items that cannot be decontaminated.

Physical Injury

- ▶ Oil-slick and uneven surfaces increase slip, trip and fall hazards. Many surfaces, including steps, ladder rungs, and boat decks may be slippery from oil. Be extra careful if you are handling or carrying anything.
- ▶ Wear chemical protective gloves, safety goggles, and steel-toed shoes or boots.
- ▶ Avoid lifting more than 50 pounds per person.
- ▶ Moving debris can result in injuries. Be sure you've had a tetanus vaccination within the past 10 years.

Confined Spaces

Oil vapors may form explosive mixtures with air. Most oil vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks) and can cause explosive conditions. **Never** enter a confined space unless you have been properly trained; even to rescue a fellow worker! Contact the fire department for help.

Heavy Equipment

Be constantly aware of your surroundings to avoid being hit by earthmovers, cranes, trucks and other heavy vehicles and equipment.

Drowning

There is a potential for drowning when working on or near the water. Use a life jacket or personal flotation device.

Heat Stress and Sunburn

Heat and Solar Exposure

- ▶ Full heat acclimatization takes 7-14 days of physical exertion in the heat. Physical exertion should start slowly but increase in intensity and duration.
- ▶ Drink enough water to replace sweat loss. If your urine becomes dark yellow and infrequent, drink more fluid.
- ▶ Use the work-rest cycle requirements of the on-site safety officer. When possible, work during the cooler hours of the day. Get medical attention for heat cramps, exhaustion, or stroke.
- ▶ Use sunscreen with an SPF of 30 or higher on all skin not covered by clothing.

Cold

- ▶ Remember **C-O-L-D**: keep clothing **C**lean, avoid **O**verheating, wear clothing **L**oose and in layers, and keep clothing **D**ry.
- ▶ Change your socks frequently to keep your feet dry.
- ▶ Use the buddy system to check for signs of cold injury.
- ▶ Get medical help for loss of sensitivity in any body part, mental slowness, or uncontrollable shivering.

Noise

If you have to raise your voice to be understood, it is too noisy. Wear hearing protection.

Animals

- ▶ To reduce exposure to harmful insects, particularly ticks and mosquitoes, use the DOD Insect Repellent System.

DOD Insect Repellent System



- ▶ Avoid all contact with spiders, snakes, reptiles, rodents, and wild and stray animals.
- ▶ Shake out boots, bedding and clothing prior to use.
- ▶ Clean your hands afterwards if contact is unavoidable.
- ▶ Seek medical attention if scratched, bitten or stung.
- ▶ Many animals may die due to exposure to the crude oil. Dispose of dead animals according to local guidelines.

Poisonous Plants

Some plants can irritate the skin and lungs if touched or burned. Avoid skin contact with plants and wash contaminated skin and clothing after contact.

Stress

Working long shifts, working many days in a row, doing heavy labor and demanding cognitive tasks, as well as exposure to animal suffering and death can cause stress and fatigue. Responders who are exhausted, stressed or temporarily distracted can place themselves and others at risk.

- ▶ Pace yourself, especially when working long shifts and many days in a row and take rest breaks away from the work area.
- ▶ Use the buddy system to watch out for each other.
- ▶ Recognize and accept what you cannot change—the chain of command, waiting, equipment failures, etc.
- ▶ Give yourself permission to feel miserable: you are in a difficult situation.
- ▶ Recurring thoughts, dreams, or flashbacks are normal—do not try to fight them. They will decrease over time.
- ▶ Communicate with your loved ones at home as frequently as possible.

Personal Protective Equipment

The level of personal protective equipment (PPE) required will depend upon your role in the effort. Anticipate and bring items such as chemical protective gloves, Tyvek® coveralls or pants, steel-toed boots, goggles, and hearing protection. Some PPE items may not be standard issue for most U.S. military personnel.