



# GoM Region Sewage and Black Water Treatment Facilities Safe Work Practice

## 1.0 Purpose / Scope

This practice provides for the protection of health of personnel who may handle or come in contact with effluents and/or wastes from sewage and black water treatment equipment/facilities within BP Gulf of Mexico operations. In addition, this practice addresses controls to protect personnel who may handle treatment chemicals associated with sewage and black water treatment equipment/facilities. The purpose of this practice is to define the risks associated with working with sewage and black water treatment equipment/facilities in addition to defining the requirements for reducing and eliminating the potential of disease transmission or chemical exposure to the workforce.

OMS Sub Element 3.4.3 states: *“Implement and maintain exposure assessment programs to monitor the effectiveness of risk reduction measures to eliminate or manage exposures to identified health hazards.”*

## 2.0 General Requirements

OSHA’s General Duty Clause (OSHAct 1970), Hazard Communication Standard (29 CFR 1910.1200) and Personal Protective Equipment standards (29 CFR 1910 Subpart I) require employers to train and educate personnel about the hazards of working with sewage or black water and to provide a clean, safe work environment with the proper facilities and equipment to protect personnel against health risks. Although contact with sewage (not originating directly from a health care facility) poses a number of health hazards, OSHA does not consider these hazards to be related to bloodborne pathogens, therefore the Bloodborne Pathogens standard (29 CFR 1910.1030) does not apply.

Personnel who have potential exposure to fecally contaminated waste in GoM locations such as personnel who work with marine sanitation devices (MSD’s) are offered the option to receive the hepatitis A vaccination (See Appendix 1-Hepatitis A Vaccination Information Sheet). If further clarification of this guideline is needed, contact the GoM Occupational Health Nurse at (281-366-3459).

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## **3.0 Key Responsibilities**

### **3.1 Operations Installation Manager (OIM)/Supervisor**

The OIM or Supervisor is responsible for implementing this SWP and verifying that workers are properly trained in recognizing, evaluating and controlling sewage effluent/waste or treatment chemical hazards and ensuring appropriate equipment is available for this purpose, such as personal protective equipment or decontamination equipment. Supervisors with the assistance of the Medic on board shall inform personnel who maintain marine sanitation devices that they have the option to receive the hepatitis A vaccine.

### **3.2 Health and Industrial Hygiene Team Leader**

The Health and Industrial Hygiene Team Leader is the subject matter expert on this SWP. They are also responsible for assuring that these practices are implemented effectively through ensuring that Industrial Hygiene Assessments are conducted periodically at each facility and corrective actions when necessary are accepted, understood, and completed by line management.

### **3.3 HSSE Site Lead**

The HSSE Site Lead will assist with requests regarding personal protective equipment use and supply and shall be available for consultation on recognizing, evaluating and controlling sewage effluent/waste and treatment chemical hazards.

### **3.4 Occupational Health Physician (OHP)**

Consultant for policy development/case managing biological contamination medical cases as appropriate.

### **3.5 Medic**

Provide training to personnel who are exposed to biological agents as described in this SWP.

Provide medical support and maintain appropriate confidential medical records, and give advice regarding the immunization provisions of this SWP as well as provide consultation to line management regarding contamination issues that may arise.

Maintain adequate supply and administer hepatitis A vaccine. Medic is also responsible for providing educational information on the vaccine to personnel. A copy of the BP employee's vaccination records shall be updated and forwarded to the BP GoM Occupational Health Nurse. For contractors, appropriate contractor medical contact shall receive the information.

### **3.6 Occupational Health Nurse**

Provide technical support and advice to personnel and Medics concerning this SWP.

### **3.7 Employees and Contractors**

When performing jobs with a reasonable expectation for exposure to sewage effluents/wastes and/or treatment chemicals, employees and contractors are expected to follow the risk assessment and hierarchy of controls through the Permit to Work process. Appropriate administrative controls (e.g., personal hygiene and/or decontamination procedures, as applicable) shall be used at all times as a precaution. Personal Protective Equipment shall be used as a last option when all other preventive measures have been taken.

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## 4.0 Protection and Control Process

### 4.1 Recognition of Hazards

#### 4.1.1 Identification and Health Effects

Untreated or partially sewage and black water contain bacteria, fungi, parasites and viruses that can cause intestinal, lung and other infections. During any part of treatment, transport or application of sewage effluents or sewage sludge employees can be exposed to materials that cause disease. Table 1 lists several organisms that may be present as well as typical signs and symptoms of exposure.

<b>Table 1</b> <b>Biological Organisms and Signs/Symptoms of Exposure</b>	
<b>Bacteria</b>	<ul style="list-style-type: none"> <li>○ Salmonella -Nausea, headache, diarrhea and vomiting</li> <li>○ Shigella -Muscular stiffness in jaw, neck; sweating, fever</li> <li>○ Tetanus -Cramps, diarrhea, fever, bloody stool, nausea, vomiting</li> <li>○ Leptospirosis -Intestinal problems, liver and kidney disease</li> <li>○ E. coli -Diarrhea, vomiting, little or no fever, blood in stool</li> </ul>
<b>Viruses</b>	<ul style="list-style-type: none"> <li>○ Hepatitis A (HAV) -Fever, abdominal pain, nausea, jaundice, dark urine</li> <li>○ Hepatitis B (HBV) -Nausea, vomiting, loss of appetite, jaundice, joint pain</li> <li>○ Human immunodeficiency virus (HIV) -Destroys immune system, prone to opportunistic infections</li> <li>○ Polio -Fever, headache, nausea, muscle pain and paralysis</li> </ul>
<b>Parasites</b>	<ul style="list-style-type: none"> <li>○ Entameoeba histolytica -Mild nausea, loose stool, abdominal tenderness and in severe cases can spread throughout body and other organs, esp. liver</li> <li>○ Giardia lamblia -Cramps, weight loss, loose/greasy stool, bloating</li> </ul>
<b>Important Factors</b>	
<ul style="list-style-type: none"> <li>▪ In general, studies have not shown higher disease infection rates for sewage effluent handlers compared to similar populations of workers not exposed to sewage (<i>Center for Disease Control</i>).</li> <li>▪ The risk of contracting HBV or HIV from sewage exposure is 'virtually non-existent' and studies have not shown an increase risk for workers handling sewage (<i>American Federation of State, County and Municipal Employees and Department of Health Services</i>).</li> <li>▪ Although no occupational outbreaks of HAV in the US have been reported among workers exposed to sewage, the risk of HAV infection in sewage workers is not well documented.</li> </ul>	

In addition to biological agents, personnel involved with operating sewage treatment equipment may be exposed to hazardous chemical agents used in the water processing (e.g., chlorine) or generated during water treatment (e.g. hydrogen sulfide when sludge tanks are associated with treatment equipment). These chemical agents may cause acute poisoning, chemical accidents (e.g., skin burns, injury to the eyes, etc.) damage to the respiratory system, allergies or dermatitis.

## 4.2 Routes of Exposure

The primary route of exposure to the biological hazard organisms is hand-to-mouth contact. This can occur during eating, drinking or smoking, or by touching the face with contaminated hands or gloves. Inhalation of aerosols containing microorganisms is a less-common method of entry. Airborne bacteria concentrations are typically highest wherever sewage is agitated, such as near incoming wastewater inlets that are open to atmosphere. Skin absorption is unlikely unless the skin has been previously damaged by cuts, blisters, burns or puncture wounds. Mucous membranes (such as in the eyes and nose) may also provide a route of entry for certain organisms.

The primary routes of exposure to treatment chemicals are via respiratory or skin contact. Generally, treatment chemicals are disinfectants with corrosive properties, such as chlorine (liquid, dry or gas). If sewage or black water treatment equipment/facilities include sludge tanks, the possibility of hydrogen sulfide accumulation exists, which is a respiratory hazard.

## 4.3 Controlling Exposures and Managing Risks

Although risk of infection of personnel handling sewage and black water appears to be low, workers should take precautions to minimize risks. Workers should assume that all sewage treatment associated surfaces are contaminated with potentially infectious materials and use precautions when working in wastewater areas. The following are several safeguards.

- Avoid direct contact with raw sewage.
  - Avoid aerosolizing sewage water and minimize exposure time in areas where this is occurring (bacteria levels are highest where the water is agitated).
  - Use personal protective equipment such as waterproof gloves, boots and eye/face protection when in direct contact with raw sewage. Face shields *shall* be used where splashing is anticipated. Personal protective equipment *shall* be decontaminated after use (cleaned with soap and hot water - 160°F – after each use) or disposed of. Skin protection is especially important when open wounds/cuts are present.
  - Wash reusable clothing commercially at high temperatures (160°F) to ensure that all organisms are destroyed.
  - Keep contaminated clothing and personal protective equipment away from smoking and/or eating and food storage areas. Laundry personnel *shall* be told that clothing has been contaminated.
  - Wear respirators when necessary. (In most cases, respirators will not be necessary for protection against biological organisms; however, AFSCME recommends that “a disposable dust mask be worn in dusty sludge areas or areas with heavy aerosols”.) Supplied air respirators may be necessary if chlorine gas is used as a treatment chemical or if hydrogen sulfide accumulation may occur (e.g., if a sludge tank is present as part of the treatment equipment).
  - If the hazard of hydrogen sulfide accumulation is present (e.g., a sludge tank is used in the treatment process) testing *shall* be conducted before servicing/opening the sludge tank for hazardous levels of hydrogen sulfide.
  - Follow good personal hygiene practices:
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- Wash hands and face regularly with soap and water, especially before eating, smoking and drinking, and at the end of the shift;
  - Keep hands away from nose, mouth, eyes and ears;
  - Keep fingernails short; and
  - Shower daily.
  - Clean, treat and report any cuts or punctures immediately. Consider all wounds as potentially infected.
- Disinfect work areas if a spill occurs. Proper use of disinfectants along with use of any required PPE is critical.

## **4.4 Employee Training and Information**

### **4.4.1 Training**

Individuals shall receive training and information to meet requirements of BP GoM's Hazard Communication SWP initially upon assignment and as required based on the specific tasks that they are assigned on site. [Training based on this SWP shall be provided by the Medic or HSSE Site Lead and shall include as a minimum:](#)

- Types of biological organisms and treatment chemicals that are a risk to personnel;
- Routes of exposure;
- Symptoms of disease or exposure illness;
- Facility-specific risk areas/tasks;
- Importance of personal hygiene;
- Personal protective equipment use (when used; which pieces of equipment; maintenance of equipment; decontamination of equipment); and
- First aid/medical attention directives, including incident and injury/illness reporting.

### **4.4.2 Immunizations**

The Center for Disease Control recommends that all personnel who may come in contact with sewage and black water be up-to-date with their Tetanus and Diphtheria inoculations (booster every 10 years).

HBV and HAV immunizations are not recommended as the Center for Disease Control has determined that personnel working with sewage are not at any higher risk of contracting these diseases than similar workers in other industries. However, to provide optimal protection for BP employees, the GoM Health Team encourages personnel who handle marine sanitation devices (MSD's) to receive the Hepatitis A vaccine on a voluntary basis.

Although immunization for HAV, (HAV is an inactivated virus, immune globulin is for treatment), is not recommended by the CDC for sewage workers as standard practice for areas where elevated levels of HAV are not present in the community (e.g., local population with regular outbreaks of HAV), personnel handling sewage should consult their doctor or BP GoM Occupational Health Nurse if they have any chronic liver disease or have been over-exposed to raw sewage without any protective measures in place. In these situations, recommendations may be made by medical professionals for specific individuals to receive immunization against HAV.

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## 5.0 Key Documents, Tools, References

OSHA 29 CFR 1910.1030, Bloodborne Pathogens Standard

[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10051](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051)

Center for Disease Control, *Biological Hazards Sewage and Wastewater Treatment: Hazard Alert*

<http://www.cdc.gov/elcosh/docs/d0200/d000283/d000283.pdf>

OSHA 29 CFR 1910.1200, Hazard Communications Standard

[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10099](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099)

OSHAct 1970, General Duty Clause

[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=OSHACT&p\\_id=3359](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=OSHACT&p_id=3359)

### Revision Log

Revision Date	Authority	Custodian	Revision Details
02/18/2013	Director of Health and Safety	Health & Industrial Hygiene Team Leader	Changed title from Procedure to Safe Work Practice. Section 1.0-Added reference to OMS. Section 2.0 – Added paragraph regarding exposure to fecally contaminated waste. Section 3.0 – Added new roles for Health/IH TL, Medic, Occ. Health Nurse, Employee and Contractor. Section 4.3 – Changed “should” to “shall” in third and fifth bullet. Deleted Attachment 1- GoM Health Protective Guidance Measures Doc 00129-2-Hepatitis A and made it Appendix 1 without a document #.
03/10/2008	Curtis Jackson	Dennis Johnson	Attached Hepatitis A guideline to document.
06/01/06	Garner, Stan; Jackson, Curtis; Tink, Steve	Jack Kogut	Issued and initial posting on the GoM HSSE Website.



## Appendix 1 - Hepatitis A Vaccine Information Sheet

### Definitions

Term	Definition
Hepatitis A	A serious liver disease caused by the hepatitis A virus (HAV). It can cause mild “flu-like” illness, jaundice (yellow skin or eyes) and severe stomach pains and diarrhea. People with Hepatitis A often have to be hospitalized. Hepatitis A vaccine can prevent hepatitis A.
Hepatitis A virus (HAV)	Found in the stool of persons with Hepatitis A. It is most commonly spread by fecal-oral contact via contaminated food or water.
Hepatitis A vaccine	Immunization against HAV. The single-dose vaccines are HAVRIX and VAQTA and the combination vaccine is TWINRIX (containing both HAV and HBV antigens).
Post-exposure prophylaxis	Treatment administered following exposure to Hepatitis A which attempts to block or reduce injury or infection.

### Dosage

Two doses of the vaccine are needed for lasting protection. 1.0 ml is given intramuscularly in the deltoid at least 6 months apart.

### Contraindications

Contraindications to receiving the vaccine are as follows:

- A severe (life-threatening) allergic reaction to a previous dose of Hepatitis A or any vaccine component (aluminum and/or 2-phenoxyethanol)
- Anyone who is moderately or severely ill (those with mild illness may receive the vaccine)
- Anyone who is pregnant

### Adverse Reactions

Mild reaction would include soreness at injection site, headache, loss of appetite or fatigue (usually lasts 1 to 2 days).

Severe reactions may be allergic in nature resulting in difficulty breathing, hoarseness, wheezing, hives, weakness or dizziness (rare).

### Post-Exposure Evaluation

Employee shall notify supervisor and GoM Health Team should an exposure occur. BP incident reporting guidelines should be implemented at the time of exposure.

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### **Post Exposure Management**

Potential exposure to HAV via contact with a contaminated source should follow the above vaccination schedule. In addition, a physician should be consulted for possible immunoglobulin prophylaxis administration in those not previously vaccinated.

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### **Key Documents/Tools/References**

CDC, Center for Disease Control. Prevention of Hepatitis A Through Active or Passive Immunization. MMWR 2006; 55:1-23.

CDC Hepatitis A Vaccine Information Statement

Vaccine Information Sheet (VIS)

<http://www.cdc.gov/vaccines/pubs/vis/default.htm#hepa>

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