Frequently Asked Questions & Answers about Wastewater and Biosolids Worker Health & Safety

Do wastewater and biosolids workers have a higher rate of potential exposure to pathogens than the general public?

A common characteristic of untreated wastewater is its high concentration of microorganisms. Biological secondary treatment followed by disinfection is an important way to treat wastewater because it significantly reduces microorganisms. The disinfection process that follows then kills many pathogens before the cleaned water is discharged to the receiving streams. Because of their daily exposure and contact with biological materials, wastewater personnel may have a higher incidence of potential exposure to pathogens than the general public. For most workers, however, the risk of developing an occupational illness is significantly reduced or eliminated when standard safety and personal hygiene procedures are followed.

What are some of the common wastewater facility hazards?

As in many occupational settings ranging from hospitals, restaurants, food processing, agriculture, and health-care professions, wastewater personnel can also be potentially exposed to biological hazards. Even routine procedures such as changing a baby's soiled diaper and preparing meat dishes can expose an individual to contamination if proper personal hygiene is not followed. Some of the potential hazards for individuals who work around any collection system or wastewater facility may include: infectious disease, physical injury, confined spaces, oxygen-deficient spaces, toxic or harmful chemicals and gases, explosive gas mixtures, fires, electrical shock, noise, and dust and fumes. It is important, therefore, that workers follow standard safe work procedures to minimize or eliminate the potential for injury and illness.

What are some of the health and safety concerns with biosolids composting?

The major wastewater worker health and safety concerns involve the potential effects of primary pathogens, bioaerosols, heavy metals, and

other microorganisms at facilities processing wastewater and biosolids. Worker exposure could occur through inhalation, ingestion, and dermal contact. Adherence to good personal hygiene and use of personal protective equipment are recommended for workers in these occupational environments.

Have there been any studies relating to the incidence of illness to wastewater workers?

Studies have been conducted over the past 25 years relating to wastewater worker occupational illnesses. Although most studies cited in the scientific literature indicate that infections from specific agents are not common, workers in contact with wastewater or biosolids, especially during their first few years of employment, have been known to experience some increased symptoms associated with gastrointestinal or upper respiratory illnesses. However, other studies also point out that wastewater workers build immunity over time against these types of illnesses and are generally healthier than the general population.

What can wastewater workers do to minimize potential exposures to pathogens?

Proper personal hygiene and use of personal protective equipment are critical because infections from contact and exposure to microorganisms may occur without symptoms and antibodies to bacteria and viruses may develop without illness symptoms being readily apparent.

What are the most common bacterial pathogens found in wastewater?

The most common bacterial pathogens found in untreated wastewater are *Salmonella* and *Shigella*. Other bacterial microorganisms include *Vibrio, Clostridium, Yersinia, Campylobacter, and Leptospira. Escherichia coli (E.coli),* which can cause gastroenteritis, is generally not considered a pathogen because it is a microorganism that naturally inhabits the gastrointestinal tract of man.

What is the difference between a virus and bacteria?

A virus is any group of ultramicroscopic agents that reproduce only in living cells. Unlike viruses, bacteria do not require a living host cell to reproduce. Pathogenic bacteria are microscopic in size and common in

wastewater. Because bacteria can reproduce outside the body, microorganisms can be present in large quantities in the wastewater collection system and treatment process.

What types of viruses are found in wastewater?

Viruses multiply in the living cells of the intestinal tract and end up in human feces. The common human viruses in wastewater include Norwalk, Rotavirus, Adenovirus, Coxsackie A and B, Echovirus, Hepatitis A, Poliovirus, and Reovirus. These viruses have the potential to cause gastrointestinal and upper respiratory illness when proper safety procedures are not followed in the workplace.

Can parasites be found in wastewater?

Waterborne parasites found in wastewater consist of various types of protozoa and worms. Many of these organisms often do not survive the journey through the wastewater collection system and treatment facilities. The cysts and eggs, in which the protozoa and worms reproduce, are often resistant to adverse conditions and may show up in wastewater or biosolids samples. Because hand-to-mouth contact is the principal cause of infection, it is important that workers wash their hands frequently.

Are wastewater workers at risk to contracting AIDS or Hepatitis B in the workplace?

AIDS and hepatitis B are both blood-borne viruses and cannot reproduce outside the human body. For disease transmission, AIDS and hepatitis B must enter the bloodstream directly. The Centers for Disease Control (CDC) has stated that there is no scientific evidence that AIDS or hepatitis B can be contracted through occupational exposure associated with wastewater treatment.

What is the most common route of wastewater worker infection?

The most common cause of infection is due to poor personal hygiene. The three basic routes that may lead to infection in the wastewater environment include ingestion through splashes, contaminated food, or cigarettes; inhalation of infectious agents or aerosols; and infection due to an unprotected cut or abrasion. Ingestion is generally the major route of wastewater worker infection. The common practice of touching the mouth with the hand will contribute to the possibility of

infection. Workers who eat or smoke without washing their hands have a much higher risk of infection. Personal hygiene practices including frequent washing of the hands will minimize these potential opportunities for exposure.

What are the risks of infection to biosolids operators?

In addition to the general risks to wastewater workers, biosolids workers that are at locations where wastewater or biosolids are sprayed, should avoid prolonged exposures where contact with such aerosols are likely. In instances where prolonged exposure to aerosols is anticipated, the use of surgical masks and goggles will significantly minimize contact and risk of infection.

What can wastewater workers do to prevent infections?

The most important consideration is the use of good common sense and following appropriate personal hygiene and using personal protective equipment where appropriate. Some of the standard workplace precautions and personal hygiene steps that should be followed include:

- Wash hands frequently with soap and water after contacting wastewater; after visiting rest rooms; before eating, drinking, or smoking; and at the end of the work shift.
- Promptly treat cuts and abrasions using appropriate first aid measures.
- Wear heavy-duty gloves (double gloving) and boots that are waterproof and puncture resistant.
- Wear surgical-type masks and goggles or face shields for prolonged exposure to wastewater aerosols.
- Change soiled uniforms or protective clothing as soon as the job is completed.
- Shower before changing into clean street clothes and shoes.
- Wherever possible, use dual lockers to separate work and street clothes
- Launder work clothes at work and not at home.
- Handle sharp items with extra care to prevent accidental injuries.
- Clean contaminated tools after use.
- Follow good common sense and exercise extra caution whenever there is contact with contaminated water or sludge.
- Promptly clean body parts that contact wastewater or biosolids.

Do the Centers for Disease Controls recommend any special immunizations for wastewater or biosolids workers?

No additional immunizations above those recommended by CDC for the adult general population are advised for workers in contact with wastewater or biosolids. Wastewater and biosolids workers and all other adults in the general population should be adequately vaccinated against diphtheria and tetanus. The preventive effect of the vaccine immune serum globulin for hepatitis A is short lived (about 3 weeks), and is not routinely recommended for wastewater or biosolids workers. This vaccine is only recommended where there has been direct exposure to wastewater splashed into an open wound or the mouth or a severe outbreak has occurred in the community. The vaccine for hepatitis B is not routinely recommended for wastewater or biosolids workers because the risk of transmission of the virus by wastewater is extremely remote.

REFERENCES

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