

Hazard Assessment, Mitigation and Training for Workers Exposed to Residential Sewage

Safety and Health Investment Project (SHIP)

Written by: The Washington On-Site Sewage Association in Collaboration the Washington State Department of Labor and Industries



Acknowledgements



Acknowledgement

Funding and support for this project has been provided by the State of Washington, Department of Labor & Industries, Safety & Health Investment Projects and a Cooperative Agreement with the Washington On-Site Sewage Association (WOSSA).

This document was prepared by WOSSA in collaboration with the State of Washington, Department of Labor & Industries, Safety & Health Investment Projects Staff. WOSSA would like to thank all who were involved in the research, writing and review of this report.

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Instructor's Guideline

This pre-amble will provide guidance to the instructional use of this training resource for the Onsite Industry.

Introduction

Washington State Labor and Industry requires employers to provide a safe and health workplace for their workers. At a minimum, this is mandated under the "General Duty Clause" of employer responsibilities.

Risk identification and management is the employer's responsibility, but it also requires awareness, recognition and compliance to company policy and procedures by employees in the identified risk based work activities. Appropriate identification and "fit for use" evaluation of PPE (personal protective equipment) is only a part of the requirement for a comprehensive safety management program. Accident Prevention Plans based in Job Safety Analysis protocols evaluate key exposures for workers.

This training resource is designed to be used and presented to employee's working in work environment exposures with wastewater outside of wastewater treatment plants. These would include but are not limited to:

- On-Site Wastewater Systems (small flows less than 3,500 gpd)
- Light commercial applications (strip malls, combined wastewater/grease)
- Side sewer and jetting operations connected to sewer infrastructure

How to use these Training Materials

Suggested Instructor qualifications:

The instructor should have a minimum of 3-5 years' experience in the On-Site industry working with OSS Pumpers, Inspectors, Installers or Regulatory infrastructure.

Have at least 1 year presentation/education experience to the OSS industry for qualified CEU approved training programs.

Have a background in the Microbiology of wastewater and be familiar with pathogen exposure in wastewater vectors, exposure and risk management.

Have a working knowledge of OSHA and State Labor Industrial Health and Safety Regulations and how they are applied.

Practical experience in Safety Management applications and program implementation for small business.

Using the Resource

Presenters of the training resource should anticipate approximately 8-10 hours of preparation time to familiarize themselves to the learning objectives and content of this program before presenting it.

It is divided into several sections:

1. Power Point presentation:

a. This should be printed in the format included, 3 slides to a page with "note" lines for participants. Speaker's notes are inclusive for each slide and should be reviewed for content and intent to learning objectives.

2. WISHA Blood Borne Pathogens:

a. This represents the current regulations and requirements for exposures to BBP's, but should be reviewed for its presentation of applicability to the OSS industry as it relates to OPIM's ("other potentially infectious materials). It can be used as a ready reference in the class or as supporting documentation for employers to review. It should be noted that in Washington, the OSS industry does not have its own LNI code, and so this is

3. Personal Protective Equipment (PPE): WAC 296-823

a. A ready reference that has practical application to any sections of the PowerPoint presentation that works through the evaluation and appropriate use of PPE.

4. Pages 87 - 100 inclusive:

- a. Eye and Face Protection
- b. Hand and Arm Protection
- c. Foot and Leg Protection
- d. Torso and Body Protection

These sections of the report provide a ready resource for application of additional safety risk assessment and mitigation for potential injuries compounded by the contaminated environment of wastewater and potential pathogens. These resources support discussion relating to vector transmission potentials in the workplace of both know and identified (in this study) bacteria and viruses to workers.

5. Job Hazard Analysis PPE Assessment

- a. Use this section in conjunction with the corresponding slides in the PPT presentation as a "worked" example. Note that the initial JSA exercise is "out of context" to the typical work environment. This is done intentionally to facilitate learners to thinking out of the box. Use of children in the pictures is also done intentionally as a motivational/relationship technique to anchor the learning objective as personal.
- b. At the end of the exercises, the handout provides the foundation of practical applications to work tasks and activities that are common to the OSS industry in the JSA that were created. It should be noted that these are not comprehensive but a starting point for companies to build off of to make them specific to their local organizational needs.



Personal Protective Equipment Training Quiz

1 61301	ar Frotective Equipment Framing Quiz
1.	What are the limitations of personal protective equipment?
2.	List the types of personal protective equipment you must use when doing your work/tasks.
3.	What are the hazards in your job for which you must use each type of PPE, and when must you use your personal protective equipment?
4.	What are the procedures for the proper use, care, and maintenance of your PPE?
5.	What should you look for to determine that your PPE is in good working condition?
6.	What do you do when your PPE is no longer usable?

Washington On-Site Sewage Association NWOTC

This is to certify that

First & Last Name

Completed: LNI SHIP Grant — "OSS Workers Exposure to Pathogens in Wastewater"

Sponsored by the Washington On-Site Sewage Association Month Day, Year

This is a full day Course: 8.0 Contact hours awarded City, State

John Thomas
Executive Director





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"Safety in Your Workplace"

Pathogen Exposures in Wastewater to Workers in the OSS Industry







Program Recognition



Funding and support for this project has been provided by the State of Washington, Department of Labor & Industries, Safety & Health Investment Projects



and Service Providers

Laboratories, Inc.

This training curriculum was prepared by WOSSA in collaboration with the Dept. of Labor and Industries SHIP

This training curriculum was prepared by WOSSA in collaboration with the Dept. of Labor and Industries SHIP Grant Staff. WOSSA would like to thank all who were involved in the research, writing and review of this curriculum.



Purpose of the Grant and Outcomes

- To study pathogen exposures to workers in the On-Site Industry
- Numerous studies have been done on wastewater workers in "Treatment Plant" situations but never in the field work that we do.
- An extensive literature review was completed in the first phase
- Field observations and workplace sampling were conducted in the next phase



Purpose of the Grant and Outcomes

- Quantify the actual exposures to workers on the OSS industry.
- Identify current risk mitigation with commonly used tools and PPE (Personal Protective Equipment).
- Raise awareness to the exposures through education and training
- Provide useful tools and recommendations to identify and manage pathogen exposures in the workplace.



Washington On-Site Sewage Association
"Voice of the Industry"

Quantifying the Exposures

to Workers in the OSS Industry with field sampling and Lab Testing





Purpose of the Grant and Outcomes

Quantify the actual exposures to workers on the OSS industry

- Field sampling was done in a variety of workplace settings with several methods.
- Three different labs with same protocols were used to ensure valid results.



Purpose of the Grant and Outcomes

Sampling was done on:

- Offices, Shops, Storage areas, Equipment, Clothing, Cell phones, Smokers, Chew, Truck Cabs and more.
- Pumping, jetting, system repairs
- Wastewater in tanks
- Sewer lines
- Drainfield components





Purpose of the Grant and Outcomes

Laboratory testing procedures:

- Fluid testing.
- Contact surface / swab testing.
- Aerosol / vapor testing
- Controls
- Testing laboratories:
 Laboratories NW (MultiCare)
 Water Management Lab
 WSU Food Safety Lab













Purpose of the Grant and Outcomes

What we found....

ALMOST EVERYTHING IS CONTAMINATED!





Purpose of the Grant and Outcomes

We also know that ...

- You are NOT SURPRISED!
- Up until now ... You know that it's DIRTY!
- Today, you will learn how it's **UNHEALTHY!**



Field Sampling Controls

Laboratory results

- Mixed Bacterial flora
- Bacillus
- Gram negative Rods
- Gram positive Cocci
- Aeronmonas Hydrophila
- Aeromona Caviae
- Streptococcus
- Fungus
- Yeasts

- Staphylococcus, Coagulase Negative
- Gram positive Coryneform rods
- Aeromonas Sobria
- Escherichia Coli O157:H7
- Fecal Flora
- Spore forming gram positive rods
- Propionibacterium gram positive rods
- MRSA
- Diptheroieds
- Enteric type gram negative rods Molds and Rare Molds



Washington On-Site Sewage Association

Where Do We Go from Here?





What we are going to talk about today

- General Management Principles of Safety
- Discuss Safety Management vs Safety **Programs**
- Characterize Accidents and Illness'
- Management Tools for Risk in Your Workplace



What we are going to talk about today

- Pathogen Exposures in Wastewater
- Work activities with Greatest Exposure
- The Best Things You Can do to Protect Yourself





Overview of Course Handout & Materials

- 1. Power Point presentation
- 2. WISHA Occupational Blood Borne Pathogen Summary
- 3. Personal Protective Equipment (PPE) Guide
- 4. Eye and Face Protection
- 5. Hand and Arm Protection
- 6. Foot and Leg Protection
- 7. Torso and Body Protection
- 8. Job Safety & Hazard Assessment tools



Why Should You Care?

"Our Goal is to give you information that helps you stay healthy and protect others while you're working..."

Question: What is the difference between....

"Managing safety"

Owner Level....It has to do with a developing a safe

"Company Culture"

"Working safely"
Personal Level.... Your decisions in Practice



Washington State Department of Labor & Industries





UNIVERSAL PRECAUTIONS

In 2007 A Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings was published by the CDC

It addressed "Best Practice" techniques applied to the Health Care Industry and WOSSA has reviewed parallels to the benefit for wastewater workers in the On-Site Industry ...



UNIVERSAL PRECAUTIONS

Some of the similarities for both industries :

- Sources of Infectious Agents
- Bio-aerosols and airborne transmission of Infectious agents
- Transmission vectors:
 Direct/Indirect/Aerosol/Droplet
- · Mobility exposures to others via clothing



WISHA - Rules of the road

Chapter – 296-823 Occupational Exposures for Blood borne Pathogens ... or OPIM's

- Occupational Exposures
- Exposure Incident
- Parenteral Contact





WISHA - Rules of the road

"This chapter applies to you if you have employees with occupational exposure to blood or OPIM, even if no actual exposure incidents have occurred"





WISHA - Rules of the road

Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

 Occupational exposures means "reasonably" anticipated skin, eye, mucous membrane, or parenteral contact with blood or OPIM that may result from the performance of an employee's duties



WISHA - Rules of the road

Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

- "Other Potentially Infectious Material"
 - Human body fluids: Semen,...... any fluid visibly contaminated with blood, and <u>all</u> body fluids in situations where it is difficult or impossible to differentiate between body fluids



Real life On-Site examples from Washington

- Sewage in eyes Both with "pink eye" needing to go to the Emergency Room
- 2 LNI Claims for "Pink Eye" over \$4,000 in paid claims follow on infections with Sty's
- MRSA infection in nose from Aerosols working in OSS with a one week hospital stay
- Giardia from an open wound exposed to sewage
- Case of E-Coli & Hepatitis
- Employees' less than 6 months on the job...



WISHA - Rules of the road

Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

- Exposure incident means a specific eye, mouth or other mucus membrane or non-intact skin or parenteral contact with blood or "OPIM" that results from the performance of an employee's duties.
- Examples of non-intact skin include skin with dermatitis, hangnails, cuts, abrasions, chafing or acne

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WISHA - Rules of the road

Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

 Parenteral contact occurs when mucous membranes, or skin is pierced by needle sticks, human bites, cuts or abrasions





WISHA - Rules of the road

Chapter -296-823-100 - Occupations

- Doctors/PA's, Nurses, Dental Hygienists (and others)
- Housekeepers in Hospitals
- Nuclear medical technologists
- Fire fighters and workers in laundries that service them
- Employees that handle or pick up regulated waste



WISHA - Rules of the road

Chapter -296-823-100 - Occupations

- Definitions : Regulated waste is any of the following:
 - Liquid or semi-liquid blood or other potentially infectious material (OPIM)
 - Items that are caked with OPIM and are capable of releasing these materials during handling
 - Pathological and microbial wastes containing OPIM



risks are identified, LHJs determine the appropriate

management action



Blackwater vs. Greywater

Parameter	Greywater	Blackwater
BOD ₅	63	37
TSS	39	61
Nitrogen	18	82
Phosphorus	70	30
Flow	60	40
FC (#/100 ml)	1,000,000	1,000,000



Who Manages us?

Thornton Creek Bacteria Study

- Public warned to stay out of Thornton Creek due to high bacteria levels; based on an intensive study done by the City of Seattle.
- We recommend avoiding contact with water from the following creeks: John's Creek, Juanita Creek, Ravenna Creek, Idylwood Creek, and Thornton Creek.

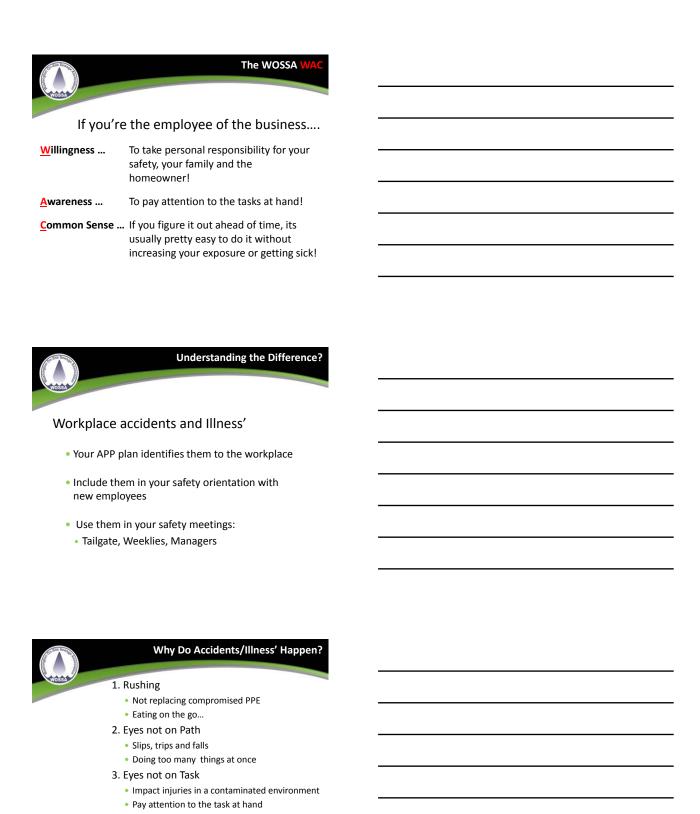


What should you do First?

If you're the owner of the business...

- Create a simple outline of your Accident Prevention Plan (APP)
- Use the KISS method when approaching this task...
- Involve your workers in workplace safety and health awareness and identification.
- Give new employees job safety orientation and provide the personal protective equipment they need.

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4. Line of Fire

Exposure to sewage by "splash back"Less obvious is line of fire by "aerosols"





How Does Illness OTJ Happen?

- 1. Unaware of exposures
 - Not replacing compromised PPE
 - Eating on the go...
- 2. Positive reinforcement for negative behaviors
- 3. Line of Fire
 - Exposure to sewage by "splash back"
 - Less obvious is line of fire by "aerosols"



CLAIM COUNTS AND COSTS BY ACCIDENT TYPE

Claim Received Year		2001			
Accident Type	Number of Claims	I	ncurred Costs Total	Incur	red Costs Average
BODILY REACTION	9,273	\$	103,997,796	\$	11,215
CONTACT ELEC/TEMP/TOXIC BODY	6,634	\$	18,925,539	\$	2,853
FALLS	18,691	\$	226,221,360	\$	12,103
HIGHWAY MOTOR VEHICLE	2,743	\$	45,945,370	\$	16,750
OVEREXERTION	35,993	\$	405,958,497	\$	11,279
STRUCK BY OR AGAINST	49,183	\$	165,825,332	\$	3,372



CLAIM COUNTS AND COSTS Z16 INJURY SOURCE

Claim Received Year			2005			
Injury Source		Number of Claims	ı	ncurred Costs Total	Incu	rred Costs Average
INFECTIOUS AGNT		686	\$	1,238,887	\$	1,806
LIVE ANIMALS		1,506	\$	3,324,104	\$	2,207
STAIRS/STEPS		1,515	\$	8,462,197	\$	5,586
TANKS/BINS		570	Ś	3.659.209	Ś	6.420



CLAIM COUNTS AND COSTS Z16 INJURY SOURCE

Claim Received Year				2005			
	Numb	er	Agg	gregate Amt	Avg p	er Claim	
LADDERS UNS		312	\$	1,610,948	\$	5,163	
PRESSURE LINES		353	\$	2,291,970	\$	6,493	
NONPOWER KNIFE		4,420	\$	3,778,130	\$	855	
NONPWR TOOL		1,937	\$	8,568,883	\$	4,424	
SHOVEL/SPADE		352	\$	2,061,306	\$	5.856	



Safety "Management" vs. Safety "Programs"

What do you think this means?

- Safety Management breaks down management as a <u>process</u>
- Looks at three elements:
 - People
 - Planning
 - Control





Safety Management

This approach puts them in context of ways to create a company "Culture" considering:

- Safety Issues
- Health Issues
- Environmental Issues





Safety Management

If Safety "Management" is the Warehouse, Then "Safety Programs" are the Delivery Trucks.

Programs are used to focus workers attention on specific issues...

- Establishing the company "safety culture"
- Team building / Training
- Focus safety issue



Safety Management

Describe in your company "Culture" in two words.....

- Needs improvement
- Pretty good
- Comprehensive



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How Does Safety Happen?

- Administrative Controls: Policy, Management Programs, Training, Vaccines
- PS:.....Make sure you put these in writing!
- Elimination/Substitution: How can I do the work differently and still get it done?
- Engineering Controls: Equipment design, Operational Procedures



Making it part of your Culture

- Worker participation in safety planning
- Management walking the talk
- Availability of proper PPE
- Influence of workplace group
- New worker orientation





Making it part of your Culture

Compliance to use of appropriate PPE by task (pumping, jetting, cleaning, repairs) was an issue from field observations in this study.

- PPE used appropriately 100% the time Never
- Compliance varied by job task...generally the more complicated or longer the job became, appropriate use of PPE declined and exposure increased.

1	9





But you can anticipate need

Greatest risk of transmission for workers

- Close contact to contaminated sewage
- Are not trained to the exposure and mitigation (proper use of PPE)
- Do not consistently use PPE
- That N-95 or higher respirators may offer additional protection in those exposed to aerosols



But you can anticipate need

Tools to assess Risk

- What is a JSA?
- Use them to anticipate work place exposures and identify appropriate mitigation for any and all jobs.





Hazard Assessment Made Specific ... Section 8

Severity of Injury		Probability of an Accident Occurring						
Level	Description	A Frequent	B Several Times	C Occasional	D Possible	Extremely Improbable		
1	Fatal or Permanent Disability	1	1	1	2	3		
11	Severe Illness or Injury	1	1	2	2	3		
681	Minor Injury or Illness	2	2	2-3	3	3		
IV	No Injury or Illness	3	3	3	3	3		

Risk Priority					
Code	Risk Level	Action Required			
1	High	Work activities must be suspended immediately until hazard can be eliminated or controlled or reduced to a lower level.			
2	Medium	Job hazards are unacceptable and must be controlled by engineering, administrative, or personal protective equipment methods as soon as possible.			
3	Low	No real or significant hazard exists. Controls are not required but may increase the comfort level of employees.			



Applied JSA exercise

Job Hazard Analysis for Personal Protective Equipment (PPE) Assessment

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Flisk Code	Control Method ¹
Playing Hockey	Impact	Hockey Puck	Head	1	В	1	Helmet Required
		Hockey Puck	Torso	П	В	1	
		Hockey Puck	Eyes				Face Mask
		Hockey Stick					
		Body Impact					
				-			
				_			





What does this mean for you?

Personal Protective Equipment (PPE)

- What do I need?
- Is it Available?
- Is it user Friendly? (all work tasks)
- Is it "Fit for Use"?

When needed, will I use it 100% of the time?



How Does Safety Happen?

PPE for sewage exposure refers to a variety of different types of barriers used alone or in combination depending on the task.

- Barrier protection
- Working "Clean to Dirty" techniques
- Clean up steps afterwards



What are the Pathogen Exposures?

Pathogen Exposures to Workers in The OSS Industry





How Does Safety Happen?

What are the Pathogen exposures?

- Are they really different from what your exposed to everyday at home, with kids, pets....
- Short answer: Yes.....No.....Maybe

You just don't know what pathogens will present from one job to the next.







It Won't Happen to Me!

TAMPA (CBSMiami) -

Two Tampa Bay Buccaneers players are being treated for methicillin-resistant staphylococcus aureus (MRSA) infections and neither the team nor the players know where they contracted the disease.





It Won't Happen to Me!

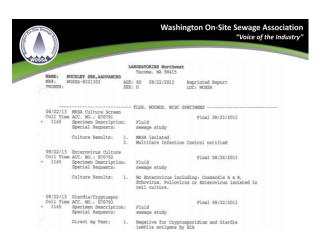
MRSA

Methicillin resistant Staphylococcus aureus (MRSA) is a bacterium responsible for several difficult-to-treat infections in people















MRSA

Methicillin resistant Staphylococcus aureus (MRSA) is a bacterium responsible for several difficult-to-treat infections in people





It Won't Happen to Me!

Exposure Vectors?

- Direct (examples?)
- Indirect (examples?)

PPE Choices

- Sunglasses ?
- Splash shield?
- Goggles?
- N-95 mask?
- Exam Grade Nitrile Gloves



- Double gloves?
- Anti-Bacterial lotion



It Won't Happen to Me!

Pink Eye

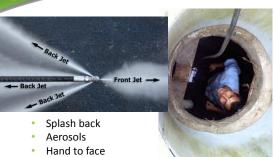
Common bacteria responsible for nonacute bacterial conjunctivitis are staph and strep and are common in

wastewater.

What do you think is the most common vector route?



Most likely cause....



Sweating into eyes













It Won't Happen to Me!

Sty — also called a hordeolum appears as a red, sore lump near the edge of the eyelid.

It is usually caused by a bacterial infection.

A sty will develop at the base of an eyelash if the eyelash follicle (root) is infected.





It Won't Happen to Me!

Exposure Vectors?

- Direct (examples?)
- Indirect (examples?)

PPE Choices

- Sunglasses?
- Safety glasses with side shields?
- Splash shield?
- Goggles?





Behavioral Elements

Everyone is different, But

- · Behaviors are learned.......
 - Perception of risk
 - Acceptance of risk
 - Past Experience
 - Current need







Microbiology of Sewage

Over half of all Americans will be infected with an intestinal parasite at some point in their lives.

Yet, many of us do not recognize the signs and symptoms of a parasite infection because they can occur weeks or even years after the initial infection, and because a parasitic infection often mimics other similar conditions.

The most common symptoms of a parasite infection include constipation, diarrhea, gas and bloating, irritable bowel syndrome, joint and muscle aches, anemia, allergies, skin conditions, tumors, nervousness, sleep disorders, teeth grinding, chronic fatigue, and immune dysfunction



Microbiology of Sewage

Bacteria

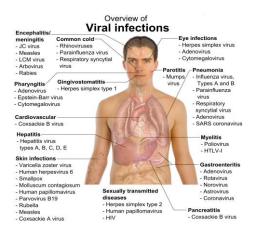
- Extremely common in sewage
- Found naturally in human intestinal tract, sewage, soil, lakes, streams & ponds
- Three groups: aerobic, anaerobic, facultative
- Responsible for much of treatment of sewage
- Some are pathogenic indicator organisms



Microbiology of Sewage

Virus

- Extremely small infective agents electron microscope is needed to see them.
- Depend on living host cell to supply needs
- More than 100 types found in sewage
- Must be removed or may cause illness





Microbiology of Sewage

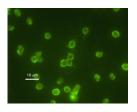
Protozoans

- About 50 times bigger than a bacterium, single cell
- Organisms should not survive passage through system, problem with cysts and eggs.
- More than 100 types found in sewage
- Must be removed or may cause illness



Protozoans





Amoeba

Crypto oocysts



Microbiology of Sewage

Other organisms

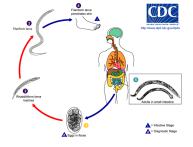
- Worms
- Rotifers & other micro-organisms
- Other macro-organisms







Hookworms





Microbiology of Sewage

Hookworms – Life Cycle

Eggs are passed in the stool , and under favorable conditions (moisture, warmth, shade), larvae hatch in 1 to 2 days. The released larvae grow in the feces and/or the soil , and after 5 to 10 days they become larvae that are infective .

These infective larvae can survive 3 to 4 weeks in favorable environmental conditions. On contact with the human host, the larvae penetrate the skin and are carried through the veins to the heart and then to the lungs.



Organism Survival Time in Soil

Entamoeba histolytica 6-8 days

Coliforms 38+ days

Salmonella 1-120 days

Cryptosporidium oocyst 60-180 days

Enteroviruses 8+ days

Ascaris ova up to 7 years



Number of Organisms to Cause Illness

Worms, viral 1

Amoebic Dysentery 10-20

Giardiasis 5-100

Cryptosporidiosis 10-100



Incident Reported Frequency in WA. Annually

Worms -	Fecal, Oral	Many
Virus'-	Fecal, Oral	Many
Giardia	Fecal, Oral	520
Crypto	Fecal, Oral	100
Shigella	Fecal. Oral	120



Incident Reported Frequency in WA. Annually

Cholera-	Fecal, Oral	Rare	
MRSA-	Contact, Inhalation	Many	
E.Coli 157:H7-	Fecal, Oral	220	
Campylobacter-	Fecal, Oral	1500	
Hep A Fecal,	Oral	30 (new)	



What are some other factors?

The "Compliance" Barrier....

What are some of the reasons that you think the voluntary use of PPE is so low in our industry?





What are some other factors?

The "Compliance" Barrier....

What are some of the reasons that you think the voluntary use of PPE is so low in our industry?

- Cost
- Peer pressure
- Time
- Nothing really bad has happened...



What are some other factors?

The "Compliance" Barrier

Independent work group studies have shown some other elements:

- Lack of Time
- Perception that use of the PPE interferes with the ability to do the job
- Physical discomfort of PPE including masks
- PPE not immediately available when needed



Behavioral Elements At Work

- "Attitude" is your <u>internal guide</u> to Behavior
- Your perception of risk allows you to lose the ability to accurately identify the risk.
- If you don't adjust to this one thing....you won't consistently minimize your exposure......
- The result that follows is the"positive re-enforcement for negative behavior"

It wears away your commitment to personal safety, with justification tactics (your attitude).



Not so "Invisible Hazards"

Exposure risks identified in the Shop or Yard

- Objective Hazards: What are they?
 - Transfer Storage -
 - Truck Washing
 - Repair Maintenance
 - Personal Items
 - Others?



Not so "Invisible Hazards"

Exposure risks you recognize in the field?

- Objective Hazards: What are they?
 - Pumping
 - Dumping
 - Jetting
 - OSS Component Repair/ Maintenance
 - Personal Actions (smoking, chew, eating)
 - Others? (External conditions weather: heat/cold)



Not so "Invisible Hazards"

Most Common Exposures - In the Field

- Objective Hazards (Hazard)
 - Direct Contact
 - Aerosols
 - Splash back
 - Inhalation
 - Immersion
 - Secondary (smoking, chew, sweating, clothing)





Consideration of PPE includes understanding why we use it in the first place.....and is it "Fit for Use"

- Uniforms protect skin and/or clothing
- Gloves protect hands
- Masks- protect mouth/nose
- Respirators protect respiratory tract from airborne infectious agents
- Goggles protect your eye













program exists for food service gloves.

Instead, the USDA requires that all glove components comply with the provisions of the FDA and Cosmetic Act.



Base Layer Protection

Exposure: Contact/Immersion/Barrier Protection

Glove Grades

Mechanics/Industrial Gloves: Poor

Offering greater protection than nothing, nitrile gloves provide resistance to most finishes, solvents, and chemicals. Nitrile material is also <u>resistant</u> to punctures, cuts, and snags. Gloves are pre-powdered and contain no natural rubber latex. Common in our industry but unsuitable for the exposures that we face in Sewage.



Base Layer Protection

Mechanics/Industrial Gloves: Poor





Base Layer Protection

Mechanics/Industrial Gloves: Poor

CAUTION: These gloves are intended for Industrial Use Only. They may NOT be worn for barrier protection in medical or healthcare applications. Please select other gloves for these applications. Components used in making nitrile gloves may cause allergic reactions in some people. Do not expose this product to any person known or suspected to be sensitive to nitrile manufacturing components before consultation with a physician. Follow your institution's policies for use. For single use only.











Inhalation Protection

Exposure: Splash, Suspended Aerosol's



A surgical mask, also known as a procedure mask, is intended to be worn by health care professionals during surgery and at other times to catch the bacteria shed in liquid droplets and aerosols from the wearer's mouth and nose...



Inhalation Protection

Exposure: Splash, Suspended Aerosol's

N-95 Mask: Best

It provides the greatest protection from airborne particles to the face for our work tasks.





Belt & Suspender Approach using Immunization

Hepatitis - A – Each year 125,000 to 200,000 people become sick with Hepatitis A

Signs and symptoms of disease include fever, weakness, nausea, abdominal pain, dark urine, yellow skin and eyes

Symptoms usually last less than two months, but 10% to 15% of those infected will have prolonged or relapsing disease lasting up to six months.

This virus is most **commonly spread in stool**, Hepatitis A may be widely spread through contaminated food. In 1983, f 203 people became ill in a county of 7,800 in Oklahoma. Ninety-two percent of those infected had eaten at the same drive-in restaurant between two and six weeks before onset of illness.



Belt & Suspender Approach using Immunization

Hepatitis B – The hepatitis B vaccine is available as a stand alone vaccine or in combination with hepatitis A vaccine.

Hepatitis B virus (HBV) is transmitted from one person to another through blood and body fluids, and primarily infects the liver. In the United States, it is most commonly spread through sexual contact or injection drug use.

Health care workers and others exposed to infected blood or body fluids are also at high risk for infection.

Symptoms of HBV infection vary and may include loss of appetite, fatigue, nausea, and jaundice (yellow eyes and skin), joint pain, and skin rashes.



Belt & Suspender Approach using Immunization

Typhoid - Typhoid fever is a serious disease caused by the bacterium called Salmonella enterica serotype Typhi (*S. Typhi*).

The infection is spread from person-to-person by the fecal-oral route. That means that people get typhoid from food or water contaminated with the feces of infected people.

Typhoid symptoms include high fever, weakness, stomach pains, headache, loss of appetite, and sometimes a rash. Infection can spread to many other places in the body (such as bones) and can cause rupture of the intestine. It kills up to 30% of people who get it, if they are not treated.

Some people who become infected with S. Typhi become chronic carriers—they have no symptoms but have S. Typhi in their feces



Belt & Suspender Approach using Immunization

Tetanus – Renewable every 10 years

Tetanus (Lockjaw) is caused by toxin-producing spores of a bacterium, Clostridium tetani that inhabit the soil and the bowels of animals and humans.

Unlike other vaccine-preventable diseases, it is not spread from person to person. Tetanus infection is most often the result of wound contamination in an unimmunized person or someone who has not had vaccine boosters in many years.

It may also occur following puncture wounds, animal bites, burns, abrasions and surgery.



Working in the Field

"Best Practice" minimizing potential pathogen exposures in the field





































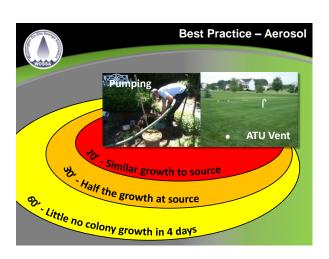






















































Summary

Pathogen Exposures to Workers in The OSS Industry







Basic Hygiene Practices for On-Site Workers

- Wash hands with soap and water immediately after handling human waste or sewage.
- Avoid touching face, mouth, eyes, nose, or open sores and cuts while handling human waste or sewage.
- After handling human waste or sewage, wash your hands with soap and water before eating or drinking.
- Before eating, remove soiled work clothes and eat away from human waste and sewage-handling activities.
- Do <u>not</u> smoke or chew tobacco or gum while handling human waste or sewage.
- Carry at least a gallon of fresh water in the truck for emergency eye wash.



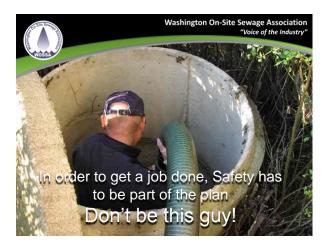
Basic Hygiene Practices for On-Site Workers

- Keep open sores, cuts, and wounds covered with clean, dry bandages.
- Gently flush eyes with safe water if human waste or sewage contacts eyes
- Use Exam/Medical gloves to prevent cuts and contact with human waste or sewage.
- Wear rubber boots at the worksite and during transport of human waste or sewage.
- Remove rubber boots and work clothes before leaving worksite.
- Clean contaminated work clothing daily with 0.05% chlorine solution (1 part household bleach to 100 parts water).



How to Immediately Reduce Your Exposure

- 1.) Stop touching your face!
- 2.) Double up on your gloves = <u>Exam grade</u> Nitril w/ Outer Glove
- 3.) Wear proper eye protection to protect from Splashback and Aerosols
- 4.) Use N-95 rated mask for tasks that create Aerosols
- 5.) Make sure your disinfectant % of alcohol is at least 67% or higher







WISHA Bloodborne Pathogens Summary

Occupational Exposure to Bloodborne Pathogens: Chapter 296-823 WAC

This chapter provides requirements to protect employees from exposure to blood or other potentially infectious materials (OPIM) that may contain bloodborne pathogens. Examples of bloodborne pathogens are the human immunodeficiency virus (HIV) and hepatitis B virus (HBV).

This chapter applies to you if you have employees with occupational exposure to blood or OPIM, even if no actual exposure incidents have occurred.

Definitions:

Bloodborne pathogens Pathogenic microorganisms that are present in human blood and can cause disease in humans.

Contaminated The presence or the reasonably anticipated presence of blood or other potentially infectious materials (OPIM) on an item or surface.

Decontamination The use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Exposure incident means a specific eye, mouth, other mucous membrane, nonintact skin or parenteral contact with blood or other potentially infectious materials (OPIM) that results from the performance of an employee's duties. Examples of nonintact skin include skin with dermatitis, hangnails, cuts, abrasions, chafing, or acne.

Occupational exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or OPIM that may result from the performance of an employee's duties.

Other potentially infectious materials (OPIM)

Includes the following:

 Human body fluids: Semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids. **Parenteral contact** occurs when mucous membranes or skin is pierced by needlesticks, human bites, cuts, or abrasions.

Personal protective equipment (PPE) Specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (for example, uniforms, pants, shirts, or blouses) not intended to function as protection against a hazard aren't considered to be PPE.

Universal precautions An approach to infection control. According to the concept of universal precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Note:

Universal Blood-Body Fluid Precautions, Body Substance Isolation, and Standard Precautions expand on the concept of universal precautions to include all body fluids and substances as infectious. These concepts are acceptable alternatives to universal precautions.

Determine if you have employees with occupational exposure: WAC 296-823-11005

You must:

Prepare a written exposure determination if your employees have occupational exposure to blood or other potentially infectious materials (OPIM).

- This determination must be made without considering the use of personal protective equipment (PPE).
- Make sure the exposure determination contains:
 - A list of job classifications where all employees have occupational exposure;
 - A list of job classifications where some employees have occupational exposure and a description of all tasks and procedures or groups of related tasks and procedures with occupational exposure for these employees.

Develop and implement a written exposure control plan: WAC 296-823-11010

You must:

Establish a written exposure control plan designed to eliminate or minimize employee exposure in your workplace.

Note:

The elements of your exposure control plan may be located in other documents such as policies and procedures. Make sure to reference their location in your plan.

You must:

Make sure the plan contains at least the following elements:

- The exposure determination, WAC 296-823-11005
- A procedure for evaluating the circumstances surrounding exposure incidents, including documentation of the routes of exposure, and the circumstances under which the exposure incident happened
- How and when you will implement applicable requirements of this rule.

Note:

The implementation dates need to be included only until your exposure control plan is fully implemented or when you are adding new requirements to your plan.

You must:

Document the infection control system used in your workplace to protect employees from exposure to blood or OPIM.

• Use universal precautions or other at least as effective infection control systems.

Note:

Universal precautions is an infection control system that considers the blood and OPIM from all persons as containing a bloodborne disease, whether or not the person has been identified as having a bloodborne disease.

Other effective infection control systems include standard precautions, universal blood-body fluid precautions, and body substance isolation. These methods define all body fluids and substances as infectious. They incorporate not only the fluids and materials covered by universal precautions and this chapter, but expand coverage to include all body fluids and substances.

Provide training to your employees: WAC 296-823-12005

You must:

Make sure all employees with occupational exposure participate in a training program that is:

- Provided at no cost to them
- Conducted during compensated working hours.

Provide training when any of the following occur:

- Before assigning tasks where occupational exposure might occur
- At least annually and within one year of the previous training.

Make sure the content and vocabulary of your training materials are appropriate to the educational level, literacy, and language of your employees.

Make sure the person conducting the required training is knowledgeable about the subject matter as it relates to your workplace

Make sure the training program contains at least the following elements:

- An accessible copy of this chapter and an explanation of the contents
- A general explanation of the epidemiology and symptoms of bloodborne diseases
- An explanation of how bloodborne pathogens are transmitted
- An explanation of your exposure control plan and how the employee can obtain a copy of the written plan

 An explanation of how to recognize tasks and other activities that could involve exposure to blood and other potentially infectious materials (OPIM)

 An explanation of the use and limitations of methods that will prevent or reduce exposure, including:

Josuic, ilicidaling.

- Equipment and safer medical devices

- Work practices

- Personal protective equipment

Information about personal protective equipment (PPE) including:

• The types

Proper use and limitations

Selection

Location

• Putting it on and taking it off

Handling

Decontamination

Disposal

Information about what actions to take and persons to contact when exposure to blood or OPIM occurs outside of the normal scope of work

An explanation of the procedure to follow if an exposure incident occurs, including:

The method of reporting the incident

- The medical evaluation and follow-up that will be available

Information about the post-exposure evaluation and follow-up procedure following an exposure incident.

An opportunity for interactive questions and answers with the trainer at the time of the training session.

Maintain training records: WAC 296-823-12015

You must:

Maintain training records for 3 years from the date of the training

Include the following information in your training records:

Dates of the training sessions

Contents or a summary of the training sessions

Names and qualifications of persons conducting the training

• Names and job titles of all persons attending the training sessions.

Provide these employee-training records upon request for examination and copying to any of the following:

- Employees
- Employee representatives.

Make sure employees clean their hands: WAC 296-823-14030

You must:

Provide handwashing facilities that are readily accessible to employees, wherever feasible. If handwashing facilities aren't feasible, provide either one of the following:

- Antiseptic towelettes
- Antiseptic hand rub product along with clean cloth/paper towels.

Make sure employees clean their hands as soon as feasible after removing gloves and whenever there is the potential for contact with blood or other potentially infectious materials (OPIM). Do one of the following:

- Wash with soap and water
- Use an appropriate waterless antiseptic hand rub product or towelettes, provided there are no signs of visible contamination
- Use an appropriate waterless antiseptic hand rub product or towelettes followed by washing with soap and water as soon as possible, when hands are visibly contaminated and handwashing facilities aren't immediately available.

Note:

An appropriate waterless antiseptic hand rub product is one that contains a 60-95% alcohol solution (isopropanol or ethanol).

Make sure employees wash any skin with soap and water, or flush mucous membranes with water as soon as feasible following contact with blood or OPIM.

Prohibit food, drink, and other personal activities in the work area: WAC 296-823-14035

You must:

Make sure eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is occupational exposure

Examine and label contaminated equipment: WAC 296-823-14050

You must:

Examine equipment which could become contaminated with blood or other potentially infectious materials (OPIM) before servicing or handling.

• Decontaminate this equipment and its parts as necessary unless you can demonstrate that decontamination isn't feasible.

Make sure your worksite is maintained in a clean and sanitary condition: WAC 296-823-14055

You must

Develop an appropriate written schedule for cleaning and decontamination based upon the following:

- The location within the facility
- Type of surface to be cleaned
- Type of contamination present
- Tasks or procedures being performed in the area.

Clean and decontaminate environmental and working surfaces and all equipment after contact with blood or other potentially infectious materials (OPIM).

- Decontaminate work surfaces with an appropriate disinfectant at these times:
 - After completion of a procedure
 - Immediately or as soon as possible when surfaces are clearly contaminated or after any spill of blood or OPIM

Note:

An appropriate disinfectant is one that is effective against tuberculosis or HBV and HIV such as:

- Diluted bleach solution (1:10 or 1:100).
 - Use the 1:10 bleach solution for spills and the 1:100 bleach solution for routine cleaning
- You can make your own bleach solution. Using household bleach (5.25% sodium hypochlorite) follow these directions:
 - For a 1:100 solution add 2 teaspoons (10 ml) to a container, then add water to make a quart (946 ml).
 - For a 1:10 solution, add 1/3 cup (79 ml) and 1 tablespoon (15 ml) in a container, then add water to make a quart (946 ml)
- EPA registered:
 - Tuberculocidals (List B)
 - Sterilants (List A)
 - Products registered against HIV/HBV (List D).

Any of the above products are considered effective when used according to the manufacturers' instructions. Higher level disinfection may be required depending on the agent or level of decontamination.

Handle contaminated laundry properly and safely: WAC 296-823-14065

You must:

Handle laundry contaminated with blood or other potentially infectious material (OPIM) as little as possible and with a minimum of agitation

Bag contaminated laundry or put it into a container at the location where it was used

- Don't sort or rinse at the location of use
- Place and transport contaminated laundry in bags or containers that are properly labeled

Place and transport wet contaminated laundry that is likely to soak through or leak to the outside, in bags or containers that will prevent such leakage.

 You need to follow additional requirements to make sure that employees who have contact with contaminated laundry wear protective gloves and other personal protective equipment (PPE) as appropriate, see WAC 296-823-150, Personal Protective Equipment.

Provide and make sure personal protective equipment is used when there is occupational exposure: WAC 296-823-15005

You must:

Provide at no cost to employees, appropriate personal protective equipment such as:

- Gloves
- Gowns
- Face shields or a combination of masks and eye protection
- Pocket masks
- Other ventilation devices.

Note:

PPE is considered "appropriate" only if it does **not** permit blood or other potentially infectious materials (OPIM) to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes, under normal conditions of use **and** for the duration of time which the protective equipment will be used.

Make sure that employees use appropriate PPE.

In rare and extraordinary circumstances, employees can briefly and temporarily choose
not to use PPE if, in their professional judgment, they believe that using PPE would
prevent the delivery of health care or public safety services or pose an increased hazard
to themselves or coworkers.

If the employee makes this judgment, you must investigate and document to determine if changes can be made to prevent future occurrences of the same situation.

Make sure that appropriate PPE, in sizes to fit your employees, is readily accessible at the worksite or issued to employees.

Make sure employees remove all PPE before leaving the work area.

Make sure gloves are worn: WAC 296-823-15010

You must

Make sure gloves appropriate to the situation are worn when:

- It can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials (OPIM).
- Handling or touching contaminated items or surfaces.

Make sure employees who are allergic to the gloves that are normally provided have ready access to at least one of the following:

- Nonlatex gloves
- Glove liners
- Powderless gloves
- Other similar alternatives.

Replace disposable (single use) gloves such as surgical or examination gloves:

- As soon as practical when contaminated
- As soon as practical if they are torn or punctured
- When their ability to function as a barrier is compromised.

Make sure disposable (single use) gloves are used only once

Discard utility gloves if they are cracked, peeling, torn, punctured, or show other signs of deterioration or when their ability to function as a barrier is compromised.

 You may decontaminate utility gloves for reuse if they can continue to function as a barrier. Make sure appropriate masks, eye protection, and face shields are worn: WAC 296-823-15015

You must

Make sure either chin-length face shields or a combination of masks and eye protection are used, whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials (OPIM) may be generated and eyes, nose, or mouth contamination can be reasonably anticipated.

Note:

Examples of eye protection devices include goggles and glasses with solid side shields

Wear appropriate protective clothing: WAC 296-823-15020

You must

Make sure appropriate protective clothing is worn when splashes to skin or clothes are reasonably anticipated. The type and characteristics will depend upon the sort of work being done and how much exposure is anticipated.

Note:

Examples of protective clothing include:

- Gowns
- Aprons
- Lab coats
- Clinic jackets
- Similar outer garments
- Surgical caps or hoods
- Shoe covers or boots.

You must

Remove a garment as soon as feasible if blood or other potentially infectious materials (OPIM) penetrate it.

Make a confidential medical evaluation and follow-up available to employees who experience an exposure incident: WAC 296-823-16005

You must

Make immediately available a confidential post-exposure evaluation and follow-up to all employees with occupational exposure to blood or OPIM who report an exposure incident.

Definition:

Exposure incident means a specific eye, mouth, other mucous membrane, nonintact skin or parenteral contact with blood or other potentially infectious materials (OPIM) that results from the performance of an employee's duties. Examples of nonintact skin include skin with dermatitis, hangnails, cuts, abrasions, chafing, or acne.

You must

Make sure that the post-exposure medical evaluation and follow-up are all of the following:

- Immediately available following an exposure incident
- Confidential
- At no cost to the employee
- At a reasonable time and place
- Administered by or under the supervision of a licensed physician or by another licensed health care professional
- Provided according to recommendations of the United States Public Health Service current at the time these evaluations and procedures take place.

You must

Make sure that the evaluation and follow-up includes at least these elements:

- Documentation of the routes of exposure, and the circumstances under which the exposure incident happened
- Identification and documentation of the source individual, unless you can establish that identification is infeasible or prohibited by state or local law
- Collection and testing of blood to detect the presence of HBV and HIV
- Post-exposure preventive treatment, when medically indicated, as recommended by the United States Public Health Service
- Counseling
- Evaluation of reported illnesses.

Make sure that all laboratory tests are conducted by a laboratory licensed by the state or Clinical Laboratory Improvement Amendments Act (CLIA).

Note:

The employer or a third-party heath care provider identified by the employer may do the evaluation.

Provide the results of the source person's blood test to the exposed employee: WAC 296-823-16015

You must

Make sure the results of the source person's blood test are provided to the exposed employee, if possible

Make sure the exposed employee is informed of applicable laws and regulations regarding disclosure of the identity and infection status of the source person.

Note:

Laws and regulations that currently apply are:

- Chapter 70.02 RCW, Medical Records--Health Care Information Access and Disclosure.
- Chapter 70.24 RCW, Control and Treatment of Sexually Transmitted Diseases.
 - Both rules can be found at: http://www.leg.wa.gov/rcw/ and click on Title 70 to find these rules.

Collect and test the blood of the exposed employee: WAC 296-823-16020

You must

Arrange to have the exposed employee's blood collected and tested as soon as feasible after consent is obtained.

• If the employee consents to baseline blood collection, but doesn't give consent at that time for HIV serologic testing, the sample must be preserved for at least 90 days. If, within 90 days of the exposure incident, the employee chooses to have the baseline sample tested, it must be done as soon as possible.

Provide information to the health care professional evaluating the employee: WAC 296-823-16025

You must

Provide **all** of the following information to the health care professional evaluating an employee after an exposure incident:

- A copy of WAC 296-823-160
- A description of the job duties the exposed employee was performing when exposed
- Documentation of the routes of exposure and circumstances under which exposure occurred
- Results of the source person's blood testing, if available
- All medical records that you are responsible to maintain, including vaccination status, relevant to the appropriate treatment of the employee.



Personal Protective Equipment (PPE) Guide

Personal Protective Equipment: Chapter 296-823 WAC

This guide is designed to be used by supervisors, lead workers, managers, employers, and anyone responsible for the safety and health of employees. Employees are also encouraged to use information in this guide to analyze their own jobs, be aware of work place hazards, and take active responsibility for their own safety.

This guide will help you to comply with the WISHA (Washington Industrial Safety and Health Act) Personal Protective Equipment rules. Volume 1: General Personal Protective Equipment, covers PPE requirements used to protect the head, eyes and face, hand and arm, foot and leg, and body (torso) in most work environments. Future volumes will cover other PPE, such as Hearing Protection, Respiratory Protection, Fall Protection, etc., which have specific requirements, including separate written programs.

This guide features a Resource section containing:

- Sample checklists and forms that you can use and modify (Microsoft Word format) to fit the needs of your particular work place.
- Optional PPE policies which you may choose to incorporate into your Accident Prevention Program. (If you need assistance with your Accident Prevention Program, you can consult the Accident Prevention Program Guide.)
- Information on particular types of PPE to help you select the appropriate equipment.

This guide is not a substitute for the WISHA standards. You need to refer to the Washington Administrative Code (WAC) chapters listed below to make sure you comply with the rules when using this guide.

For this user guide on general PPE, refer to PPE in the Core Rules...... Chapter 296-800-160

Introduction

When an injury occurs in the workplace, not only does the worker suffer but the costs, medical and time loss payments, loss in productivity, costs for a replacement worker, and potential increase in insurance premium costs, can be great. According to the Department of Labor & Industries, there were 11,240 claims for eye injuries alone in the year 2000, totaling over five million dollars (total costs to date) and averaging \$452 per claim.

As an employer, you are required by Washington States occupational safety and health rules to provide a safe and healthful work place for your employees. You must identify and anticipate hazards your workers are or may be exposed to, and provide appropriate protective measures. One type of protective measure is personal protective equipment (PPE).

PPE is equipment or a device that protects a workers body from hazards and any harmful conditions (existing and potential) that may result in injury, illness, or possibly death. PPE may be an item worn on the body, such as gloves, or a device, such as a protective shield or barrier. (See table of examples on next page.)

PPE is the least effective way to protect workers because it does not eliminate or reduce the hazard; it only places a barrier between the worker and the hazard. If the PPE fails or is not used, then the worker is not protected from the hazard. Therefore, try considering more effective methods to control the hazard before resorting to PPE. Use a system of strategies, called the "Hierarchy of Controls," which prioritizes control methods that try to remove or reduce the hazard:

Hierarchy of Controls

- 1. Engineering Controls
- 2. Work Practice Controls
 Administrative Controls
- 3. Personal Protective Equipment

If engineering, work practice, and/or administrative controls do not adequately protect your employees and PPE is used, you must comply with the safety and health requirements under WAC 296-800-160 Personal Protective Equipment (PPE).

What are you required to do

The Personal Protective Equipment (PPE) Rule WAC 296-800-160 says you must

- Do a Hazard Assessment for PPE and document it
- Select and provide appropriate PPE to your employees
- Provide training to your employees and document it
- Make sure your employees use their PPE properly
- Make sure PPE is in safe and good condition

Do a Hazard Assessment for PPE and document it

Before you can know if your employees need PPE, you must assess your work place for hazards. It will help you select the appropriate PPE for any hazards present or likely to be present. WISHA also requires you to document that you have done a hazard assessment. As the person responsible for conducting the hazard assessment, you are accountable both for the quality and thoroughness of the hazard assessment.

Involve the employees throughout the process: review the job steps, discuss potential hazards, and recommend solutions together. They are the most familiar with their jobs and their work area, and can provide information about their job that you may not necessarily see when you observe them at work. They may have ideas or have already worked out some practical solutions, and will be more likely to accept and adhere to changes in policies and procedures if they are involved in the decision-making process.

Document (either on paper or electronically, as long as it is available to safety and health personnel from the Department of Labor and Industries) that the PPE hazard assessment has been done with the information required under WAC 296-800-16010 Document your hazard assessment for PPE.

Reassess hazards

It is a good idea to reassess hazards periodically and on an as-needed basis. You may want to review your hazard assessment every year and update it whenever there are changes in your work place, such as

- job/task changes
- you get new equipment
- there has been an accident

Even if no changes have been made in a job, you might find hazards you missed in the previous analysis. Incorporate any new PPE requirements that you have developed into your written accident prevention program.

Select and provide appropriate PPE to your employees

If PPE is determined to be necessary, select PPE for your employees that is suitably matched to the hazard to provide the appropriate protection. The PPE must be of safe design and construction for the work.

This includes PPE for

- eye and face protection (p. 87)
- hand and arm protection (p. 93)
- foot and leg protection (p. 97)
- torso (body) protection (p. 99)

Discuss the selections with the employees required to use the PPE and provide them with the appropriate PPE that

- Is durable.
- Fits snugly to assure maximum protection.
- Doesn't interfere with the employee's movements.

PPE items/devices are not "one size fits all." PPE that fits poorly will not properly protect the wearer and may make it more difficult to work. For example, loose-fitting protective clothing can get caught in moving machine parts; poorly fitting gloves will increase the effort required to do a job. Also, an employee is less likely to use PPE that causes discomfort.

Provide training to your employees and document it

There are several ways in which you can provide your employees with the proper training on the PPE they are required to use. You can

- Provide your own training
- Borrow safety and health videotapes from L&I's video library
- Call your local L&I Office's Consultation Services for free assistance with your training program.
- and/or
- Seek the services of an outside consultant specializing in safety and health training

The training must be customized to the particular processes and hazards at your work place and it must be documented (see WAC 296-800-16035 Document PPE Training).

Retraining:

You must retrain an employee

- whose work habits or demonstrated knowledge indicates a lack of the necessary understanding, motivation, and skills required to use the PPE (i.e., uses PPE improperly)
- when changes in the work place make previous training out-of-date (for example, when you get new equipment)
- when changes in the types of PPE to be used make previous training out-of-date

Don't forget to document any retraining that you do.

Make sure your employees use their PPE properly

Make sure that your employees are using required PPE properly and are following the policies and procedures regarding PPE established at your work place. Have supervisors or lead workers regularly monitor, supervise, reinforce, and enforce the correct use and care of PPE by employees. Provide follow-up training if necessary to ensure that each employee has the adequate skill, knowledge, and ability to use his/her personal protective equipment.

If necessary, you may have to take measures to enforce PPE use.

If employees choose to provide their own PPE, make sure that it is adequate for the work place hazards, and that it is maintained in a clean and reliable condition.

Make sure PPE is in safe and good condition

Make sure that PPE is inspected before each use, and that it is cleaned and maintained according to manufacturers, recommendations and instructions. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

DISCARD DEFECTIVE PPE!

Do not use any defective equipment, including any employee-supplied equipment.

Defective equipment can be worse than no PPE at all. Employees would avoid a hazardous situation if they knew they were not protected; but they would get closer to the hazard if they wrongly believed they were protected (by defective equipment) and therefore would be at greater risk.

What is a hazard?

A hazard is an existing (or potential) hazardous or unsafe condition or work practice that, by itself or in combination with other conditions, could cause injury, illness, or death to workers, as well as cause property damage.

Hazards may exist from

•	Processes, procedures	Any series of actions or operations (manufacturing, equipment, product flow, etc., and handling) that convert raw material into a product
•	Unsafe equipment, machinery, or tools	For example damaged tools, unguarded blades or unguarded moving parts, etc.
•	Unsafe work practices	Allowing untrained workers to perform hazardous tasks, taking unsafe shortcuts, being distracted, working long shifts, etc.

The table below describes some common types of hazards. It does not cover all the possible hazards that employees may face or for which personal protective equipment may be required. Some hazards, such as noisy environments or those that may require respirators, must be evaluated with appropriate test equipment to quantify the exposure level when overexposure is suspected.

Hazard Type	General Description	Examples
Impact	Person can strike an object or be struck by a moving or flying or falling object.	 movement of machine parts chips thrown from machines falls from elevation or on the same level
Penetration	Person can strike, be struck by, or fall upon an object or tool that would break the skin.	sharp edges or protrusions on tools, machines, or in aisles
Crush or pinch	An object(s) or machine may crush or pinch a body or body part.	 a falling, rolling, or dropped object that causes crushing injury to hands or feet press
Harmful Dust	Presence of dust that may cause irritation, or breathing or vision difficulty. May also have ignition potential.	wood sand grain

Hazard Type	General Description	Examples
Chemical - Inhalation - Contact or - Absorption Heat	Exposure from spills, splashing, or other contact with chemical substances or harmful dusts that could cause illness, irritation, burns, asphyxiation, breathing or vision difficulty, or other toxic health effects. May also have ignition potential. Exposure to radiant heat sources, splashes or spills of hot material, or work in hot environments that could cause burns to the skin, injury to the eyes, or ignition of clothing.	• solids • coolants (not • liquids elsewhere • chemical classified) dusts • gases • abrasives • vapors • fiberglass • fumes • slivers • mists • lubricants • molten metal • stoves/ovens
Light (optical) Radiation	Exposure to strong light sources, glare, or to intense light that is a by-product of a process that could cause burns to the eyes or skin.	 welding torch cutting furnaces high intensity or ultraviolet light
Electrical Contact	Exposure to contact with or working close to live or potentially live electrical objects.	• power lines
Ergonomic hazards	Repetitive movements, awkward postures, vibration, heavy lifting, etc.	stocking overhead shelvesloading heavy objects
Environmental hazards	Conditions in the work place that could cause discomfort or negative health effects.	 cold lighting heat energy noise pressure vibration
Radiological hazards, radiation	Any type of radiological process or threat (lifetime doses, mutational impacts, personal reproductive issues, quality of life)	radioisotopesX-rays
Biological hazards	Microorganisms	virusesfungibacteriaparasites

It takes both a <u>hazardous condition</u> of some kind and <u>exposure</u> to that condition to cause an <u>injury / illness</u>. Therefore, the hazardous condition and/or the exposure can be eliminated or reduced and an accident can be prevented.

A hazard is usually described by stating the condition and the injury or illness a person can suffer from contact with the hazard. For example,

Condition Condition Condition Injury/illness resulting from contact with hazard exposed to a cut or amputation hazard working near a noisy machine walking on a second floor balcony without a guardrail at the edge Several conditions taken together may create a hazard:

A potential hazard usually involves a condition that can reasonably be predicted to occur. For example,

guard on the blade, (2) but is talking

with a co-worker while cutting wood

• If one or more bolts holding a table saw blade guard in place are loose or missing, then the guard may fall off, exposing an employee to injury.

hazard

A potential exposure exists when it is reasonably predictable that an employee could be exposed to the hazard. For example,

- Does an employee's expected work pattern, travel, or simple presence in an area pose a danger?
- Has anything been done to prevent access to hazardous equipment that someone may use?

How do you control hazards?

To control hazardous and unsafe conditions and work practices, use the most effective control methods feasible at your work place. Try to reduce employee exposure by implementing effective controls that <u>do not</u> primarily rely on individual employee behavior. Follow a system of strategies, called the "Hierarchy of Controls," which prioritizes control methods that try to remove or reduce the hazard:

Hierarchy of Controls (most to least effective)

- 1. Eliminate/reduce the hazard
- 2. Reduce the hazard
- 3. Put barrier between worker and hazard if needed
- Engineering Controls
- Work Practice Controls
- Administrative Controls
- Personal Protective Equipment (PPE)

Controls that depend on successful employee behavior (for example, depending on an employee's work technique to minimize exposure) are a last resort since they are less reliable than controls that don't allow the employee to be exposed to the hazard. Controls that are designed and implemented to prevent or reduce employee exposure (such as engineering controls) require less reliance on behavior to be effective.

Engineering Controls

Engineering controls are the best and the "first line of defense" against injury/illness, because they focus on the hazard itself and have the potential to completely eliminate the hazard or to reduce the probability of harmful exposure. This may be done by removing the employee from the hazard or providing distance between the worker and the hazard. If you can physically change the machine or work environment to prevent employee exposure to the potential hazard, then you have eliminated the hazard with an engineering control.

Engineering controls also do not rely on human behavior to be effective. For example, instead of requiring employees to wear respiratory protection which must be monitored, inspected, trained, and managed, it is much more effective to install a ventilation system that does not require any of those management activities.

In general, when considering engineering controls, follow these principles:

- 1. If feasible, design the facility, equipment, or process to <u>remove the hazard and/or substitute</u> something that is not hazardous or is less hazardous.
- 2. If removal is not feasible, enclose the hazard to prevent exposure in normal operations.
- 3. If complete enclosure is not feasible, establish barriers or local ventilation to reduce exposure to the hazard in normal operations.

Work Practice Controls

Work practice controls reduce employee exposure to hazards by changing or redesigning safe work practices into job procedures. They also include changing work procedures to reduce overexertion, lifting, and exposure to extremes in temperature. If you can reduce your employees' exposure to the potential hazard by changing the way they do their jobs, then you have reduced the hazard with work practice controls.

Using work practice controls is not as effective as engineering controls because in most cases, they only reduce exposure – they don't eliminate the hazard. Work practice controls rely on human behavior which must be managed, and they must also be accompanied by good worker training, reinforcement, and consistent and reasonable enforcement.

Examples of work practice controls may include

- wetting down surfaces to reduce dust or contaminants in the air
- housekeeping and maintenance
 - o removal of tripping, blocking, and slipping hazards
 - removal of accumulated toxic dust on surfaces
- using safe lifting techniques
- maintaining equipment and tools in good repair

Administrative Controls

Administrative controls limit employees' exposures to hazards through scheduling breaks, changing the number of workers doing a job, and other changes in the frequency and duration of exposure. If you can limit your employees' exposure to the potential hazard by manipulating their schedules, then you have reduced the hazard with an administrative control.

As with work practice controls, using administrative controls is not as effective as engineering controls because in most cases, they only reduce exposure - they don't eliminate the hazard. Also, administrative controls do rely on human behavior which must be managed.

Administrative controls may include

- reducing shift length
- increasing the number of breaks
- increasing break time/recovery time
- rotating workers through different jobs
- varying the duties of a worker to limit exposure and allow variety of work
- using additional relief workers

Personal Protective Equipment (PPE)

When hazards cannot be engineered completely out of normal operations or maintenance work, and when safe work practices and other forms of administrative control cannot provide sufficient additional protection, use PPE as a supplementary method of control. PPE is the least effective way to protect workers because it does not eliminate or control the hazard itself, but rather

places a barrier between the worker and the hazard. PPE devices alone should not be relied on to provide protection against hazards; if the equipment fails, the worker is immediately exposed to the hazard.

Ask these questions:

- What PPE is available to deal with this kind of hazard?
- How intense is the hazard?

For example,

- Will the PPE prevent penetration of the projectile?
- Will the gloves be harmed by this chemical through absorption or disintegration?
- How long will the PPE last before it wears out?
- What type of hazard is it, how severe is it, and what capabilities must the PPE have? Select the appropriate PPE based on the answers to these questions.
- What is the minimum protection required? Then provide a greater protection than the minimum so that it will be adequate under less than optimum conditions and will have a reasonably long life.

Site Sewage Pssociation Wossa

Eye and Face Protection

Facts About Eye Protection in the Workplace

Everyday an estimated 1,000 eye injuries occur in American work places. The financial cost of these injuries is enormous - more than \$300 million per year in lost production time, medical expense and workers' compensation.

And no dollar amount can adequately reflect the personal suffering and pain that these accidents inflict on injured workers.

The Department of Labor and Industries and the Occupational Safety and Health Administration (OSHA) are working together to reduce the number of eye injuries in America's workforce.

Take a moment to think about possible eye hazards at your workplace. A survey of 1,000 minor eye injuries by the U.S. Labor Department's Bureau of Labor Statistics (BLS) revealed how and why many on-the-job eye accidents occur.

What contributes to eye injuries at work

- Not wearing eye protection: The BLS reported that nearly three out of every five workers injured were not wearing eye protection at the time of their accident
- Wearing the wrong kind of protection for the job: About 40 percent of the injured workers
 were wearing eyeglasses without side shields, although some injuries still can occur when
 full-cup and flat-fold side shields are worn. Tight-fitting goggles offer the most complete
 protection and should be worn for liquid chemical hazards.
- Flying particles: The BLS found that almost 70 percent of the accidents studied resulted from flying or falling objects striking the eye. Injured workers estimated that nearly 60 percent of the objects were smaller than a pin head.
- Contact with chemicals caused about 20 percent of the injuries. Other accidents were caused by objects swinging from a fixed or attached position such as tree limbs, ropes, and chains or tools that contacted the eye while the worker was using them.

How can eye injuries be prevented?

Always wear effective eye protection

WISHA standards require that employers provide, and workers wear, suitable eye protection. To be effective, the eyewear must be the appropriate type and properly fitted. For example, the BLS survey revealed that 94 percent of injuries to workers wearing eye protection resulted from objects or caustics going around or under the protector. Only 13 workers injured while wearing eye protection reported breakage of the protective device. Nearly 20 percent of the injured workers with eye protection wore face shields or welding helmets. But less than six percent of the injuries happened to workers wearing goggles, which generally offer a tighter fit around the eyes.

Better training and education

BLS reported that most workers were injured while doing their regular jobs. Workers injured while not using protective eyewear most often said they believed that protection was not required in that situation. Even though the vast majority of the employers furnished eye protection at no cost to employees, about 40 percent of the workers received no information on where and what types of eye protection should be used. If you are afraid that an eye injury could occur at your job, don't be hesitant about asking your employer for eye protection and training.

Provide your employees with appropriate protection if they are exposed to hazards that could injure their eyes and/or faces, such as:

- Flying particles
- Molten metal splashes
- Liquid chemicals
- Acids or caustic liquids
- Chemical gases or vapors
- Harmful light radiation or any light that could injure the eyes such as lasers, ultraviolet, or infrared light
- Blood and other potentially infectious body fluids that might splash, spray, or splatter. Wear your safety glasses to keep objects out of your eye!

Generally, Safety glasses/goggles are the primary protection for eyes. Side shields (such as clip-on or slide- on side shields) are required for flying objects.

A face shield is not sufficient protection for both the face and eyes. If eye protection is required, appropriate eye PPE must also be worn. Masks and face shields are the primary protection for the face; secondary protection for the eyes. Be aware that you may need to protect against more than one hazard at the same time. E.g., welding rays and flying particles.

TYPE	HAZARD PROTECTION	DESCRIPTION	
Safety Glasses	Protect eyes from	Safety frames	
	moderate impact from	 Tempered glass or 	
	particles	plastic impact	
		resistant lenses	
		 Temples and side 	
		shields	
		• Corrective	
		(prescription) lenses	
		available	
Safety Glasses Side	Protect against particles	Made of wire mesh or	
Shields	that might enter the	plastic	
	eyes from the side	 Eye-cup type side 	
		shields provide the	
		best protection	
Safety Goggles	Protect eye, eye sockets	 Vinyl framed goggles 	
	and surrounding facial	of soft pliable body	
	area from impact, dust,	design	
	splashes and other	 Clear or tinted lenses 	
	hazards	 Perforated, port 	
		vented, or non-vented	
		frames	
		 Single lens goggles 	
		similar protection to	
		spectacles, may be	
		worn in combination	
		with spectacles or	
		corrective lenses to	
		ensure protection	
		along with proper	
		vision	
Chemical goggles	Protects eyes from liquid	Have ventilation	
	chemicals	covers to allow air	
		circulation but	
		prevent easy entry of	

		liquids through the vents If the atmosphere is gaseous, will not protect the person's eyes since gas will travel through the vents. If eye hazard from the gas is an issue then a full face respirator would be necessary	
Welder's goggles	Protects eyes from sparking, scaling, or splashing metals; harmful light rays	Impact resistant lenses, available in graduated shades of filtration	
Chippers/Grinders goggles	Protects eyes from flying particles	 Dual protective eye cups Impact resistant clear lenses with individual cover plates 	
Laser safety goggles	Protects eyes from intense concentrations of light from lasers	Protect for the specific wavelength of the laser and be of optical density adequate for the energy involved	
Face shield (*should only be worn over primary eye protection – spectacles or goggles)	Protect eyes and entire face against flying particles, metal sparks, and chemical/ biological splash or spray	 Adjustable headgear Face shield of tinted/transparent acetate or polycarbonate materials, or wire screen May be polarized for glare protection Various sizes tensile strength, impact/heat resistance, and light ray filtering capacity Does not protect from impact hazards – must be used with primary eye protection 	

		(spectacles or	
		goggles)	
Welding shields	Protection from infra-	Vulcanized fiber or	
	red or radiant light	glass fiber body	
	burns, flying sparks,	 Filter and cover plate 	
	metal splatter and slag	holder	
	chips –	Does not protect from	
		impact hazards – must	
		be used with primary	
		eye protection	
		(spectacles or	
		goggles)	

The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.

Eye and Face Protection Selection Chart				
Hazard Source	Assessment of Hazard	Type of Eye/Face Protection		
IMPACT				
Chipping, grinding, machining, drilling, chiseling, riveting, sanding, etc.		Spectacles with side protection, goggles, face shields. For severe exposure, use face shield over primary eye protection.		
HEAT				
Furnace operations, pouring, casting, hot dipping, and welding.	Hot sparks	Face shields, goggles, spectacles with side protection. For severe exposure use face shield.		
arpping, and weraing.	Splash from molten metals	Face shields, reflective face shields.		
	High temperature exposure	Screen face shields, reflective face shields.		
CHEMICALS				
Acid and chemicals handling	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield over primary eye protection		
	Irritating mists	Special-purpose goggles		
DUST				
Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types.		
LIGHT and/or RADIATION				
Welding - electric arc	Optical radiation	Welding helmets or welding shields. Typical shades: 10-14		

Welding - gas	Optical radiation	Welding goggles or welding face shield. Typical shades:
		gas welding 4-8, cutting 3-6, brazing 3-4
Cutting, torch brazing,	Optical radiation	Spectacles or welding face shield. Typical shades:
torch soldering		1.5-3
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as
		suitable.

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Hand and Arm Protection

Hazards requiring hand protection

Provide your employees with the appropriate hand protection if they are exposed - or likely to be exposed - to any of the following hazards that may result in potential hand injury:

- Severe cuts, lacerations, or abrasions
- Punctures
- Thermal burns
- Harmful temperature extremes
- Chemical hazards
 - Absorption of harmful substances
 - Chemical burns
 - Rashes, irritation

You should also examine the work activities of the employee to select the PPE that will fit the task and needs of the employee best:

- · the degree of dexterity required
- the glove length based upon the hazard
- the physical stresses that will be applied (the strength of the glove)
- the chemical use based on shortest breakthrough time of chemical combination used
- how easy it is to remove the PPE without contaminating the user

Make sure that the hand and arm protection worn by your employees meet the requirements in WAC 296-800-16065.

Chemical Hazards

In particular, more than any other part of the body, our hands are most likely to come in contact with hazardous chemicals.

No glove currently available will provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. (Generally, any "chemical resistant" glove can be used for dry powders.) Therefore, it is important to select the most appropriate glove for a particular application.

When selecting gloves for protection against chemical hazards, consider the following:

- Choose the most appropriate type for a particular application.
- Determine the toxic properties of the chemical(s), in particular the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects.
- Determine how long it can be worn.
- Make sure employees are able to remove the gloves in such a manner as to prevent skin contamination.
- Determine whether the glove can be reused.

Read instructions and warnings on chemical container labels and MSDSs before working with any chemical. Recommended glove types are often listed in the section for personal protective equipment. Check with your PPE supplier to make sure the list is current and accurate.

How long can a glove be used

Chemicals will eventually soak through or "permeate" most glove materials, making them unsafe. The permeation rate measures the length of time it takes a given material (glove) to become saturated by the chemical through absorption. Another term used with chemical hazards is the Breakthrough or Penetration rate, which measures the speed it takes for a given chemical to break through the layer(s) of the glove to contact the skin.

Gloves can be used safely for limited time periods if the specific use, thickness, permeation rate, and time are known. Your PPE supplier or the manufacturer can be a good source to assist in determining the specific type of glove material that should be worn for a particular chemical. Work closely with them to select the appropriate hand protection based on an evaluation of the performance characteristics of the hand protection.

One more consideration is that as long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly replace less expensive gloves than to reuse more expensive types.

Common types of protective gloves

The following table is a guide to some common types of protective work gloves and the types of hazards they can guard against:

Types	Protection	Use/Properties
Leather gloves	sparksmoderate heatblowsscraping against rough objects	 welding can be also used in combination with an insulated liner when working with electricity
Aluminized gloves	• insulation against intense heat	 most commonly when working with molten materials - welding, furnace, and foundry work requires an insert made of synthetic materials that protect against heat & cold
Aramid fiber	heat and cold cut- and abrasive-resistant	synthetic material; wears well
Metal Mesh	cuts and scratches	most commonly when working with cutting tools or other sharp instruments
Other synthetic materials	 heat and cold cut- and abrasive-resistant may withstand some diluted acids (but not alkalis and solvents) 	
Fabric and coated fabric gloves	Varying degrees	Generally used to improve grip when handling slippery objects. They also help insulate hands from mild heat or cold
• Fabric	Dirt, slivers, chafing, and abrasion	Does not provide sufficient protection against rough, sharp, or heavy materials
Coated fabric	General-purpose slip-resistant hand protection	Handling bricks, wire rope, chemical containers, etc. Cotton flannel with napping on one side, plastic coating on unnapped side
Chemical and liquid resistant gloves	Burns, irritation, and dermatitis caused by contact with oils, greases, solvents, and other chemicals; also reduces the risk of exposure to blood and other potentially infectious substances	
• Butyl rubber	Nitric acid, sulfuric acid, hydrofluoric acid, red fuming nitric acid, rocket fuels, and peroxide; highly impermeable to gases, chemicals, and water vapor; resist oxidation and ozone corrosion; resist abrasion	Remain flexible at low temperatures

Natural latex or	Resist abrasions caused by	Comfortable wear and pliability. Cause of
rubber	sandblasting, grinding, and polishing;	allergic reactions in some people
	protection against most water	(hypoallergenic gloves, glove liners, and
	solutions of acids, alkalis, salts, and	powderless gloves are possible
Neoprene	Hydraulic fluids, gasoline, alcohols,	Good pliability, finger dexterity, high
	organic acids, and alkalis	density, and tear resistance
Nitrile rubber	Chlorinated solvents; resist abrasions,	For jobs requiring dexterity and
	punctures, snags, and tears	sensitivity; sturdy

WOSSA Wage Association

Foot and Leg Protection

Foot and Leg protection

Provide your employees with appropriate protection if they are exposed to hazards that could injure their feet, such as

- Objects which could
 - Fall (impact hazard)
 - Roll (compression hazard)
 - Pierce or cut the sole or uppers (puncture hazard)
- Electrical hazards
- Chemical hazards

The foot protection must meet the requirements listed in WAC 296-800-16060. Look at the ANSI label, which is typically located on the underside of the tongue.

Make sure that appropriate protection is provided for the legs against splashes or impacts from

- heat hazards
 - molten metal
 - welding sparks
- chemical hazards
- sharp objects
- woodworking or grinding (ballistic nylon chaps or pads are required when using a chain saw)

Select the appropriate protection:

If work activities involve	Then use	
carrying or handling materials which could be	safety shoes/boots with impact	
dropped	protection	
-packages	- steel-toed safety shoes	
-objects		
- parts		
- heavy tools		
other activities where objects might fall onto the		
feet		
skid trucks (manual material handling carts)	safety shoes/boots with compression	
 working around bulk rolls (such as paper rolls) 	protection	
 working around heavy pipes (could potentially 	- steel-toed safety shoes	
roll over employees' feet		
working in areas where sharp objects could be	safety shoes/boots with puncture	
stepped on	protection	
- nails, tacks, screws	- puncture-resistant soles	
- wire		
- large staples		
- scrap metal parts		
working on tops of logs	caulk or other non-slip footwear	
• (in construction) working around materials which	safety shoes/boots with leather or	
could	equivalent firm material (Note:	
- burn, scald	leather provides poor absorption	
-cut	protection.)	
- penetrate/puncture		
exposure to hot substances or dangerous	leggings or high boots of leather,	
chemical spills	rubber, or other suitable material	



Torso and Body Protection

Torso and Body Protection

Provide your employees with appropriate protection if they are exposed to hazards that could injure their torso, such as:

- Intense heat
- Splashes of hot metals and other hot liquids
- Impacts from tools, machinery, and materials
- Cuts
- Hazardous chemicals
- Contact with potentially infectious materials, like blood
- Radiation

Some types of PPE for the body include

- Vests
- Aprons
- Coveralls
- Jackets
- Body Suits
- Welding Leathers
- Protective clothing for temperature extremes:
 - Heat: Cooling vests, Long-sleeved shirt and pants
 - Cool: Parkas, Heavy gloves, Hoods, Insulated protective outer wear

Specialized protective wear may be necessary for certain jobs or work conditions:

- Fire-resistant clothing (Nomex) for working in refineries
- Heat-resistant (aluminized) suits for extreme situations, such as working around smelters or forges
- Body armor for police officers
- High-visibility or reflective clothing, such as when directing traffic or doing night work

Other Protective Clothing Materials

Material	Protection	Comments
Paper-like fiber	Dust and splashes	Disposable
Treated wool and cotton	Dust, abrasions, rough and irritating surfaces	Adapts well to changing work place temperatures; comfortable; fire resistant
Duck	Cuts and bruises when handling heavy, sharp, or rough materials	Closely woven cotton fabric
Leather	Dry heat and flame	
Rubber, rubberized fabrics, neoprene, and plastics	Certain acids and other chemicals	

Be aware that different materials will protect against different chemical and physical hazards. When chemical or physical hazards are present, check with the clothing manufacturer to make sure that the material selected will provide protection from the specific chemical or physical hazards in your work place.

Option 2

Job Hazard Analysis Assessment for PPE

Use with WAC 296-800-160 Personal Protective Equipment (PPE)

The Job Hazard Analysis (JHA) approach to doing a hazard assessment for PPE is a more comprehensive method and may be more useful in larger businesses with many hazards and/or complex safety issues. It also helps you assign a *Risk Priority Code* to the hazard to determine the course of actions you need to take to control the hazard.

Follow the instructions as you conduct your hazard assessment and fill in the hazard assessment form. You can make copies of the form or customize it to fit the needs of your work place. (For more detailed explanations of the instructions and guidance on doing the hazard assessment, including completed sample forms, see the "Additional Guidelines on Conducting a JHA Hazard Assessment for PPE," pages 25-30 in the guide.)

This tool can also serve as written certification that you have done a hazard assessment as required by WAC 296-800-16010 Document your hazard assessment for PPE. Make sure that the blank fields at the bottom of the form (indicated by *) are filled out.

- *Name of your work place
- *Address of the work place where you are doing the hazard assessment
- *Name of person certifying that a workplace hazard assessment was done
- *Date the hazard assessment was done

Job Hazard Analysis Assessment for PPE: Instructions

- 1. Conduct a walk through survey of your business. For each job/task step, note the presence of any of the following hazard types (see table below), their sources, and the body parts at risk. Fill out the left side of the hazard assessment form (for help, see samples on p.29-30 in the guide). Gather all the information you can.
 - Look at all steps of a job and ask the employee if there are any variations in the job that are infrequently done and that you might have missed during your observation.
 - For purposes of the assessment, assume that no PPE is being worn by the affected employees even though they may actually be wearing what they need to do the job safely.
 - Note all observed hazards. <u>This list does not cover all possible hazards that employees may face or for which personal protective equipment may be required.</u> Noisy environments or those which may require respirators must be evaluated with appropriate test equipment to quantify the exposure level when overexposure is suspected.

Hazard Type	General Description of Hazard Type
Impact	Person can strike an object or be struck by a moving or flying or falling object.
Penetration	Person can strike, be struck by, or fall upon an object or tool that would break the skin.
Crush or pinch	An object(s) or machine may crush or pinch a body or body part.
Harmful Dust	Presence of dust that may cause irritation, or breathing or vision difficulty. May also have ignition potential.
Chemical	Exposure from spills, splashing, or other contact with chemical substances or harmful dusts that could cause illness, irritation, burns, asphyxiation, breathing or vision difficulty, or other toxic health effects. May also have ignition potential.
Heat	Exposure to radiant heat sources, splashes or spills of hot material, or work in hot environments.
Light (optical) Radiation	Exposure to strong light sources, glare, or intense light exposure which is a byproduct of a process.
Electrical Contact	Exposure to contact with or proximity to live or potentially live electrical objects.
Ergonomic hazards	Repetitive movements, awkward postures, vibration, heavy lifting, etc.
Environmental hazards	Conditions in the work place that could cause discomfort or negative health effects.

- 2. Analyze the hazard. For each job task with a hazard source identified, use the Job Hazard Analysis Matrix table and discuss the hazard with the affected employee and supervisor. Fill out the right side of the hazard assessment form:
 - Rate the SEVERITY of injury that would *reasonably* be expected to result from exposure to the hazard.
 - Rate the PROBABILITY of an accident actually happening.
 - Assign a RISK CODE based upon the intersection of the SEVERITY and PROBABILITY ratings on the matrix.

	Job Hazard Analysis Matrix								
	Severity of Injury		Probabili	y of an Accident O	ccurring				
Level	Description	A B C D Extremely Frequent Several Times Occasional Possible Improbable							
I	Fatal or Permanent Disability	1	1	1	2	3			
П	Severe Illness or Injury	1	1	2	2	3			
III	Minor Injury or Illness	2	2	2-3	3	3			
IV	No Injury or Illness	3	3	3	3	3			

	Risk Priority					
Code	Risk Level	Action Required				
1	High	Work activities must be suspended immediately until hazard can be eliminated or controlled or reduced to a lower level.				
2	Medium	Job hazards are unacceptable and must be controlled by engineering, administrative, or personal protective equipment methods as soon as possible.				
3	Low	No real or significant hazard exists. Controls are not required but may increase the comfort level of employees.				

- **3. Take action on the assessment.** Depending on the assigned Risk Level/Code (or Risk priority), take the corresponding action according to the table above:
 - If Risk priority is LOW (3) for a task step → requires no further action.

<u>Note</u>: If you assign a risk code of 3, be sure that there isn't a WISHA standard that requires specific protection be provided. For example: WAC 296-24-65003 requires personal protective equipment when using compressed air for cleaning.

- If Risk priority is MEDIUM (2) → select and implement appropriate controls.
- If Risk priority is HIGH (1) → immediately stop the task step until appropriate controls can be implemented.

A high risk priority means that there is a reasonable to high probability that an employee will be killed or permanently disabled doing this task step and/or a high probability that the employee will suffer severe illness or injury!

4. Select PPE:

• Try to reduce employee exposure to the hazard by first implementing engineering, work practice, and/or administrative controls. If PPE is supplied, it must be appropriately matched to the hazard to provide effective protection, durability, and proper fit to the worker. Note the control method to be implemented in the far right column.

5. Certify the hazard assessment:

- Certify on the hazard assessment form that you have done the hazard assessment and implemented the needed controls.
- Incorporate any new PPE requirements that you have developed into your written accident prevention program.

b/				L	ocation:		
Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Note: Engineering, work practice, and/o	or administrative hazard co	ntrols such as guarding mu	st be used, if feasible,	before req	uiring employe	ees to use pe	ersonal protective equipment.
ertification of Assessment							
ame of work place:		*Address _					
ssessment Conducted By:		Title:		*	Date(s) of	Assessm	nent
plementation of Controls Appro							

Page

 Job/Task: On-Site Septic Designer / Engineer
 Location:

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Evaluation							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage	Direct Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
Onsite Septic Repair							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage /	Direct Contact	Removing Lids / Tank Evaluation		Ш	В	2	Require Gloves
distribution box	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive

*Name of work place:	*Address	
*Assessment Conducted By:	Title:	*Date(s) of Assessment
Implementation of Controls Approved By:	Title:	Date:

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Evaluation							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage	Direct Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
Onsite Septic Repair							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage /	Direct Contact	Removing Lids / Tank Evaluation		Ш	В	2	Require Gloves
distribution box	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive

*Name of work place:	*Address	
*Assessment Conducted By:	Title:	*Date(s) of Assessment
Implementation of Controls Approved By:	Title:	Date:

Job/Task: On-Site Septic Installer

Location: _________

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Evaluation							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage	Direct Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
Onsite Septic Repair							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage /	Direct Contact	Removing Lids / Tank Evaluation		Ш	В	2	Require Gloves
distribution box	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive

*Name of work place:	*Address		
*Assessment Conducted By:	Title:	*Date(s) of Assessment	
Implementation of Controls Approved By:	Title:	Date:	

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Repair							
Work in drainfield	Direct Contact	Effluent	Hands / Torso	Ш	С	2	Require Rubber Boots, Gloves, removable clothing
	Indirect Contact	Effluent	Hands / Torso	Ш	В	2	Require Rubber Boots, Gloves, Removable Clothing
	Splash	Ponding Effluent	Face / Eyes	II	D	2	Require Safety Goggles
	Immersion	Ponding Effluent		II	Е	3	Be attentive
Work in tank /	Direct Contact	Effluent	Hands / Torso	III	С	2	Require gloves, Removable Clothing
distribution box	Indirect Contact	Effluent	Hands / Torso	III	В	2	Require gloves, Removable Clothing
	Splash	Effluent	Face / Eyes	II	D	2	Require Safety Goggles
	Immersion	Effluent		II	Е	3	Be attentive
Work in distribution	Direct Contact	Effluent	Hands / Torso	III	С	2	Require Gloves, Removable Clothing
Piping / UV Light	Indirect Contact	Effluent	Hands / Torso	Ш	В	2	Require Gloves, Removable Clothing
	Splash	Ponding Effluent	Face / Eyes	II	D	2	Require Safety Goggles

*Name of work place:	*Address	
*Assessment Conducted By:	Title:	*Date(s) of Assessment
Implementation of Controls Approved By:	Title:	Date:

Job/Task: On-Site Septic Operations and Maintenance Professional

Location:	

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Evaluation							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage	Direct Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		П	Е	3	Be attentive
Onsite Septic Maintenance							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage /	Direct Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
distribution box	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	E	3	Be attentive

*Name of work place:	*Address	
*Assessment Conducted By:	Title:	*Date(s) of Assessment
Implementation of Controls Approved By:	Title:	Date:

Job/Task: On-Site Septic Operations and Maintenance Professional

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Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Maintenance							
Work in drainfield	Direct Contact	Effluent	Hands / Torso	Ш	С	2	Require Rubber Boots, Gloves, removable clothing
	Indirect Contact	Effluent	Hands / Torso	Ш	В	2	Require Rubber Boots, Gloves, Removable Clothing
	Splash	Ponding Effluent	Face / Eyes	II	D	2	Require Safety Goggles
	Immersion	Ponding Effluent		II	Е	3	Be attentive
Work in tank /	Direct Contact	Effluent	Hands / Torso	III	С	2	Require gloves, Removable Clothing
distribution box	Indirect Contact	Effluent	Hands / Torso	III	В	2	Require gloves, Removable Clothing
	Splash	Effluent	Face / Eyes	II	D	2	Require Safety Goggles
	Immersion	Effluent		II	Е	3	Be attentive
Work in distribution	Direct Contact	Effluent	Hands / Torso	III	С	2	Require Gloves, Removable Clothing
Piping / UV Light	Indirect Contact	Effluent	Hands / Torso	Ш	В	2	Require Gloves, Removable Clothing
	Splash	Ponding Effluent	Face / Eyes	II	D	2	Require Safety Goggles
Tank Entry (Confined	Direct Contact	Effluent	Hands / Torso	П	Α	1	Require Rubber Boots, Gloves, Removable Clothing
Space Entry)	Splash	Effluent	Hands / Torso	II	Α	1	Require Rubber Boots, Gloves, Removable Clothing
	Aerosol	Effluent	Face / Eyes	I	Α	1	Require N-95 Mask & Ventilation (WISHA CSE)

*Name of work place:	*Address		
*Assessment Conducted By:	Title:	*Date(s) of Assessment	
Implementation of Controls Approved By:	Title:	Date:	

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Evaluation							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage	Direct Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Indirect Contact	Removing Lids / Tank Evaluation		Ш	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
Onsite Septic Pumping							
Walking site / drainfield	Direct Contact	Surfacing Effluent		III	С	2	Require Rubber Boots
	Indirect Contact	Surfacing Effluent		III	С	3	Be attentive
Accessing tankage /	Direct Contact	Removing Lids / Tank Evaluation		Ш	В	2	Require Gloves
distribution box	Indirect Contact	Removing Lids / Tank Evaluation		III	В	2	Require Gloves
	Splash	Removing Lids / Tank Evaluation		II	Е	3	Be attentive
	Immersion	Removing Lids / Tank Evaluation		II	Е	3	Be attentive

*Name of work place:	*Address	
*Assessment Conducted By:	Title:	*Date(s) of Assessment
Implementation of Controls Approved By:	Title:	Date:

Job/Task: On-Site Septic Pumper Location: _____

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Pumping							
Work in drainfield	Direct Contact	Effluent	Hands / Torso	Ш	С	2	Require Rubber Boots, Gloves, removable clothing
	Indirect Contact	Effluent	Hands / Torso	Ш	В	2	Require Rubber Boots, Gloves, Removable Clothing
	Splash	Ponding Effluent	Face / Eyes	II	D	2	Require Safety Goggles
	Immersion	Ponding Effluent		II	Е	3	Be attentive
Work in tank /	Direct Contact	Effluent	Hands / Torso	III	С	2	Require gloves, Removable Clothing
distribution box	Indirect Contact	Effluent	Hands / Torso	III	В	2	Require gloves, Removable Clothing
	Splash	Effluent	Face / Eyes	II	D	2	Require Safety Goggles
	Immersion	Effluent		П	Е	3	Be attentive
Work in distribution	Direct Contact	Effluent	Hands / Torso	III	С	2	Require Gloves, Removable Clothing
Piping / UV Light	Indirect Contact	Effluent	Hands / Torso	Ш	В	2	Require Gloves, Removable Clothing
	Splash	Ponding Effluent	Face / Eyes	II	D	2	Require Safety Goggles
Tank Entry (Confined	Direct Contact	Effluent	Hands / Torso	П	Α	1	Require Rubber Boots, Gloves, Removable Clothing
Space Entry)	Splash	Effluent	Hands / Torso	II	Α	1	Require Rubber Boots, Gloves, Removable Clothing
	Aerosol	Effluent	Face / Eyes	I	Α	1	Require N-95 Mask & Ventilation (WISHA CSE)

*Name of work place:	*Address		_
*Assessment Conducted By:	Title:	*Date(s) of Assessment	
Implementation of Controls Approved By:	Title:	Date:	_

Job/Task: On-Site Septic Pumper Location: _____

Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity	Probability	Risk Code	Control Method ¹
Onsite Septic Pumping							
Pumping Tank	Direct Contact	Effluent	Hands / Torso	II	Α	1	Require Rubber Boots, Gloves, Removable Clothing
	Indirect Contact	Effluent	Hands / Torso	III	В	2	Require Rubber Boots, Gloves, Removable Clothing
	Splash	Effluent	Face / Eyes	Ш	С	2	Require Safety Goggles
	Immersion	Effluent		II	Е	3	Be attentive
	Aerosol	Effluent	Face / Eyes	III	С	2	Require N-95 Mask & Ventilation (WISHA CSE)
Loading and Off -	Direct Contact	Effluent	Hands / Torso	II	Α	1	Require Gloves, Removable Clothing
Loading Pump Truck	Indirect Contact	Effluent	Hands / Torso	III	В	2	Require Gloves, Removable Clothing
	Splash	Effluent	Face / Eyes	II	С	2	Require Safety Goggles
	Immersion	Effluent		II	Е	3	Be attentive
	Aerosol	Effluent	Face / Eyes	III	С	2	Require N-95 Mask & Ventilation (WISHA CSE)

*Name of work place:	*Address	
*Assessment Conducted By:	Title:	*Date(s) of Assessment
Implementation of Controls Approved By:	Title:	Date:



Introduction of topic to class, the speaker.

Depending on class size, the presenter should have participants introduce themselves and the industry segment they work in.

The ideal class size for interactive participation should not exceed 25.

Alternatively, this presentation with minor modification will work well as a simple presentation with limited participation up to several hundred.



Presenter should recognize the SHIP program as the funding source to develop this program, and the Washington Onsite Sewage Association for the deliverables of the grant milestones that included:

- A literature review
- Field practice and observations
- PPE evaluations
- Hazard assessments and field sampling in various workplaces

(These will also be discussed in more detail in upcoming slides).



Program Recognition



WOSSA Board Members

WOSSA Association Members

On-Site Industry Professionals and Service Providers



Water Management Laboratories, Inc.

This training curriculum was prepared by WOSSA in collaboration with the Dept. of Labor and Industries SHIP Grant Staff. WOSSA would like to thank all who were involved in the research, writing and review of this curriculum.

Recognition is given to the member companies that participated and were open to learn.

They were willing to have their operations evaluated in real time and without this support, this project would not have been as comprehensive as it has been.



- To study pathogen exposures to workers in the On-Site Industry
- Numerous studies have been done on wastewater workers in "Treatment Plant" situations but never in the field work that we do.
- An extensive literature review was completed in the first phase
- Field observations and workplace sampling were conducted in the next phase

Discuss this slide as an overview of the program and what will be discussed..... The first bullet point establishes why the study was undertaken.

The next is a relational point that explains that while sewage studies have been done in Treatment Plant settings, the work tasks from a safety perspective are really unrelated to the exposures that workers in OSS (On-Site Systems) encounter and while those studies have identified some exposures, they miss many of them as they relate to OSS.

Include in the discussion of bullet point three that exposures were reviewed in the wastewater industry, that many more were also conducted outside of the WW(waste water) industry and included parallels to the healthcare industry when considering the appropriate PPE (personal protective equipment).



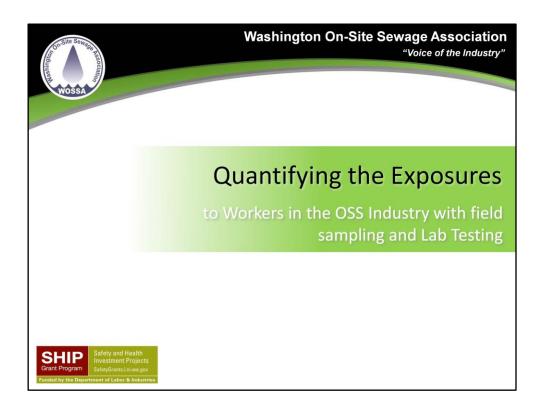
- Quantify the actual exposures to workers on the OSS industry.
- Identify current risk mitigation with commonly used tools and PPE (Personal Protective Equipment).
- Raise awareness to the exposures through education and training
- Provide useful tools and recommendations to identify and manage pathogen exposures in the workplace.

This slide outlines what are Key Learning Areas for the presentation.

Instructor should review the program and what will be discussed..... Provide specifics that they will learn in the class and what will be the take away.

i.e.: Bullet point number two – "The field study evaluated both the various work activities and the specific PPE used".

A key discussion point later in the presentation will be, if the current PPE commonly used in the industry is, "fit for use".



Pathogen exposure in wastewater has largely been identified through work in large wastewater treatment plants.

Over 100 known virus's and pathogens have been identified.

In the literature review at the start of the project, we found no documented evidence of a study specific to the actual exposure of pathogens, evaluation of best practice work procedures or a related review of "fit for use" issues with typical PPE issued and used (or not) by the OSS industry service providers.



Quantify the actual exposures to workers on the OSS industry

- Field sampling was done in a variety of workplace settings with several methods.
- Three different labs with same protocols were used to ensure valid results.

This slide reveals the "purpose statement" in the presentation as to "why' the study was done.

While work has been done on sewer treatment plants, to the project teams knowledge, and based on the literature review, this study for OSS and worker exposure has never been done in the United States.

Blanks, cross lab sample testing, duplicate samples to same labs were some of the techniques used to validate results and will be further detailed in coming slides.



Sampling was done on:

- Offices, Shops, Storage areas, Equipment, Clothing, Cell phones, Smokers, Chew, Truck Cabs and more.
- Pumping, jetting, system repairs
- Wastewater in tanks
- Sewer lines
- Drainfield components



These examples represent most, but not all common tasks and work areas that service providers perform on OSS.

Sewer work that is also done by the same service providers were reviewed in the field study.

Depending on the industry segment matrix of attendee's, the presenter should be prepared to go with the flow and discussions of the group and to encourage interactive discussion with work tasks, not specifically reviewed in the presentation but that can be related.



Laboratory testing procedures:

- Fluid testing.
- Contact surface / swab testing.
- Aerosol / vapor testing
- Controls
- Testing laboratories:

Laboratories NW (MultiCare) Water Management Lab WSU Food Safety Lab



Different pathogens are identified using different lab protocols.

This slide also can be used to discuss methods used in field sampling and the utilization of three labs to evaluate the samples and were used to back check testing procedures against one another.

They were:

- Plate tests for aerosols and splashing
- Liquid samples drawn from septic trucks, storage and pump tanks
- Swab sampling on contaminated contact surfaces



Fluid samples were taken to represent common work or wastewater handling procedures/exposures including:

- Repairs
- Storage/transfer
- Standard maintenance and pumping
- Typical residential and commercial sewage



Contact surface testing was done to understand both the level of contamination and how it migrated through the work process to advance exposures or minimize them.

Non industry equipment (top right picture) was surface contact tested as a control for contact testing of other work activities and equipment.



Most common vectors of exposure were:

- Direct Contact
- · Splash back
- Aerosols....Contamination and the level of exposure in aerosols created by work activities have been previously unrecognized to the level demonstrated in field sampling.

In addition to confirmation of exposure near the workplace activity, we also found positive plate tests as far as 30 feet from equipment.



Several methods used to ensure the validity of the sampling and testing were established and used throughout the study.



Although it should be obvious, the field observations of service providers demonstrated that either they are not aware of the exposures or they have rationalized the exposure to minimize the perceived risk.



We also know that ...

- You are NOT SURPRISED!
- Up until now ... You know that it's DIRTY!
- Today, you will learn how it's UNHEALTHY!

This slide expands on the previous slide's perception of the exposure.

Most commonly, use nitrile gloves along with the use of over gloves by the service provider are typically focused on keeping sewage off the hands, but it was apparent the level of awareness to pathogen exposure was not in consideration of barrier protection for exposure mitigation.

Field Sampling Controls

Laboratory results

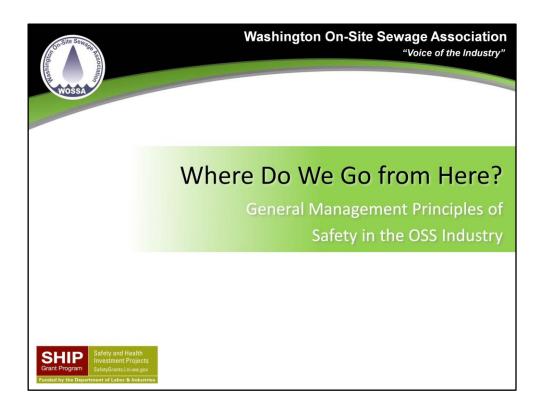
- Mixed Bacterial flora
- Bacillus
- Gram negative Rods
- Gram positive Cocci
- Aeronmonas Hydrophila
- Aeromona Caviae
- Streptococcus
- Fungus
- Yeasts
- Enteric type gram negative rods
 Molds and Rare Molds

- Staphylococcus, Coagulase Negative
- Gram positive Coryneform rods
- Aeromonas Sobria
- Escherichia Coli O157:H7
- Fecal Flora
- Spore forming gram positive rods
- Propionibacterium gram positive rods
- MRSA
- Diptheroieds

This list provides a level of detail of many specific pathogens and information previously identified in our industry. It also adds these following "new" players to the list that were not known.

- MRSA
- Molds and rare molds
- Fungus/Yeasts
- Specifics on E.Coli O157-H71

In the field studies, samples tested positive for a bacterium family at the dump site directly related to Chlamydia. These were captured on a plate test from aerosolized wastewater during the truck unloading sequence...



Safety begins as process management. While we don't always fall under a specific set of rules and guidelines, it appears that for this issue there is much that can be gleaned from Blood Borne Pathogen rules and methods.

Small businesses are obligated to ensure a safe workplace under the "General duty" clause of both WISHA and OSHA.

Having an APP (accident prevention plan), PPE evaluation and use and a commitment from management to protect workers health is a minimum.

What we are going to talk about today



- General Management Principles of Safety
- Discuss Safety Management vs Safety Programs
- Characterize Accidents and Illness'
- Management Tools for Risk in Your Workplace

This and the next slides sets the detail of content for the rest of the class. These are specific "learning objectives" of the training resource.



What we are going to talk about today

- Pathogen Exposures in Wastewater
- Work activities with Greatest Exposure
- The Best Things You Can do to Protect Yourself



This and the next slides sets the detail of content for the rest of the class. These are specific "learning objectives" of the training resource.

Overview of Course Handout & Materials



- Power Point presentation
- 2. WISHA Occupational Blood Borne Pathogen Summary
- 3. Personal Protective Equipment (PPE) Guide
- 4. Eye and Face Protection
- 5. Hand and Arm Protection
- 6. Foot and Leg Protection
- 7. Torso and Body Protection
- 8. Job Safety & Hazard Assessment tools



The presenter should review the outline of the handout materials to orient the class participants to the materials to be used in the presentation.

It can also be referenced as a future basis for use as a safety management plan.

Why Should You Care?

"Our Goal is to give you information that helps you stay healthy and protect others while you're working..."

Question: What is the difference between....

"Managing safety"

Owner Level....It has to do with a developing a safe

"Company Culture"

"Working safely"
Personal Level.... Your decisions in Practice

Management of safety is a process that looks at all elements: Safety, Health, and Environmental issues in the workplace.

It should be stated that "working safely" is both an activity *and* behavior based process in the workplace.



These are a few terms used by industry:

Swim Jobs = larger release of sewage in the crawlspace of a house, under a deck or anywhere that access is limited. Service providers suit up in rain suits, duct tape (not watertight), and dive in.

Digester/Poop Flu = An industry term used by those who are new to the industry. Common flu like symptoms that resolve in a week to ten days.

Baptism by Sewage = Obvious, but any sudden release of sewage from a truck, storage or even the release of a clogged pipe with sewage backed up to the second floor of the home.

Learning the "Lingo"



Terms Used by Healthcare Providers:

- MDROs (Multi-Drug Resistant Organisms)
- Transmission Vectors
- Direct and Indirect contact
- Infective Dose
- OPIM's (Other Potentially Infectious Material)

MDRO's will come up later in the presentation along with the discussion on MRSA that was found in sewage.

Common transmission vectors are direct immersion, splash back's and aerosols through cuts, abrasions and inhalation.

Infective dose is another important element as it varies, there will be several slides that address this later in the presentation for survival in soil, ground water and surface water of the various pathogens known and found.

OPIM: In context to the Blood Borne Pathogen rules under OSHA or local State rules, This "cover" language may have a direct or indirect application to rule application to the On-Site Industry, as it may be applied. Other presenters should review the BBP rules for a broader understanding.

Learning the "Lingo"



Terms Used by Labor and Industries:

- Job Safety Analysis (JSA)
- Personal Protective Equipment (PPE)
- Confined Space Entry (CSE)



JSA's are critical tools for task assessment. The participants will work through both abstract examples of JSA application as well as review basic application of JSA techniques for specific job tasks by industry segment for Designers, Regulators, Installers, O&M inspectors and Pumpers.

PPE: Self explanatory but many employee level participants may not be familiar with the "lingo" of "Personal Protective Equipment".

CSE (confined space entry) is an important part of the discussion for this program in particular to "supplied" air to repairs in a septic tank which is grossly contaminated. By following the standard CSE procedure, the likelihood of the creation of contamination of aerosols actually creates another hazard that isn't always recognized that must be mitigated.



Transition slide: In the development of the program and PPE fit for use issues to the known and discovered pathogen exposures, the health care setting provided the closest parallel to "best practice" for PPE mitigation procedures.

UNIVERSAL PRECAUTIONS



In 2007 A Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings was published by the CDC

It addressed "Best Practice" techniques applied to the Health Care Industry and WOSSA has reviewed parallels to the benefit for wastewater workers in the On-Site Industry ...

Universal Precautions in health care settings, establishes "best practice" for PPE and procedures in health care and has cross over applications to the Onsite Industry with common pathogen exposures and vector pathways.

UNIVERSAL PRECAUTIONS

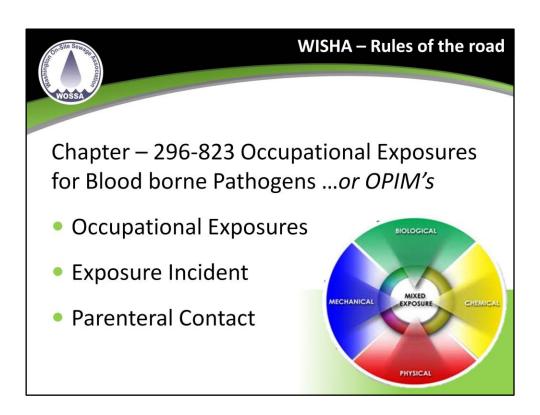


Some of the similarities for both industries:

- Sources of Infectious Agents
- Bio-aerosols and airborne transmission of Infectious agents
- Transmission vectors:
 Direct/Indirect/Aerosol/Droplet
- Mobility exposures to others via clothing

Provides speaking points for cross over parallels. However, a main difference is that by the time a health care workers is interacting with a patient, they have a lot of information about the person, their illness, infection, care program, special circumstance, and have a standard of care to follow.

In the OSS industry, SP (service providers), have the "x-rays" (As-built), but don't have the lab results. They never know what they are getting into, because they often never speak to the system operator.



This is the introduction to the discussion and rationalization of the relationship between BBP (Blood born pathogen) rules and the application to similar exposures in the Onsite Industry.

Part of this discussion takes into consideration that there is currently no distinct place for our industry to "be" under WA. state rules and makes the case that this could be an area that would be used in the event of serious workplace injury/loss.



"This chapter applies to you if you have employees with occupational exposure to blood or OPIM, even if no actual exposure incidents have occurred"



This continues the discussion taking in light of the fact that it likely be sometime before any consideration is given to changes in rulemaking and reinforces the case that this could be an area of rule that may be used in the event of serious workplace injury/loss.



Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

 Occupational exposures means "reasonably" anticipated skin, eye, mucous membrane, or parenteral contact with blood or OPIM that may result from the performance of an employee's duties

The language in the existing BBP rule, in our view, has the potential to expand the scope of employer beyond the healthcare industry. The broad based language and catch all phrasing of OPIMs is something employers should take seriously.



Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

- "Other Potentially Infectious Material"
 - Human body fluids: Semen,...... any fluid visibly contaminated with blood, and <u>all</u> body fluids in situations where it is difficult or impossible to differentiate between body fluids

The descriptors extend unknown or unforeseen situations for all body fluids where the employer is unable to distinguish any differences between body fluids. Certainly the case in a septic tank.

Real life On-Site examples from Washington



- Sewage in eyes Both with "pink eye" needing to go to the Emergency Room
- 2 LNI Claims for "Pink Eye" over \$4,000 in paid claims follow on infections with Sty's
- MRSA infection in nose from Aerosols working in OSS with a one week hospital stay
- Giardia from an open wound exposed to sewage
- Case of E-Coli & Hepatitis
- Employees' less than 6 months on the job...

These examples of real life work related illness' support the application of the BBP rules to the industry when biologic exposures are included in the JSA's if done and selection of appropriate PPE.



Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

- Exposure incident means a specific eye, mouth or other mucus membrane or non-intact skin or parenteral contact with blood or "OPIM" that results from the performance of an employee's duties.
- Examples of non-intact skin include skin with dermatitis, hangnails, cuts, abrasions, chafing or acne

Noting the examples in the previous slide, exposures and exposure incidents in the industry, the language continues to support the BBP rule applicability in the vacuum of any other more specific rule application.



Chapter – 296-823 Occupational Exposures for Blood borne Pathogens and Definitions

 Parenteral contact occurs when mucous membranes, or skin is pierced by needle sticks, human bites, cuts or abrasions



Initially, parenteral contact (needle sticks in particular) were not specifically applicable. However, additional information on job tasks (Pump out of public facilities or remote sites like pit vaults at heavily used trailheads), were subject to dumping of used needles. We heard one story of a pump truck operator in this situation who while pumping out a tank, had a needle poke through his hose and penetrate his hand. We also were told of all these types of materials that would be observed on the "trash gate" at the dump sites, including used condoms and the like.



Chapter -296-823-100 - Occupations

- Doctors/PA's, Nurses, Dental Hygienists (and others)
- Housekeepers in Hospitals
- Nuclear medical technologists
- Fire fighters and workers in laundries that service them
- Employees that handle or pick up regulated waste

This slide points out that even within the existing BBP rule that affiliated industries and workers are intended to be included in the intent of the rule (firefighters, housekeeping staff).

"Regulated" waste needs definition. While raw sewage from septic's is not a placarded waste (DOT), its collection and disposal is regulated by the state DOH and LHJ's with tracking mechanism's in place.



Chapter -296-823-100 - Occupations

- Definitions : Regulated waste is any of the following:
 - Liquid or semi-liquid blood or other potentially infectious material (OPIM)
 - Items that are caked with OPIM and are capable of releasing these materials during handling
 - Pathological and microbial wastes containing OPIM

A clearer definition of regulated waste as defined in rule, strengthens the relationship to the OSS industry. In our industry situation, items are contaminated hoses, sampling tools, shovels and other hand tools, jetters etc.



Transition slide to bring the discussion back to focus on the Onsite Industry.

Note: The presenter may point out the service provider in the CSE in the top picture:

- Limited egress
- Safety glasses on his forehead
- No hand protection
- No situational awareness (he's smiling about how "tough" he must be to be down here for the picture)

What are you working in?



You JUST Don't KNOW!!! BUT......

Public beaches are closed when E.Coli levels hit

> 126 /100 ml

Raw Sewage in our field sample studies were commonly

> <u>160,000</u> /100 ml

Relational slides that brings home the point of public health decisions and the gross contamination of raw human waste in septic tanks.

Who Manages us?



- State Board of Health
- Local Health Jurisdictions
- What is their mission?
 - Evaluate and manage risks to the environment and public health from OSS. In areas where increased risks are identified, LHJs determine the appropriate management action

Discussion on Agency interaction and responsibilities.

Blackwater vs. Greywater Blackwater Parameter Greywater 63 37 BOD₅ TSS 39 61 18 82 Nitrogen Phosphorus 70 30 60 Flow 40 FC (#/100 ml) 1,000,000 1,000,000

Key focus is on FC numbers at the bottom of chart.

Fecal's in Greywater and Blackwater are at one million.

Who Manages us?



Thornton Creek Bacteria Study

- Public warned to stay out of Thornton Creek due to high bacteria levels; based on an intensive study done by the City of Seattle.
- We recommend avoiding contact with water from the following creeks: John's Creek, Juanita Creek, Ravenna Creek, Idylwood Creek, and Thornton Creek.

Reinforcement of the discussion on the public health issue for unprotected exposure of the public vs the typical and increased exposure frequency of wastewater workers in the Onsite Industry.

What should you do First?



If you're the <u>owner</u> of the business...

- Create a simple outline of your Accident Prevention Plan (APP)
- Use the KISS method when approaching this task...
- Involve your workers in workplace safety and health awareness and identification.
- Give new employees job safety orientation and provide the personal protective equipment they need.

Begins the discussion of the APP and employer responsibilities under OSHA/WISHA for employers.

This discussion also sets the stage for the tasks and accountability of the owner/manager to provide a safe work environment under the rule.

Workplace accidents usually have immediate consequences for being stupid, Workplace illness are incremental and creep up over time...can be unrecognized symptomatically, and if the employee's don't know what to look for, may lay the cause off to something else, only to have it repeat with a different pathogen exposure in the future.

The WOSSA WAC



If you're the employee of the business....

Willingness ... To take personal responsibility for your

safety, your family and the

homeowner!

<u>Awareness</u> ... To pay attention to the tasks at hand!

Common Sense ... If you figure it out ahead of time, its

usually pretty easy to do it without

increasing your exposure or getting sick!

The "WOSSA" WAC (play on words to the Washington Administrative Code (WAC)

- 1. It is the law, but it makes sense to not put ourselves at risk unnecessarily
- 2. Everyone's responsible for their own safety, but in a company, Sr. mgt needs to "Walk the Talk" and ensure enough resources (staff, time and \$\$) are available to make it happen (enabling behavior).
- 3. Working in raw sewage without PPE of any kind (gloves).
 - a. Working with PPE's that are not designed to protect you (sunglasses with no side shields for splashing).
 - b. Rinsing off equipment or dumping samples on the ground.
 - c. Entering a tank.
 - 4. While your employer is responsible for certain aspects of Safety Management and reporting, you are personally responsible for your safety. In every (99.9%) accident or injury, the person involved made a conscious decision to accept a higher level of risk or demonstrated an unsafe behavior. Workplace safety is all about "Transfer of Control" in a defined risk situation. Ultimately, if you are doing the job, you have all the control and final say.

Understanding the Difference?



Workplace accidents and Illness'

- Your APP plan identifies them to the workplace
- Include them in your safety orientation with new employees
- Use them in your safety meetings:
 - Tailgate, Weeklies, Managers

If you don't have a written plan, you're not going to be nearly as effective at managing workplace safety, seeing results and building confidence that a safety attitude permeates your workforce at all levels.

Awareness programs and posters are good, but without a foundation, they lose focus pretty quickly.



Why Do Accidents/Illness' Happen?

- 1. Rushing
 - Not replacing compromised PPE
 - Eating on the go...
- 2. Eyes not on Path
 - Slips, trips and falls
 - Doing too many things at once
- 3. Eyes not on Task
 - Impact injuries in a contaminated environment
 - Pay attention to the task at hand
- 4. Line of Fire
 - Exposure to sewage by "splash back"
 - Less obvious is line of fire by "aerosols"

With a safety plan in place we next need to consider why accidents happen.

Shows the relationship between outcomes and four unsafe behaviors: Root cause of accidents:

- •Eyes not on Path
- •Line of fire
- •Eyes not on Task
- •Rushing or hurrying



Impact slide...

This is used to challenge the general perception of industry workers that "it will never happen to me".

Other topical discussions here would allow for safety lapses for:

- Appropriate eyewear
- Face mask

These discussions should avoid being judgmental but intended to introduce a change in the thought process and approach to safety and mitigation by the class participants.

Ask the participants what they think is going on here? How do these things happen?

How Does Illness OTJ Happen?



- 1. Unaware of exposures
 - Not replacing compromised PPE
 - Eating on the go...
- 2. Positive reinforcement for negative behaviors
- 3. Line of Fire
 - Exposure to sewage by "splash back"
 - Less obvious is line of fire by "aerosols"

With a safety plan in place we next need to consider why accidents happen.

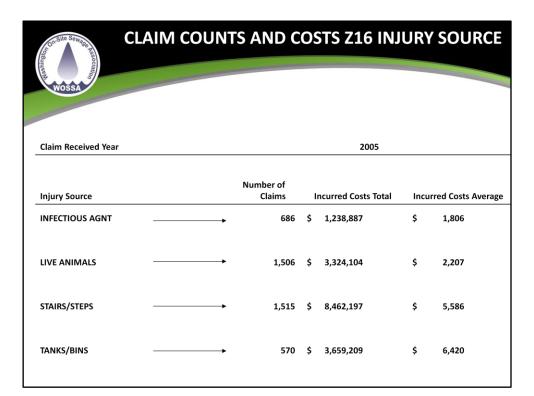
Stress the motivation discussion point in number 2.: "I've done this a hundred times and nothing ever happened".

Note that accidents can also occur by a combination of more than one element noted in the speaking points

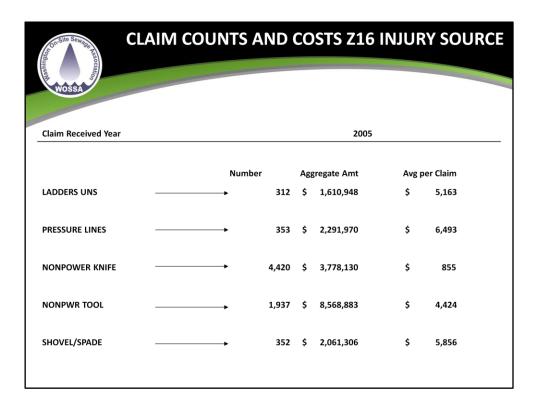
CLAIM COUNTS AND COSTS BY ACCIDENT TYPE Claim Received Year 2001 Number of **Accident Type** Claims **Incurred Costs Total Incurred Costs Average BODILY REACTION 9,273** \$ 103,997,796 11,215 CONTACT ELEC/TEMP/TOXIC BODY 18,925,539 2,853 **FALLS** 18,691 \$ 226,221,360 12,103 HIGHWAY MOTOR VEHICLE 45,945,370 16,750 OVEREXERTION 35,993 \$ 405,958,497 11,279 STRUCK BY OR AGAINST 49,183 \$ 165,825,332 3,372

Statistical discussion is to the cost of accidents.

It's real, it changes your risk/rate category and in small business' can have a significant impact to work capacity if 30% of your workforce is unavailable because they are sick and there are only three of you.



Highlight 'Infectious Agents"



These types of accidents when coupled with biologically contaminated equipment will make matters worse and potentially complicate the accident to a higher cost threshold for your risk exposure.



- Looks at three elements:
 - People
 - Planning
 - Control



Safety is not a black art, but a measured way to effectively implement this activity into the workplace and workflow.

Just like three legs of the stool: people planning (activity) and control(of the risk), they all support each other. If one is missing, sooner or later the stool will tip over.

Safety Management



This approach puts them in context of ways to create a company "Culture" considering:

- Safety Issues
- Health Issues
- Environmental Issues



- 1. Safety issues: Communication, Hazard Identification in the workplace, mitigation (slips, trips & falls, back injury).
- 2. Health Issues: Tend to be cumulative long term or an end result (long term impact of Hepatitis infection).
- 3. Environmental Issues: Identification of critical exposures (spills, contamination).

Safety Management



If Safety "Management" is the Warehouse, Then "Safety Programs" are the Delivery Trucks.

Programs are used to focus workers attention on specific issues...

- Establishing the company "safety culture"
- Team building / Training
- Focus safety issue

Safety "tailgate" meetings are very common, but they do not replace a well structured and thought out Management Plan.

It is very common in the OSS and small business community to do focus meetings, like "tailgate", and think this is your "safety management program", but it lacks the depth of management planning.

Safety Management



Describe in your company "Culture" in two words......

- Needs improvement
- Pretty good
- Comprehensive



- 1. Safety issues: Communication, Hazard Identification in the workplace, mitigation (slips, trips & falls, back injury)
- 2. Health Issues: Tend to be cumulative long term or an end result (long term impact of Hepatitis infection)
- 3. Environmental Issues: Identification of critical exposures (spills, contamination)

How Does Safety Happen?



- Administrative Controls: Policy, Management Programs, Training, Vaccines
 - PS:.....Make sure you put these in writing!
- Elimination/Substitution: How can I do the work differently and still get it done?
- Engineering Controls: Equipment design,
 Operational Procedures

Point out that in small business', safety management doesn't have to be cumbersome, it just needs to meet the needs of the organization.

The slide helps learners to break it down into three categories that taken one at a time, makes it more manageable.



Including the people that are affected by the exposures, rules and consequences allows management to get a better "buy in" from employee's and consequently a better opportunity for more consistent compliance to follow procedures or use of PPE.

Making it part of your Culture



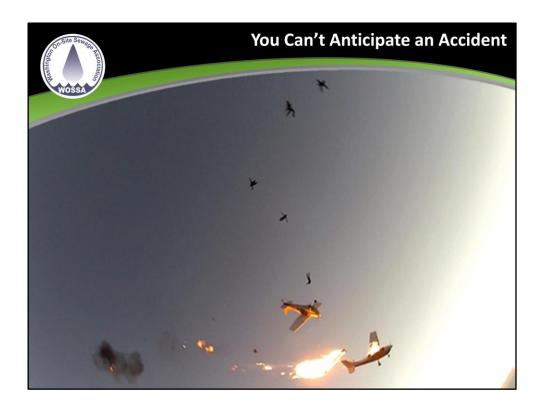
Compliance to use of appropriate PPE by task (pumping, jetting, cleaning, repairs) was an issue from field observations in this study.

- PPE used appropriately 100% the time Never
- Compliance varied by job task...generally the more complicated or longer the job became, appropriate use of PPE declined and exposure increased.

This opens the discussion on the personal decisions made by workers, and consideration of the decision tree employee's use and or replace appropriate PPE.

As the slide states, in our the field observations conducted, PPE was compromised or not used at some point in the work activities observed 100% of the time and provides for a discussion on the deterioration and cause for non-compliance.

The presenter could ask the audience for examples of why they think this happened.



Relational slide

May add other references depending on the organization or area.

This slide will be followed by activity slides that show recreational PPE.

You use it while you're having fun, you make your kids use it....why would you make a different personal choice when you know about the risk in the workplace.

Question the group- Where do you want to be in this picture?

But you can anticipate need



Greatest risk of transmission for workers

- Close contact to contaminated sewage
- Are not trained to the exposure and mitigation (proper use of PPE)
- Do not consistently use PPE
- That N-95 or higher respirators may offer additional protection in those exposed to aerosols

Discuss understanding the risks, and how the transmission vectors are compromised.

But you can anticipate need



Tools to assess Risk

- What is a JSA?
- Use them to anticipate work place exposures and identify appropriate mitigation for any and all jobs.

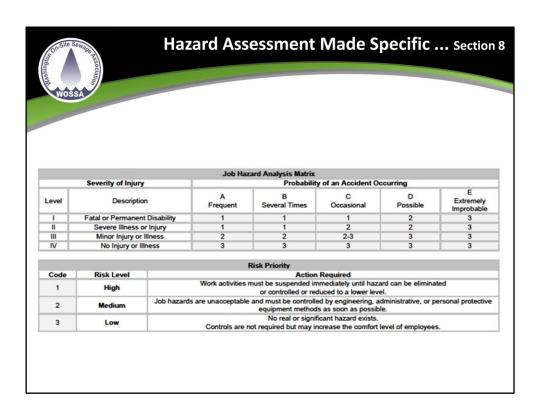
Explain what a JSA (job safety analysis) is, and how they work.

You could use a common work task and work through an example to explain how by evaluating some of these tasks in common exposures, will provide tools for employee or workplace compliance issues.



As previously noted the discussion of JSA and it's approach in safety management is out of context in this slide, to stimulate the thought process in a way that is not defensible to industry arguments like "I've worked in this industry for 20 years and haven't died yet!"

Use of children in the example and safety is both relational and by intent...



Refer participants to this section in their workbook and explain the rational of the risk based model of the matrix.

• Severity of injury + probability of accident (illness) occurring and the risk level determines the course of action.

Nago R	Applied JSA e						
and secondary							
ation and a second							
A							
		-					
Job/Task:	b Hazard Analysis	for Personal Prote	ective Equipm		PE) Asse ocation:	ssmer	nt
Job/Task Step	Hazard Type	Hazard Source	Body Parts At Risk	Severity		Risk Code	Control Method ¹
Playing Hockey	Impact	Hockey Puck	Head	1	В	1	Helmet Required
		Hockey Puck	Torso	Ш	В	1	
		Hockey Puck	Eyes				Face Mask
		Hockey Stick		ĺ			
		Body Impact					
				_			
				-			
(1) Note: Engineering, work practice Certification of Assessm		ontrots such as guarding mu	st be used, if feasible,	before req	uiring employ	ees to us	e personal protective equipment.

Worked example using the previous Hockey slide.



What parent today, doesn't take appropriate steps to protect their children that are active in sports or playground equipment.

They are the "safety managers" for their family...so why not work better at it when you're making personal decisions at work?

What does this mean for you?



Personal Protective Equipment (PPE)

- What do I need?
- Is it Available?
- Is it user Friendly? (all work tasks)
- Is it "Fit for Use"?

When needed, will I use it 100% of the time?

Evaluative discussion for the individual that has the exposure and must take personal responsibility for protecting himself

How Does Safety Happen?

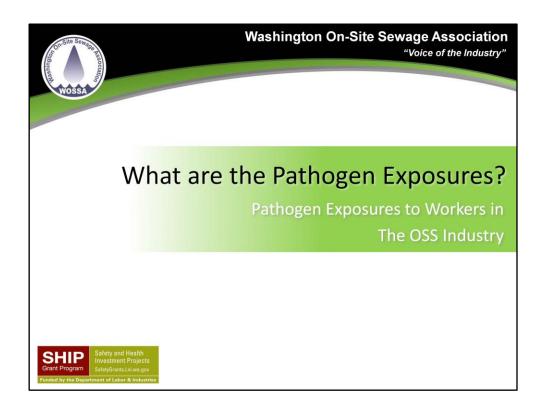


PPE for sewage exposure refers to a variety of different types of barriers used alone or in combination depending on the task.

- Barrier protection
- Working "Clean to Dirty" techniques
- Clean up steps afterwards

This slide presents both options and process for workers to use that will emphasize that these are steps that they likely normally do for clean up after any job.

With just a few minor changes to process, it is relatively simple to effectively implement some of the "best practices" techniques to mitigate pathogen exposures.



Since each septic tank inspection or pump out is unique to the occupants, each has to be evaluated individually.

The actual pathogens found and exposed via lab testing are the culprits. In truth, there are likely many more that are yet to be identified as well as new pathogens that are yet unknown.

How Does Safety Happen?



What are the Pathogen exposures?

- Are they really different from what your exposed to everyday at home, with kids, pets....
- Short answer: Yes.....No.....Maybe

You just don't know what pathogens will present from one job to the next.

Proof statement and discussion to follow helps participants understand the need to mitigate exposure is rationalized by both unknown environments of each job as it is presented.

The inability to evaluate the risks of each field job (pump-out), based on any kind of homeowner interview and the results of the field samples done through this grant program, recognizes that with over 100 known virus, bacterial pathogens and worms the need to protect to the highest exposures by definition will cover all lower levels of exposures.



Discussion can follow both the expectation of typical exposures found in sewage to understanding that these same illness' can be an exposure in sewage.

Recognition that all of these exposures are everyday and common. For the sewage worker they are complicated by frequency of exposure, its concentrations (infective dose) and the follow on tasks with loading and unloading the sewage at the dump sites.



Transition slide to highlight that even with appropriate PPE, there is the possibility of a failure of an unknown or exposure that has not been evaluated or recognized. (MRSA)...

Presenter note: A number of slides in this presentation are very much out of context to industry tasks. This is done with intent to help the participants think about safety process in very different way and "outside the box"

It Won't Happen to Me!



TAMPA (CBSMiami) -

Two Tampa Bay
Buccaneers players are
being treated for
methicillin-resistant
staphylococcus aureus
(MRSA) infections and
neither the team nor the
players know where they
contracted the disease.



MRSA survivability in sewage is now documented and a known exposure. The following slides will take it home to the workers in the Onsite industry.



This slide will transition the discussion on this exposure back to the potential for the Onsite worker.



In this slide there is a collapsed line from tank to DF (gravity system).

The Septic Tank had been pumped the previous day and allowed use by homeowner.

This sewage from the septic tank sample produced a positive MRSA result from the water going into the tank from the house.

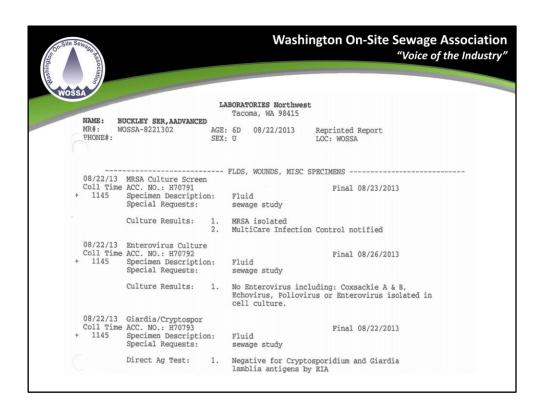
Someone inside had an active MRSA infection.

The workers had no PPE used at all.

Exposures: working with jetter to clear plugged lines (dust, aerosol's) and a potential of inhalation exposure, along with direct contact in contaminated soil and sewage.



Contaminated sewage, soil and ground, subsequent testing of sewage samples demonstrated viable MRSA.



Presenter should review and discuss Lab results.



Ask participants to identify the exposures, PPE use and the contaminated (MRSA) clothing that are going to end up in the household laundry.

Note that the jetter equipment was also in use to clear the transport pipe to the Drainfield under the front edge of the Trailer.

Exposure:

The aerosol created by its use created the potential for inhalation of MRSA contaminated material and possibility of MRSA of the lungs, nasal and other mucus (mouth) membranes.



MRSA can impact a worker in a number of ways and vectors of exposure can include, open sores, acne, abrasion and inhalation.

All common to any of the work tasks with OSS.



Previously restricted to home health care and hospitals, this is now common in the general population.

It Won't Happen to Me!



Exposure Vectors?

- Direct (examples?)
- Indirect (examples?)

PPE Choices

- Sunglasses ?
- Splash shield?
- Goggles?
- N-95 mask?
- Exam Grade Nitrile

Gloves



- Double gloves?
- Anti-Bacterial lotion

Bridges the discussion or comments from participants on vector exposures and possible PPE to mitigate the exposure.

It Won't Happen to Me!



Pink Eye

Common bacteria responsible for non-acute bacterial conjunctivitis are staph and strep and are common in

wastewater. What do you think is the

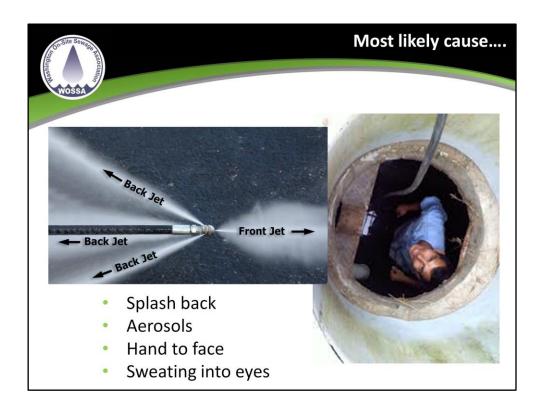
most common vector route?



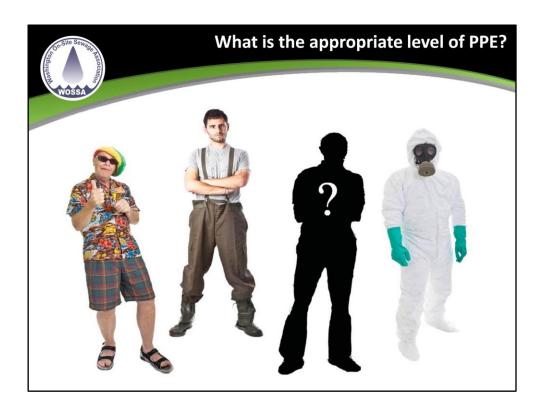
Bacterial infection from splash back or aerosolization...there are demonstrated examples of this from several companies and after each of the initial presentations, someone would come up and tell their story.

Discuss how what vectors and contamination pathways would end up in this result.

- Direct contact with an aerosol
- Splash back of sewage
- Hand to face contact on hot days/sweating into eyes



Vector discussion, amplified by the inappropriate CSE, and non use of any PPE visible: eyewear, barrier protection for hands or respiratory protection.



Ask group to quantify extremes vs appropriate ("fit for use" issue).

Employers may not need to go the extremes of the picture on the right, but each job, each task and each company needs to evaluate the situation and choose the appropriate PPE to meet the need.



Task: Rangers empty out collection baskets from the toilets immediately behind them that are full of paper, wet with urine and human excrement into 55 gallon drums to be helicoptered off the mountain.

PPE: Tyvek suits over clothing, double gloves, N-95 masks

Clean up procedure on equipment evaluated....Given the level of protection that they are affording themselves, why would they clean off and place grossly contaminated equipment in the dirt and rocks of the area that are "traffic" areas and subject to high winds that blow the dirt and dust over the snow in the next slides that is used by climbers and hikers to make drinking water....

This opens the discussion to responsibility to protect the public from aerosolized exposures in upcoming slides.



The tents in this picture are directly below (within 75') of the toilets and is a designated area for the climbers. They will harvest snow from within a 225' area of the tents sites and melt it for drinking water.

As an aside, the climbers are making an effort to boil the water, but since they are at 10,200', the boiling point of water is 194 degree's F and should be boiled for 3 minutes minimum.

This rarely happens.

Other users may substitute the mountaineering slides with other risk based pictures of choice.

It Won't Happen to Me!



Sty — also called a hordeolum appears as a red, sore lump near the edge of the eyelid.

It is usually caused by a bacterial infection.

A sty will develop at the base of an eyelash if the eyelash follicle (root) is infected.



This slide introduces the concept of exposure of aerosols and splash back exposures and proper eyewear.

It can also be an introduction to the consideration of weather in the work environment and hand to face contact when it is 75-90 degree's out and sweating is an issue on the head and face.



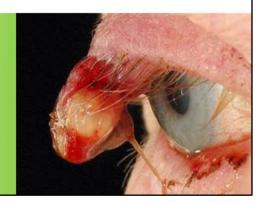
It Won't Happen to Me!

Exposure Vectors?

- Direct (examples?)
- Indirect (examples?)

PPE Choices

- Sunglasses?
- Safety glasses with side shields?
- Splash shield?
- Goggles?

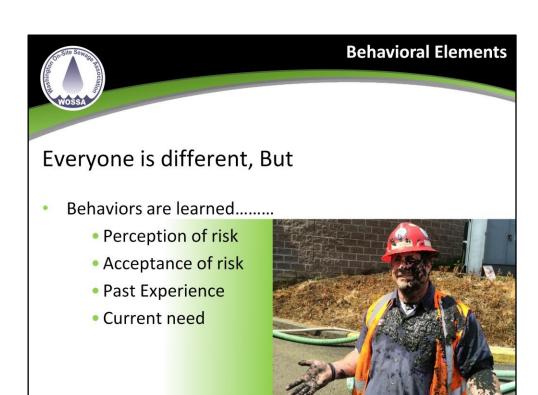


Impact slide and discussion on appropriate levels of PPE and fit for use issues.

Are standard glasses or sunglasses adequate?

The presentation going forward along with recommendations describe the context of PPE choices as:

- Good
- Better
- Best



A list of pathogen exposures can be handed out, but start here, because it is individual behaviors that will get the job done on a personal level, up close and personal, so the discussion should start here based on what we see in the field.



New workers to the industry experience a higher frequency of sick time until acquired immunities are built up.

This has been recognized in several companies with larger workforces (100 plus) that is often unrecognized in small family operations.

It is noteworthy as a motivational statement for compliance of use, to highlight the fact that most employer's at this level do not offer sick leave pay.

If you don't show up, you don't get paid.

Microbiology of Sewage



Over half of all Americans will be infected with an intestinal parasite at some point in their lives.

Yet, many of us do not recognize the signs and symptoms of a parasite infection because they can occur weeks or even years after the initial infection, and because a parasitic infection often mimics other similar conditions.

The most common symptoms of a parasite infection include constipation, diarrhea, gas and bloating, irritable bowel syndrome, joint and muscle aches, anemia, allergies, skin conditions, tumors, nervousness, sleep disorders, teeth grinding, chronic fatigue, and immune dysfunction

Proof statement on statistical information from the gov't. If even remotely accurate, a service provider has no knowledge of client health issues and can "reasonably" anticipate these exposures.

Infective dose for parasites from human waste sources and contaminated soil or effluent are:

ONE!

Microbiology of Sewage



Bacteria

- Extremely common in sewage
- Found naturally in human intestinal tract, sewage, soil, lakes, streams & ponds
- Three groups: aerobic, anaerobic, facultative
- Responsible for much of treatment of sewage
- Some are pathogenic indicator organisms

Introduction and discussion to the microbiology of OSS.

Microbiology of Sewage



Virus

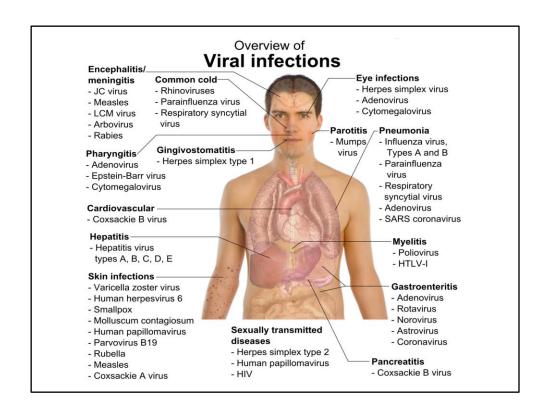
- Extremely small infective agents electron microscope is needed to see them.
- Depend on living host cell to supply needs
- More than 100 types found in sewage
- Must be removed or may cause illness

Washing your hands frequently with regular soap and water is important to help prevent the spread of germs.

It is important to state that while antibacterial products may seem like a stronger cleaning option, they are no more effective in cleaning your hands than regular soap and water.

Further, they do not kill viruses like H1N1 (swine) flu. In fact, the routine use of antibacterial cleaning products has been questioned by scientists and studies have shown that triclosan, the active ingredient in many antibacterial products, may make matters worse by creating drug resistant bacteria like MRSA.

Stick with simple soap and water and if you can't wash your hands, use an alcohol-based sanitizer with at least 60% alcohol content.



Overview of common sources, and part of the "over 100" virus found in sewage

Microbiology of Sewage

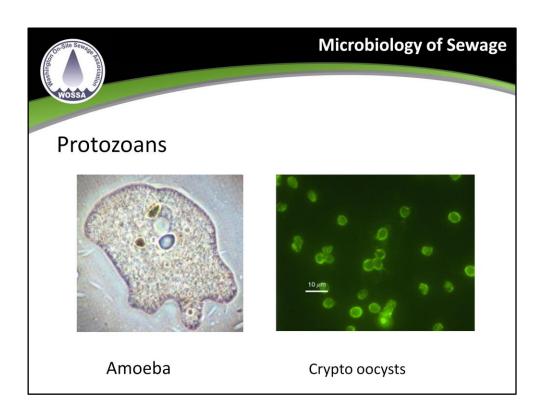


Protozoans

- About 50 times bigger than a bacterium, single cell
- Organisms should not survive passage through system, problem with cysts and eggs.
- More than 100 types found in sewage
- Must be removed or may cause illness

Overview, but presenter should note the issue of cyst and egg forming Protozoans that may phase into survival mode until conditions that they need for life resume.

In a later slide, the presenter will have an opportunity to strengthen this point with "survivability" of these organisms in ground and surface water as well as contaminated soils.



visual

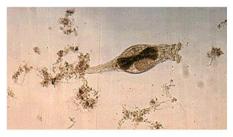


Microbiology of Sewage

Other organisms

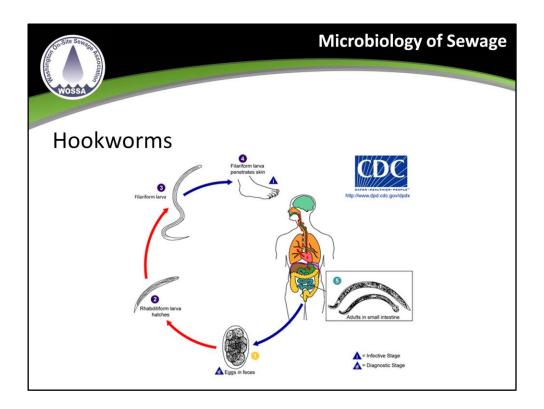
- Worms
- Rotifers & other micro-organisms
- Other macro-organisms





Visual

Note the infective dose of these are ONE...



Visual

Microbiology of Sewage



Hookworms – Life Cycle

Eggs are passed in the stool, and under favorable conditions (moisture, warmth, shade), larvae hatch in 1 to 2 days. The released larvae grow in the feces and/or the soil, and after 5 to 10 days they become larvae that are infective.

These infective larvae can survive 3 to 4 weeks in favorable environmental conditions. On contact with the human host, the larvae penetrate the skin and are carried through the veins to the heart and then to the lungs.

Visual

Wossa Wossa	Organism Survival Time in Soil
Entamoeba histolytica	6-8 days
Coliforms	38+ days
Salmonella	1-120 days
Cryptosporidium oocyst	60-180 days
Enteroviruses	8+ days
Ascaris ova	up to 7 years

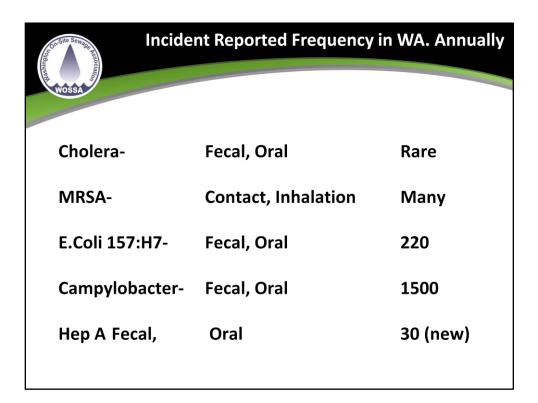
Specifics: Note especially how long these pathogens survive until they are reintroduced into a more favorable environs.

Worms, viral 1 Amoebic Dysentery 10-20 Giardiasis 5-100 Cryptosporidiosis 10-100

Infectious doses: It is important to note that these colonies or organism numbers are found in very small droplets of water (including mists).

Incident Reported Frequency in WA. Annually Fecal, Oral Worms -Many Virus'-Fecal, Oral Many Giardia Fecal, Oral **520** Fecal, Oral Crypto 100 Shigella Fecal, Oral **120**

Actual reported incidents and should be in context to "un-reported" and infected people that live in the system service providers are working on.



Actual reported incidents and should be in context to "un-reported" and infected people that live in the system service providers are working on.

Also note the transmission vectors in the discussion (multiple).



What are some other factors?

The "Compliance" Barrier....

What are some of the reasons that you think the voluntary use of PPE is so low in our industry?



With a safety plan in place we next need to consider why illness' happen.

Shows the relationship between outcomes and four unsafe behaviors: Root cause of accidents

- •Eyes not on Path
- •Line of fire
- •Eyes not on Task
- •Rushing or hurrying

What are some other factors?



The "Compliance" Barrier....

What are some of the reasons that you think the voluntary use of PPE is so low in our industry?

- Cost
- Peer pressure
- Time
- Nothing really bad has happened...

This slide outlines some of the reasons and rational common to the decision making process workers and small business owners make to use or not use PPE that are completely outside of the actual work task or activity.

What are some other factors?



The "Compliance" Barrier....

Independent work group studies have shown some other elements:

- Lack of Time
- Perception that use of the PPE interferes with the ability to do the job
- Physical discomfort of PPE including masks
- PPE not immediately available when needed

Other behavior based rationalizations for non-compliance.

Behavioral Elements At Work



- "Attitude" is your <u>internal guide</u> to Behavior
- Your perception of risk allows you to lose the ability to accurately identify the risk.
- If you don't adjust to this one thing....you won't consistently minimize your exposure......
- The result that follows is the"positive re-enforcement for negative behavior"

It wears away your commitment to personal safety, with justification tactics (your attitude).

Discussion on why peoples personal behavior's are either an expression of why they wear PPE and why they don't.

Stress the "positive re-enforcement for negative behaviors" (when you get away with something, with no obvious consequence)

Note how in a male dominated workforce, successfully "facing down" risk without getting hurt is as often admired as it is subject to corrective action (near misses).

Not so "Invisible Hazards"



Exposure risks identified in the Shop or Yard

- Objective Hazards: What are they?
 - Transfer Storage -
 - Truck Washing
 - Repair Maintenance
 - Personal Items
 - Others?

Focus' on workplace settings and try to encourage discussion that will make a shift in how the participants "look" at their workplace and tasks.

What are they missing because they look at it 50 times a day or have done the same thing for 20 years.

Not so "Invisible Hazards"



Exposure risks you recognize in the field?

- Objective Hazards: What are they?
 - Pumping
 - Dumping
 - Jetting
 - OSS Component Repair/ Maintenance
 - Personal Actions (smoking, chew, eating)
 - Others? (External conditions weather: heat/cold)

Same as previous slide

Not so "Invisible Hazards"



Most Common Exposures - In the Field

- Objective Hazards (Hazard)
 - Direct Contact
 - Aerosols
 - Splash back
 - Inhalation
 - Immersion
 - Secondary (smoking, chew, sweating, clothing)

This shifts the discussion from obvious traditional workplace hazards (pinch points, lifting, shock) to exposures that participants (and demonstrated in the field studies), are not recognizing.

Hazard Assessment Made Easy...



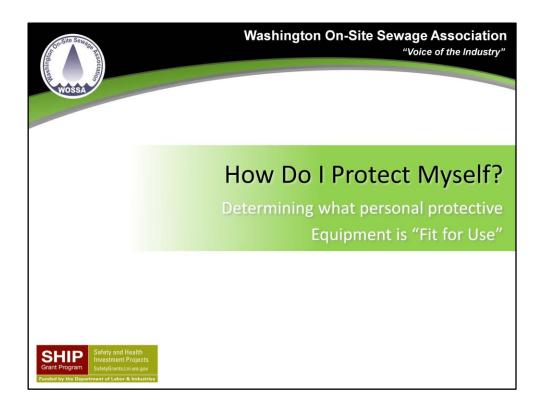
Hazardous condition + Exposure = Illness, Injury, Death

Hazardous condition + Exposure = Illness, Injury, Death

Hazardous condition + Exposure = Illness, Injury, Death

Simple visual

Take just one thing out of the equation and you mitigate the risk...



Focus on:

Personal responsibility first and foremost is on the individual who has final choice over his or her use of PPE or not.

The only thing worse than not using PPE, is having the availability of PPE that has not been evaluated on the "Fit for use" issue.

WHY?

It leads people to do things that they wouldn't if they were just barehanded

Base Layer Protection



Consideration of PPE includes understanding why we use it in the first place.....

PPE means:

"Specialized clothing or equipment worn by an employee for protection against infectious materials" (OSHA)

Simple definition

Base Layer Protection



Consideration of PPE includes understanding why we use it in the first place.....and is it "Fit for Use"

- Uniforms protect skin and/or clothing
- Gloves protect hands
- Masks- protect mouth/nose
- Respirators protect respiratory tract from airborne infectious agents
- Goggles protect your eye

Field studies showed that while many of the service providers had PPE, they had not been evaluated for intended use.

Many of the nitrile gloves plainly stated on the box their limitations to food handling.



Common gloves used in the industry that provides protection against "dirt" but no protection against pathogens.



Worker with tools:

Part of this discussion on "fit for use" goes beyond the practical ability of the PPE (nitrile gloves), to provide protection against the pathogen exposures, but also if the gloves have the durability to survive a single use in the inspection of a OSS. (see subsequent slides).



Working inside the septic system with minimal PPE.

Highlight that "Exam" grade gloves are necessary for minimal protection, but that 5 mil thickness may fail the "durability" of the PPE assessment for the overall "fit for use" need.



PPE not fit for use due to failure in average work activities involved with just an inspection.



Big heavy over gloves are a good choice of PPE, but only used for some tasks To get an employee to consistently use them, they also need to be comfortable. How would these work on a 90 degree day?

Base Layer Protection



Exposure: Contact/Immersion/Barrier Protection

Glove Grades

Surgical Gloves: Good

As the name suggests, surgical gloves are designed primarily for use in healthcare procedures posing the highest risk for the spread of blood borne pathogens

Discuss the vector pathway.

Fit for use/application includes barrier protection and durability.

It is important to remind everyone that when the manufacturer's make 100,000 nitrile gloves in a run that they will subsequently test them.

The ones that pass the Exam grade protocol are separated from those that don't...the other while they look the same, are downgraded in use to "industrial" use or "food handling" use.

Exam grade gloves are a minimum.

"Surgical grade" gloves are not needed for this industry application as the only difference between them and "Exam grade" is the surgical grade gloves are sterile to be used in the operating room or to prevent the doctor from contaminating the patient.



Exposure: Contact/Immersion/Barrier Protection

Glove Grades

Examination / Medical Gloves (min. 4-6ml):

Better

Examination grade gloves, also sometimes referred to as medical gloves, were originally designed for non-surgical medical procedures, but are also used in a variety of other applications. Exam gloves are sold both sterile and non-sterile.

Discuss the vector pathway.

Fit for use/application includes barrier protection and an evaluation for durability.

Base Layer Protection



Exposure: Contact/Immersion/Barrier Protection

Glove Grades

Food Service Gloves: Minimal to Poor

Food Service gloves, often referred to as multipurpose gloves, are designed for short-term use and frequent glove changes. No government regulations or inspection program exists for food service gloves.

Instead, the USDA requires that all glove components comply with the provisions of the FDA and Cosmetic Act.

It is suggested that presenter have examples of labeling on common grade gloves used by participants and go through the exercise of reading the labels. A review of the use limitations is often written clearly on the box. Other times it is not.

The box needs to specifically say they are "Exam grade" or say "Examination Gloves" somewhere on the packaging.

Note on Nitrile Gloves: Most of these gloves are produced in China. Gloves then undergo various testing protocols and this determines their use. Gloves that pass the standard for "exam" grade gloves are identified. Generally, the only difference between a Surgical grade and Exam grade glove is that the Surgical grade glove is sterile. Gloves that don't pass the testing protocol are packaged as something else (mechanics glove, etc.) and available at Home Depot or Lowe's

Base Layer Protection



Exposure: Contact/Immersion/Barrier Protection

Glove Grades

Mechanics/Industrial Gloves: Poor

Offering greater protection than nothing, nitrile gloves provide resistance to most finishes, solvents, and chemicals. Nitrile material is also <u>resistant</u> to punctures, cuts, and snags. Gloves are pre-powdered and contain no natural rubber latex. Common in our industry but unsuitable for the exposures that we face in Sewage.

Discussion continues: Ask if they even know what grade their gloves are?

It is a good discussion to speak/remind the issue of "positive reinforcement for negative behaviors" here.

Just because nothing bad or noticeable has immediately happened, the use of PPE that doesn't pass muster on the "fit for use" issue doesn't mean anything more than you just got lucky today.



Presenter focus:

It is common for an employee to rely on the owners provision of PPE to assume that someone "else" has determined it fit for use. Field studies show that this is not the case in the OSS industry.

The only thing worse than not using PPE, is having the availability of PPE that has not been evaluated on the "Fit for use" issue.

WHY?

It leads people to do things that they wouldn't if they were just barehanded



Presenter focus:

This is the actual labeling from the previous slide. The lack of awareness or acceptance of the biological exposures to raw human sewage led to the decision to provide this unacceptable barrier protection to employee's

The only thing worse than not using PPE, is having the availability of PPE that has not been evaluated on the "Fit for use" issue.

Base Layer Protection



Exposure: Contact/Immersion/Barrier Protection

Glove Grades

Double Exam / Medical Gloves: Best

Offering greatest protection used along with, over gloves to provide barrier protection. Nitril material is also <u>resistant</u> to punctures, cuts, and snags more so than latex and provides better durability for many tasks.

Presenter should discuss in context to the task being performed,

This will help with the compliance issue for use of PPE.

In addition, understanding that as the task becomes more specific or even changes as it progress the longer the job goes into the inspection or pumping/maintenance needs of the OSS, that there is the prospect of the need of additional PPE to be added as needed.

Eye Protection



Exposure: Splash, Suspended Aerosol's

- Eye protection chosen for specific works depends on the task, potential exposure and personal vision needs
- Personal eyeglasses and/or contact lenses are not considered adequate eye protection

Exposure will determine the level of PPE needed.

Eye protection for aerosols should include consideration for mists and eyewear with a continuous seal around the eye is appropriate.

Eye protection for splashes may not need the same level, but if a SP is limited to one choice, and both exposure levels are commonly encountered, then the highest level is appropriate.

Note that individuals may need to have prescription safety glasses made in whatever configuration is chosen.

Eye Protection



Exposure: Splash, Suspended Aerosol's

- NIOSH: States that eye protection must be:
 - Comfortable
 - Allow for sufficient peripheral vision
 - Adjustable to ensure a secure fit

Indirectly vented goggles with a manufacturer's antifog coating may provide the most reliable protection from splashes, spray and airborne droplets from multiple angles.

Presenter should offer these considerations for management:

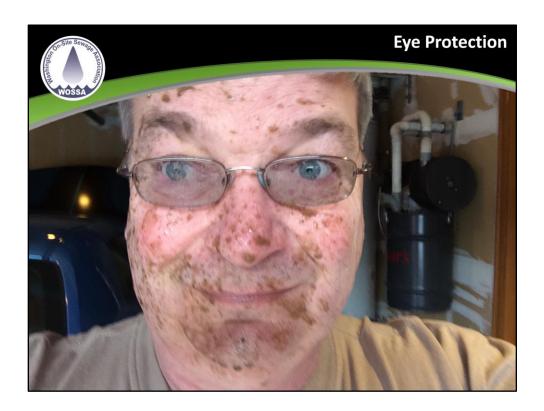
- If you're going to spend the money, make sure that the choice of PPE meets other needs to improve compliance and use.
- Owners/management cannot rely on the excuse that "We give them the PPE, it's out of our control if they actually use them or not!"



Presenter focus:

For specific discussion on application. This eyewear is relatively inexpensive and readily available.

The "cat crap" in the upper right of the slide is an anti fogging application for the lens that is very effective in extreme weather conditions (heat and cold)



Presenter note: This accident (splash back) was caused by the unanticipated release of a "dog-ear" on a discharge hose, resulting in a "baptism by sewage". While there were no subsequent illness post accident, the SP was fortunate to be wearing eyewear at all.

The eyewear in the photo is inadequate.



This service provider is doing it all just about right. Note appropriate use of PPE by the SP.

- Double Gloves
- Eyewear
- Hearing protection
- Coveralls

Presenter note: This same employee is shown later at the dump site wearing no PPE at all.

The reason given was that the dumpsite operator had been putting pressure on him to get in, unload and get out. As a result he wouldn't take the time to put back on all his PPE seen here to unload his truck.



The observed practice in the field showed that when masks are used it is common to retain and use them over multiple days and accumulated contamination my defeat their functionality.

One test of an N-95 mask showed readings of over 10,000 colonies. A canister face mask may be a better choice, but a fresh mask is a minimum.



These are the masks used in hospital and clinical settings. Very inexpensive to purchase and easy to use.

There are "fit testing" considerations to think about. Field observation noted that a lot of SP that work in the OSS industry have beards and mustaches.

There are an additional set of rules by OSHA for fit testing these masks..



Hepatitis - A – Each year 125,000 to 200,000 people become sick with Hepatitis A

Signs and symptoms of disease include fever, weakness, nausea, abdominal pain, dark urine, yellow skin and eyes

Symptoms usually last less than two months, but 10% to 15% of those infected will have prolonged or relapsing disease lasting up to six months.

This virus is most **commonly spread in stool,** Hepatitis A may be widely spread through contaminated food. In 1983, f 203 people became ill in a county of 7,800 in Oklahoma. Ninety-two percent of those infected had eaten at the same drive-in restaurant between two and six weeks before onset of illness.

Many employers offer immunization to employees, others don't.

Either way, the benefit of immunization is still apparent and if you are not going to use external PPE consistently or if they are not available to you, then these immunizations are a type of "internal barrier protection" that SP need to consider.



Hepatitis B – The hepatitis B vaccine is available as a stand alone vaccine or in combination with hepatitis A vaccine.

Hepatitis B virus (HBV) is transmitted from one person to another through blood and body fluids, and primarily infects the liver. In the United States, it is most commonly spread through sexual contact or injection drug use.

Health care workers and others exposed to infected blood or body fluids are also at high risk for infection.

Symptoms of HBV infection vary and may include loss of appetite, fatigue, nausea, and jaundice (yellow eyes and skin), joint pain, and skin rashes.

Risk exposure to Hep B is considered low by many in the industry, but it still exists in the OPIM discussion, and therefore needs to be addressed. When pumping of public or pit toilets (Parks, etc.), it should be anticipated that dirty needles may be common in the sewage.



Typhoid - Typhoid fever is a serious disease caused by the bacterium called Salmonella enterica serotype Typhi (*S. Typhi*).

The infection is spread from person-to-person by the fecal-oral route. That means that people get typhoid from food or water contaminated with the feces of infected people.

Typhoid symptoms include high fever, weakness, stomach pains, headache, loss of appetite, and sometimes a rash. Infection can spread to many other places in the body (such as bones) and can cause rupture of the intestine. It kills up to 30% of people who get it, if they are not treated.

Some people who become infected with S. Typhi become chronic carriers—they have **no symptoms but have** *S. Typhi* **in their feces**

Risk exposure to Typhoid is also considered low by many in the industry, but it still exists in the OPIM discussion, and therefore needs to be addressed.



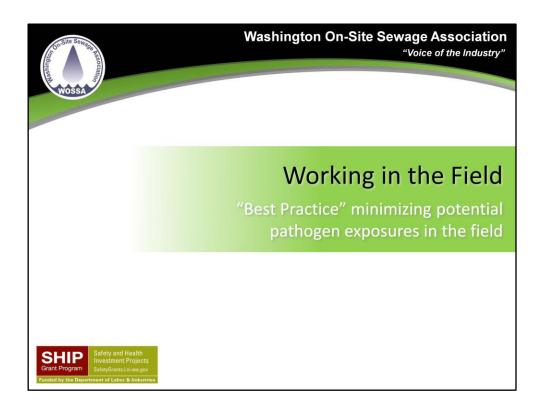
Tetanus – Renewable every 10 years

Tetanus (Lockjaw) is caused by toxin-producing spores of a bacterium, *Clostridium tetani* that inhabit the soil and the bowels of animals and humans.

Unlike other vaccine-preventable diseases, it is not spread from person to person. Tetanus infection is most often the result of wound contamination in an unimmunized person or someone who has not had vaccine boosters in many years.

It may also occur following puncture wounds, animal bites, burns, abrasions and surgery.

Risk exposure to Tetanus is a higher risk in the industry, it still exists in the OPIM discussion, and therefore needs to be addressed with appropriate PPE and shots to be kept current.



This is a transition slide in the presentation and shifts the discussion over to best practice in the field and a discussion of observations of a variety of work tasks.

The Presenter can facilitate feedback from the group on:

- What is it that we do?
- While there are commonalities, each job is different.
- What is best practice?



Exposure:

Hand to face contact: The field observations showed that in a typical 45 minute job, the average number of times workers touched their face was more than 18 times.



Exposure: Various

Top left: Contaminated equipment stored in office space.

Top right: SP smoking during a break after significant contamination exposure.

Bottom left: Working on a hot day increased the frequency of hand to face contact while contaminated.

Bottom Right: Worker is right hand dominant, cell phone on hip which is against the company policy. During the jetting task, the hose was see-sawing against the phone back and forth and swabbed results of the phone surface found it contaminated with E coli. A secondary hand to face exposure presents itself when he calls back to the office for the next job.



The operator needed something from the cab of his truck. Using a 'clean to dirty" work procedure violated the chain and created a potential for contaminants to migrate the contamination into a "clean" area (food kept here).



The SP in this picture was pumping out a septic tank and generally has available and is using the appropriate PPE here:

- Double Gloves
- Coveralls
- Work boots

Note: in the bottom left hand side of the picture, a high pressure hose is being used and likely creating an aerosol.



When you consider some of the things that influence personal decision along with an evaluation of accidents, most accidents include one or several of these 4 root causes for why or how the accident happened.

These "root cause" definitions can be used to expand participant understanding of how they get hurt in the workplace.

The individual in this picture, had been diligent all day about putting on and taking off "protective clothing" (coveralls), that he had available, and using most PPE (missing facemask), but when he got to the septic dump station, he abandoned all of his PPE, because of the pressure that the station operator was putting on the drivers to "hurry up" dump the load and clear the dump station for the next truck (motivation by operator to maximize through put at the expense of safety, and willingness of truck operator to be "rushed").



This slide represents external influence issues that are recognized or not that end up in poor decisions being made by the SP that could result in an illness!

This is the community dump site for offloading pump trucks.



Single Family Residence (SFR) pump out and inspection Line of fire potential to:

- Aerosols
- Splash back (wearing gloves, but no other PPE), in this case the operator is actually creating a hazard by his work activity



Lift Station to Sewer

In this slide, have the participants identify what the task and person is doing right and what they could improve on.

This lift station is connected directly to the sewer and is pumped out every two weeks

Issues:

Line of fire potential to: aerosol, splash back (wearing gloves, but no other PPE)



Single Family Residence (SFR) pump out and inspection In this slide, have the participants identify what the task and person is doing correctly and what tasks they could improve on.

Line of fire potential to:

- Aerosol
- Splash back (wearing gloves, but no other PPE), has eyewear on, but not "fit for use" to the exposure



Single Family Residence (SFR) pump out and inspection In this slide, have the participants identify what the task and person is doing correctly and what tasks they could improve on.

Line of fire potential to:

- Aerosol
- Splash back (wearing gloves, but no other PPE), has eyewear on, but not "fit for use" to the exposure

The SP is wearing gloves, but no other PPE), in this case the operator is actually creating a hazard by his work activity. He is wearing glasses, but not due to exposure they are prescription.

Note that care has been given to properly laying out lids with the contaminated side up so as to not contaminate the ground.



Single Family Residence (SFR) pump out and inspection In this slide, have the participants identify what the task is, what things the person is doing correctly and what they could improve on.

Line of fire potential to: aerosol, splash back (wearing gloves, but no other PPE), in this case the operator is actually creating a hazard by his work activity



Single Family Residence (SFR) pump out and inspection

This slide graphically demonstrates the creation of aerosols and strengthens the need for PPE protection (face fit, N-95masks) for mitigation of pathogens and inhalation.



Single Family Residence (SFR) pump out and inspection Jetting job in a plugged and grossly contaminated line to Drainfield.

Line of fire: aerosol, PPE: (note gloves are not designed for barrier protection at all). This is a different employee of the same company that issues these gloves to their employee's.

It is a corporate fail on "fit for use" that was transferred to all employee's issued these gloves and also promotes the issue of positive reinforcement for negative behavior).

Employee's receiving the "PPE" from the employer assume that they are protected and may now do things that they would do with their bare hands "thinking" they are protected.



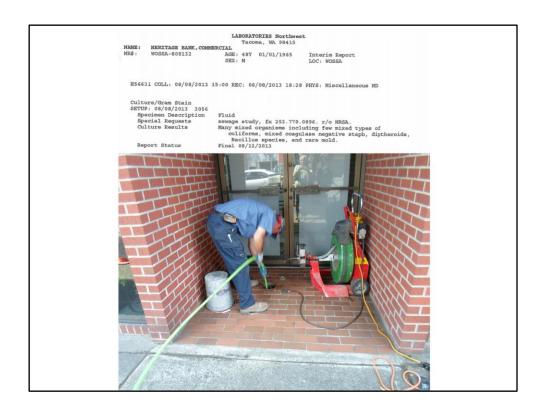
Note cell phone on right hip.

This is not allowed by company policy.

Potential of hand to face contamination is very high...(this will come up again in a subsequent slide)



Another employee, same company... Exposure is creation of aerosol...note this employee doing a similar job cleaning out the building sewer to the main in the street.



Employee is right hand dominant and has his cell phone on hip. During the jetting the hose was rubbing against the phone back and forth. Swabbed results of the phone surface found them to be contaminated with E coli.



Commercial application (gas station with a pump out done weekly year round) with a holding tank.



SP is pumping out the tank on a weekly basis. With no other components to inspect it is a straight forward pump out job that usually about 15-20 minutes start to finish.



Still on the site of the previous slide, this is another example of aerosols created, but from the equipment.

The tank is being vented as shown and is typical of how pump trucks operate.

Temperature and humidity graphically show the aerosol created. Field tests demonstrated positive tests for biologics up to 30 feet away in plate tests.

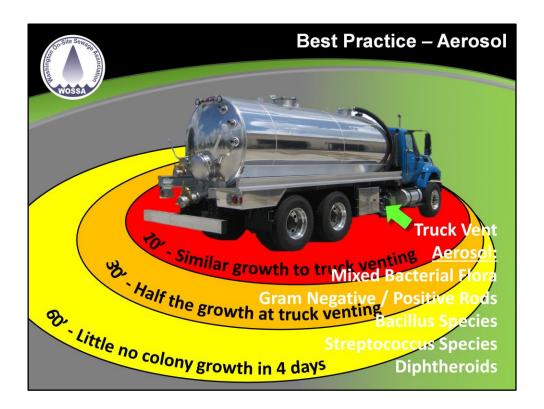


The amount of aerosols and the contamination range was a surprise to the field work and study.

Positive samples for bacteria and plate tests were out to 30 feet from the truck.

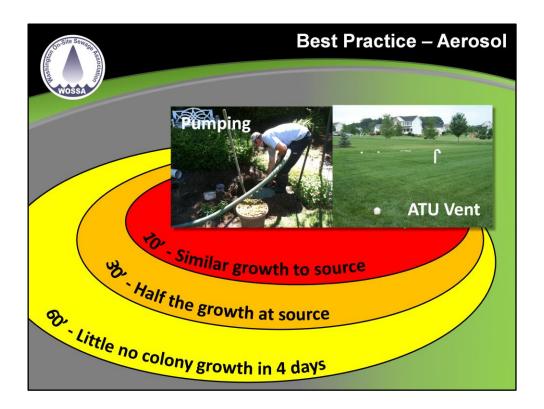


The contaminated aerosols created by the blower, also present a potential exposure hazard to the public if not protected or directed



The results of the field studies are demonstrated here, along with the microorganisms.

In the study, there was not a dramatic drop in colony growth until the 60 foot mark.



The results of the field studies are demonstrated here, along with the microorganisms.

In the study, there was not a dramatic drop in colony growth until the 60 foot mark.

This portion of the study examined the potential exposure for air venting of several ATU suspended growth technologies.



Task:

Wire brush grinding of a discharge connection on a pump truck that was creating a 'dust" aerosol, on the main discharge valve of the septic pump truck. The threads were swabbed (after cleaning) and still tested positive for E-coli.



Task: Emptying of Pump Truck at Wastewater facility:

This service provider wore full and appropriate PPE while on the customers jobsite, and didn't continue here when he offloaded the pump truck. Principally because the site manager put pressure on the drivers to get in and out as quickly as possible.



There is little to do to minimize the exposures at this dump site that is not already commonly available and identified in the study. The use of coveralls, facemask, gloves and glasses will minimize the exposure to aerosols and should be common practice.



This is a look at two different unloading methods with one being a much better practice to minimize the creation of aerosols.

As you can see, a dramatically lower aerosolization of the wastewater is achieved by use of this specialized hose carried on the truck for the specific purpose of off loading the truck.



Explain the distance from the truck to the septic system components that the service provider must drag hose (a long ways)...the point of this slide is reinforced in the following slides and the decisions made by the operators.

It is too far away from the actual work to facilitate going back and forth for equipment, PPE etc. The service provider should think this through just a bit more and make sure that he has everything that he needs on the first or last trip into the backyard before he begins work.



In this single family residence, one of the laterals was not taking water and was determined to be clogged. This slide shows the what the d-box (distribution box) looked like upon initially opening up the system. The d-box was full.

In this slide you can see the SP is not wearing any coveralls and will eventually have his pants and shirt grossly contaminated as his work wears on through out the job and the remainder of the day and he will wear these home tonight, potentially extending the gross contamination to his family.



Exposure: The SP is creating an aerosol by using the clients hose.

- The gloves that he is using are not appropriate for the work environment (cloth backs and rubber)
- He is also using the clients hose for cleaning out the d-box. With no backflow preventer, he risks contamination of the clients drinking water.



Exposure: The SP is creating an aerosol by using the clients hose.

- The gloves that he is using are not appropriate for the work environment (cloth backs and rubber).
- No facemask of any type is used as barrier protection for the aerosol being created.
- He is also using the clients hose for cleaning out the d-box. With no backflow preventer, he risks contamination of the clients drinking water.
- Samples were taken and plate tests can be observed with the results.



This picture is of the same job, but digging out the other end of the line.

This was done when the line couldn't be cleared from the d-box side. The SP initial work was in grossly contaminated soil and is wearing no PPE at all.



Although the SP has added single layer Nitrile gloves, the trench is full of contamination and sewage. Note shovel handle.



Same job, continues digging out the trench with grossly contaminated wet soil now on the adjacent trench sides (no ground cover – adds an additional secondary exposure to the backyard to client and family).

Presenter should review the lab testing results of the work environment with participants.



This slide shows and interesting comparison to the PPE used by the man in orange working on the OSS compared to the small business owner's representative.

The man in orange works for a public utility who typically have a more robust safety program, but still is missing any face protection for aerosols which would be critical PPE.



Note gaps in PPE between two operators.

- Full coveralls vs partial
- Suitable eyewear for the SP on the left but not the other (previous picture)



Are the PPE used for just keeping clean or for protection from pathogens? Note the extreme facial hair in the operator on the left. Face fit for any style of mask for protection from aerosols is problematic.



Exposure limits and infective dose as you get/work close to the truck are discussion topics here.

The samples tested positive at:

- Truck (photo on right shows plate samples being taken)
- 10 feet away from the truck
- 30 feet away from the truck

It wasn't until the samples place 60 feet away from the truck were they coming back negative.



This SP is wearing:

- Double Gloves
- Waterproof boots
- Safety Glasses
- N-95 mask

The addition of external clothing (coveralls) would strengthen his exposure mitigation.



Using customer hose is a big no-no in our industry due to the potential secondary exposures to kids, property owners.

Observations found awareness to the issue high by compliance very low.

The "need" caused this decision because his water supply is on the truck several hundred feet away.

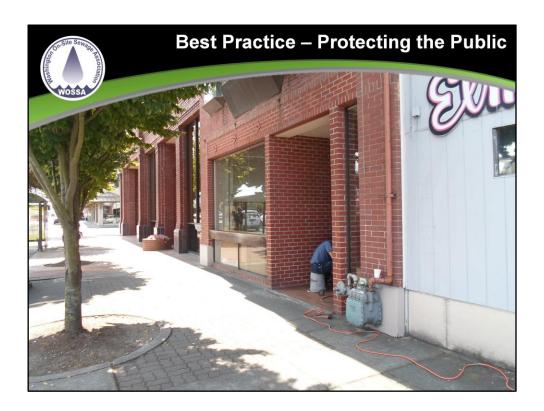
Presenter could ask participants what he could have done differently?



Protecting the homeowner in light of the results of the field studies are the speaking points for this slide:

- Keeping contaminated lids that have been removed "dirty side" up, prevents contamination in the grass, but that also is the case for hose laid casually in the grass that dribble wastewater during pumping operations or at the end of the job and the service provider is putting his gear away.
- In this slide, a simple technique of laying the hose end over the body of the hose will elevate it so it won't leak all over the grass. Given the survival time of many pathogens in the soil of months to years, this is a simple fix.
- Although you can't quite see it, the septic tank is in the landscaping just under the flag and at the front door.

Presenter should mention to participants to pay attention if they are creating aerosols. Remembering that the field tests conducted in the study showed results of biologics that were positive 30 feet away.



Discuss if the SP should consider the aerosols being created and potential exposure to the casual public walking by?

A recommendation would be to put up some traffic barriers for the protection of the public.



Installation repair of a system and decommissioning the tank.

The operator "scooped" out about 18 inches of raw sewage from the existing tank that had been broken down and was being decommissioned. He rotated 180 degrees and dumped the sewage in what would be the new tight line running out to the Drainfield.

Drainage was poor in this compacted glacial till.

The tank had been pumped out the day before, but had some residual use by the homeowner.

The exposure is to the workers that laid the subsequent pipe in that part of the extension to the Drainfield legs beyond the vegetation.



Transition slide....

What do we need to do differently?

- Raise awareness to the issue.
- Train SP's on best practice and basic PPE selection.
- Encourage business owners to set the example and "walk the talk".



In the review of available products and approved use in the health care setting, we found that the label should read "flammable" at a minimum to ensure an adequate amount of % of Alcohol (60%) to be fit for use.

The hospital minimum is 70% of several that were researched.

Basic Hygiene Practices for On-Site Workers



- Wash hands with soap and water immediately after handling human waste or sewage.
- Avoid touching face, mouth, eyes, nose, or open sores and cuts while handling human waste or sewage.
- After handling human waste or sewage, wash your hands with soap and water before eating or drinking.
- Before eating, remove soiled work clothes and eat away from human waste and sewage-handling activities.
- Do <u>not</u> smoke or chew tobacco or gum while handling human waste or sewage.
- Carry at least a gallon of fresh water in the truck for emergency eye wash.

Here are some thoughts if this slide is used:

Safety begins in the parking lot (or your shop) with planning for a successful day in the field.

It was uncommon to find available on the pump trucks or service trucks any fresh water as part of the first aid kit and is a recommendation.

Make sure that you have the appropriate PPE and first aid kit supplies when you go out into the field.

Basic Hygiene Practices for On-Site Workers



- Keep open sores, cuts, and wounds covered with clean, dry bandages.
- Gently flush eyes with safe water if human waste or sewage contacts eyes.
- Use Exam/Medical gloves to prevent cuts and contact with human waste or sewage.
- Wear rubber boots at the worksite and during transport of human waste or sewage.
- Remove rubber boots and work clothes before leaving worksite.
- Clean contaminated work clothing daily with 0.05% chlorine solution (1 part household bleach to 100 parts water).

Here are some thoughts if this slide is used:

- Basic first aid considerations.
- Ensure that the PPE available has been assessed and is "fit for use"
- Water Proof footwear should be mandatory.
- Sanitizing is different from sterilizing contaminated surfaces. Simply washing
 work clothes in the washer is more likely to spread contaminants than wash
 them away.

How to Immediately Reduce Your Exposure



- 1.) Stop touching your face!
- 2.) Double up on your gloves = <u>Exam grade Nitril w/ Outer</u> Glove
- 3.) Wear proper eye protection to protect from Splashback and Aerosols
- 4.) Use N-95 rated mask for tasks that create Aerosols
- 5.) Make sure your disinfectant % of alcohol is at least 67% or higher

Simple things you can do to protect yourself...

- Quit touching your face
- Have available and use a N-95 rated mask for bacteriologic exposures.
- Wear "exam" grade nitrile or latex loves.
- Wear "outer" protective layer of clothing (coveralls).
- Don't wash these cloths in the family washing machine.



Here are some thoughts if this slide is used:

A clear violation on several level, but with the focus of the last few slides on best option for barrier protection for your hands, the presenter should bring a final focus on the gloves the person in the picture is wearing.

They are the same ones that food prep employee's use and are totally inadequate.

The presenter may suggest that when they go to the local sandwich shop for their next sandwich, to have a look at the gloves that the person preparing their food is wearing.

They are the same as in the picture, and by this time, participants should recognize the inadequacy of them.

