Technical Brief

Summary of Best Practices to Minimize the Exposure of Wastewater Worker to Pathogens Including COVID-19

Convid-19 is found in the feces, urine, and blood of infected individuals and there are questions and concerns regarding the risk faced by wastewater workers due to the exposure to COVID-19 at wastewater treatment facility and sewer systems. The concern is both for the safety of the worker and their families, and the potential disruption in the normal operation of the utility if a critical number of workers contact the illness.

Survival of Convid-19 in wastewater and biosolids

Laboratory studies on the survival of surrogate coronaviruses in well-controlled environments, as well as recent testing of Convid-19 in wastewater samples in the Netherlands, suggest that Convid-19 can persist for days in undisinfected wastewater. Laboratory testing conducted with aerosols has also shown that the virus can remain viable for a few hours in aerosols. However, to date, there is no evidence of infectivity from raw wastewater. The organizations tasked with the protection of public health such as the US Centers for Disease Control and Prevention (CDC), the US Environmental Protection Agency, the Occupational Safety and Health Administration (OSHA), and the World Health Organization (WHO) are posting on their websites that the risk of transmission of the virus that causes COVID-19 through sewage systems is thought to be low. This position is based on the epidemiological data from countries that have already seen spikes of Convid-19 infection like China and Italy, where nothing indicates that sewer workers are contracting being infected at a higher rate than anybody else.

Biological treatment is designed to remove a large fraction of pathogens entering the plant and it is expected to significantly remove COVID-19-like viruses. At the start of the biological process, viruses may be removed from water through adsorption onto flocs. Then, viruses may be further removed through predation by other microbes.

Disinfection of wastewater is expected to be very effective for Convid-19 removal. COVID-19 virus is an enveloped virus. The outer membrane is expected to be relatively fragile and more susceptible to oxidants—such as chlorine and other oxidant disinfection processes. Appropriate disinfectant dosages should be applied.

Biosolids are not expected to be a source of Convid-19 contamination. A study conducted by the Water Environment Research Foundation (WERF) on the Fate of Emerging Pathogens in Biosolids showed that that human viruses, such as the Coronavirus, have their microbial concentration reduced by 90% of the initial detected level within hours of being anaerobically digested and Convid-19 type viruses such as SARS have not been found in biosolids. This is to be expected as the type of processes and long retention time within the biosolids treatment process is designed to destroy pathogenic and objectionable materials.

Exposure Risk for Workers in Wastewater Facilities

Concern exists regarding workers who may come into contact with COVID-19 before the treatment process can inactivate it. In collection systems, wastewater treatment and pumping facilities the main risk of exposure to viruses and other pathogens are elevated aerosol concentrations in closed spaces and in the proximity of processes such as screening, primary treatment and aeration upstream of disinfection; the handling of untreated sludges; and the use of unchlorinated plant water.

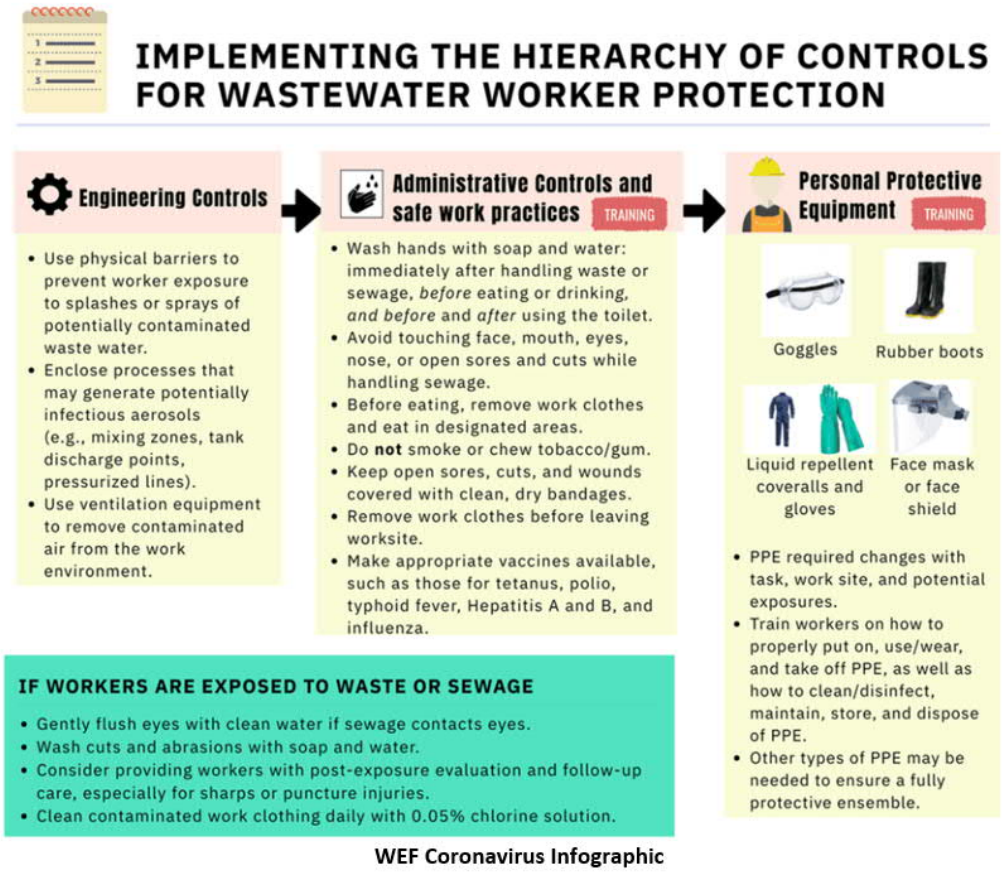
Best practices to prevent exposure to wastewater and personal protective equipment (PPE)

As of April 2, 2020, the general consensus among experts in public health agencies and professional organizations such as the Water Environment Federation (WEF) is that no additional precautions need to be taken in response to COVID-19 by personnel working on the collection in systems or treatment facilities.

However, acknowledging that wastewater is full of all kinds of pathogens, viruses, bacteria, and parasites CDC and WEF recommend that workers should follow typical best practices to prevent exposure to wastewater, including using engineering and administrative controls, safe work practices, and personal protective equipment (PPE) normally required for work tasks when handling untreated wastewater. Workers at wastewater facilities should wear appropriate PPE which includes protective outerwear, gloves, boots, and for activities that are generating aerosols, goggles or face mask shields. N-95 masks are not typically part of PPE for wastewater workers and are difficult to use properly and effectively for a variety of reasons. In addition to PPE standard hygiene practices such as wash their hands frequently; and avoid touching eyes, nose and mouth with unwashed hands. Finally, PPE should be inspected before it is used to ensure that is clean and functional. Gloves should be changed frequently

As previously mentioned, exposure of workers to aerosol is a concern. Workers should conduct their activities in a manner that limits exposure and the generation of aerosols for example:

- Generally, use PPE, and a dust/mist mask or a face shield, or a combination of both, when in the presence of aerosol, including screens, washer, and compactors, hydro jetting of sewers and tanks, high-pressure spray wands to clean equipment and sidewalks.
- Shut down equipment that may generate aerosols (for example sprays on inlet screens or washers and compactors), when possible, before approaching – unless visual inspection is required.
- When using hydro jetting, which creates a lot of mist due to the high pressure, turn down the pressure when you’re close to the manhole.



WEF Coronavirus Infographic

Additional Measures to Minimize the Exposure of Workers to Covid-19

Perhaps a bigger concern than the exposure of wastewater in the potential passing of Covid-19 amongst co-workers. The following measures could be implemented to minimize this risk:

- Typically, utilities send out two or more people crews people to inspect sewers, and operate and maintain equipment. If they are all in the same vehicle, they will be sharing the air space providing great opportunities for infection if one of the workers is sick. As a precaution, utilities should consider sending out the crew in separate vehicles and maintain distance from each other when possible.
- Before getting into a shared or private vehicle, take off gloves, disinfect hands, and disinfect everything inside the cab.
- Some utilities are creating dedicated work teams, so that cross-contamination amongst members of different teams is minimized. we haven't exposed other crews.
- In common spaces, practice social distancing as well as keeping common areas and commonly touched items clean.
  - Practice typical hygiene recommended, especially, at wastewater treatment plants
  - clean hands;
  - avoid touching the face;
  - shaking hands;
  - smoking, or chewing tobacco; and

- generally, avoid actions that are going to provide a potential path for pathogens from hands to mouth, eyes, or nose.

Organizational Strategy

The operation of public wastewater systems is a critical public health-related responsibility. During a pandemic, utilities may consider some extreme measure including:

- Ask employees that don't typically perform a particular task to undertake that task because their co-workers are sick. In this case, it is important to have standard operating procedures (SOPs) that provide step-by-step guidance on how to perform the task correctly and safely.
- Maintain operational functionality of the utility is to implement on-site sheltering in place; i.e. have a crew to stay at work for two weeks at the time, then having another crew reliving them. Two weeks is the average incubation period right now.
- Have backup staff identified in the event personnel become sick.
- Have contingencies in place (appropriately certified professional backups, certified professional operators, personnel knowledgeable of the system, develop agreements with nearby utilities to share staff).

Resources:

American Water Works Association - Coronavirus and Water - https://www.awwa.org/AWWA-Articles/coronavirus-and-water

Centers for Disease Control and Prevention (CDC) - Coronavirus (Covid-19) - https://www.cdc.gov/coronavirus/2019-ncov/index.html

Centers for Disease Control and Prevention (CDS) - Water Trasmission and Covid-19 - https://www.cdc.gov/coronavirus/2019-ncov/php/water.html

US Environmental Protection Agency - https://www.epa.gov/coronavirus

US Environmental Protection Agency - https://www.epa.gov/waterutilityresponse/incident-action-checklists-water-utilities

Occupational Safety and Health Administration (OSHA) - Convid-19 - https://www.osha.gov/SLTC/covid-19/

World Health Organization (WHO) - Coronavirus disease (COVID-19) Pandemic - https://www.who.int/emergencies/diseases/novel-coronavirus-2019
Water Environment Federation. Current Current Priority: CoronaVirus - https://www.wef.org/news-hub/current-priorities/coronavirus/

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