WORKER SAFETY

Radionuclides Web Cast

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INTRODUCTION

- **Radiation is invisible, tasteless, and odorless, and, as a result, is commonly overlooked as a potential hazard at water systems.**
- **Systems need to determine whether a radiation problem exists and, if it does, take appropriate safety precautions to prevent or limit water system staff members' exposure to radiation.**

Radiation Surveys

- **A system should contact a professional radiation protection specialist or a health physicist for assistance in conducting a radiation survey (including radon) *if*:**
  - **Lab test approached or has exceeded an MCL for a regulated radionuclide within the past 5 years**
  - **If calculations derived from use of the EPA SPARRC model indicates potential concentrations of radioactivity**

**** Some states require specialists who conduct radiation surveys (including radon surveys) to be certified or licensed.**

Radiation Surveys

- **Although designed for post-cleanup surveys of radioactively contaminated sites, EPA's *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) provides useful information**
- **The manual and other information on radiation surveys can be obtained from EPA's Radiation Protection Division Web site (at http://www.epa.gov/radiation)**

Potential Sources of Exposure

- **Pumps and piping where mineral scales accumulate;**
- **Lagoons, and flocculation and sedimentation tanks where residual sludges accumulate;**
- **Filters, pumping stations, and storage tanks where scales and sludges accumulate;**
- **Facilities where filter backwash, brines, or other contaminated water accumulates;**
- **Facilities that are enclosed (radon);**
- **Residuals processing or handling areas**
- **Landfills where residuals are shoveled, transported, or disposed**

Pathways of Radiation Exposure

The three primary paths of radiation exposure at a system are:

- **Inhalation,**
- **Ingestion, and**
- **Direct exposure.**

OSHA Standards

- **The Occupational Safety and Health Administration (OSHA) has developed occupational radiation standards (see 29 CFR 1910.1096) that might apply whenever an operator becomes aware of the presence of radiation at the facility.**
- **May not apply to municipal water treatment plant workers unless covered by state OSHA program**

OSHA Standards

- Standards that may apply:
  - **Requirements that personal protection equipment (PPE) such as protective clothing , respiratory devices, and protective shields and barriers be provided, used, and maintained**
  - **Training for employees who would use the PPE equipment (29 CFR 1910.132-136)**
  - **Practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces.**

General Radiation Safety Practices

- Use an OSHA-approved respirators (not dust masks);
- Limit time spent at land disposal sites to reduce inhalation of contaminated dust;
- Ventilate all buildings, especially where waste with high concentrations of radium is stored;
- Take standard OSHA measures to limit the potential ingestion of heavy metals and biological pathogens present in filters;

General Radiation Safety Practices

- Use protective gloves and frequently wash hands to reduce the potential for ingestion;
- Avoid eating and drinking in the vicinity of facilities or land disposal sites;
- Locate treatment units and waste storage areas as far away from common areas (e.g., offices) as possible;
- Shower after exposure to potentially radioactive materials and launder work clothing at the system;

General Radiation Safety Practices

- If laundering equipment is not available, workers should keep and wash work clothing separately and avoid wearing contaminated clothing into the home;
- Work boots or shoes should be wiped and cleaned after potential contamination. They should stay at the system or not be worn into the home;
- Conduct radiation surveys at least once annually to monitor the system's ambient radiation levels in areas where radionuclides are removed.

General Radiation Safety Practices

- Monitor levels of radiation to which staff are exposed. Systems should contact, or be referred to, state or other radiation experts for more information on how to monitor radiation levels.
- **If radionuclides or radiation have been found in drinking water or at a system, having operators who are trained in treating for radionuclides, and handling, disposing of, and transporting TENORM waste, is highly recommended**

Radon Protection

- It is appropriate for systems to consider radon protection measures when handling wastes containing radium.
- EPA recommends that the radon action level used for homes and schools be used for water systems.
- Action should be taken to reduce radon levels where testing shows average concentrations of 4 pCi/L or greater.

Who to Contact

- **Assistance and advice are available from:**
- **Appropriate State Radiation Control Programs;**
- **Conference of Radiation Control Program Directors (at http://www.crcpd.org), and**
- **EPA Regional Radiation Programs (at www.epa.gov/radiation/tenorm/keyradcontacts.htm)**