

### 3.1.13

#### **EMS Aspects: Radiography, Research and Clinical Services, Waste**

#### **Aspect Ranking: 8**

The University of Texas Health Science Center at Houston (UTHSC-H) is a research and educational institution which utilizes radiographic film processing in patient care clinics and research labs. Used films, fixer solutions, and other associated wastes are disposed of in a cost effective, safe, and environmentally compliant manner.

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#### **Radiography, Environmental Releases**

##### **Task/Activity Description:**

Disposal/recycling of spent fixer solution

Radiographic film processors are utilized for research and clinical activities in UTHSC-H buildings. These processors utilize developer and fixer solutions, with the fixer solutions containing silver in excess of hazardous waste thresholds set by the U.S. Environmental Protection Agency (EPA) in 40 CFR Part 261. Silver recovery units are listed as a tank for managing hazardous wastes on the UTHSC-H Medical School, Notice of Registration for solid and industrial hazardous wastes.

Silver dissolved in the fixer solution from radiographic film processors is precipitated onsite in silver recovery units (SRU) to reduce the amount of silver to less than 5 ppm. After treatment through the SRUs, fixer solution is released to the sanitary sewer as a non-hazardous waste.

The Environmental Protection Program utilizes 150 to 250 gallon filtering capacity steel wool SRUs. The units are gravity fed closed plastic buckets containing steel wool mesh that adsorbs silver ions from the spent fixer solution. These SRUs are maintained by the EPP and are exchanged on a regular schedule. Spent SRUs are collected and shipped to an offsite vendor for recycling.

In order to document compliance with the EPA silver limit of 5 ppm, the EPP conducts annual analysis of the effluent fixer solution silver concentration. The concentration of total silver is measured utilizing copper test strips capable of detecting silver in low concentrations. Current effluent concentrations indicate greater than 5 ppm before treatment and less than 5 ppm after treatment.

##### **Key Control Points:**

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Silver recovery units are connected in line on gravity fed systems to radiographic film processors.

The EPP analyzes spent fixer solution waste streams annually to determine effectiveness of SRUs

**Related Forms, Records, SOPs:**

- Environmental Health and Safety Assistant database - Equipment Menu

**Personnel Responsible:**

Department/Clinic Personnel

- Report malfunctioning SRUs to EPP
- Request SRU by calling the hazardous waste line
- Notify EPP if equipment or process change

Safety Specialists, EPP

- Maintain SRUs
- Perform semi-annual survey
- Perform annual waste analysis on spent fixer solution

Safety Manager, EPP

- Oversee and conduct waste stream evaluations and retain documented results

Director, EHS

- Liaison with department/clinic directors provide program oversight
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**Environmental Surveillance (Sanitary Sewer Monitoring) Program**

**Task/Activity Description:**

Sanitary Sewer Monitoring

Schedule: Annually

The Office of Environmental Health & Safety (EHS) Environmental Protection Program (EPP) conducts annual sampling from the sanitary sewer discharge point from each UTHSC-H building where research is housed. Samples are obtained utilizing an automatic composite sampler for a period of 24 hours. The composite water sample is analyzed by an accredited laboratory for: pH, total suspended solids, biochemical oxygen demand,

formaldehyde, oil and grease, silver, arsenic, barium, cadmium, chromium, lead, selenium, and mercury.

Results from the water sampling program are reported to the Institutional Chemical Safety Committee and retained at OCB 1.330.

**Key Control Points:**

- Identify potential mismanagement, improper storage and disposal of hazardous wastes

**Related Forms, Records, SOPs:**

Annual Sanitary Sewer Monitoring Report  
Silver Recovery Unit Efficacy Report

**Personnel Responsible:**

Manager/Safety Specialists, EPP

- Perform annual composite water sampling from listed sanitary sewer connection points
- Deliver water samples to accredited laboratory and complete chain of custody forms

EH&S Director

- Provide program oversight and funding
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**Environmental Management Systems and Environmental Awareness Training**

**Task/Activity Description:**

For the communication of environmental programs and environmental management systems, Environmental Health & Safety provides initial training to research and clinical staff. This training introduces and reinforces environmental management system principles, chemical waste disposal, bloodborne pathogens, waste management practices specific to laboratory and clinical operations, and environmental concerns and compliance requirements for chemical waste management. The training is lead by an instructor and is incorporated into new employee orientation training and is also offered on a monthly basis to current employees. Additionally, the training materials are available on the EH&S web page.

**Key Control Points:**

- Communicate environmental compliance requirements, environmental management concepts, and emergency procedures to personnel who generate chemical wastes.

**Related Forms, Records, SOPs:**

- Basic Clinical and Laboratory Safety Training

**Personnel Responsible:**

Principal Investigator

- Ensure staff attends training

Manager/Safety Specialists, EHS

- Present training materials to laboratory and clinical staff
- Document training by obtaining a sign in sheet with all participants listed, deliver sign in sheet to EH&S administrative assistant who will enter names of personnel trained into a training data base

Director, EHS

- Provide management review, liaison with Principle Investigators (PI) if necessary
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