

# Chemical Management

Required

**CM Prerequisite 1**

## **Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management**

### **Intent**

Reduce the potential exposure of building occupants to polychlorinated biphenyls and equivalents (PCBs), PCB combustion by-products, and asbestos-containing materials (ACM). Prevent associated harmful effects of these hazardous materials in new and existing buildings.

### **Health Issues**

The 209 chemicals classified as polychlorinated biphenyls (PCBs) are persistent, bioaccumulative, and toxic chemicals (PBTs). PBTs are toxic chemicals of particular health concern because they do not break down quickly in the environment, they become widely distributed geographically and they bio-magnify or concentrate in the tissue of living organisms as they move up the food chain. PCBs are associated with a variety of adverse health effects, including cancer and effects on the immune, reproductive, nervous, and endocrine systems. These can occur even with very low exposure levels. The 1996 U.S. EPA reassessment of PCBs determined that PCBs are probable human carcinogens; other agencies, including the International Agency for Research on Cancer, the National Toxicology Program, and the National Institute for Occupational Safety and Health, have reached similar conclusions.

Asbestos exposure increases the risk of mesothelioma (a kind of cancer of the lung, chest and/or abdominal lining), other forms of lung cancer, and asbestosis (a chronic form of lung disease). To minimize exposure of building occupants, regulatory authorities require remediation of asbestos-containing materials, either through a process of encapsulation or removal. Asbestos abatement undertaken during renovation while the building is partially occupied should take special precautions to ensure 100% containment of asbestos containing material

### **Credit Goals**

#### **OPTION 1: New Construction (operational less than one year)**

- Verify that materials containing polychlorinated biphenyls and equivalents (PCB's), PCB combustion by-products and asbestos-containing materials (ACM) are not present in the building or on the site.

OR

## CM Prerequisite 1 continued

### Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management

#### OPTION 2: Existing Facilities (operational more than one year)

- Develop and implement a program for the discovery, testing and mitigation of PCB-containing materials and ACM to ensure proper removal and appropriate disposal as the facility is upgraded and equipment is replaced.
- Identify the applicable regulatory requirements for identification and proper disposal of PCBs and ACM.
- Maintain a current survey of the facility to identify where PCBs and ACM may be remaining in the building and on the site.

#### Suggested Documentation

##### OPTION 1

- Obtain a letter from the facility manager, an accredited HAZMAT (Hazardous Materials) program manager or inspector stating that PCBs and ACM are not present in the building, on the building exterior or on the site.

OR

##### OPTION 2

- Annually review the previously completed PCB or ACM work done on the building and on the building site and use these data to prepare the history-based component of the survey for the building and the site that describes: (1) where PCBs and ACM have been removed; (2) where PCBs and ACM remain; and, (3) how the remaining PCBs and ACM are being addressed.
- For PCB-containing facility equipment, document regular inspections and maintenance checks for leaks and spills.
- As equipment is phased out, document that PCBs have been removed and disposed of in accordance with regulatory requirements and the HAZMAT management program.

#### Reference Standards

There is no reference standard for this credit.

#### Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Credit 2: Regulated Medical Waste Reduction; and, FS Credit 8: Chemical Management for Food Services.*
- Review the current HAZMAT management program, and prepare a description of the program that identifies the applicable regulatory requirements and explains how the program will address PCBs and ACM remaining in the building on an ongoing basis. For PCB-containing facility equipment, conduct regular surveys for leaks and spills.

## CM Prerequisite 1 continued

### Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management

- Update the PCB and ACM survey with current information by: (1) sampling additional likely locations in the building and on the site for PCBs and ACM; and (2) testing samples to see if PCBs and/or ACM are present. If the annual review identifies any previously unknown contamination, add these to the description of how the hazardous materials (HAZMAT) management program is addressing PCBs and ACM remaining in the building on an ongoing basis.
- Engage an environmental testing agency and licensed abatement professional to audit building systems and materials and determine protocols and procedures to encapsulate or remove materials as appropriate.
- Consider replacing transformers using PCBs or mineral oil with natural ester fluids, which are biodegradable and can reduce the need for firewalls and deluge systems, as well as spill containment.

#### Resources

Environmental Health and Safety Online. *PCB Regulatory Guidance*, <http://www.ehso.com/PCBregs.htm>

U.S. Code of Federal Regulations (CFR) 29 CFR 1910.1001: Asbestos, [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9995](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9995)

U.S. Code of Federal Regulations (CFR) 29 CFR 1910.1000: Air Contaminants, [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=9991&p\\_table=STANDARDS](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9991&p_table=STANDARDS)

U.S. Code of Federal Regulations (CFR) 40 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions; current edition, [http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr761\\_main\\_02.tpl](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr761_main_02.tpl)

U.S. Code of Federal Regulations (CFR). Standards Interpretations: CFR 1910.1000 TABLE Z-1. PCBs in Fluorescent Light Fixtures, [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=INTERPRETATIONS&p\\_id=19530](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=19530)

U.S. Code of Federal Regulations (CFR) 40 CFR Part 61, Subpart M - National Emission Standard for Asbestos, <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=5f3a0078f49318bbfcfe734644bae34e&rgn=div6&view=text&node=40:8.0.1.1.1.13&idno=40>

U.S. Environmental Protection Agency (EPA) Technical Factsheet on: POLYCHLORINATED BIPHENYLS (PCBs), <http://www.epa.gov/OGWDW/dwh/t-soc/pcbs.html>

U.S. Environmental Protection Agency (EPA) PCB Home Page, <http://www.epa.gov/opptintr/pcb>

U.S. Environmental Protection Agency (EPA) Region 4. *Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance*, <http://www.epa.gov/Region4/air/asbestos/asbmatl.htm>

U.S. Environmental Protection Agency (EPA), *Introduction to Indoor Air Quality: Asbestos*, <http://www.epa.gov/iaq/asbestos.html>

U.S. Occupational Safety and Health Administration (OSHA). *Safety and Health Topics: Asbestos*, <http://www.osha.gov/SLTC/asbestos/>

Required

**CM Prerequisite 2****Chemical Management Policy and Audit****Intent**

Institute a comprehensive chemical management policy and audit process to establish a framework of policies and procedures to reduce and eliminate the use, emission and improper disposal of chemical hazards and toxic materials within the healthcare facility and to the surrounding community.

**Health Issues**

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

**Credit Goals**

- Develop a comprehensive chemical management policy (per Joint Commission Environment of Care Standard 3.10.1) that includes processes for all receiving, identification and characterization, handling, storing and disposing of all hazardous chemicals, materials and waste, and includes staff training and education, labeling, proper use, air monitoring, and employee health monitoring as appropriate, with special consideration for chemicals/materials that have been identified for increased risk of occupational exposure by state and federal regulations. Additionally, ensure coordination and compliance with GGHC WM Prerequisite 1: Waste Management Plan.
- Undertake an internal hazardous chemical/material audit (per Joint Commission Environment of Care Standard 3.10.2, Element of Performance 2: Hazardous Materials and Hazardous Waste Inventory) to determine use by each department, and properly characterize chemical/materials. Include a description of all chemical storage areas, identify secondary containment measures and evaluate proper labeling, according to OSHA's Hazard Communication Standard and U.S. EPA's Resource Conservation and Recovery Act (RCRA).
- Develop and implement an occupational health strategy addressing potential occupational exposure issues and goals for improvement. An occupational health strategy regularly and systematically identifies hazardous exposures in the workplace and uses elements from the OSHA Hierarchy of Controls to protect workers. Mechanisms for worker participation in decision-making are a critical component of the strategy.

## CM Prerequisite 2 continued

### Chemical Management Policy and Audit

#### Suggested Documentation

- Document the implementation of the hazardous chemical management policy and annual inventory results in accordance with Credit Goals.
- Compile and annually update documentation demonstrating a Hazard Communication and/or Hazardous Chemical Management Plan over the previous twelve-month period, including, but not limited to: MSDS management, staff training and complete inventory of all hazardous materials. Include, at a minimum, the name of the chemical or compound, hazardous classification, usage and quantities, safety and environmental precautions, waste disposal requirements, and monitoring requirements.
- Compile and annually update an occupational health strategy in accordance with Credit Goals.

#### Reference Standards

Joint Commission. Environment of Care Standard 3.10.1, <http://www.jointcommission.org>

Joint Commission. Environment of Care Standard 3.10.2, Element of Performance 2: Hazardous Materials and Hazardous Waste Inventory, <http://www.jointcommission.org>

Occupational Safety and Health Administration (OSHA), Hazard Communication Standard, <http://www.osha.gov/SLTC/hazardcommunications/standards.html>

U.S. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA), <http://www.epa.gov/epaoswer/osw/laws-reg.htm>

#### Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC ES Credit 1: Environmentally Preferable Cleaning; FS Credit 8: Chemical Management for Food Services; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*

## CM Prerequisite 2 continued

### Chemical Management Policy and Audit

- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewering authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Sources of chemicals in health care facilities that may be potentially environmentally harmful include those discharged into the sanitary sewer system generated from their use. Areas of use include clinical laboratory, building system operations, environmental services (e.g. solvents and disinfectants), food services (e.g. soaps, chlorine), and diagnostic and treatment areas (e.g. glutaraldehyde, radioactive substances). Set up an onsite review with POTW to determine chemicals and substances of concern that may be entering wastewater, and ensure proper management techniques are in place.
- A hospital's main wastewater discharge flow may not warrant pre-treatment (except neutralization or radioactive decontamination). However, partial flows from hospital functional areas (e.g., laboratories, oncology, and pathology) should be carefully evaluated for opportunities to reduce discharge and improve quality.
- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Use automated laboratory equipment that maximizes sample throughput while minimizing sample size, reagent quantity, and waste streams. Utilize microscale chemistry to minimize use of lab chemicals and solvents where possible. Work with EHS personnel and wastewater authorities in developing an action plan.
- Explore technologies and strategies to eliminate chemical waste to drain in cooling tower and boiler blowdown. Treat blowdown so that chemical treatment can be reclaimed for re-use.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments such as ozonation or ultraviolet germicidal irradiation (UVGI) for applications such as cooling tower basins.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.
- Avoid discharging concentrates of disinfecting and cleaning agents should be avoided — particularly chlorine, phenols, quaternary ammonium compounds, and products containing nonylphenol (potentially estrogenic effect) and strong cleaning ingredients.
- Approach FDA, other regulating agencies, manufacturers and group purchasing organizations about creating and developing a registration system for approving safe use and effective alternatives to glutaraldehyde and ethylene oxide (ETO) and other high level disinfectants and sterilants.

## CM Prerequisite 2 continued

### Chemical Management Policy and Audit

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#### Resources

American National Standards Institute. ST58-1996, Safe Use and Handling of Glutaraldehyde-based Products in Healthcare Facilities.

Best Practices for the Safe Use of Glutaraldehyde in Health Care. OSHA Publication 3258, (2006), 261 KB PDF, 48 pages.

Joint Commission Environment of Care EC.3.10,  
<http://www.jointcommission.org/NR/rdonlyres/266E870D-BEB4-48CC-9ABC-2EC3210C8291/0/BHC2008ECChapter.pdf>

Medical, Academic and Scientific Community Organization (MASCO), Boston, MA: Mercury Work Group, Types of Hospital Water, <http://www.masco.org/mercury/techid/types.html>

Minnesota Technical Assistance Program (MnTAP), fact sheet on formalin recovery, <http://www.mntap.umn.edu/health/20-Formalin.htm>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth> or <http://www.h2e-online.org/tools/chemplan.htm>

U.S. Centers for Disease Control and Prevention (CDC), 2003 Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004,  
<http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

U.S. Centers for Disease Control and Prevention, CDC/HICPAC Disinfection and Sterilization Guidelines, 2008

U.S. Environmental Protection Agency (EPA), National Emission Standards for Hospital Ethylene Oxide Sterilizers, <http://www.epa.gov/fedrgstr/EPA-AIR/2007/December/Day-28/a25233.htm>

U.S. Environmental Protection Agency (EPA), SARA Title III: the Emergency Planning and Community Right-to-Know Act (EPCRA), [http://www.epa.gov/Region8/toxics\\_pesticides/epcra/epcra.html](http://www.epa.gov/Region8/toxics_pesticides/epcra/epcra.html)

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants., OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses,  
[http://www.osha.gov/pls/oshaweb/owasrch.search\\_form?p\\_doc\\_type=PREAMBLES&p\\_toc\\_level=1&p\\_keyvalue=Air~Contaminants](http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air~Contaminants),  
[http://www.osha.gov/pls/oshaweb/owadis.show\\_document?p\\_table=PREAMBLES&p\\_id=771](http://www.osha.gov/pls/oshaweb/owadis.show_document?p_table=PREAMBLES&p_id=771)

U.S. Occupational Safety and Health Administration (OSHA), Use of Latex Surgical Exam Gloves for Protection Against Glutaraldehyde



Required

## CM Prerequisite 3

### Community Contaminant Reduction: **Leaks & Spills**

#### Intent

Mitigate leaks and spills and waterborne effluents to prevent releasing waterborne environmental, health and safety burdens to the site neighbors and surrounding community.

#### Health Issues

Health care facilities have the potential to contaminate wastewater, stormwater and surface and groundwater through releases from a variety of sources. Water contamination on a health care campus may include heavy metals such as mercury, silver and chromium, pharmaceuticals, cyanide, sulfur, nitrates, chloride, fats, oils and grease (FOG), synthetic oils, fuel oil, and laboratory chemicals, to name a few. Often, wastewater treatment plants have limited capacity to treat or filter out many of these contaminants. Wastewater effluents may therefore expose people and wildlife to a variety of chemical contaminants originating at the health care facility. By minimizing or eliminating use of these chemicals, controlling releases of waste, and actively monitoring wastewater, health care facilities can contribute to protecting the health of the surrounding community.

#### Credit Goals

- Develop and implement a policy that complies with U.S. EPA Spill Prevention Control Countermeasures Regulations (SPCC) containment and engineering controls and all applicable state and local administrative codes pertaining to storage tanks to manage above- and below-ground storage of fuels and chemicals in order to minimize risk from leakage and spills.
- Develop and implement an emergency response plan to contain leaks and spills from above- and below-ground storage tanks in accordance with applicable state and local administrative codes pertaining to petroleum storage tanks.
- Ensure that outdoor hazardous waste storage areas include secondary containment provisions, a locked enclosure, an emergency phone and proper labeling with the date and documentation of all chemicals stored onsite per the U.S. EPA Resource Conservation and Recovery Act (RCRA) or state or local regulations, whichever is most stringent. Assure that RCRA rules are followed for time limitations on hazardous waste storage areas.
- Develop and implement a plan to prevent materials/substances from dumpsters, compactors and outdoor hazardous or medical waste storage areas from entering stormwater runoff, and inspect and monitor storm drains at least quarterly to ensure proper clearance.



## CM Prerequisite 3 continued

### Community Contaminant Reduction: **Leaks & Spills**

#### Suggested Documentation

- ❑ Compile and annually update outdoor chemical storage policy and procedures, an emergency response plan to contain leaks and spills, secondary containment provisions on outdoor storage facilities and a plan to manage stormwater runoff from dumpsters, compactors and outdoor hazardous or medical waste storage areas, in accordance with Credit Goals.
- ❑ Document and annually review the success of the outdoor chemical storage policy. Analyze and determine the root causes of incidents and compile documentation on the short term and long term actions taken.

#### Reference Standards

U.S. Environmental Protection Agency (EPA) Clean Water Act, Spill Prevention Control Countermeasures Regulations (SPCC), <http://www.epa.gov/oilspill/>

U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA), 40 CFR Part 264 & 265, <http://www.epa.gov/epaoswer/osw/laws-reg.htm>

#### Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC SSM Credit 1.1: Site Management: Building Exterior & Hardscape Management Plan; GGHC SSM Credit 1.2: Site Management: Integrated Pest Management, Erosion Control & Landscape Management Plan; GGHC SSM Credit 3: Stormwater Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Develop a facility wide policy governing the controlled and secure outdoor storage of hazardous chemicals and fuels, both for incoming deliveries and outgoing waste products.
- Utilize double wall fuel supply pipe to prevent unintentional spills and leakage from contaminating aquifers and stormwater.

#### Resources

Environmental Health and Safety Online. Hazardous Materials Guide for First Responders - General Approach to a Hazmat Incident, <http://www.ehso.com/EmergencyResponseOLevel.htm>

For guidance on Underground Storage Tanks visit the facility's State Administrative Code.

U.S. Code of Federal Regulations (CFR). 40 CFR 112: *Spill Prevention Control and Countermeasures- Leaks and Spills.*

U.S. Code of Federal Regulations (CFR) 40 CFR 122.26: *National Pollutant Discharge Elimination System (NPDES)-Stormwater Discharges,*  
[http://a257.g.akamaitech.net/7/257/2422/06sept20031800/edocket.access.gpo.gov/cfr\\_2003/julqtr/pdf/40cfr122.26.pdf](http://a257.g.akamaitech.net/7/257/2422/06sept20031800/edocket.access.gpo.gov/cfr_2003/julqtr/pdf/40cfr122.26.pdf)

## CM Prerequisite 3 continued

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### Community Contaminant Reduction: **Leaks & Spills**

U.S. Code of Federal Regulations (CFR) 40 CFR 403: *General Pretreatment Regulations for Existing and New Sources of Pollution*, [http://www.access.gpo.gov/nara/cfr/waisidx\\_03/40cfr403\\_03.html](http://www.access.gpo.gov/nara/cfr/waisidx_03/40cfr403_03.html)

U.S. Code of Federal Regulations (CFR) 40 CFR 280, 281 and 282.50-282.105. *Underground Storage Tanks*, <http://www.epa.gov/OUST/fedlaws/cfr.htm#40cfr302.4>

U.S. Department of Transportation. *Hazardous Materials Transportation Act*. Details regulations, emergency response, training and shipment requirements for transporting hazardous materials. Requirements for packaging, labeling and transporting infectious substances, 49 CFR 171-180, <http://www.myregs.com/dotrspa/>

U.S. Environmental Protection Agency (EPA), Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (Document No. EPA-840-B-92-002), <http://www.epa.gov/OW>

U.S. Environmental Protection Agency (EPA), Stormwater Management Guidance. [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=6](http://cfpub.epa.gov/npdes/home.cfm?program_id=6)

U.S. Environmental Protection Agency (EPA), Healthcare Sector Notebook. Profile of the Healthcare Industry - Including Hospitals, Physicians Offices, Dental Offices, Nursing Homes, etc., <http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/health.html>

1 point

**CM Credit 1.1**

Indoor Chemical Contaminant Reduction: **Sanitary Sewer**

**Intent**

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

**Health Issues**

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

**Credit Goals**

- Develop and implement a policy banning discharge of chemicals into the sanitary sewer without express permission and acknowledgment of the Hazardous Materials Officer or other staff member responsible for regulatory compliance. Report to local Publicly Owned Treatment Works (POTW) on all planned chemical releases to wastewater to ensure regulatory compliance.
- Test wastewater discharge at minimum quarterly to ensure that nitrates, mercury and other heavy metals, cyanide and other toxic substances are not entering the sanitary sewer at concentrations greater than federal, state or locally regulated levels. Mercury shall be eliminated from wastewater down to 30 parts per trillion per EPA Method 1631E (40 CFR Part 136). Ensure that chemical and biological oxygen demand levels meet local publicly-owned treatment works (POTW) standards.

## CM Credit 1.1 continued

### Indoor Chemical Contaminant Reduction: **Sanitary Sewer**

#### Suggested Documentation

- Compile and annually review the policy banning discharge of chemicals into the sanitary sewer in accordance with Credit Goals.
- Compile and annually review documentation verifying that quarterly tests of wastewater discharge meet the standards outlined in Credit Goals.

#### Reference Standards

U.S. Code of Federal Regulations. 40 CFR Part 136—Guidelines Establishing Test Procedures for the Analysis of Pollutants,  
[http://a257.g.akamaitech.net/7/257/2422/05dec20031700/edocket.access.gpo.gov/cfr\\_2003/julqtr/pdf/40cfr136.3.pdf](http://a257.g.akamaitech.net/7/257/2422/05dec20031700/edocket.access.gpo.gov/cfr_2003/julqtr/pdf/40cfr136.3.pdf)

#### Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC ES Credit 1: Environmentally Preferable Cleaning; FS Credit 8: Chemical Management for Food Services; GGHC EP Prerequisite 1: Mercury Elimination; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewering authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Sources of toxic chemicals from health care facilities include infectious substances, laboratory discharge, building system operations, housekeeping (e.g. solvents and disinfectants), food services (e.g. soaps, chlorine), and diagnostic and treatment areas (e.g. glutaraldehyde, radioactive substances). Set up an onsite review with POTW to determine chemicals and substances of concern that may be entering wastewater, and ensure proper management techniques are in place.
- A hospital's main wastewater discharge flow may not warrant pre-treatment (except neutralization or radioactive decontamination). However, partial flows from hospital functional areas (e.g., laboratories, oncology, and pathology) should be carefully evaluated for opportunities to reduce discharge and improve quality.

## CM Credit 1.1 continued

### Indoor Chemical Contaminant Reduction: **Sanitary Sewer**

- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments where possible.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.
- Avoid discharging concentrates of disinfecting and cleaning agents— particularly chlorine, phenols, quaternary ammonium compounds, and products containing nonylphenol (potentially estrogenic effect) and strong cleaning ingredients.

### Resources

Medical, Academic and Scientific Community Organization (MASCO), Boston, MA: Mercury Work Group, Types of Hospital Water, <http://www.masco.org/mercury/techid/types.html>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Replacing Mercury in Healthcare Facilities, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/hazmat/mercguide.html#step6>

1-3 points

**CM Credit 1.2-1.4****Indoor Chemical Contaminant Reduction:  
Hand Hygiene Products, Sterilization & High Level Disinfection****Intent**

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

**Health Issues**

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

**Credit Goals****CM Credit 1.2: Hand Hygiene Products (1 point)**

- In collaboration with the infection control committee, use the infection control risk analysis (ICRA) process to determine which areas of the facility may require the use of antimicrobial hand soaps. Avoid the use of hand soaps containing antimicrobials for any area not recommended by the ICRA process, as a mechanism to reduce the volume of antimicrobials entering the sanitary sewer and thus the environment. For hand soaps not containing antimicrobials, utilize selection criteria for hand soaps per GGHC ES Credit 1.1-1.2: Environmentally Preferable Cleaning: Policy Development and GGHC ES Credit 1.3-1.5: Environmentally Preferable Cleaning: Products & Materials.
- In addition to meeting environmental and efficacy criteria, ensure that hand hygiene products have a low irritancy potential, particularly when these products must be used multiple times per shift. To maximize acceptance of hand-hygiene products by health care providers, solicit input from these staff regarding the feel, fragrance, and skin tolerance of products under consideration.

Note: Alcohol-based hand sanitizers are excluded from this credit.

**CM Credit 1.3: Sterilization (1 point)**

- Replace the sterilant ethylene oxide (EtO) with safer alternatives for a minimum of 90% of equipment requiring sterilization.
- Where EtO must be used due to incompatibility or regulatory recommendations, ensure that reprocessing units are enclosed under negative pressurization and utilize local exhaust ventilation in accordance with OSHA Standard 29 CFR 1910.1047 and NIOSH "Current Intelligence Bulletin-52: Ethylene Oxide Sterilizers in Healthcare Facilities (1997, October 22)" and the CDC/HICPAC Disinfection and Sterilization Guidelines, 2008. Monitor exposure to ensure that the Threshold Limit Value (TLV – 15 min STEL) to the American Conference of Government Industrial Hygienists (ACGIH) and the OSHA Permissible Exposure Limit (PEL) of 1 ppm for an 8 hour time weighted average with a 5 ppm excursion level is never exceeded. In addition, meet state permitting requirements for use of EtO sterilizer reprocessing units.

## CM Credit 1.2-1.4 continued

### Indoor Chemical Contaminant Reduction: **Hand Hygiene Products, Sterilization & High Level Disinfection**

#### CM Credit 1.4: High Level Disinfection (1 point)

- Replace the high level disinfectant (HDL) glutaraldehyde with safer alternatives for a minimum of 90% of equipment requiring high level disinfection.
- Where glutaraldehyde must be used due to incompatibility or regulatory recommendations:
  - Ensure that enclosed reprocessing units limit the Threshold Limit Value (TLV – 15 min STEL) to the American Conference of Government Industrial Hygienists (ACGIH) threshold of 0.05 ppm or less, and use local exhaust ventilation (capture velocity of at least 100 feet per minute and at least 10 air exchanges per hour) per NIOSH's Glutaraldehyde: Occupational Hazards in Hospitals. Units must also operate in accordance with the CDC/HICPAC Disinfection and Sterilization Guidelines, 2008. Additionally, glutaraldehyde shall never be used or stored in a direct patient care area.
  - Replace manual disinfection with automatic machine washers/disinfectors to minimize staff exposure to liquid disinfectants.

#### Suggested Documentation

##### CM Credit 1.2

- Compile documentation of the results from the infection control risk analysis (ICRA) process determining which areas of the facility require the use of antimicrobial hand soaps.
- Document the program ensuring avoidance of hand soaps containing antimicrobials for any area not recommended by the ICRA process.
- Compile and annually review hand soap purchasing practices in accordance with Credit Goals.
- Document staff feedback on hand hygiene products in accordance with Credit Goals.

##### CM Credit 1.3

- Compile and annually update documentation demonstrating minimum 90% reduction of ethylene oxide in accordance with Credit Goals.
- In facilities where EtO continue in use, compile and annually review documentation verifying compliance with the reference standards safeguarding staff from exposure during sterilization procedures.

##### CM Credit 1.4

- Compile and annually update documentation demonstrating minimum 90% reduction of glutaraldehyde in accordance with Credit Goals.
- In facilities where glutaraldehyde continues in use, compile and annually review documentation verifying compliance with procedures safeguarding staff from exposure during disinfection procedures in accordance with Credit Goals.



## CM Credit 1.2-1.4 continued

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### Indoor Chemical Contaminant Reduction: **Hand Hygiene Products, Sterilization & High Level Disinfection**

#### Reference Standards

American Conference of Government Industrial Hygienists (ACGIH) Threshold Limit Value for Glutaraldehyde, <http://www.acgih.org>

American Society for Gastrointestinal Endoscopy, "Infection Control During Gastrointestinal Endoscopy: Guidelines for Clinical Application," ASGE Publication No. 1035, 1998. <http://www.asge.org/WorkArea/downloadasset.aspx?id=3382>

American Society for Gastrointestinal Endoscopy. "Multi-Society Guideline for Reprocessing Flexible Gastrointestinal Endoscopes." *Gastrointestinal Endoscopy*, 2003; 58: 1-8.

U.S. Centers for Disease Control and Prevention, CDC/HICPAC Disinfection and Sterilization Guidelines, 2008, <http://www.cdc.gov/ncidod/dhqp/sterile.html> (Note: This standard will become available in 2008.)

U.S. Department of Health Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH), "Current Intelligence Bulletin-52: Ethylene Oxide Sterilizers in Healthcare Facilities (1997, October 22)," [http://www.cdc.gov/niosh/89115\\_52.html#General%20Control%20Methods](http://www.cdc.gov/niosh/89115_52.html#General%20Control%20Methods)

U.S. Department of Health Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH), *Glutaraldehyde: Occupational Hazards in Hospitals*, <http://www.cdc.gov/niosh/pdfs/01-115.pdf>

U.S. Occupational Safety and Health Administration (OSHA), Standard 29 CFR 1910.1047 (Ethylene Oxide), [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10070](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10070)

#### Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC ES Credit 1: Environmentally Preferable Cleaning; FS Credit 8: Chemical Management for Food Services.*
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Alternatives to sterilant ethylene oxide (EtO) include other low temperature sterilization methods that include vaporized hydrogen peroxide, hydrogen peroxide-gas plasma, liquid peracetic acid, and ozone.
- Approach FDA, other regulating agencies, manufacturers and group purchasing organizations about creating and developing a registration system for approving safe use and effective alternatives to glutaraldehyde and ethylene oxide (ETO) and other high level disinfectants and sterilants.

## CM Credit 1.2-1.4 continued

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### Indoor Chemical Contaminant Reduction: **Hand Hygiene Products, Sterilization & High Level Disinfection**

#### Resources

American National Standards Institute. ANSI/AAMI ST58-1996, Safe Use and Handling of Glutaraldehyde-based Products in Healthcare Facilities, AAMI, 3330 Washington Blvd., Arlington, VA 22201.

American Society for Healthcare Environmental Services (ASHES), Practice Guidance, <http://www.ASHES.org>

Best Practices for the Safe Use of Glutaraldehyde in Health Care. OSHA Publication 3258, (2006), 261 KB PDF, <http://www.osha.gov/Publications/glutaraldehyde.pdf>

Centers for Disease Control and Prevention. Hand Hygiene in Healthcare Settings, 2002, <http://www.cdc.gov/nicdod/dhqp/index.html>

Centers for Disease Control and Prevention. Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006, <http://www.cdc.gov/nicdod/dhqp/index.html>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E)), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

U.S. Centers for Disease Control and Prevention, 2003 Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004, <http://www.cdc.gov/ncidod/hip/enviro/guide.htm>

U.S. Code of Federal Regulations. 29 CFR Part 1910.1000. Table Z-1 Limits for Air Contaminants, [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9992](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992)

U.S. Department of Health Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH), Glutaraldehyde Occupational Hazards in Hospitals. Publication No. 2001-115, (2001, May), <http://www.cdc.gov/niosh/2001-115.html>

U.S. Environmental Protection Agency (EPA), Antimicrobial Science Policies, Disinfectant Technical Science Section (DIS/TSS), <http://www.epa.gov/oppad001/sciencepolicy.htm>

U.S. Environmental Protection Agency (EPA), Selected EPA-Registered Disinfectants (EPA's Registered Sterilizers, Tuberculocides, and Antimicrobial Products Against Certain Human Public Health Bacteria and Viruses, <http://www.epa.gov/oppad001/chemregindex.htm>

U.S. Environmental Protection Agency (EPA), National Emission Standards for Hospital Ethylene Oxide Sterilizers, <http://www.epa.gov/fedrgstr/EPA-AIR/2007/December/Day-28/a25233.htm>

U.S. Environmental Protection Agency (EPA), Sanitizing Rinses (for previously cleaned food-contact surfaces), DIS/TSS-4 Jan 30, 1979, [http://www.epa.gov/oppad001/dis\\_tss\\_docs/dis-04.htm](http://www.epa.gov/oppad001/dis_tss_docs/dis-04.htm)

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants. OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses, [http://www.osha.gov/pls/oshaweb/owasrch.search\\_form?p\\_doc\\_type=PREAMBLES&p\\_toc\\_level=1&p\\_keyvalue=Air~Contaminants](http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air~Contaminants), [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=PREAMBLES&p\\_id=771](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=PREAMBLES&p_id=771)

## CM Credit 1.2-1.4 continued

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Indoor Chemical Contaminant Reduction:

### Hand Hygiene Products, Sterilization & High Level Disinfection

U.S. Occupational Safety and Health Administration (OSHA), Ethylene Oxide Gas,  
<http://www.osha.gov/SLTC/etools/hospital/central/central.html#ExposuretoEthyleneOxideGas>

U.S. Occupational Safety and Health Administration (OSHA), Use of Latex Surgical Exam Gloves for Protection Against Glutaraldehyde. OSHA Standard Interpretation, (1997, October 3).

World Health Organization (WHO), Hand hygiene guideline:  
[http://www.who.int/patientsafety/events/05/HH\\_en.pdf](http://www.who.int/patientsafety/events/05/HH_en.pdf)

1 point

**CM Credit 1.5**

Indoor Chemical Contaminant Reduction: **Laboratories**

**Intent**

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

**Health Issues**

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

**Credit Goals**

- Develop and implement a laboratory solvent reprocessing program for alcohols, xylene and formalin in the laboratory.
- Phase out use of mercury-containing fixatives, stains and laboratory equipment where safe and effective alternatives exist, as outlined in the Sustainable Hospital Project's "List of Mercury-free Alternatives in the Lab."
- Use automated laboratory equipment that maximizes sample throughput while minimizing sample size, reagent quantity, and waste streams. Utilize microscale chemistry to minimize use of lab chemicals and solvents where possible. Work with Environmental Health & Safety (EHS) personnel and wastewater authorities in developing an action plan.
- Use either local exhaust controls or other HVAC design element(s) that facilitate safe removal of chemical vapors, to minimize occupational exposure in laboratory per FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.

## CM Credit 1.5 continued

### Indoor Chemical Contaminant Reduction: **Laboratories**

#### Suggested Documentation

- Document volume of chemical solvents reprocessed, avoided purchase cost of new chemicals and avoided hazardous waste disposal calls in accordance with Credit Goals.
- Document and annually review mercury phase-out plan progress, including an inventory of alternative mercury-free fixatives, stains and laboratory equipment in use.
- Compile documentation and annually review progress in phasing in microscale chemistry in labs.
- Document and annually evaluate effectiveness of local exhaust controls or other HVAC design elements that facilitate safe removal of chemical vapors in accordance with Credit Goals.

#### Reference Standards

Sustainable Hospital Project, "List of Mercury-free Alternatives in the Lab."  
[http://www.sustainablehospitals.org/cgi-bin/DB\\_Report.cgi?px=W&rpt=Cat&id=18](http://www.sustainablehospitals.org/cgi-bin/DB_Report.cgi?px=W&rpt=Cat&id=18)

#### Potential Technologies & Strategies

- **Credit Synergies:** Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 1: Mercury Elimination; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.
- For more comprehensive guidance on environmental strategies for laboratories, refer to Labs for the 21<sup>st</sup> Century, <http://www.labs21century.gov>.
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.

## CM Credit 1.5 continued

### Indoor Chemical Contaminant Reduction: **Laboratories**

- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewering authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments where possible.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.

### Resources

Labs for the 21<sup>st</sup> Century, <http://www.labs21century.gov>

Minnesota Technical Assistance Program (MnTAP), fact sheet on formalin recovery, <http://www.mntap.umn.edu/health/20-Formalin.htm>

National Microscale Chemistry Center, <http://www.microscale.org/about.asp>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Replacing Mercury in Healthcare Facilities, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/hazmat/mercguid.html#step6>

U.S Code of Federal Regulations. 29 CFR Part 1910.1000. Table Z-1 Limits for Air Contaminants, [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9992](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992)

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants., OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses, [http://www.osha.gov/pls/oshaweb/owasrch.search\\_form?p\\_doc\\_type=PREAMBLES&p\\_toc\\_level=1&p\\_keyvalue=Air-Contaminants](http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air-Contaminants), [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=PREAMBLES&p\\_id=771](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=PREAMBLES&p_id=771). OSHA Standard Interpretation, (1997, October 3).

U.S. Environmental Protection Agency (EPA), SARA Title III: the Emergency Planning and Community Right-to-Know Act (EPCRA), [http://www.epa.gov/Region8/toxics\\_pesticides/epcra/epcra.html](http://www.epa.gov/Region8/toxics_pesticides/epcra/epcra.html)

1 point

**CM Credit 1.6**

**Indoor Chemical Contaminant Reduction: Radiology**

**Intent**

Reduce and eliminate the use and improper disposal of chemical hazards and toxic materials within the health care facility to safeguard the health of building occupants.

**Health Issues**

The health of building occupants and the health of the local ecosystem can be directly impacted by the chemicals and materials selected for use in clinical and facility operations. Chemical hazards and toxic materials of concern found within the health care environment include heavy metals like mercury, lead, silver and cadmium; sterilants; disinfectants and cleaning products; pesticides; laboratory solvents; laboratory fixatives and stains; and hazardous pharmaceuticals; among others. Some of these are classified as hazardous waste and some are not. It is incumbent upon the health care facility to develop and implement a protocol for the handling, management and disposal of chemical and material hazards to protect the health of patients, staff and the community.

**Credit Goals**

- Recycle silver and used lead aprons from Radiology.
- Ensure that fixer solution from x-ray technology (where not digital) is properly captured and disposed of. Do not dispose to sanitary sewer unless tested for heavy metal content.
- Use either local exhaust controls or other HVAC design element(s) that facilitates safe removal of chemical vapors, to minimize occupational exposure in radiology per FM Credit 6: IAQ Management: Maintaining Indoor Air Quality.



## CM Credit 1.6 continued

### Indoor Chemical Contaminant Reduction: Radiology

#### Suggested Documentation

- ❑ Document amounts of silver and lead recycled from Radiology, and final disposition of all fixer solution.
- ❑ Document and annually evaluate effectiveness of local exhaust controls or other HVAC design elements that facilitate safe removal of chemical vapors in accordance with Credit Goals.

#### Reference Standards

There are no reference standards for this credit.

#### Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 5.4: Performance Measurement: Emissions Reduction Reporting; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 2: Pharmaceutical Minimization, Management & Disposal; GGHC WM Credit 2: Regulated Medical Waste Reduction; GGHC EP Prerequisite 1: Mercury Elimination; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- For more comprehensive guidance on environmental strategies for laboratories, refer to Labs for the 21<sup>st</sup> Century, <http://www.labs21century.gov>.
- Emphasize source reduction of all hazardous chemicals. Purchase non-hazardous chemicals, and/or determine opportunities to reduce highly hazardous materials.
- Minimize chemical discharges down the drain. In principle, it should always be assumed that waste materials, until properly evaluated, should not be disposed of in the wastewater system. To make that determination, document formal hazardous waste determinations, check with local POTW (sewering authority) for permit to discharge and ensure proper permits are in order for discharge of all hazardous chemicals.
- Minimize use of hazardous materials in relationship to testing and experimental volume.
- Take steps to prevent accidental discharges to drain, such as raised lips around cup sinks and working over trays.
- Use non-chemical water treatments where possible.
- Hospitals are one of the few known sources of the heavy metal gadolinium (from nuclear magnetic resonance imaging) in wastewater. Little is known about gadolinium's environmental impact. Ensure proper disposal of gadolinium to mitigate the potential health and environmental burdens associated with its release.

## CM Credit 1.6 continued

### Indoor Chemical Contaminant Reduction: **Radiology**

#### Resources

Labs for the 21<sup>st</sup> Century, <http://www.labs21century.gov>

Minnesota Technical Assistance Program (MnTAP), fact sheet on formalin recovery, <http://www.mntap.umn.edu/health/20-Formalin.htm>

National Microscale Chemistry Center, <http://www.microscale.org/about.asp>

Practice Greenhealth (formerly Hospitals for a Healthy Environment or (H2E), has published materials to assist in the development of a chemical minimization plan, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/tools/chemplan.htm>.

Practice Greenhealth (formerly Hospitals for a Healthy Environment or H2E), Replacing Mercury in Healthcare Facilities, <http://www.practicegreenhealth.org> or <http://www.h2e-online.org/hazmat/mercguid.html#step6>

U.S. Code of Federal Regulations. 29 CFR Part 1910.1000. Table Z-1 Limits for Air Contaminants, [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9992](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992)

U.S. Environmental Protection Agency (EPA) SARA Title III: the Emergency Planning and Community Right-to-Know Act (EPCRA), [http://www.epa.gov/Region8/toxics\\_pesticides/epcra/epcra.html](http://www.epa.gov/Region8/toxics_pesticides/epcra/epcra.html)

U.S. Occupational Safety and Health Administration (OSHA), Air Contaminants., OSHA Preamble to Final Rules, (1989). Section 7 - VII. Feasibility and Regulatory Analyses, [http://www.osha.gov/pls/oshaweb/owasrch.search\\_form?p\\_doc\\_type=PREAMBLES&p\\_toc\\_level=1&p\\_keyvalue=Air~Contaminants](http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=PREAMBLES&p_toc_level=1&p_keyvalue=Air~Contaminants), [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=PREAMBLES&p\\_id=771](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=PREAMBLES&p_id=771). OSHA Standard Interpretation, (1997, October 3).

1-2 points

**CM Credit 2.1 & 2.2****Pharmaceutical Minimization, Management & Disposal****Intent**

Safeguard human and ecological health through minimization and proper management and disposal of pharmaceuticals and associated wastes.

**Health Issues**

The disposal of pharmaceuticals is governed by a complex web of regulations, many of which are outdated and ineffective in protecting human and ecosystem health. A study by the US Geological Survey found pharmaceutical residue in 80% of U.S. lakes, streams and rivers tested in 1999 and 2000, including estrogenic agents, anti-hypertensives, anti-depressants, anti-inflammatory agents, and anti-seizure medications. Moreover, many of these same medications have now been reported at low levels in the drinking water of several major U.S. cities. Scientists are still analyzing the impact of these and other chemicals on the health of the ecosystem and human health. . Many pharmaceuticals are disposed of through the solid waste stream from which they can leach into groundwater. Those disposed of through the sanitary sewer can contaminate surface and ultimately groundwater. Furthermore, wastewater treatment facilities in the U.S. are not designed to remove or destroy pharmaceutical wastes. Pharmaceuticals disposed of in the regulated medical waste stream can pose risks to environmental services staff, waste handlers at treatment facilities, and the environment. It is imperative that health care organizations both minimize pharmaceutical waste at its source and properly handle and manage these drugs at the end of their useful life.

**Credit Goals****CM Credit 2.1 (1 point)**

- Utilize a formulary review process to characterize hazardous pharmaceuticals per National Institute for Occupational Safety and Health (NIOSH) and U.S. EPA Resource Conservation and Recovery Act (RCRA) guidance and regulations.
- Based on the results of the formulary review, develop and implement a policy and program for the receipt, handling, storage, labeling, transport and end disposal of all pharmaceuticals, as well as staff education and training. Both policy and program should include at a minimum:
  - Proper characterization of all waste pharmaceuticals per the formulary review process.
  - Identification of proper specifications for pharmaceuticals that can be accepted for rebate/disposal through reverse distribution.
  - A comprehensive description of segregation practices for different classes of pharmaceuticals, including P-listed, U-listed and characteristic wastes per U.S. EPA Resource Conservation and Recovery Act (RCRA).
  - Segregation and management as hazardous waste of *all* bulk chemotherapy drug waste.
  - Proper compounding and handling procedures, including appropriate Personal Protective Equipment (PPE) for all drugs.
  - Evaluation and adoption of protective treatment and disposal options for all pharmaceuticals.
  - Proper management of any nuclear medicine formulation.

## CM Credit 2.1-2.2 continued

### Pharmaceutical Minimization, Management & Disposal

#### CM Credit 2.2 (1 point in addition to CM Credit 2.1)

- Minimize the generation of waste pharmaceuticals by implementing the following processes:
  - Improve inventory control processes.
  - Reduce the number of pharmaceuticals dispensed and returned that cannot be re-prescribed.
  - Substitute less toxic pharmaceuticals or mechanical methods for products containing toxic substances such as persistent bioaccumulative toxic chemicals (PBTs).
  - Minimize packaging and container weight of pharmaceutical products and formulations.
  - Minimize personal protective equipment waste. Mix chemicals in batches, minimize spills, and institute regular staff training.
- Institute best management practices for the handling and disposal of non-regulated pharmaceuticals that act as teratogens, mutagens, carcinogens, endocrine disruptors, reproductive and developmental toxicants or pose a threat to ecosystem health. *Note: Until new technologies have been developed and legalized, the best management practice for disposal of non-regulated pharmaceuticals is incineration with regulated medical waste. As a result, facilities should actively minimize pharmaceutical waste wherever possible.*
- Utilize stock rotation strategies to rotate pharmaceuticals close to the expiration date back into high-use areas such as crash carts or the pharmacy as a means of pharmaceutical waste minimization.
- Ensure all pharmaceutical samples are logged into the facility, and only allow those samples with an expiration of one year or longer.

*Note: An innovation point is available to facilities that ban all antibiotics and active pharmaceutical formulations from discharge into the sanitary sewer and develop and implement an education program for patients and staff on proper disposal methods for used and expired pharmaceuticals.*

#### Suggested Documentation

##### Credit 2.1

- Compile and annually review documentation of a formulary review process to characterize hazardous pharmaceuticals in accordance with Credit Goals.
- Compile and annually update the policy and program for the receipt, handling, storage, labeling, transport and end disposal of all pharmaceuticals and staff education and training, in accordance with Credit Goals.

##### Credit 2.2

- Compile and annually review the success of the pharmaceutical minimization program as outlined in the Credit Goals.
- Compile and annually update implementation of best management practices for non-regulated pharmaceuticals that act as teratogens, mutagens, carcinogens, endocrine disruptors, developmental toxicants or pose a threat to ecosystem health in accordance with Credit Goals.
- Collect and track data on volumes and kinds of pharmaceuticals generated in each department, stock rotation and corresponding cost data.
- Maintain a log of all pharmaceutical samples brought into facility.

## CM Credit 2.1-2.2 continued

### Pharmaceutical Minimization, Management & Disposal

#### Reference Standards

National Institute for Occupational Safety and Health (NIOSH). NIOSH Publication No. 2004-165, "Preventing Occupational Exposure to Antineoplastic and Other Hazardous Drugs in Health Care Settings," <http://www.cdc.gov/niosh/docs/2004-165/>

U.S. Environmental Protection Agency (EPA), Resource Conservation Recovery Act (RCRA), <http://www.epa.gov/rcraonline/>

#### Potential Technologies & Strategies

- **Credit Synergies:** *Coordinate implementation of this prerequisite in coordination with GGHC IO Prerequisite 1: Integrated Operations & Maintenance Process; GGHC FM Credit 6: IAQ Management: Maintaining Indoor Air Quality; GGHC CM Prerequisite 1: Polychlorinated Biphenyl (PCB) Removal and Asbestos-Containing Materials (ACM) Management; GGHC CM Prerequisite 2: Chemical Management Policy and Audit; GGHC CM Prerequisite 3: Community Contaminant Prevention: Leaks & Spills; GGHC CM Credit 1: Indoor Chemical Contaminant Prevention; GGHC WM Credit 2: Regulated Medical Waste Reduction; and, GGHC EP Credit 2: Toxicity Prevention in Purchasing.*
- Discontinue sewerage of all pharmaceuticals where possible and advocate updating state regulations to prohibit this practice.
- Examine all non-hazardous pharmaceutical waste and segregate it into dedicated containers for disposal at a regulated landfill permitted to accept non-hazardous pharmaceutical waste.
- Avoid uncontrolled disposal of mercury-containing drugs, diagnostic agents (e.g., Thiomersal®), disinfectants (e.g., Merbromin®, Mercurochrome® and Nitromersol®), and diuretic agents (e.g., mercurphyllin).
- Consider banning all pharmaceutical samples from the facility.

#### Resources

American Society of Health-System Pharmacists (ASHP). ASHP Technical Assistance Bulletin on Handling Cytotoxic and Hazardous Drugs [ASHP 1990]. An informed discussion of the dangers and safe handling procedures for hazardous drugs. [www.osha.gov/dts/tib/tib\\_data/tib20011221.pdf](http://www.osha.gov/dts/tib/tib_data/tib20011221.pdf)

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## CM Credit 2.1-2.2 continued

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