



Standard Guide for Environmental Compliance Performance Assessment¹

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INTRODUCTION

This guide provides a framework for the development of an environmental compliance assessment program. It integrates environmental compliance, environmental risk classification and business risk management for use in decision-making. It provides a flexible, technically defensible framework to prioritize environmental compliance and associated pollution prevention, with a wide applicability to a range of facilities and environmental pathways. The facilities that may find an environmental compliance performance assessment program useful and appropriate are domestic establishments that perform work for consumers, business, government and other organizations. These include public and commercial establishments, but they generally exclude individual households. This guide may not be appropriate where a primary manufacturing facility has already implemented a site-specific environmental management system (EMS). This guide could be used as a tool in conjunction with an EMS, to evaluate compliance and pollution prevention.

1. Scope

1.1 *Overview*—This guide is an organized collection of information and series of options for industry, regulators, auditors, consultants and the public, intended to measure compliance with environmental performance standards against established benchmarks. It focuses on compliance with air, water, waste prevention, waste management, and toxic reduction standards for facilities in the United States. While the guide does not recommend a specific course of action, it establishes a tiered framework of essential components, beginning with those standards where a deviation presents the greatest potential public health, environmental, and business risks. In each identified pathway, at each tier or step of analysis, the guide outlines ways to identify compliance options and reduce pollution in iterative steps. The goal in using the guide is to lower environmental, public health and business risks from Tiers 1 and 2 to Tiers 3 and 4, by evaluating the performance standards described in this guide. While this guide provides a simplified framework of explicit steps for users, a qualified professional should conduct detailed, site-specific risk analysis. This guide may act as a starting point for organizations with limited experience in systematic environmental assessment. As facilities develop their specific plan

framework, they will find that risk is weighted by more than just a few parameters. For each facility risk is the complex interaction among location, size, history, surrounding community and ecological zones.

1.2 *Differences Among Standards*—This guide focuses on compliance with environmental performance standards in the United States. As such it includes a unique, risk-based method to analyze specific groups of legal requirements, as well as risk reduction techniques, sometimes called “pollution prevention.”

1.2.1 Use of this guide provides a system to evaluate the relative priority of compliance and pollution prevention activities. Unlike environmental management systems, it provides a framework to triage critical issues, based on consideration of actual risk of harm to public health and the environment.

1.2.2 Environmental regulatory requirements in the United States are administered primarily by the United States Environmental Protection Agency (USEPA) and the parallel State and Local Agencies with similar regulatory authority. Certain other Federal regulatory agencies and State and local counterparts may also have legal requirements relating to environmental performance standards. Examples include the Departments of Transportation (DOT) and Agriculture (USDA) and the Occupational Safety and Health Administration (OSHA). Unlike certain international standards, this guide uses the major groups of environmental regulatory standards in the United States for air and water quality, waste management, release prevention, and toxic materials use reduction, in order to organize the compliance analysis framework.

1.2.3 This guide derives general information about regulatory requirements from common elements of Federal, State and

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local programs, including statutes, regulations, guidance and policies. Since agencies may have overlapping authorities and different emphasis for particular issues such as waste management, the user should consult the applicable program for detailed interpretation of specific requirements in a particular jurisdiction.

1.2.4 *Pollution prevention* is a specific term used in United States environmental compliance management programs. The term usually refers to source reduction actions. Unlike the term “prevention of pollution,” which is used in certain international environmental management standards, pollution prevention does not generally include end-of-pipe or top-of-stack control actions.

1.3 *Limitations of this Guide*—Given the variability of the different types of facilities that may wish to use this guide, and the existence of State and Local regulations that may impose requirements greater than those required by USEPA, it is not possible to address all the relevant standards that might apply to a particular facility. This guide uses generalized language and examples to guide the user. If it is not clear to the user how to apply standards to their specific circumstances, it is recommended that users seek assistance from qualified professionals. An Environmental Regulatory Compliance Audit, such as Practice E2107, may assist a facility with areas of non-compliance and potential liabilities. This can be a starting point for development of facility specific environmental compliance management programs.

2. Referenced Documents

2.1 ASTM Standards:²

E1526 Practice for Evaluating the Performance of Release Detection Systems for Underground Storage Tank Systems (Withdrawn 2002)³

E1609 Guide for Development and Implementation of a Pollution Prevention Program (Withdrawn 2010)³

E1990 Guide for Performing Evaluations of Underground Storage Tank Systems for Operational Conformance with 40 CFR, Part 280 Regulations

E2107 Practice for Environmental Regulatory Compliance Audits

F1127 Guide for Containment of Hazardous Material Spills by Emergency Response Personnel

2.2 International Standard:

ISO 14001:1996 Environmental Management Systems—Specification with Guidance for Use⁴

3. Terminology

3.1 Definitions:

3.1.1 *accumulation*—short term containment of a hazardous waste in the control of the person who generated such waste in

a manner which does not constitute disposal, which is in containers at or near the point of generation in the process, and which otherwise complies with Federal Regulations.

3.1.2 *air*—the natural, gaseous environmental medium contained in the troposphere that is shared in common and used for several purposes including breathing, cooling, combustion and as a sink for pollutants. The quality of this pathway is regulated through restrictions on emissions, controls and monitoring. Many programs require best or maximum available control technologies to restrict air emissions.

3.1.3 *approval*—any required license, permit, certificate, formal determination, registration, plan review, variance, exemption or other authorization. Regulatory agencies typically require such authorization to address releases, discharges, or disposal of material and certain business practices and activities.

3.1.4 *beneficial uses of water*—extraction or in place use of water for domestic purposes (for example, drinking, bathing, boating or fishing), or commercial, agricultural, or industrial purposes which will not harm public health or the environment.

3.1.5 *best management practices (BMPs)*—schedules of activities, prohibitions of practices, maintenance procedures, and other management practices that prevent or reduce the pollution of water. They include treatment goals, operating procedures, and practices to control plant site runoff, spillage, or leaks, of sludge, waste disposal, or drainage from raw material storage.

3.1.6 *CARB*—the California Air Resources Board is an organization that creates some state air quality standards, such as those which regulate petroleum storage tanks. These standards may or may not legally apply, depending upon the jurisdiction. The standards are useful in addressing many pollution prevention issues, especially in motor vehicle fuel dispensing.

3.1.7 *cargo tank motor vehicle*—as used in this standard, a truck that carries gasoline or other volatile hydrocarbon fuels in bulk, for delivery to dispensing stations.

3.1.8 *compliance assessment*—an evaluation of environmental regulatory requirements. The evaluation identifies and classifies requirements applicable to the individual facility, group of facilities or industry sector.

3.1.9 *criteria air pollutants*—a group of very common air pollutants regulated by EPA on the basis of criteria (information on health or environmental effects of pollution, or both). Criteria air pollutants are widely distributed all over the country. The six current criteria pollutants are Sulfur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Ozone (O₃), Carbon Monoxide (CO), Particulate Matter (PM₁₀) and Lead (Pb).

3.1.10 *entity*—a facility with regulatory requirements or potential requirements. The facility has a specific geographic location and owners and operators who may be public or private.

3.1.11 *environmental compliance benchmarks*—industry specific performance standards, which measure attainment of pollution control and prevention requirements.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

3.1.12 *environmental management system (EMS)*—an Environmental Management System (EMS) is a framework that helps a company achieve its environmental goals through consistent control of its operations. The assumption is that this increased control will improve the environmental performance of the company.

3.1.13 *environmental performance standards*—regulatory requirements, which, if violated, may result in enforcement by a regulatory agency.

3.1.14 *facility*—a location or building where regulated activity occurs.

3.1.15 *hazardous air pollutants (HAPs)*—EPA definition of certain chemical emissions regulated by the Federal Government.

3.1.16 *hazardous substance*—any material in whatever form which because of its quantity, concentration, or physical, chemical, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare or to the environment when improperly stored, treated, transported, disposed of, used or otherwise managed. Note that this term is further defined as a hazardous substance pursuant to CERCLA (42 USC §9601(14)), as interpreted by EPA regulations and the courts, and does not include petroleum.

3.1.17 *hazardous waste*—any discarded material, not exempted under Federal Regulations, which because of its quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in serious irreversible or incapacitating reversible illness or pose a substantial present or potential hazard to human health, safety, welfare or the environment when improperly treated, stored, transported, used, disposed of or otherwise managed. This definition varies from one jurisdiction to another and may or may not include waste petroleum.

3.1.18 *high priority violation*—contravention of a regulatory limitation, which, by its nature, concentration, extent or duration, warrants formal enforcement.

3.1.19 *media*—environmental pathways or locations through which pollution can travel or accumulate, or both. For example, air, water, or soil.

3.1.20 *pollution prevention “P2”*—the act of reducing or eliminating the use, release, or generation of a pollutant or potential pollutant through source reduction, recycling, reuse, reclamation, or modification of operating practices. It should be noted that ASTM’s definition of “pollution prevention,” as contained in Guide E1609, is different from the definition used by the Environmental Protection Agency. See, for example, 58 Fed. Reg. 6478 (Jan 29, 1993, Council on Environmental Quality), and 58 Fed. Reg.41,981 (Aug. 6, 1993, Executive Order).

3.1.21 *release prevention*—activities that reduce the risk of human and environmental exposure to petroleum or hazardous substances. In the United States, underground storage tank (UST) and toxic materials use reduction regulations are examples of such requirements.

3.1.22 *reportable quantity releases*—the concentration or amount of oil or hazardous materials, in or released to soil, groundwater, air or surface water which requires notification to the local, state or federal authority.

3.1.23 *self-certification*—a program designed for facilities to comply with a set of environmental performance standards in lieu of permitting or other direct approval. Certification is reviewed and can be renewed annually based on the results of reports from and multimedia inspections of the facility

3.1.24 *service facilities*—domestic establishments that perform work for consumers, businesses, governments, and other organizations. These include public and commercial establishments doing business, but excluding manufacturing and individual households.

3.1.25 *significant noncompliance*—contravention of a regulatory limitation on facility operations, which, by its nature, concentration, extent or duration, warrants enforcement.

3.1.26 *small business*—the federal government defines small businesses as facilities that have less than 100 full time equivalent employees. Some states define small businesses as facilities that have less than 10 full-time equivalent employees.

3.1.27 *storage*—the containment of hazardous waste for a temporary period in a manner which does not constitute disposal, at the end of which period, the hazardous waste will be used, treated, disposed of, transported or stored elsewhere.

3.1.28 *toxic air contaminants*—EPA has defined hazardous air pollutants (see 3.1.15) as chemicals that can cause serious health or environmental hazards. Various state programs may also define this term. The user should consult the local air pollution control agency for a specific definition of this term.

3.1.29 *Tier 1 performance standards*—the first step of analysis identifies standards that prevent or require a response to those imminent hazards which would likely cause actual harm to human health or the environment. Failure to meet these standards carries the highest liability for both harm to third parties, as well as government fines and penalties.

3.1.30 *Tier 2 performance standards*—the second step identifies significant, high priority requirements, approval for releases, emissions, discharges or potential releases to the environment. A facility should evaluate these benchmarks immediately after Tier 1, since they manage potential risk to human health and the environment. These requirements, if not met, are considered serious violations of environmental standards.

3.1.31 *Tier 3 performance standards*—operation, maintenance, repair and monitoring of controls on emissions, discharges, releases or prevention devices are some standards in step three. Regular checking and adjustment of air and water pollution control devices, management of hazardous waste storage areas and similar activities are the third set of benchmarks evaluated by the facility. These requirements, if not met, are considered serious because repeat violations of environmental regulations for pollution control systems could result in actual or increased releases to the environment.

3.1.32 *Tier 4 performance standards*—the final step to complete the analysis includes record keeping or other requirements that demonstrate the performance of controls on emissions, discharges, releases, and prevention devices. Retention and review of pollution management records may also help the facility analyze its opportunities for pollution prevention, a reduction or elimination of regulatory requirements and a reduction in costs to the facility.

3.1.33 *waste*—discarded solid or liquid materials (other than materials applied to a beneficial use that does not constitute sham recycling) that may require management controls consistent with federal, state or local regulations.

3.1.33.1 *Discussion*—Solid and hazardous waste require controls on handling, transport, storage treatment and disposal.

3.1.33.2 *Discussion*—Materials slated for recycling may be subject to state or local regulation. The user should verify rules that apply under solid waste, air and water regulations.

3.1.34 *water*—an environmental medium regulated through restrictions on drinking supplies, withdrawals for other purposes, waste discharges and alteration of wetlands.

3.1.35 *waters of the United States*—waters as defined by the United States Environmental Protection Agency (USEPA) in its rules at 40 CFR 122.2 and as construed by the Federal Judiciary.

4. Significance and Use

4.1 This guide may be used for environmental compliance performance assessment in the United States in a wide variety of applications and is not particularly limited to one type of user. The following groups of users may find the guide particularly helpful:

- 4.1.1 Small businesses or enterprises;
- 4.1.2 Service industries;
- 4.1.3 Federal, state or local facilities and regulators, including departments of health and fire departments;
- 4.1.4 Financial and insurance institutions;
- 4.1.5 Waste managers, including liquid and solid waste haulers, treatment, recycling, disposal and transfer;
- 4.1.6 Consultants, auditors, inspectors and compliance assistance personnel;
- 4.1.7 Educational facilities;
- 4.1.8 Property, buildings and grounds management, including landscaping;
- 4.1.9 Non-regulatory government agencies, such as the military; and
- 4.1.10 Specific industrial sectors such as dry cleaners, printers, photo processors, laboratories, health care, and vehicle fueling, maintenance and delivery.

4.2 This guide is intended as a first step in crafting simplified management goals for assessing compliance with a wide variety of multimedia environmental performance standards. The framework describes a process by which the user may categorize current waste management, air quality, water, and release prevention practices in order to manage the risks associated with noncompliance. The technique classifies common environmental performance standards into tiers based on relative risks to human health, the environment and business

operations. The tier classifications found in this guide reflect the general requirements of State, Federal and local compliance and enforcement programs. These authorities generally classify groups of similar environmental performance standards according to the significance of any noncompliance within each group of standards.

4.3 The guide helps the user to realize the benefits of environmental compliance. These benefits may include but not be limited to:

- 4.3.1 Ability to set priorities for environmental management activities;
- 4.3.2 Marketing environmental awareness and sensitivity;
- 4.3.3 Assessing compliance with permits and other requirements;
- 4.3.4 Risk management, underwriting; loss control and history; premiums and claims;
- 4.3.5 Liability assessment and qualifications for loans;
- 4.3.6 Standardization, consistency and certification of facility specific evaluations;
- 4.3.7 Educating employees, clients and customers;
- 4.3.8 Generating multi media and cross medium information;
- 4.3.9 Evaluating vendors; and
- 4.3.10 Reducing costs and preventing pollution.

4.4 Users may consider various benefits of environmental compliance performance assessment.

4.4.1 This guide is a basic primer on environmental compliance and may serve to introduce the subject for organizations unfamiliar with requirements.

4.4.2 Many government enforcement agencies, fiduciaries and business organizations publish environmental compliance records over the internet. The public will soon have the systematic ability to access environmental compliance information on individual businesses. Therefore, businesses need guidance on how to assess the nature and potential risks of environmental non-compliance, and a programmatic approach for reducing or eliminating those risks through pollution prevention and other proactive management systems.

4.4.3 Reduced operation and maintenance costs and paperwork may be realized through a tiered evaluation of environmental compliance and pollution prevention opportunities.

4.4.4 Compliance may be streamlined and simplified so that all levels in an organization may participate in environmental management.

4.4.5 Some enterprises may be more competitive in the marketplace with improved environmental compliance programs.

4.4.6 Setting priorities can allow planning and evaluation of new environmental requirements.

4.5 This guide establishes a framework of common, environmental risk management requirements in the United States and will allow the user to evaluate the potential level of risk from non-compliance. Compliance requirements would then be evaluated for pollution prevention opportunities in order to continually reduce the risks from non-compliance.

4.6 Noncompliance with Tier 1 Environmental Performance Standards represents the highest risk because Tier 1 Standards

prevent, mitigate or respond to imminent hazards for human health or the environment. Tier 2 Standards address areas of significant risk, where noncompliance could result in penalties, primarily for failure to obtain required approval for releases or modifications to the environment. Tier 3 Standards require operation and maintenance of approved controls on releases or modifications to the environment, where repeat noncompliance could represent a risk. Tier 4 Standards represent the lowest direct risk from noncompliance; however, they are still important for documenting environmental management, the details of the compliance record, environmental compliance costs and pollution prevention measurements.

5. Tiered Approach to Compliance Measurement

5.1 The essential principles of this guide are:

- 5.1.1 Environmental assessment by objective;
- 5.1.2 Compliance with requirements;
- 5.1.3 Pollution prevention;
- 5.1.4 First steps in environmental stewardship; and
- 5.1.5 Priority planning.

5.1.6 Over the years, environmental agencies have grouped statutory and regulatory requirements into classes. Both statutory and policy principles identify performance standards for environmental protection in classes.

5.1.6.1 Tier 1 Standards generally govern the prevention and response to direct, actual pollutant releases and modifications to the environment.

5.1.6.2 Tier 2 Standards ensure the appropriate approvals are in place for existing releases of pollutants to the environment or for modifications that require controls. Significant releases or modifications above approved levels are included in Tier 2 Standards.

5.1.6.3 Tier 3 Standards encompass the operation, maintenance and monitoring of source control systems and reporting for environmental pollutants or environmental modifications. Releases or modifications above approved levels, but which are of low concentration and duration, may be grouped in Tier 3, for corrective action in operation and maintenance.

5.1.6.4 Tier 4 standards document pollution control management and management of environmental records.

NOTE 1—Recordkeeping violations are the most frequently cited violation by federal, state, and local regulatory agencies.

5.2 Facilities should focus on environmental performance standards in a systematic way. The guiding principle for most compliance programs is pollution prevention. By evaluating and implementing pollution prevention steps for each class of standards, facilities will reduce both costs and impacts on the environment. Tier 1 and 2 standards generally show the greatest pollution prevention opportunities. In many cases, pollution prevention may reduce or eliminate the risks and economic and environmental impacts addressed by the environmental performance standards described as follows.

5.3 The tiered compliance and pollution prevention analysis is shown in Fig. 1. This is an iterative process that first identifies the highest priority environmental performance standards in all media. Next, the user evaluates Tier 1 standards for pollution prevention opportunities to eliminate or reduce the

risk of non-compliance. The user evaluates all standards in this iterative fashion until all requirements are addressed at all tiers of analysis.

5.4 Tier 1 Standards generally require the following:

5.4.1 Prevent direct release of pollutants to the environment and prevent harm to public health;

5.4.2 Respond promptly to actual risks from releases or modifications to the environment; and

5.4.3 Promptly report all accidental, unpermitted releases and discharges of hazardous waste and materials.

5.5 Tier 1 Standards highlight methods by which actual or potential releases, emissions, or discharges of chemicals can be prevented or which require a response. Table 1 classifies standards according to the environmental concern: air quality; wastewater; waste; and release prevention. Tier 1 Standards are designed to help a facility manage the actual or potential threat a release may pose to human or environmental health. Due to this risk management and minimization aspect of the standards, they should be the first standards evaluated and complied with by a particular facility. Compliance with these standards not only mitigates risk, but also facilitates compliance with standards in subsequent tiers of analysis. Noncompliance with these standards is considered a serious violation and may be grounds for higher-level enforcement. Prompt action to comply with Tier 1 Standards can minimize high costs and subsequent liability.

5.5.1 *Air Quality Tier 1 Standards*—Air Quality Tier 1 Standards are designed to control the emission of criteria air pollutants, HAPs and emissions of other regulated substances into the air. For example, standards may regulate emission of volatile organic compounds, oxides of nitrogen and benzene. These standards require prompt response, including reporting and public notification, for unauthorized discharge of air contaminants that could pose a potential public health risk. In some cases Tier 1 standards require emergency planning and evaluation of potential off-site consequences for extremely hazardous substances.

5.5.2 *Water Quality Tier 1 Standards*—Industrial Wastewater Tier 1 standards are designed to prevent pollutants in wastewater from entering surface or groundwater at concentrations that exceed applicable water quality standards, are likely to cause acute aquatic toxicity or which impair beneficial uses. For example, permits and standards may regulate discharge of total dissolved solids, metals, flammable and corrosive liquids, or water above a certain temperature or volume. Prompt response to unauthorized discharge of wastewater into surface or groundwater, or slug discharges to municipal sewers, that could pose a potential threat to public health or the environment and public notification are considered “front line” requirements. Other regulations cover the withdrawal volume and quality of irrigation or drinking water.

5.5.3 *Solid and Hazardous Waste Tier 1 Standards*—Solid and Hazardous Waste Tier 1 Standards are designed to prevent wastes from contaminating environmental media, and include release prevention criteria. Generally, unpermitted releases of hazardous substances, in amounts equal to or greater than the reportable quantity, require prompt notification to government agencies. Most jurisdictions also require Tier 1 release

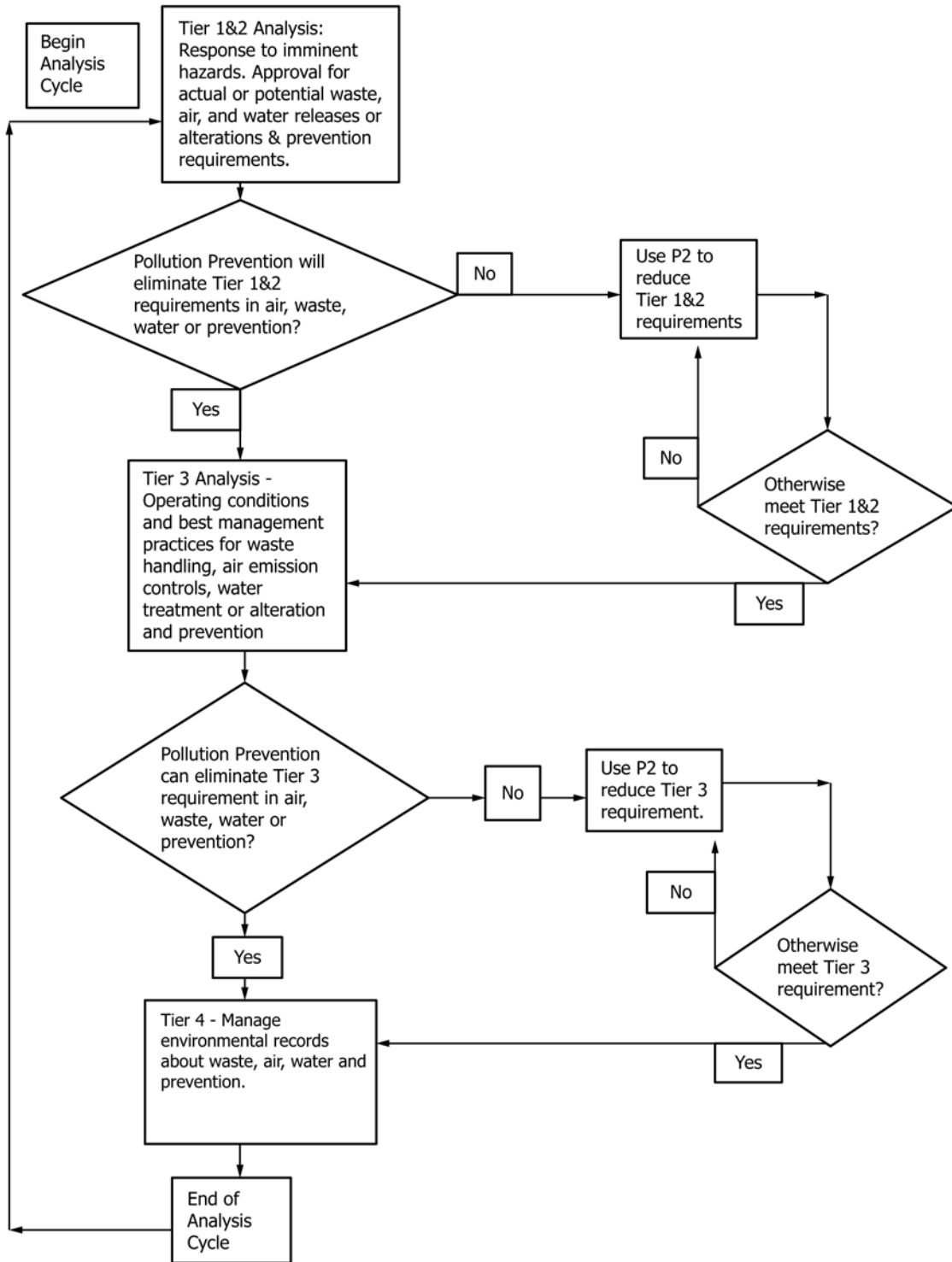


FIG. 1 Sample Flow Chart for Compliance Analysis

prevention, including containment for underground and above-ground storage tanks holding petroleum products and hazardous substances. Tier 1 standards require prompt response to actual releases of petroleum and hazardous substances in order to minimize environmental and public health impacts by implementation of contingency plans, commitment of resources and implementation of emergency response operations.

5.6 Tier 2 standards specify the approval required for certain types of releases or modifications to the environment.

5.6.1 Obtain required approvals for releases, discharges, emissions or disposal of material into the environment, or modification of the environment.

5.6.2 Meet technical standards or limitations that are conditions of a required approval.

TABLE 1 Sample Classification of Performance Standards

Medium or Program	Tier 1 Preventing and responding to actual releases, emissions, discharges or alterations	Tier 2 Required permits and approvals for releases or alterations to the environment	Tier 3 Operating conditions and best management practices	Tier 4 Managing environmental records
Waste	Reporting and response to a hazardous waste or material release.	Obtaining required approval for release or disposal of material into the environment. Required approval for treatment, storage, management, transport, receipt or delivery of wastes. Meeting conditions and limits of required approvals.	Identify, label and mark wastes. Waste sampling and analysis. Maintain storage areas and vehicles. Complete waste manifests in accordance with Federal hazardous materials transportation regulations.	Technical completeness and retention of records. Written documentation of required notifications. Timely reporting. Financial audits.
Air	Reporting and response to excess air emissions.	Approval for emissions, detection and conditions within limits of approval. Approved installation of emission monitoring devices.	Inspections and reports of pollution control equipment, report compliance status. Emission testing and monitoring. Report excess emissions. Water quality discharge reports. Recording conditions on wetlands work. Treatment plant operator licensing. Correct sampling and monitoring procedures. Routine water quality reports. Pretreatment preventative maintenance.	Record keeping, manuals and test result retention. Document management. Timely reporting of emissions.
Water	Reporting and response to an actual unpermitted release or water supply contamination incident, including notification to the public.	Required approval for water resource activity such as a discharge, filling, drinking water analysis or withdrawal. Maintaining conditions within approved limits. Reporting discharge above approved limits. Approval for public, community or industrial water supplies.	Measures to reduce potential for harm or risk. Toxic use reduction and documentation. Maintenance of vapor recovery and drainage systems. Tank maintenance.	Registering wetlands work. Retaining monitoring results for discharges and water supply.
Prevention	Reporting and response to releases of hazardous materials, such as petroleum. Restoration of containment following an actual release. Response to petroleum vapor emissions.	Required approval for storage of petroleum or hazardous materials. Installation of secondary containment and alarm systems for air and hazardous materials storage. Disclosure of hazardous materials. Approvals for vapor recovery and drainage systems.		Toxic use reduction cost and alternatives analysis. Records on installation and maintenance of vapor recovery, drainage and tank systems.

5.6.3 Prevent unauthorized emissions or discharges.

5.6.4 Obtain permits, licenses or approvals required for engaging in a regulated business or activity.

5.6.5 Maintain necessary structural, engineering, operational and management controls to prevent, mitigate and respond to releases of petroleum products and hazardous substances.

5.7 Tier 2 Standards:

5.7.1 *Air Quality Tier 2 Standards*—Equipment that emits air contaminants generally requires a permit prior to operating. For example, permits for combustion equipment may specify nitrogen oxides (NOX), volatile organic compounds (VOC), carbon monoxide (CO) and particulate matter (PM₁₀) emission limits. Some regulatory agencies may waive certain permitting requirements if the facility purchases equipment that the manufacturer has certified will meet certain emission limits, and this equipment is listed on a regulatory agency pre-certification list. For facilities using VOCs, the standards may specify the VOC content of manufacturing materials, storage of VOC-containing materials in closed containers, recovery of VOC emissions and control of leaks from process equipment using VOC-containing materials. Standards may also describe emission control equipment that should be in place to limit emissions to allowable levels. Methods for controlling fugitive dust may be specified for construction sites. Filing of a Risk Management Plan may be required for storage of extremely hazardous substances above threshold quantities (that is,

ammonia, chlorine) pursuant to Federal Clean Air Act or equivalent state regulation requirements.

5.7.2 *Water Quality Tier 2 Standards*—Facilities should obtain the appropriate permits prior to discharge of wastewater to the environment. For example, discharge to a Publicly Owned Treatment Works (POTW) generally requires an Industrial Wastewater Permit. Discharge to waters of the United States generally requires a National Pollution Discharge Elimination System (NPDES) permit. A permit may also be required for discharge of wastewater to land. Discharge limits of certain key surface and groundwater pollutants are specified by the standards. Additionally, general and specific prohibitions are outlined. If wastewater is stored onsite prior to offsite disposal, wastewater should be stored in aboveground storage tanks or Department of Transportation (DOT) approved containers that are in good condition in a secure location. Withdrawal of water for drinking or irrigation generally requires a permit from the appropriate regulatory agency.

5.7.3 Hazardous and Solid Waste Tier 2 Standards:

5.7.3.1 Facilities may be required to obtain both State and USEPA generator ID numbers if they generate hazardous waste. These ID numbers are site specific and correspond to a generating status of the facility.

5.7.3.2 Depending upon the jurisdiction, hazardous waste generators are generally classified into the following three groups, depending on the quantity of hazardous waste generated: conditionally exempt small quantity generators

(CESQG), small quantity generators (SQG) and large quantity generators (LQG). If the facility generates more waste than specified by their status, they are required to meet additional requirements and may be required to notify the appropriate regulatory agency.

5.7.3.3 Generators shall properly classify and segregate hazardous waste from non-hazardous waste to minimize the quantity of hazardous waste generated. Certain incompatible hazardous substances shall also be segregated to avoid possible reaction.

5.7.3.4 Wastes shall be kept in containers that are in good physical condition and are constructed of material appropriate for the waste being stored.

5.7.3.5 Most jurisdictions have some Tier 2 requirements for managing solid waste.

5.7.3.6 Filing plans with the Local Emergency Planning Committee is generally required for the storage of hazardous substances above certain threshold quantities, including contingency plans for responses to releases, pursuant to SARA Title III or equivalent state regulations.

5.7.3.7 Although licenses or permits are generally required for storage, transfer, treatment or disposal of hazardous waste, generators are generally authorized to accumulate hazardous waste for a limited time, below specified volumes and at specified locations without a specific permit. For example, 90 days is the usual time limitation for generator storage of hazardous waste without a specific license.

5.7.3.8 Standards may also apply for the proper management of universal or special wastes such as used oil and oil filters, asbestos-containing material, fluorescent lights, etc.

5.8 Tier 3 Performance Standards are concerned with the operation and maintenance of pollution control and monitoring equipment and the management of hazardous or other waste accumulation areas. They usually require notification of excess emissions or discharges over permitted amounts, except for those instances where immediate reporting is required (Tier 1 Standards). Tier 3 Standards also set timelines for monitoring and testing of equipment, accumulation areas, and potential physical points of release. These standards ensure that approved release control strategies, outlined in Tier 2, do not fail and that programmatic environmental protection goals are met. Accordingly, Tier 3 Standards are an important step towards compliance. Noncompliance with these standards may be serious because they often make up the bulk of repeat violations of a facility. Repeat violations could potentially lead to actual or increased releases to the environment. Tier 3 Standards generally require the following:

5.8.1 Compliance with operating conditions or prescribed best management practices to prevent actual or potential harm to public health, safety, or the environment, as required by statute, regulation, license, permit or other approval.

5.8.2 Reporting of releases, disposal or discharges of pollutants to the environment not otherwise required to be immediately reported, when required by statute, regulation, or license. Reportable quantity releases are addressed in Tier 1 Standards.

5.8.3 Maintain requirements, such as monitoring systems, designed to detect potential threats to public health, safety, welfare and the environment.

5.8.4 Meet essential statutory or regulatory program goals, such as toxic materials use reduction.

5.9 Tier 3 Standards:

5.9.1 *Air Quality Tier 3 Standards*—Air Quality Tier 3 Standards address monitoring of potential physical points of release. Examples include periodically testing the performance of vapor control systems, periodic stack testing of combustion equipment and implementation of Leak Detection and Repair Plans. Periodic stack testing is generally conducted by a third party source testing company, and may be witnessed by a regulatory agency representative. If periodic leak detection monitoring is required for manufacturing equipment, these inspections should be conducted with the proper equipment as prescribed by regulatory agency and industry standards. If leaks are detected, repair is generally required within 24 h discovery of the leak. If this is not possible, repairs should be made within the timeframes specified by the regulations or a variance should be sought. Regulations typically allow repair of certain leaks associated with critical process equipment to be delayed until the next turnaround. These types of exceptions are generally covered in the Leak Detection and Repair plan. Good maintenance practices are also suggested to minimize the occurrence of leaks associated with standard equipment use.

5.9.2 *Water Tier 3 Standards*—Wastewater Tier 3 standards address requirements for wastewater tanks, discharges, pollution control equipment, and certain kinds of monitoring equipment for secondary standards not directly related to protecting public health. Examples would be routine monitoring of wastewater discharged to POTWs or NPDES discharge monitoring to confirm compliance with permit limits. Some reporting standards for water supplies may be included in this group. Regular monitoring of drinking water supplies is usually required for certain primary quality indicators, and time intervals required for testing may be specified.

5.9.3 Hazardous Waste Tier 3 Standards address the maintenance of waste storage and accumulation areas and the facility's emergency preparedness.

5.9.3.1 Accumulation areas shall be clearly marked, shall be in or near the area where the waste is generated and shall have no more than 55 gal of waste.

5.9.3.2 Storage areas shall be secure, labeled, have sign and floor markers, be separated from other areas of activity, and have clearly defined emergency numbers and procedures. Containers shall be labeled and storage of any waste must be less than 90 days unless the facility has a specific license or permit authorizing longer storage, or the facility is conditionally exempt because it is a very small quantity generator.

5.9.3.3 Containers in hazardous waste storage areas shall be inspected weekly using the inspection requirements found in Federal hazardous waste regulations. Containers that hold hazardous waste shall be compliant with Federal hazardous material transportation requirements. The containers shall be labeled with the words "hazardous waste," the contents of the container, the hazard(s) associated with the waste, and the accumulation start date. Containers shall be kept sealed and

under the control of the operator unless waste is being added or removed. Once the container(s) is/are ready for shipment, the appropriate Uniform Waste Manifest shall be signed by the generator. The material shall then be shipped by a licensed waste transporter to a facility permitted to accept that waste stream.

5.9.3.4 Facilities shall also have an Emergency Contingency Plan. This plan should include training for employees in the handling of waste and spill response. One employee should be designated as an emergency coordinator. Communication should also be established between the facility and local emergency agencies.

5.9.3.5 Tanks and piping shall be located in a secure area. If underground or aboveground storage tanks are used for storage of petroleum products or hazardous substances, they shall be in good physical condition and constructed of material appropriate for the material being stored. Underground tanks and piping shall not be placed below the water table, and shall have secondary containment or leak detection systems, or both, as specified by regulations or permit conditions, or both.

5.10 Tier 4 Standards address documentation and reporting of operational information (except for releases, disposal or discharges—see previous tiers), including keeping timely and accurate records. These records help Local, State and Federal agencies ensure that facilities are acting in compliance with their certifications or permits. Analysis of records may also help a facility pinpoint opportunities for waste and cost reduction as well as pollution prevention. Facilities should maintain operating manuals and design specifications of both their manufacturing and pollution control equipment. This ensures that the facility is knowledgeable in the proper operation and repair of their equipment. Most records should be kept on the facility’s premises for a minimum of three years and many programs recommend record retention for longer periods for inspection and auditing purposes.

5.10.1 *Air Quality Tier 4 Standards*—Tier 4 Standards address record keeping required by air quality regulations or permit conditions. One example would be maintaining tank throughput records and vapor pressure measurements for aboveground storage tanks holding liquids containing volatile

organic compounds. Another example would be maintaining component leak detection and repair logs.

5.10.2 *Water Quality Tier 4 Standards*—Tier 4 Standards address recording required by wastewater discharge permits. Examples could include keeping monitoring equipment maintenance and calibration logs and logs associated with underground storage tank (UST) leak detection systems. Secondary drinking water standards may require monitoring for certain non-health related parameters for aesthetics such as odor or color. Drinking water withdrawal sources should be documented by keeping records about volume, operations, water quality and service information.

5.10.3 *Solid and Hazardous Waste Tier 4 Standards* address record keeping required by waste management regulations. Examples could include maintaining purchase records and Material Safety Data Sheets (MSDSs) to corroborate generator status and records of manifests for the offsite transport of hazardous and solid waste to document that the generator properly disposed of such waste.

5.11 *Prevention Performance Standards:*

5.11.1 Some facilities may go through one additional step towards the development of an environmental compliance management system by looking at “prevention” requirements. Prevention requirements are typically phrased as vapor recovery, drainage, storage tank and toxic use reduction requirements and may be mandatory in some jurisdictions.

5.11.2 Vehicle fueling and maintenance facilities in the United States, for example, are subject to requirements that are designed to prevent leakage of petroleum products from underground storage tanks (USTs) and piping. The user should consult the following standards for more information: Practice [E1526](#), and Guide [E1990](#). [Appendix X3](#) gives some example prevention requirements for vehicle fueling and maintenance facilities.

5.11.3 Facilities that are required to report under such requirements may find it helpful to organize their preventative actions and reporting requirements into a systematic tool such as an environmental management system. By conducting this additional prevention analysis, facilities can incorporate a more rigorous system of pollution prevention into their environmental compliance program beyond what is suggested in this guide.

APPENDIXES

(Nonmandatory Information)

X1. EXAMPLE INTERNET RESOURCES FOR ENVIRONMENTAL COMPLIANCE AND POLLUTION PREVENTION

X1.1 *Caveat:*

X1.1.1 The internet web citations below are current as of November 1, 2005. They are considered examples only and the user should consult the most recent information available about a particular standard or program. This is a limited list of sites that may provide the user with a starting point for planning Environmental Management Systems and other compliance and pollution prevention activities.

X1.2 *Environmental Management System Resources:*

X1.2.1 ISO14000: <http://www.iso.ch/iso/en/ISOOnline.frontpage>; <http://www.quality.co.uk/iso14000.htm>

X1.2.2 Responsible Care Codes of Management Practices: <http://www.responsiblecare-us.com/>

X1.2.3 EPA pilot program for Colleges and Universities: <http://www.epa.gov/region1/assistance/univ/index.html>

X1.2.4 Public Entity Environmental Management System Resource Center: <http://www.peercenter.net/>

X1.2.5 Research Triangle Institute EMS Plus: <http://ems.rti.org>

X1.2.6 Waltham Public Schools EMS: <http://www.city.waltham.ma.us/SCHOOL/WebPage/EMS/EM.htm>

X1.2.7 EMAS—Eco-Management and Audit Scheme: <http://europa.eu.int/comm/environment/emas/>

X1.2.8 EMS in Enforcement—MADEP: <http://www.mass.gov/dep/service/enfpol.htm-erg>

X1.2.9 EPA EMS Policies: <http://www.epa.gov/ems/>

X1.3 *Government Recognition Programs for Environmental Performance:*

X1.3.1 EPA Performance Track: <http://www.epa.gov/performance-track>

X1.3.2 New Jersey Silver and Gold Track: <http://www.state.nj.us/dep/opppc/silver.html>

X1.3.3 Clean Texas Program: <http://www.tnrcc.state.tx.us/exec/sbea/cleantx/index.html>

X1.4 *Compliance and Assistance:*

X1.4.1 Massachusetts Department of Environmental Protection, Environmental Results Program: <http://www.mass.gov/dep/service/envrespr.htm>

X1.4.2 Wisconsin DNR Compliance Assistance: <http://www.dnr.state.wi.us/org/caer/cea/assistance/index.htm>

X1.5 *Pollution Prevention Resources:*

X1.5.1 Industrial Environmental Performance Metrics: <http://www.nap.edu/books/030906242X/html/>

X1.5.2 University of Nebraska Pollution Prevention Home Page: <http://p2.unl.edu/>

X1.5.3 California IWMB Business Efficiency and Resource Management: <http://www.ciwmb.ca.gov/BizWaste/>

X1.5.4 Surface Coating Pollution Prevention Guide: <http://www.cdph.state.co.us/ap/P2/coating.htm>

X1.5.5 Toxic Use Reduction Institute P2 Gems: <http://www.p2gems.org/>

X2. SAMPLE ENVIRONMENTAL COMPLIANCE BENCHMARKS FOR RETAIL SERVICE FACILITIES SUCH AS DRY CLEANERS, PHOTOPROCESSORS OR PRINTERS

INTRODUCTION

This Appendix provides detailed tables of performance standards for certain specific activities. These are examples that apply directly to development of an assessment plan for the activities, but they may also illustrate to the user how to build performance tables for other types of facilities. The tables proceed from the most important standards in Tier 1 for air, water and waste, through the final planning steps in Tier 4 for the three media.

X2.1 Tier 1 performance standards for businesses such as dry cleaners, photoprocessors or printers, prevent or manage actual releases of chemicals. Examples include perchloroethylene (PERC) or other volatile organic compounds (VOCs), such as adhesives and cleanup solutions, or processing materials, such as silver waste solutions, that could be released to the air, water or ground as waste. These multimedia environmental standards are usually grouped under air, industrial wastewater and waste management in most Federal and State regulatory programs. The user should consult the appropriate experts to determine specific requirements for a facility, and should be aware that the performance standards listed in this appendix are only examples. Since Tier 1 performance standards manage actual or potential risk to human health and the environment from releases, they should be the first benchmarks evaluated by the facility. These performance standards,

if not met, are considered the most serious among violations of environmental regulatory standards.

X2.1.1 *Air Quality Tier 1 Example Performance Standards:*

Type of Performance Standard	Description	P2
Use carbon adsorber	Prevent air-PERC gas-vapor streams from bypass of carbon adsorber to the atmosphere.	Minimize volumes of PERC stored or managed on sites and explore less volatile and toxic cleaning substitutes.
Notify of and respond to unexpected emissions	Accidents, spills, failure of emission equipment or other events that release significant air pollutants require notification to local, state and appropriate Federal agencies.	Minimize storage of VOCs at the facility. Conduct drills for all staff to administer emergency response procedures, to minimize the release if an accident does occur.

Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
Secure Storage of Cleanup Solution	Cleanup solution shall be stored in accordance with applicable storage requirements.	Use application devices that minimize over-spray and use sparingly.	Report and respond to releases	Establish contingency procedures for responsible persons to notify all proper agencies in the event of a spill.	Conduct contingency plan training and emergency response drills for all staff to minimize damage in the event of a spill. An EMS is a good management tool to prevent the threat of release to the environment.
Secure Storage of PERC and Wastes	Store PERC and other solvents in accordance with applicable storage requirements.	Use appropriate engineering controls to dispense material and to transfer waste to storage containers. Eliminate disposal or outdoor un-containerized storage of solvent filters.	Emergency Response/ Preparedness	Notify the appropriate agency in the event of a spill or leak that exceeds state or local discharge notification requirements.	Notify environmental agency within 2 h of release. Follow up with a written report within 60 days. Conduct contingency plan training and emergency response drills for all staff to minimize damage in the event of a spill. An EMS is a good management tool to prevent the threat of a release to the environment.

X2.1.2 Tier 1 Example Performance Standards for Industrial Wastewater:

Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
General Prohibitions	No facility can allow the discharge of substances, materials or wastewaters to a POTW that would harm the sewer, treatment process, and equipment or endanger life, unless otherwise authorized by permit.	Post warning signs near sinks to remind employees not to dispose of chemicals down the drain. Eliminate any discharge of non-sanitary wastewater to the sewer or the environment.	Emergency Response/ Preparedness	In the case of a spill, conduct immediate containment and clean up contaminated materials, following facility contingency plan. Significant spills require notification of the National Response Center.	Employees should be trained in the proper use of spill kits, absorbents, and proper disposal of absorbed waste. Key staff should be trained in emergency response and be familiar with containment procedures such as Guide F1127.
Specific Prohibitions	Facility must prevent the discharge of pollutants into a POTW that: (1) Pose a fire or explosion hazard. (2) Cause corrosion (for example, maintain acid-base levels at 5.5 < pH < 9.5). (3) Cause obstruction to flow into the POTW. (4) Are discharged at a flow rate/concentration that would interfere with the POTW. (5) Would inhibit biological activity due to heat (temp at POTW should not exceed 104°F).	Post warning signs near sinks to remind employees not to dispose of chemicals down the drain. Prevent discharge of any wastes with a pH of < 5.5 or > 9.5.	Emergency Response/ Preparedness	In the case of a fire notify appropriately trained emergency response personnel. Follow all posted firefighting procedures until emergency response personnel arrive.	Employees should be trained in the proper use of fire extinguishers, including the PASS acronym.
Silver Discharge	Facilities without an agency approved permit shall not discharge wastewater that has silver concentrations that exceed regulatory standards.	Facilities should comply with the most stringent silver concentration limit, whether it is a state or POTW imposed standard.	Ignitable Wastes	Ignitable wastes shall be stored to prevent accidental ignition. Such wastes shall be kept away from: (1) Open Flame. (2) Smoking. (3) Cutting and welding. (4) Hot Surfaces. (5) Frictional Heat. (6) Static, electrical or mechanical sparks. (7) Spontaneous ignition. (8) Radiant Heat.	Smoking should be avoided in all areas where wastes are accumulated as well as areas where ignitable materials are used in production. "No Smoking" signs should be conspicuously placed in areas where there is actual or potential hazard from ignition.
Wastewater Discharge	Facilities without an agency-approved permit shall not discharge wastewater into a sewer system or POTW unless it has been treated to recover the silver.	Recovery systems include: (1) Cartridge series. (2) Electrolytic plus cartridge. (3) Small scale precipitation.			

X2.1.3 Tier 1 Example Performance Standards for Waste Management:

X2.2 Tier 2 Standards for Retail Service Industries: Tier 2 performance standards for businesses such as dry cleaners, photo processors or printers, manage potential releases of chemicals. These include PERC or other VOCs, such as adhesives and cleanup solutions, or silver solution which can be released to the air, water or ground as waste, and which

require control strategies and certain approvals for use in many jurisdictions. Tier 2 performance standards may also describe actions to address alterations to the environment. These standards outline various approvals, such as permits, required to emit certain levels of pollutants to the environment in order to operate the subject business. While specific requirements may differ by jurisdiction, typical pollutants associated with retail business will usually require some level of State or local approval. These multimedia environmental standards are usually grouped under air, industrial wastewater and waste management in most Federal and State regulatory programs. Since Tier 2 performance standards manage potential environmental impacts from releases, they should be the second group of benchmarks evaluated by the facility. These performance standards, if not met, are considered serious among violations of environmental regulatory standards, and noncompliance may carry substantial penalties in many jurisdictions.

X2.2.1 Tier 2 Air Quality Example Performance Standards:

Type of Performance Standard	Description	P2
Dry Cleaner PERC Calculation	The amount of PERC bought is recorded on a routine basis as determined by state or local requirements.	Routine inventory program should be established to track product usage and waste generated. This practice should reveal potential releases that otherwise would not be detected.
Dry Cleaner Control Requirements	Have a dry-to-dry machine installed on or after 12/9/91 or have a refrigerated condenser.	Convert vented dry-to-dry machines to closed loop exhaust systems.
Dry Cleaner Control Requirements	Have either a carbon adsorber that was installed before 12/9/91 or a refrigerated condenser on all transfer machines.	Replace transfer machines with dry-to-dry machines.
Volatile Organic Compound Content Standards for Gravure, Letterpress and Flexography Printers	(1) Ink and coatings: < 300 g VOC/L or 2.5 lb VOC/gal. (2) Post-press Adhesives: < 150 g VOC/L or 1.25 lb VOC/gal. (3) Cleanup solution: VOC composite partial pressure < 25 mm Hg at 20°C (68°F).	Use Ultra Violet (UV)-cured inks, electron beam (ECB) inks or waterbased inks when possible. Use water-based coatings and UV varnishes for in-line and off-line coatings. Recycle press-cleaning solvent using a fully enclosed solvent recovery system (may require a permit).
Volatile Organic Compound Content Standards for Screen Printers	(1) Printing and Metallic Ink: < 400 g VOC/L or 3.3 lb VOC/gal. (2) Conductive Ink: < 850 g VOC/L or 7.1 lb VOC/gal (3) Coatings and post-press adhesives: < 400 g VOC/L or 3.3 lb VOC/gal (4) Cleanup solution: VOC composite partial pressure < 5 mm Hg or less at 20°C (68°F)	Use alternative inks, such as vegetable-based inks. Use water-based coatings and UV varnishes for in-line and off-line coatings. Avoid using adhesives that contain F-listed solvents. Avoid chlorinated solvents for cleaning. Use alternative petroleum solvents if possible.

Type of Performance Standard	Description	P2
Volatile Organic Compound Content Standards for Non-heat-set Offset Lithographic Printers	(1) Fountain solutions for sheet-fed presses: < 5 % VOC by weight if unrefrigerated. < 8 % VOC by weight if refrigerated to < 60°F. (2) Postpress Adhesives: < 300 g VOC/L or 2.5 lb VOC/gal.	Fountain solutions for web-fed presses should not contain alcohol. Use alcohol substitutes in the fountain solution. Use water based, animal based and hot melt adhesives when possible.
Storage of Shop Towels	Shop towels contaminated with cleanup solution shall be kept in closed containers when not in use.	Gravity drain or mechanically wring saturated shop towels to remove excess solvent.

X2.2.2 Industrial Wastewater Tier 2 Example Performance Standards:

Type of Performance Standard	Description	P2
Permitting or certification.	A certification or discharge permit, issued by the appropriate agency, is required for: (1) Discharge of pollutants to surface or groundwater, (2) An outlet for discharging pollutants, and (3) Modification or use of a sewer extension or connection.	Facilities should not discharge wastewater into a septic system or dispose of it on-site, without the explicit knowledge and approval of the environmental agency. Inspect all the pipes that lead out of the building. If one leads to street drain it may require a permit.
Wastewater Discharge Permit	Shall comply with National Pollutant Discharge Elimination System (NPDES) permitting requirements or POTW permit requirements, and comply with respective permit O&M requirements.	The POTW often can provide useful information on wastewater and toxic reduction techniques.
Oil Spill	If there is an oil spill the source of the spill shall be located. The spill cleaned up and the spilled oil shall be prevented from reaching water. Spills usually require notification of the local or state regulatory agency.	Immediate corrective action should be taken on the source of the spill to prevent further and future spillage.

X2.2.3 Solid and Hazardous Waste Tier 2 Example Performance Standards:

Type of Performance Standard	Description	P2
EPA ID and Generator Status	An EPA or State ID number is required for a waste generator unless you are a CESQG or SQG of waste oil only. Volume will determine status.	The smaller amount of waste generated, the fewer the requirements and lower standard regulatory fees. Consider substituting processes and materials that reduce the end production of waste.

X2.2.3			X2.3.1		
Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
Condition of Containers	Containers for waste shall be kept in good condition free from dents, leaks and rust. Facilities storing waste shall comply with state or local storage requirements.	Waste found in containers that are in poor condition should be transferred to containers in good condition.	Storage of PERC, VOCs and Wastes	Store PERC and other solvents in accordance with state or local requirements.	Employees are responsible for reporting and responding to open containers.
Containment	Containers for waste shall be kept closed except when waste is being added or removed. Secondary containment may be appropriate based on state or local storage requirements.	Keeping containers closed at all times minimizes the risk of accidental spills.	Inspection and Repair	Conduct a routine leak and container checks, using proper equipment.	All staff should be aware of inspection requirements and be responsible for reporting any unusual conditions.
Containment	Waste accumulation areas shall be on an impervious surface free of cracks, gaps and drains.	If an impervious surface cannot be found, containers may be elevated on a containment surface designed to catch and contain possible leaks.	Inspection and Repair	If a leak is detected, repair the problem or remove the equipment from operation until it can be repaired or replaced.	Spare parts should be kept on hand at all times so leaks can be fixed immediately.
Containment	Have a spill containment system for outdoor and indoor storage area. Outdoor storage areas shall have protection from storm events.	Outdoor storage is not recommended. Additional hazardous waste storage requirements apply and you may need to get a federal storm water discharge permit.	Operation and Maintenance Requirements	Operate systems in accordance with manufacture's specifications.	Technical specifications and O&M Manuals for equipment should be onsite and readily available.
Separate Incompatible Wastes	Separate different types of hazardous wastes in storage areas.	Separate hazardous and non-hazardous wastes to avoid cross contamination. If non-hazardous waste is contaminated with hazardous waste it is considered hazardous waste and should be disposed of as hazardous.	Control Requirements	Keep any doors of the control system closed at all times except maintenance.	Minimize the time the door is open.
Management of Containers	Hazardous waste shall be stored at proper locations and distances from adjacent property lines. Refer to state or local storage requirements for improper locations and minimum distances.	Containers of flammable solvents and hazardous waste should be electrically grounded when material is dispensed or added.	Operation and Maintenance Requirements	Prevent PERC or other VOCs from venting to the air, unless the facility has a permit to discharge vapors.	Properly maintain, repair or replace air pollution control, as needed.
			Operation and Maintenance Requirements	End the cycle after the temperature on the outlet side of the refrigerated condenser is 45°F/7.2°C.	Technical specifications and O&M Manuals for equipment should be onsite and readily available.
			Refrigerated Condenser Standards	Conduct routine inlet and outlet inspections of the temperature, using appropriate sensor and accuracy ranges. Conduct at the end of the cycle on the outlet side of the refrigerated condenser.	Information not available.
			Refrigerated Condenser Standards	Maintain the appropriate temperature difference between the inlet and outlet stream.	Information not available.
			Carbon Adsorber to prevent exceedance of minimum standards	Conduct routine inspections using colorimetric detector tube with appropriate sensitivity and accuracy ranges. Maintain appropriate PERC concentration in the carbon adsorber exhaust.	Information not available.
			Carbon Adsorber Technical Specifications	Have a detector tube located at an appropriate duct distance, upstream and downstream from any flow disturbance.	Technical specifications and O&M Manuals for equipment should be onsite and readily available.
			Storage of PERC and Wastes	Store PERC and all other waste in closed non-leaking containers, in accordance with state & local requirements.	Information not available.
			Management of Cartridge Filters	Drain filter cartridges in their housings or another sealed container before treating them as hazardous waste.	Recover solvent from filter cartridges by draining them then heating to vaporize and capture additional solvent.

X2.3 Tier 3 multimedia performance standards require operation and maintenance of air and water pollution control devices, management of hazardous waste storage areas and similar activities. They include, for example, proper use and maintenance of silver recovery units, wastewater tanks, and hazardous waste accumulation areas. These environmental standards are usually considered the next step in compliance evaluation in most Federal and State regulatory programs. Since Tier 3 performance standards cover monitoring, operation and maintenance of physical controls over actual or potential releases, they should be the third set of benchmarks evaluated by the facility. These performance standards, if not met, could become serious because deviations from environmental regulatory standards for pollution control systems could result in actual or increased releases to the environment.

X2.3.1 Air Quality Tier 3 Example Performance Standards:

X2.3.2 Industrial Wastewater Tier 3 Example Performance Standards:

			X2.3.2		
Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
Wastewater Sampling	Wastewater treatment facility owners should periodically provide wastewater sampling results to the environmental agency.	Sampling and analysis ensures that the treatment facility is working properly.	Wastewater UST	When a tank is placed near a saturated zone, it should be anchored to prevent it from dislodging and floating away.	If USTs must be placed under the water table, provide an engineering integrity assessment by the tank manufacturer, trade association, or other qualified party. Reduce risk by placing tanks as far from groundwater or surface water as possible.
Monitoring	Samples and measurements for monitoring purposes have to be representative of activities and conducted according to 40 CFR part 136.	Other procedures for monitoring can be used if detailed in the permit.	Wastewater UST	If a tank will be subject to vehicular loading, it should be constructed and installed to withstand loading and ensure that tank foundations will be able to handle the weight of a full tank.	Perform routine inspections of tank filler port, manhole, and pavement where UST is located.
Groundwater Monitoring	Facilities that discharge to groundwater should test the groundwater or effluent samples, or both, periodically to ensure compliance with state or local groundwater regulations.	Groundwater monitoring wells strategically located to provide data to detect potential releases to groundwater.	Silver Recovery Unit	Silver recovery system shall be maintained according to manufacturer's instructions, and monitored and sampled to meet the state or local silver discharge limit.	If wastewater results show that the silver content is approaching the state or local discharge limit, prepare and implement a corrective action plan. Use metallic replacement cartridges after electrochemical silver recovery units to remove more silver.
Aboveground Wastewater Tanks	Tanks shall comply with state or local storage tank requirements. At a minimum tanks shall have year-round access, odor control, security, be in an impervious area, and contained with 110 % capacity of the total tank volume.	Tanks can be placed on special platforms designed to collect and contain any accidental releases. The area chosen should be free of floor drains and be bermed to contain spills.	Silver Recovery Unit	All employees should be trained in silver recovery operation and maintenance.	Contact a Board of Certification of Wastewater Treatment Facilities or similar appropriate agency to see if they need certified operators for their silver recovery unit. Employment or consultation with a certified operator may demonstrate opportunities for pollution prevention.
Aboveground Wastewater Tanks	Automatic fill tanks shall have an audio/visual alarm system that is activated and transmitted to employee areas when the tank reaches 75 % capacity.	Manually filled tanks should have a visual measurement system, but extra, automated alarms will reduce risks and prevent spills.			
Wastewater UST	Wastewater USTs shall comply with state or local storage tank UST requirements. USTs shall be watertight and structurally stable.	Integrity tests should be performed to identify potential leaks or confirm the structural integrity of tanks and appurtenances.			

Type of Performance Standard	X2.3.2 Description	P2	Type of Performance Standard	X2.3.3 Description	P2
Wastewater Analysis	Take representative samples, tested by either: (1) A state certified laboratory. (2) A photographic equipment manufacturer. (3) A photochemical manufacturer provided they use the proper published methodology. (4) Other qualified laboratory.	Facility owners should obtain documentation from the qualified test facility that identifies the date of the last test, who performed the test, and the analytical results.	SQG Requirements	SQGs may store a maximum of: (1) 6000 kg of non-acute hazardous waste, regardless of container type, and (2) Less than 1 kg of acutely hazardous waste on site at any one time.	No information available.
			SQG Requirements	SQGs can store hazardous waste in an on-site storage area for a maximum of 180 days.	SQGs that store waste for longer than 180 days are considered storage facilities and should get a permit license from the agency managing the hazardous waste program.

X2.3.3 Solid and Hazardous Waste Tier 3 Example Performance Standards:

Type of Performance Standard	X2.3.3 Description	P2	Type of Performance Standard	X2.3.3 Description	P2
Change of Status	Hazardous waste generators that need to accumulate more or less waste than their status allows should fill out a "Change of Status" notification and submit it to the agency managing the hazardous waste program. Change of Status activities (that is, accumulating more waste) shall not begin until the environmental agency has approved the change of status request.	Although frequent changes in generator status are not encouraged, the facility should periodically evaluate opportunities to reduce wastes such as PCE or other volatile organic compounds by reducing or eliminating them from the business process and by carefully controlling purchasing and storage procedures. Businesses are required to select the highest generator status applicable to the facility, however pollution prevention evaluation may lead to documentation of a consistently lower rate of hazardous waste generation. This can result in reduced risks, reduced hazardous waste disposal costs and reduced fees in some jurisdictions.	Conditionally Exempt Small Quantity Generator (CESQG) Requirements	CESQGs may generate a maximum of 220 lb of waste in a month, may accumulate up to 2 200 lb and shall dispose of all the waste as soon as all containers are full.	CESQGs should not accumulate acutely hazardous waste. There is no time limit for storing wastes at a CESQG.
			CESQG Self Transport	CESQGs may self-transport waste without a license or manifest if: (1) No more than 55 gal is transported at one time. (2) The receiving facility can accept the waste without exceeding its own storage limits.	Incompatible wastes should not be transported together. Keep containers secured to vehicle at all times. Bring a spill kit in case of spills.
			Hazardous Waste Storage Areas	A secure, clearly marked, and protected area, separated from generation areas. Signs shall be posted within or above storage areas. Aisle space shall be wide enough for containers to be inspected weekly to check for leaks and container condition. Generally storage must be for less than 90 days.	Production materials should be kept away from storage areas, which should be conspicuously marked with tape, painted lines, locked gates, fences and signs that say "Hazardous Waste" in at least 1 in. high letters. Accumulated rainwater should be disposed of as soon as it is found.
Large Quantity Generator (LQG) Requirements	(1) LQGs can accumulate: A total of 55 gal of hazardous waste or one quart of acutely hazardous waste at any one accumulation area. (2) LQGs can store hazardous waste in an on-site storage area for a maximum of 90 days.	LQGs that store waste for longer than 90 days are considered storage facilities and should get a permit from agency managing the hazardous waste program.	Satellite Hazardous Waste Accumulation Areas	This waste must be kept at or near the site of its generation, with less than 55 gal of waste. This waste may also be hard-piped back into the process.	There should be sufficient space for employees/ inspectors to easily examine containers. Waste found in containers that are in poor condition should be transferred to containers in good condition.
Small Quantity Generator (SQG) Requirements	SQGs can accumulate: (1) A total of 55 gal of hazardous waste, or (2) One quart of acutely hazardous waste at any one accumulation area. SQGs may generate a maximum of 2 200 lb of waste in a month.	Information not available.	Labeling and Marking in Satellite Accumulation Areas	Each container may require labeling with: (1) The words "Hazardous Waste." (2) Type of waste. (3) Type of hazard.	Labels should be placed on the container where they can be clearly seen. Label all containers regardless of size to avoid confusion and cross contamination.

Type of Performance Standard	X2.3.3 Description	P2
Moving waste from Satellite Accumulation to Storage areas.	When waste accumulation containers become full, they shall be marked with the fill date and moved to the main storage area within the appropriate regulatory time frame.	Employees should contact the employer/ environmental manager to notify when containers are full.
Transporting Wastes	Generators must use a licensed transporter with both a valid EPA ID and Department of Transportation approval.	Keep a copy of the transporters' licenses in the facility's records.
Transporting Wastes	Generators can only allow waste to be transported to a licensed Treatment Storage or Disposal Facility.	The receiving facility should either have a valid permit issued by the EPA or authorized state according to 40 CFR Part 270/271.
Emergency Response/ Preparedness	Have a written list of designated emergency coordinators to manage waste emergencies either on site or on call at all times.	Multi-shift facilities should keep an updated list of coordinators for each shift. The list should include coordinators who are thoroughly familiar with all emergency plans.
Contingency Plan	The facility shall have a written contingency plan that includes: (1) Steps to take in the event of an emergency. (2) Lines of communication. (3) A Spill Control Plan. (4) Arrangements with local emergency response agencies. (5) Emergency control equipment. (6) Evacuation routes.	Copies of the contingency plan should be made available to all employees in easy to access areas. All managers and staff should be familiar with the plan.
Emergency Response/ Preparedness	Emergency lists contain, locations, names and phone numbers of: (1) Emergency Coordinators. (2) Emergency Agencies. (3) Fire alarms/ extinguishers. (4) Evacuation routes.	Emergency lists should be posted near accumulation areas, by the telephones, kept up to date and contain pager, cell phone, and speed dial numbers as necessary.
Emergency Response/ Preparedness	Have an alarm/PA system to notify employees of emergencies.	Alarm/PA system should be tested regularly.
Emergency Response/ Preparedness	Fire extinguishers or water at adequate volume and pressure, or both, are needed to abate fires.	Appropriate fire extinguishers (combustible, electrical, liquids or metals) should be placed near accumulation areas.
Emergency Response/ Preparedness	Local emergency response agencies should be familiarized with a site, its wastes, hazards, entrances, and evacuation routes and personnel locations.	If possible, maps of the site detailing certain aspects (for example, accumulation areas, roads, etc.) should be made available to emergency agencies.

Type of Performance Standard	X2.3.3 Description	P2
Emergency Response/ Preparedness	The facility shall have adequate aisle space and clearly marked exits.	Painted lines on the floor may help employees find the proper escape exits in the case of a smoky fire.
Emergency Response/ Preparedness	Facility shall have a program to periodically test emergency equipment to ensure proper working order in an emergency.	Logs should be maintained detailing when emergency equipment failed, when it was fixed and when it passed a subsequent test.
Personnel Training	Employees need to be trained annually to handle hazardous wastes and respond to waste related emergencies.	Logs should be maintained detailing what training was offered, when, and who attended the training.

X2.4 Tier 4 performance standards for retail businesses cover the records that keep track of management of pollution control devices or chemical use. They are usually the final step in the cycle of compliance evaluation and improvement, but are nonetheless important to keep track of how the facility is doing with its compliance. State and Federal regulations may require particular record keeping activities. Retention and review of pollution management records may also help the facility analyze its opportunities for pollution prevention, a reduction or elimination of regulatory requirements and a reduction in costs.

X2.4.1 Air Quality Tier 4 Example Performance Standards:

Type of Performance Standard	X2.4.1 Description	P2
Retain Operating Manuals etc	Keep a copy of design specs and operating manuals for pollution control machinery and systems on site.	Designated staff should be familiar with designs and technical information in manuals for control machinery and systems.
On Site Record-keeping	Keep monthly and yearly records of Volatile Organic Compound purchases and usage, weekly equipment monitoring, leak checks, and repair logs. Records shall be retained for the time specified by the agency managing the air quality program.	Computerized central purchasing and equipment monitoring and maintenance programs can be very effective in managing records efficiently and in analyzing data to reduce the use of hazardous materials and generation of hazardous waste.

X2.4.1			X2.4.2		
Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
Small Printer Record keeping	Keep monthly purchase and usage records to prove you are a small printer and demonstrate you do not go above the 55-gal limit for incidental materials. Keep MSDSs for materials that have $\leq 10\%$ volatile Organic Compound (VOC) content by weight and for cleanup solutions.	Appoint one person (or one person in each department) to be solely responsible for chemical purchases and inventory control. VOC content should be determined using appropriate EPA methods or other environmental agency approved calculation.	All records	Records shall be maintained onsite for the time frame identified by the regulating agency.	Records should be maintained indefinitely to prove compliance and do waste reduction analysis.
Midsize Printer Record keeping	Keep records of: (1) % VOC content by weight for sheet-fed alcohol-containing fountain solutions, supporting calculations or spreadsheets, or both, for determining calendar week average VOC content. (2) MSDSs for all fountain solutions. (3) Daily temperature log for sheet-fed fountain solutions containing alcohol when the VOC content is $\geq 5\%$. (4) Additives used in ink, coatings, and adhesives to demonstrate compliance with performance standards.	Midsize printers purchased or used between 275-3000 gal of cleanup solution, ink, adhesives and coatings, or used more than 55 gal of alcohol per rolling 12-month period.	Training Records	Facilities shall keep logs of training sessions including when the training occurred, what was covered and who attended the training.	Trained employees may be able to suggest pollution prevention and product substitution options.
Large Printer Record keeping	Keep records of actual facility emissions of all VOCs and each Hazardous Air Pollutant-containing compound per calendar month.	Large Printers purchased or used more than 3000 gal of cleanup solution, ink, adhesives and coatings per rolling 12-month period. For non-heat-set lithographic inks assume 5 % of the ink's VOCs are emitted. For heat-set lithographic inks assume 80 % emission. For all other inks you should assume 100 % emission.	Wastewater Sampling and Monitoring Records	Facilities should keep logs of wastewater sampling dates and results, and may be required to report monitoring results at least once a year.	Monitoring/sampling reports should include: (1) Date, place and time of sampling. (2) Who took the sample. (3) Date analysis was performed. (4) Who performed the analysis. (5) Analytical techniques. (6) Analytical results.
Self-Converted or Un-permitted Heat-set and Nonconforming operations Record keeping	Keep records required for Large Printers. Also keep records to demonstrate that the facility has ≤ 10 VOC/year of actual facility emissions.	Information not available.	Monitoring reporting	Records of all calibration, maintenance and original strip charts from continuous monitoring equipment should be retained for the time frame specified by the regulating agency.	Records of calibration and maintenance can be used to corroborate or explain outliers in monitoring reports.
			Recovery System with or without cartridges	Facilities should keep logs of the dates when each silver recovery unit is put into service, when cartridges are installed and repaired and when each system was cleaned or serviced.	Logs should include: (1) Date, place and time of service. (2) Who put the unit in service. (3) Repair information. (4) Last cleaning service.
			Wastewater Discharge Records	Facilities should maintain records that document the amount of wastewater that passed through the silver recover system and was discharged in the previous 12 months.	This information may be useful in documenting improvements in business and environmental performance standards, such as reductions in, water use, toxic waste generation and costs.
			Wastewater Shipping Records	Facilities should maintain records that show that wastewater is shipped to a POTW.	Records should contain transporter name and address, when, where, and how much was shipped.
			Recycling record keeping	Facilities that have recycling permits should record the amount of wastewater that goes through its systems and send required reports to the environmental agency.	It is recommended that reports be maintained onsite indefinitely to track wastewater volumes and to evaluate the effectiveness of recycling program.

X2.4.2 Industrial Wastewater Tier 4 Example Performance Standards:

X2.4.2		
Type of Performance Standard	Description	P2
Permit application	Facilities shall completely and accurately fill out a permit application and send it to the appropriate environmental agency.	The environmental agency can deny permitting a facility that has an incomplete/ inaccurate application.

X2.4.3 Solid and Hazardous Waste Tier 4 Example Performance Standards:

X2.4.3			X2.4.3		
Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
Contact Change	The environmental agency shall be notified in writing any time there is a change in name, mailing address or contact individual or any change to a larger or smaller generator status.	The environmental agency should have updated files in order to be able to contact the facility properly.	Release Notification	After a spill, a release notification form shall be filled out and returned to the environmental agency within the time frame specified by the regulating agency.	After a spill that exceeds reporting requirements, the regulating agency should be notified by telephone prior to submitting the notification form.
Manifest	If a generator is shipping waste off site, the generator portion of a hazardous waste manifest shall be filled out, signed and retained at the facility.	Other copies of the manifest are for the transporter, and copies may need to be mailed to the environmental agency and the state receiving the waste.	Material Safety Data Sheets (MSDS)	Every employer who manufactures, processes, uses or stores toxic or hazardous substances in the workplace must post a notice in a central location in the workplace informing employees of their "Right to know."	The MSDS is a useful source of information to compare toxic cleaning solvents with non-toxic solvents, for evaluating other hazardous characteristics such as flammability, and opportunities for pollution prevention.
Emergency Response/ Preparedness	Generators shall have signed and dated letters that prove the attempt to contact local emergency agencies.	Even if the emergency agencies did not respond to the letters or refused to assist a facility, it is important that the facility have documentation that contact was attempted.	On Site Record keeping	Annual hazardous waste generator reports may be required in some jurisdictions.	Hazardous waste generation information may help evaluation of environmental performance and set benchmarks for future waste reduction.
Satellite Hazardous Waste Accumulation Areas	Logs of weekly accumulation area inspections shall be maintained.	CESQGs are exempt from this requirement.	On Site Record keeping	Maintain land disposal restriction forms for the time frame specified by the regulating agency.	Retention of land disposal restriction forms may assist in determining past (final) disposal methods and inventories.
Record Maintenance	Maintain: logs, maintenance records, test results, reports, shipping records, and hazardous waste manifests for the time frame specified by the regulating agency.	Records should be kept on site indefinitely to prove consistent compliance.			
Contingency Plan	Copies of a facility's emergency contingency plan shall be sent to local emergency response agencies and other appropriate agencies such as the Board of Health, the community head and the environmental agency.	Having the facility's contingency plan helps the emergency response agencies plan how they are going to assist a facility during the event of an emergency.			

X3. ADDITIONAL SAMPLE ENVIRONMENTAL COMPLIANCE BENCHMARKS FOR PREVENTION AT VEHICLE MAINTENANCE AND FUELING FACILITIES

INTRODUCTION

This Appendix provides a tiered analysis of certain pollution prevention standards used to manage potential environmental risks at vehicle maintenance and fueling stations. While not all petroleum storage tanks require vapor recovery in every jurisdiction, this method of release prevention protects air, water and soil, and lowers environmental risk.

X3.1 Tier 1 performance standards for vehicle fueling and maintenance facilities include many of the standard set of air, water and waste requirements, as listed in **Appendix X2**. This sector also features a specialized set of performance standards which address the prevention and containment of potential or actual releases of chemicals, such as solvents, antifreeze, waste oil, gasoline, and gasoline vapors to the air, water or ground as waste or leaking underground storage tanks (USTs). Performance standards may apply to bulk terminals, transport vehicles and dispensing facilities, as well as maintenance garages. These multimedia environmental standards address prevention of releases to air, water and soil in many local,

Federal and State regulatory programs, by managing vapor recovery, tank storage and drainage systems. Certain air, industrial wastewater and waste management standards, similar to **Appendix X2**, also apply to this sector, however **Appendix X3** gives only the examples that emphasize the prevention standards generally unique to vehicle maintenance. The user should always consult the appropriate experts to determine specific requirements for a facility, and should be aware that the performance standards listed in this appendix are only examples. Since Tier 1 performance standards prevent or manage actual or potential risk to human health and the environment from releases, they should be the first benchmarks

evaluated by a facility. These performance standards, if not met, are considered the most serious among violations of environmental regulatory standards.

X3.1.1 Example Tier 1 Prevention Performance Standards for Vapor Collection:

Type of Performance Standard	Description	P2
Storage Tanks Emission Control Requirements	Selected motor vehicle fuel storage tanks may require systems to collect and recover petroleum vapors. The user shall identify specific Federal and State requirements that apply to facility operations in that location.	Proper vapor recovery system installation and operation reduces health risks and odors from gasoline vapors and cuts costs of lost product.
Operation Requirements: Cargo Tank Motor Vehicle	Cargo tanks should also have a vapor collection system properly installed to dispense to a gas station. This may not be a requirement in all areas and the user should consult the appropriate regulatory authority.	Proper vapor recovery system installation and operation reduces health risks and odors from gasoline vapors and cuts costs of lost product.
Operation Requirements: Cargo Tank Motor Vehicle	Cargo tanks can only be refilled at bulk stations that also comply with appropriate vapor recovery requirements. Specific local and state requirements may apply.	Cargo tank owners should ensure that bulk plants and terminals are in compliance with vapor recovery requirements before "filling up."

X3.1.2 Example Tier 1 Prevention Performance Standards for Surface Water Run-off:

Type of Performance Standard	Description	P2
General Regulations	Each facility should take steps to prevent releases of petroleum into surface or groundwater.	Appropriate spill control devices should be installed to reduce the potential risk of product exposure to environmental media.
Spill Reporting	A spill that exceeds the state or local reportable quantity shall be reported immediately to the supervisor of the business operation and to the appropriate regulatory agency.	The sooner such a spill is reported and the earlier the response, the lower the risk to the environment.
Best Management Practices	Each facility should have a pollution prevention plan containing best management practices for that location, whose primary goal is to prevent direct releases of oil or hazardous materials to the surface or groundwater.	Conduct regular drills and training sessions with the staff and identify specific BMP duties in each employee's job description.

X3.1.3 Example Tier 1 Prevention Performance Standards for Tanks and Piping:

Type of Performance Standard	Description	P2
Existing Tank Systems	Owners and operators should prevent releases.	Each facility should evaluate its tank situation and minimize tank storage. In addition, tank storage and piping should be located or relocated the furthest distance possible from surface and groundwater resources, residences and other businesses. All tanks and piping should have secondary containment, corrosion protection and leak detection systems.
Tank Construction	Tanks, piping and all tank accessories shall be constructed out of content compatible material.	Proper construction of a tank and piping will minimize corrosion and leakage.
Spill Prevention	The facility owner, the operator or a designee shall monitor transfers of product into USTs to prevent overfilling or spilling, or both. The appropriate regulatory authority may have specific requirements on spill prevention.	This may prevent excessive spillage of product.
Spill Prevention Equipment	Tanks shall have spill containment manholes that can return spilled material to the tank. This is a requirement in some jurisdictions.	This may prevent excessive spillage of product.
Spill Prevention Equipment	Tanks shall have overflow protection devices to minimize spillage due to tank filling.	Beware of rounding up of actual capacity. A good practice is to slightly underfill.
Emergency Response	Abnormal gains of water shall be removed and disposed of with required approvals from the environmental agency.	The tank should be checked 24 h later, during which time no product has been added.
Emergency Response	When leaks are detected the owner/operator shall notify the local fire department, the environmental agency and any other authority having jurisdiction. The tank must be taken out of service immediately.	Leaking tanks should be emptied within the time frame specified by the state or local agency.

X3.2.2 Example Tier 2 Prevention Performance Standards for Surface Water Run-off:

Type of Performance Standard	Description	P2
Groundwater Table	Facility owners should obtain maps that show where the water table is in relation to their facility where discharge may occur.	The USGS can be contacted for further information. Location of the groundwater helps plan facilities to avoid any future water contamination.
Buffer Zone	Facilities abutting a wetland should be constructed with a 100-ft buffer zone between the wetland and the facility.	Permits should be acquired before any work may be done within a wetland or riverfront area.
Underground Injection Wells	Floor drains or sinks that lead to soil and groundwater may be prohibited in areas where hazardous materials are in use or require special approvals from a designated authority. Establish Best Management Practices for the facility.	An owner has the following options with injection wells: (1) Reroute the drain to a sewer system (needs a permit). (2) Connect drain to an approved holding tank. (3) Seal the drain. (4) Get a groundwater discharge permit. (5) Close the injection well.

X3.2.3 Example Tier 2 Prevention Performance Standards for Tanks:

Type of Performance Standard	Description	P2
Environmental Site Assessment	The environmental conditions of the site should be considered before installing a tank. Some criteria include: (1) Soil Corrosiveness. (2) Depth to water table. (3) Seismic potential.	Knowing the environmental conditions helps an owner: (1) Choose an appropriate tank. (2) Choose where to site the tank. (3) Know where environmentally sensitive areas are.
Tank Installation	The local fire department and other authorities having jurisdiction shall be notified before new or replacement USTs can be installed. All new tanks shall have cathodic protection, be double walled or lined and have leak detection systems.	Practice E1526 and Guide E1990 are useful references for evaluating tanks as well as preventing leaks and releases to the environment.
Existing Tank Systems	Owners of USTs installed prior to May 9, 1986 shall obtain a permit from the fire department or other authority to maintain the old tanks.	Owners should periodically evaluate old tanks as part of a preventative maintenance plan.
Tank Installation	Only contractors certified by the manufacturer or a petroleum equipment certification can install USTs.	Owners should ensure that contractors are installing USTs in accordance with local or state regulations.
Tank Installation	New USTs and all associated piping shall be tested before being buried.	Pre-burial testing helps find structural flaws before the tank is installed.

Type of Performance Standard	Description	P2
Emergency Response	The owner shall immediately notify the environmental agency of any release that exceeds a reportable quantity, as required by state or local agency regulations.	A leaking tank or piping should be taken out of service immediately, and removed, repaired or replaced. The owner should try to determine the root cause of any past releases, and take steps to prevent them in the future.
Prevention	No flammable or combustible products can be pumped into a UST under pressure unless the tank is constructed to withstand the pressure or the vent pipe is big enough to relieve the pressure.	This measure prevents in-tank explosions of product.

X3.2 Example Tier 2 Prevention Standards for Vehicle Fueling and Maintenance generally address the approvals required by Federal, State and Local authorities for certain operations of the facility which could cause a release to the environment. The prevention examples given here address vapor controls, drainage and underground storage tanks (USTs).

X3.2.1 Example Tier 2 Prevention Performance Standards for Vapor Collection:

Type of Performance Standard	Description	P2
Operation Requirements: Cargo Tank Motor Vehicles	Keep cargo tanks vapor tight at all times.	Being “vapor tight” means that the vapor collection system is kept in good working order, reducing risks, odors and costs.
Operation Requirements: Gas Station	Motor vehicle fuel should not be dispensed to a gas station whose stationary tank has a capacity greater than or equal to the volume specified by the state or local agency, if the dispenser doesn't have a vapor recovery system.	Gas station owners should look for evidence of a vapor recovery system before letting a cargo tank dispense to them.
Operation Requirements: Gas Station	In many jurisdictions, gas stations should have a vapor collection system installed to sell gas.	Vapor collection system includes automatic shutoff of gas, nozzle boots, faceplates (or flexible cones), hoses, and vapor recovery on Underground Storage Tanks (USTs).
Willful removal of vapor recovery/control equipment	Vapor recovery systems should not be altered so they collect less than 95 % of gas vapors.	Gas station owners should routinely inspect vapor recovery systems for damage or tampering.
Gas Reid Vapor pressure during ozone season	Gasoline with a Reid vapor pressure greater than the values identified by the appropriate regulatory agency should not be sold during the identified ozone season.	The high ozone production season usually has warm summer temperatures. Extra emphasis should be placed on controlling petroleum and other vapors from volatile compounds during this period.

Type of Performance Standard	X3.2.3 Description	P2
Tank Construction	Tanks shall have a striker plate at the bottom of each tank opening.	Striker plates can be metallic or non-metallic and meet the minimum size requirement identified by the local or state agency.
Vapor Control Equipment	Tanks shall have a filler pipe, vent pipe and gauge pipe.	Filler pipes should have a non-iron cap to prevent vapors from escaping and water from getting in since vapors may corrode iron caps.

Type of Performance Standard	X3.3.1 Description	P2
Cargo Tank Motor Vehicle	Cargo tank vapor equipment shall prevent visible liquid leaks during loading and unloading and shall be visually inspected for visible vapor or liquid leaks. Testing equipment, procedures and tester qualifications may be prescribed by the appropriate regulatory agency.	Inspect all gaskets, seals, valves, rings, covers, hoses, piping, adaptors and the entire tank for signs of product leakage.
Inspection and repair (gas station)	Replace gas nozzle boots that have a triangular tear on any side or that have a horizontal tear larger than that identified in applicable regulations.	Use your thumbs to stretch and inspect boot segments to check for tears.
Inspection and repair (gas station)	Replace flexible cones and faceplates that are damaged or are missing sections larger than permitted by applicable regulations.	It is best to replace damaged equipment right away, to reduce risks and minimize product loss.
Inspection and repair (gas station)	Replace fuel hoses that are flattened, kinked, or torn and replace fuel nozzles that fail to close automatically.	It is best to replace damaged equipment right away, to reduce risks and minimize product loss.
Inspection and repair (gas station)	Ensure all components of vapor recovery system, if required, are certified for use.	Contact CARB for a list of certified vapor recovery equipment dealers. Some states require the installation, inspection and maintenance of vapor recovery systems.
Inspection and repair (gas station)	Visually inspect the vapor recovery system, including seals on tanks and tank caps, weekly for malfunctions and broken equipment.	It is best to perform routine inspections and replace damaged equipment right away, to reduce risks and minimize product loss.
Inspection and repair	Repair or replace malfunctioning or broken components within the time frame identified by the local or state agency.	Spare parts should be kept on hand at all times so equipment can be fixed.

X3.3 Tier 3 prevention performance standards require effective operation and maintenance of fuel storage, dispensing and maintenance facilities, to prevent the release of petroleum products or other hazardous materials to the environment. This includes vapor recovery equipment, which should be present on all equipment that either stores or dispenses gasoline, floor drains and underground storage tanks (USTs). These environmental standards are usually considered the next step in compliance evaluation in most Federal and State regulatory programs. Since Tier 3 performance standards cover monitoring, operation and maintenance of physical controls that prevent releases over time, they should be the next set of benchmarks evaluated by the facility. These performance standards, if not met, could become serious because repeat violations of environmental regulatory standards for prevention systems could result in actual or increased releases to the environment.

X3.3.1 Example Tier 3 Prevention Performance Standards for Vapor Control:

Type of Performance Standard	X3.3.1 Description	P2
Cargo Tank Motor Vehicle	Access assemblies on cargo tanks shall be kept closed during operation and vapor balance systems shall be maintained.	Maximize the vapor recovery to reduce risks from inhalation and minimize product loss.
Gas Station	Gauges, meters and testing devices shall be kept in good working order.	Inspect pressure vacuum gauges, vapor vents, and testing devices for proper operation.
Cargo Tank Motor Vehicle	Cargo tanks shall have monthly motor vehicle fuel tank inspections and repairs shall be conducted within the time frame specified by the applicable regulatory authority.	Inspect pressure vacuum valves, vapor vent covers, gaskets, dome covers, seals, and dome base rings for damage to prevent leaks.
Cargo Tank Motor Vehicle	Cargo tank vapor equipment shall prevent gauge pressure from exceeding 18 in. of water and vacuum from exceeding 6 in. of water, using standard California Air Resources Board (CARB) tests.	Inspect truck vapor equipment and routinely monitor gauge pressures.

X3.3.2 Example Tier 3 Performance Standards for Surface Water Run-off:

Type of Performance Standard	X3.3.2 Description	P2
Floor Drain Inventory	Facility owners should inventory all floor drain locations and discharge points.	Floor drains that are near areas where hazardous materials are stored, used, or disposed of should be closed.
Spill Containment	Indoor spills should be contained before they reach floor drains.	This prevents the material from potentially contaminating surface/ groundwater.
Spill Containment	A spill should be contained to the extent practicable with a Spill Kit.	If material is dripping from the spill kit items, it should be disposed of as hazardous waste (see Hazardous Waste performance standards).

X3.3.2			X3.3.3		
Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
Spill Containment	Facilities should be equipped with an absorbent spill kit.	Proper use of the spill kit will prevent materials from contaminating groundwater.	Equipment Testing	All tanks, piping and accessories such as adapters, gaskets, and caps should be kept secure, operable and without excessive wear.	Visually inspect tanks, piping and tank accessories on a weekly basis.
Material Disposal	Do not dispose of materials by dumping them down a drain.	All sinks should have signs that remind employees not to dump in a drain.	Equipment Testing	Leak detection equipment should be operated and maintained according to manufacturer's instructions and applicable regulations.	Designated staff should be familiar with leak detection equipment and manufacturers instructions for operation and maintenance.
Vehicle Washing	Washing of vehicles can only be done at a designated facility, with appropriate controls for oil and grease from vehicle undercarriages.	Designated facilities have: (1) Drains that connect to the municipal sewer or a wash water recycling system, or (2) An approved holding tank.	Equipment Testing	The test wire/box attached to the negative voltage of the cathodic protection equipment shall be routinely tested. Impressed current corrosion protection shall also be inspected routinely. Reference local or state regulations for required inspection schedule.	It is best to perform routine inspections and tests, and replace damaged equipment right away to reduce risks and minimize product loss.
De-icing compounds	Salt or sand piles should be stored in closed sheds. Outdoor salt/sand piles should be bermed and covered when not in use.	Consider some alternative, non-sodium, de-icing compounds (that is, CaCl ₂) and reduce use through equipment calibration, driver training and careful application.	Equipment Testing	New or replacement piping shall be inspected after installation in a time frame identified by the local or state agency.	It is best to perform routine inspections and replace damaged equipment right away to reduce risks and minimize product loss.
Snow Management	Snow should be moved from impervious areas (concrete) and spread out to melt in highly permeable areas (soil). Do not contaminate snow with oil or hazardous material. Do not dispose of snow to any surface water.	Snow allowed to remain on impervious surfaces both acquires pollutants and can cause ponding during the thaw season.	Equipment Testing	Inventory testing supplemented by 3rd party testing should be routinely performed in accordance with state or local regulations.	This will provide proper quality control to minimize risks and potential product loss.
Street Sweepings	Street sweepings should be collected and either disposed of in a landfill or put to beneficial use.	Beneficial use is defined as fill in public ways, added to restricted use compost, or used in some other capacity subject to environmental agency approval.	Leak Detection	Operators shall perform leak detection tests on a routine consistent with local or state regulations to confirm that nothing enters or leaves the tank.	Any detectable leak warrants action to prevent a larger release and cut down on potential clean up costs. Reference the local or state agency to determine leakage rate limitations and notification requirements.
Facility Cleaning	Water should be avoided as a facility floor cleaner whenever possible.	Water may pick up pollutants that are on the floor and may also be accidentally discharged to a floor drain. Instead use inert, low volume, dry cleaning compounds that can be swept up and properly disposed.	Tank removal	If a tank cannot physically be removed from the ground due to structural integrity issues, all products shall be removed from the tank under the direction of the local fire department and other authorities having jurisdiction and filled with inert material.	Tank owners should test the soil in the area around the tank to see if removing the tank would disturb the structural integrity of the ground or nearby tanks and piping.
Best Management Practices (BMPs)	Facilities should develop a pollution prevention plan that contains all of the applicable BMPs.	All employees should be trained in BMPs, and clear accountability for each practice identified.	Tank removal	Before permanent closure of a tank, the owner shall check the site for the possible release of oil or hazardous material.	Installing wells in proximity to the tank system may be used to monitor for releases. Soil and water from these wells should be tested for the appropriate chemicals.

X3.3.3 Example Prevention Tier 3 Performance Standards for Tanks and Piping:

X3.3.3		
Type of Performance Standard	Description	P2
Fill Covers	The surface of fill covers as well as a radius should be painted with fuel color codes. Reference local or state regulations for minimum radius of paint.	To avoid waste and spills, all staff should be trained to identify the type of fuel in each tank, according to its color code.
Equipment Testing	Tank owners shall develop a comprehensive routine maintenance system for early detection of leaks/equipment malfunction.	All employees should be trained to conduct preventative inspections and maintenance. Such actions should be logged.
Equipment Testing	Overfill prevention devices should not prevent tightness testing.	Tightness testing, in accordance with Guide E1990.

X3.4 Tier 4 example prevention performance standards for vehicle fueling and maintenance facilities cover the records, which keep track of management of vapor control devices, drains, surface water management and chemical use. They are usually the fourth step in the process of compliance evaluation but are nonetheless important to keep track of how the facility is doing with its compliance. Record keeping activities may be required by local, State or Federal regulations. Retention and

review of pollution management records may also help the facility analyze its opportunities for pollution prevention, a reduction or elimination of regulatory requirements and a reduction in costs.

X3.4.1 Example Tier 4 Prevention Performance Standards for Vapor Recovery:

Type of Performance Standard	Description	P2
On site Record keeping	Cargo tank owners/operators shall keep certification records on hand for at least two years.	Records should be maintained indefinitely to prove compliance and do vapor reduction analysis.
On site Record keeping	Records that demonstrate compliance shall be maintained and kept onsite for the minimum time frame identified in local or state regulations.	Records should be maintained indefinitely to prove compliance and do vapor reduction analysis.
Record Maintenance	Maintain a log of failures of vapor collection and control system.	Records, when compared with odor complaints, may lead to early repair of a failing system. This will cut down on risks, lost product and costs.
Record Maintenance	Maintain a log of maintenance performed on vapor collection and control system.	Maintenance log may provide early detection signals that lead to early repair of a failing system. This will cut down on risks, lost product and costs.
Record Maintenance	Maintain records of daily and monthly fuel input and output, and of daily fuel input into delivery vehicles.	Daily input and output logs may provide detection signals that lead to early repair of a failing system. This will cut down on risks, lost product and costs.
Certification of Facility Operators and Employees	Keep certifications that facility operators and employees received training in operation and maintenance of vapor collection and control equipment.	Logs should be maintained detailing what training was offered, when, and who attended the training.
Facility Labeling	Clear operating instructions for dispensing fuel with vapor recovery systems should be posted in the dispensing area. There are also specific fire protection safety and other labeling requirements specified by applicable regulatory authorities.	Public awareness and instruction may minimize the potential for vapor releases.
Facility Labeling	Operating instructions should include a warning not to top off the tank and a telephone number to report problems with the vapor recovery system.	Public awareness and instruction may minimize the potential for vapor releases.
Facility Labeling	Conspicuous "Out of Order" signs should be placed on equipment that is malfunctioning or broken.	This prevents employees or others from releasing vapors to the environment, where it can be easily prevented. Consider "locking down" broken equipment to cut down on accidental releases.

Type of Performance Standard	Description	P2
Emergency reporting	Reports concerning releases of petroleum or other hazardous materials into the environment shall be filed with the appropriate environmental regulatory agency, describing any "emergency" situations.	Emergency reports should contain the name of the owner or operator of the cargo tank and the emergency vehicle as well as the nature of the emergency.

X3.4.2 Example Tier 4 Performance Standards for Surface Water Run-off:

Type of Performance Standard	Description	P2
Permit application	Facilities shall completely and accurately fill out a permit application and send it to the environmental agency.	The environmental agency can deny permitting a facility that has an incomplete/inaccurate application.
All records	Records shall be maintained onsite for the time frame identified by the local or state agency.	Records should be maintained indefinitely to prove compliance. Records are also useful measurement tools to document actual or potential pollution prevention in everyday business operations and compliance with best management practices.
Training Records	Facilities should keep logs of training sessions including when the training occurred, what was covered and who attended.	Training records are useful to solicit pollution prevention ideas from employees.
Monitoring reporting	Facilities shall report any required monitoring results in accordance with the time frames identified by the local or state agency.	Monitoring reports should include: (1) Date, place and time of sampling. (2) Who took the sample. (3) Date analysis was performed. (4) Who performed the analysis. (5) Analytical techniques. (6) Analytical results.
Monitoring reporting	Records of all calibration, maintenance and original strip charts from continuous monitoring equipment shall be retained for the time frame identified by the local or state agency.	Records of calibration and maintenance can be used to corroborate or explain outliers in monitoring reports.
Oil Spill	A report detailing the specifics of a spill must be generated in most situations and submitted to the appropriate regulatory authority.	The report helps the environmental agency keep track of both spills and the corrective action taken to prevent future spills.

X3.4.3 Example Tier 4 Prevention Performance Standards for Tanks and Piping:

X3.4.3			X3.4.3		
Type of Performance Standard	Description	P2	Type of Performance Standard	Description	P2
Tank Installation	Contractors hired to install a UST shall give the local fire department and other authorities having jurisdiction, a copy of his/her certification before installation.	USTs should only be installed by qualified contractors.	Equipment Test Records	Maintain records of: (1) Cathodic protection monitoring. (2) Leak detection monitoring. (3) Calibration maintenance. (4) Repair of leak detection equipment. (5) Inventory. Shall be maintained on site for the operating life of the facility.	Proper maintenance of records allows the owner to show evidence of sustained compliance, and analyze data for pollution prevention opportunities.
Tank Installation	Owners of new USTs shall give the local fire department or other authority a certified copy of all pre-burial testing, and upgrading of devices.	This will confirm the performance of the UST system and provide the local fire department or other authority with prevention assurances.			
Tank Records	Owners shall maintain evidence of the date of installation for each tank, which may include permits or licenses.	Tanks without evidence of the date of installation are assumed to have been installed prior to January 1, 1998.	Equipment Test Records	Operators shall maintain records of monitoring well and leak detection system inspections, water level measurements, and adjustments.	Records should be maintained indefinitely to prove compliance. Records are also useful measurement tools to document actual or potential pollution prevention in everyday business operations.
Permitting	Tanks, piping and tank components shall not be removed, repaired or modified without a permit from the fire department or other authority having jurisdiction.	The fire department or other authority should make sure that repairs/modifications do not disturb the structural integrity of the tank or promote leaks, etc.	Change of Ownership	Tank owners shall notify the fire department and other relevant authority, of changes of name, address, or telephone numbers of the owner within seven business days of the change.	The environmental agency should have updated files in order to be able to contact the facility properly.
Permitting	Permits for USTs (either original or photocopied) shall be conspicuously posted, kept on the premises, and renewed regularly.	New storage tanks should not be installed without first getting a permit.			
Tank Inventory	Tank operators shall maintain daily inventory records for each tank and tank network for the time frame specified by the local or state agency.	Inventory based on actual daily measurement of tank product and water levels using gauges as well as sales, use and receipts.			

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