

Industrial User Inspection and Sampling Manual For POTWs



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ACRONYMS

ATP	Alternate Test Procedure
BAT	Best Available Technology Economically Achievable
BBL	Barrel
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practice
BMR	Baseline Monitoring Report
BOD	Biochemical Oxygen Demand
CBI	Confidential Business Information
CFR	<i>Code of Federal Regulations</i>
CIU	Categorical Industrial User
COC	Chain-of-Custody
COD	Chemical Oxygen Demand
CPR	Cardiopulmonary Resuscitation
CROMERR	Cross-Media Electronic Reporting Rule
CWA	Clean Water Act
CWF	Combined Wastestream Formula
CWT	Centralized Waste Treatment
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
EMS	Environmental Management System
ERP	Enforcement Response Plan
gpd	Gallons per Day
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
HEM	Hexane Extractable Material
IATA	International Air Transport Association
ICP	Inductively Coupled Plasma Mass Spectrometry
ISO	International Organization for Standardization
LEL	Lower-Explosive Limit
mg/L	Milligrams per Liter
mL	Milliliter
MS	Matrix Spike
MSD	Matrix Spike Duplicate

MTCIU	Middle-Tier Categorical Industrial User
MUR	Methods Update Rule
NAICS	North American Industry Classification System
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NSCIU	Nonsignificant Categorical Industrial User
OSHA	Occupational Safety and Health Administration
O&M	Operation and Maintenance
PMP	Pollutant Management Plan
POTW	Publicly Owned Treatment Works
PPE	Personal protective equipment
ppm	Parts per Million
ppq	Parts per Quadrillion
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
SCBA	Self-contained Breathing Apparatus
SDS	Safety Data Sheet (formerly Material Safety Data Sheet or MSDS)
SGT-HEM	Silica Gel Treated Hexane Extractable Material
SIU	Significant Industrial User
SNC	Significant Noncompliance
SOP	Standard Operating Procedures
SUO	Sewer Use Ordinance
TLV	Threshold Limit Values
TOMP	Toxic Organic Management Plan
TRC	Technical Review Criteria
TSS	Total Suspended Solids
TTO	Total Toxic Organics
TWA	Time Weighted Average
UEL	Upper Explosive Limit

DEFINITIONS

Accuracy

Accuracy refers to the degree of difference between observed values and known or actual values in the analysis of wastewater.

Act or “the Act” [40 CFR 403.3(b)]

The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. §1251 *et. seq.*

Acute Effects

When the effects of an exposure to a pollutant over a short period of time cause severe health effects to humans or other organisms, this condition is said to be acute (compare to chronic below).

Aliquot

A measured portion of a sample taken for analysis. One or more aliquots make up a sample.

Approval Authority [40 CFR 403.3(c)]

The director in a National Pollutant Discharge Elimination System (NPDES) authorized state with an approved state pretreatment program, or the appropriate EPA regional administrator in a non-NPDES authorized state or NPDES state without an approved state pretreatment program.

Baseline Monitoring Report (BMR) [40 CFR 403.12(b)]

A report required following promulgation of a federal categorical standard, pursuant to 40 CFR 403.12(b).

Batch Process

A treatment or manufacturing process in which a tank or reactor is filled, the wastewater (or solution) is held or a chemical solution is prepared, and the tank is emptied, resulting in a discrete discharge to the sanitary sewer. The tank may then be refilled and the process repeated. Batch processes are also used to clean, stabilize, or condition chemical solutions for use in industrial manufacturing and treatment processes.

Best Management Practice (BMP) [40 CFR 403.3(e)]

A schedule of activities, prohibition of practices, maintenance procedures, and other management practices to implement the prohibitions listed in section 403.5(a)(1) and (b). BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage.

Biochemical Oxygen Demand (BOD)

The quantity of dissolved oxygen in milligrams per liter (mg/L) in an effluent or other water, required during stabilization of decomposable organic matter by aerobic biochemical action as determined by analytical procedures set forth in the *Manual of Methods for Chemical Analysis of Water and Wastes* (USEPA, Office of Technology Transfer, Washington, D.C., March 1983).

Biological Treatment

A waste treatment process by which bacteria and other microorganisms break down complex organic or inorganic (e.g., ammonia) materials into simple, nontoxic, more stable compounds.

Blank (Bottle)

An aliquot of analyte-free water which is taken through the appropriate steps of the analytical process as a means of determining if the sampling container is introducing contamination into the sample. For aqueous samples, reagent water is used as a blank matrix; however, a universal blank matrix does not exist for solid samples (e.g., sludge), and therefore, no matrix is used.

Blank (Equipment)

An aliquot of analyte-free water which is taken to and opened in the field. The contents of the blank are poured appropriately over or through the sample collection device, collected in a sample container, and returned to the laboratory as a sample to be analyzed. Equipment blanks are a check on the sampling device cleanliness.

Blank (Field)

An aliquot of analyte-free water or solvent brought to the field in sealed containers and transported back to the laboratory with the sample containers and analyzed along with the field samples. Field blanks are a check on contamination that may be introduced into a sample or bottle from the surrounding environment while a container is sealed.

Blank (Method)

An aliquot of analyte-free water prepared in the laboratory and analyzed by the analytical method used for field samples. Method blanks are used to test for the cleanliness of reagents, instruments, and the laboratory environment.

Blank (Sample Preservation)

An aliquot of analyte-free water to which a known quantity of preservative is added. This type of sample is a means of determining the level of contamination of chemical preservatives after a period of use in the field.

Blowdown

The discharge of water with high concentrations of accumulated solids from boilers to prevent plugging of the boiler tubes and/or steam lines. In cooling towers, blowdown is discharged to reduce the concentration of dissolved solids in the recirculating cooling water. Clean “make-up” water is added to dilute the dissolved solids in the system. Blowdown also includes the discharge of condensate.

Categorical Industrial User (CIU)

A categorical industrial user is an industrial user (see industrial user definition below) that is subject to a categorical standard promulgated by the EPA. A CIU is a specific type of significant industrial user (SIU) (see significant industrial user definition below).

Categorical Standards (40 CFR parts 405-471)

Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Sections 307(b) and (c) of the Act (33 U.S.C. §1317) which apply to a specific category of users and which appear in 40 CFR Chapter I, Subchapter N, Parts 405-471. Not all

categorical standards include numerical standards; some have BMPs and some may be zero discharge. Some categorical standards do not include pretreatment standards for New Sources or Existing Sources.

Centralized Waste Treatment Facility (CWT) [40 CFR 437.2(c)]

A public or private facility that treats (for disposal, recycling or recovery of material) hazardous or non-hazardous industrial wastes, hazardous or non-hazardous industrial wastewater, and/or used material received from off-site. These facilities are designed to handle the treatment of specific wastes from industry. The waste waters are transported to the facility for proper storage, treatment and disposal.

Chain-of-Custody (COC)

A legal record (which may be a series of records) of each person who had possession of an environmental sample, from the person who collected the sample to the person who analyzed the sample in the laboratory, to the person who witnessed the disposal of the sample. A POTW may have a chain-of-custody form, sometime referred to as a COC form, for sample collection that shows custody of the sample up to delivery to the laboratory. Laboratories often have their own custody procedures and COC forms.

Chemical Oxygen Demand (COD)

Chemical oxygen demand is expressed as the amount of dissolved oxygen consumed from the oxidation of a chemical during a specific test (in mg/L). The COD is a measure of the oxygen-consuming capacity of the inorganic and organic matter present in the water or wastewater. The results of the COD test are not necessarily related to the Biochemical Oxygen Demand (BOD) because the chemical oxidant responsible for utilizing the oxygen may react with substances that bacteria do not stabilize.

Chemical Treatment Process

A waste treatment process that involves the addition of chemicals to achieve a desired level of effluent quality.

Chronic Effects

The effect of a single or repeated exposure to a pollutant that causes health effects over a long period of time in humans or other organisms (compare to acute effects above).

Code of Federal Regulations (CFR)

A publication of the United States government that contains all of the finalized federal regulations. Federal environmental regulations are found in volume 40 of the CFR, and the General Pretreatment Regulations are found at 40 CFR part 403.

Combined Wastestream Formula (CWF) [40 CFR 403.6(e)]

The combined wastestream formula is a means of deriving alternative categorical discharge limits in situations where process effluent is mixed with waste waters other than those generated by the regulated process prior to treatment.

Composite (Proportional) Samples

A sample composed of several discrete samples combined in a known proportion. For wastewater monitoring, a composite sample is a sample composed of several discrete samples collected at equal time intervals, or proportionally to the flow rate of the discharge.

Confined Space

A space which, by design, has limited openings for entry and exit, unfavorable natural ventilation that could contain or produce dangerous air contaminants (or create an atmosphere of oxygen deprivation), and that is not intended for continuous employee occupation. A permit may be required under OSHA to enter a confined space. Specific language regarding confined space can be found at:

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9797.

Conservative Pollutant

Any pollutant that is not significantly degraded by physical, chemical or biological processes which may occur in a wastewater or other water.

Contributing Jurisdiction

As a general rule, the powers of a municipal entity are limited to its geographic boundaries, and additional authority will be needed to regulate industrial users located beyond these boundaries. The U.S. Environmental Protection Agency (EPA) refers to these types of situations as “multijurisdictional,” because industrial users are located within the boundaries of one or more jurisdictions other than the municipal entity that is charged with program implementation and enforcement responsibilities.

Control Authority [403.3(f)]

The Control Authority is the jurisdictional entity which oversees the implementation of the National Pretreatment Program at the local level. Usually, the Control Authority is the POTW with an approved pretreatment program, but in some cases, the Control Authority may be the state (e.g., Vermont, Connecticut, Nebraska, Alabama, and Mississippi), or it may be the EPA (i.e., where there is no local approved program and the state is not authorized to administer the National Pretreatment Program).

Conventional Pollutant

A water pollutant that is amenable to treatment by a municipal wastewater treatment plant and which has been designated as conventional under section 304(a)(4) of the Act. These pollutants include: BOD, total suspended solids (TSS), pH, fecal coliform, and oil and grease.

Daily Discharge (40 CFR 122.2)

The “discharge of a pollutant” measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the “daily discharge” is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the “daily discharge” is calculated as the average measurement of the pollutant over the day.

Daily Maximum or Maximum Daily Discharge Limitation [40 CFR 122.2]

The highest allowable “daily discharge.”

Duplicate Sample (Field)

A precision check on sampling equipment and sampling technique. At selected stations on a random time frame duplicate samples are collected from two sets of field equipment installed at the site, or duplicate grab samples are collected from a single piece of equipment at the site. The results of the field duplicate samples may be compared to estimate the overall

precision of the entire sample collection and analysis process. This precision check should be ongoing while testing, using various control samples. It should not be done after a problem is detected (once a problem is detected it is too late).

Duplicate Sample (Laboratory)

A sample that is received by the laboratory and divided (by the laboratory) into two or more portions. Each portion is separately and identically prepared and analyzed. The results from laboratory duplicate samples check the laboratory precision.

Effluent

Wastewater or other liquid—raw, untreated, partially or completely treated—flowing from an industrial user to a reservoir, basin, treatment process, or treatment plant.

EPA

The United States Environmental Protection Agency. The principal environmental regulatory agency established by the Congress to administer the nation's environmental laws.

Existing Source

Any source of discharge, the construction or operation of which commenced prior to the publication by the EPA of proposed categorical pretreatment standards, which will be applicable to such source if the standard is thereafter promulgated in accordance with Section 307 of the Act. EPA's memorandum entitled New Source Dates for Direct and Indirect Dischargers (2006) can be found at http://www.epa.gov/npdes/pubs/newsource_dates.pdf to determine whether a source should be classified as "existing" or "new".

Grab Sample

A sample that is taken from a wastestream without regard to the flow in the wastestream and over a period of time not to exceed 15 minutes.

Hazardous Waste (40 CFR part 261)

Any waste that is defined or identified as a hazardous waste pursuant to the Federal Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §§ 6901 et seq.).

Indirect Discharge [40 CFR 403.3(i)]

The introduction of pollutants into a publicly owned treatment works (POTW) from any non-domestic source regulated under section 307(b), (c), or (d) of the Act.

Inductively Coupled Plasma Mass Spectrometry (ICP)

A type of mass spectrometry that is capable of detecting metals and several non-metals at concentrations as low as one part per 10¹⁵ (part per quadrillion, ppq) on non-interfered low-background isotopes. This is achieved by ionizing the sample with inductively coupled plasma and then using a mass spectrometer to separate and quantify those ions.

Industrial User or User (IU) [40 CFR 403.3(j)]

A source of indirect discharge.

Influent

Wastewater or other liquid—raw (untreated), partially or completely treated—flowing into a reservoir, basin, treatment process, or treatment plant.

Instantaneous Maximum Discharge Limit

The maximum concentration of a pollutant allowed to be discharged at any time, which is typically determined from the analysis of a grab sample collected at the discharge from the industrial user.

Interference [40 CFR 403.3(k)]

A discharge which, alone or in conjunction with a discharge or discharges from other sources, inhibits or disrupts the POTW, its treatment processes or operations or its sludge processes, use or disposal; and therefore, is a cause of a violation of the POTW's NPDES permit or of the prevention of sewage sludge use or disposal in compliance with the act or any more stringent state or local regulations.

Local Limits [40 CFR 403.5(c)]

Effluent discharge limits applicable to significant industrial users or other controlled industrial users of the Control Authority's system developed by the Control Authority in accordance with 40 CFR 403.5(c).

Middle Tier CIUs (MTCIUs) [40 CFR 403.12(e)(3)]

CIUs (under the jurisdiction of a POTW with approved streamlining regulations) that do not discharge categorical wastewater that exceed any of the following:

1. 0.01 percent of the design dry weather hydraulic capacity of the POTW, or 5,000 gallons per day (gpd) whichever is smaller, as measured by a continuous effluent flow monitoring device
2. 0.01 percent of the design dry weather organic capacity of the POTW
3. 0.01 percent of the maximum allowable headworks loading for any pollutant for which approved local limits were developed by a POTW.

Monthly Average or Average Monthly Discharge Limitation [40 CFR 122.2]

Highest allowable average of "daily discharges over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

National Pretreatment Standard [40 CFR 403.3(l)]

Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with section 307 (b) and (c) of the Act, which applies to industrial users. This term includes prohibitive discharge limits established pursuant to §403.5.

New Source [40 CFR 403.3(m)]

1. Any building, structure, facility, or installation from which there is (or may be) a discharge of pollutants, the construction of which commenced after the publication of proposed pretreatment standards under Section 307(c) of the Act which will be applicable to such source if such standards are thereafter promulgated in accordance with that section, provided that:
 - a. The building, structure, facility, or installation is constructed at a site at which no other discharge source is located; or
 - b. The building, structure, facility, or installation totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or
 - c. The production or wastewater generating processes of the building, structure, facility, or installation are substantially independent of an existing source at the same site. In

- determining whether these are substantially independent, factors such as the extent to which the new facility is engaged in the same general type of activity as the existing source, should be considered.
2. Construction on a site at which an existing source is located results in a modification rather than a new source if the construction does not create a new building, structure, facility, or installation meeting the criteria of Section (l)(b) or (c) above but otherwise alters, replaces, or adds to an existing process or production equipment.
 3. Construction of a new source as defined under this paragraph has commenced if the owner or operator has:
 - a. Begun, or caused to begin, as part of a continuous on-site construction program;
 - i. any placement, assembly, or installation of facilities or equipment; or
 - ii. significant site preparation work including clearing, excavation, or removal of existing buildings, structures or facilities which is necessary for the placement, assembly, or installation of new source facilities or equipment; or
 - iii. entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under this definition.

EPA's memorandum entitled *New Source Dates for Direct and Indirect Dischargers* (2006) can be found at http://www.epa.gov/npdes/pubs/newsources_dates.pdf to determine whether a source should be classified as "existing" or "new".

90-Day Compliance Report [40 CFR 403.12(d)]

A report submitted by categorical industrial users within 90 days following the date for final compliance with the standards for existing sources and within 90 days following commencement of the introduction of wastewater into the POTW for new sources. This report must contain flow measurement (or regulated process streams and other streams), measurement of pollutants, and a certification as to whether the categorical standards are being met. Specific requirements for this information are listed in 40 CFR 403.12(d).

Noncontact Cooling Water

Water used for cooling which does not come into direct contact with any raw material, intermediate product, waste product, or finished product.

Nonsignificant Categorical Industrial User (NSCIU) [40 CFR 403.3(v)(2)]

An NSCIU never discharges more than 100 gpd of total categorical wastewater (excluding, noncontact cooling and boiler blowdown wastewater, unless specifically included in the Pretreatment Standard) and meets the following conditions:

1. Consistently complies with all applicable categorical requirements
2. Submits annual certification statement required in 40 CFR 403.12(q)
3. Never discharges any untreated concentrated wastewater.

NPDES Permit [40 CFR 403.3(n)]

A National Pollutant Discharge Elimination System permit is the regulatory document issued to a point source that discharges pollutants into waters of the U.S. (e.g., POTWs), pursuant to section 402 of the Act, by either the EPA or authorized state agency.

Pass Through [40 CFR 403.3(p)]

A discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit, including an increase in the magnitude or duration of a violation.

Periodic Compliance Report [40 CFR 403.12(e) and (h)]

A compliance monitoring report required pursuant to an Industrial Wastewater Discharge Permit or other control mechanism issued by the Control Authority.

pH

The logarithm of the reciprocal of the hydrogen ion concentration.

Physical Wastewater Treatment Process

Physical wastewater treatment processes include racks, screens, comminutors/grinders, clarifiers (sedimentation and flotation), and filtration, etc., which, through physical actions, remove pollutants from the wastewater.

Precision

A measure of agreement among repeated measurements of the same property under identical, or substantially similar, conditions; expressed generally in terms of the standard deviation.

Pretreatment [40 CFR 403.3(s)]

The reduction in the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to, or in lieu of, introducing those pollutants into the POTW. This reduction or alteration can be obtained by physical, chemical, or biological processes; by process changes; or by other means, except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard.

Pretreatment Requirements [40 CFR 403.3(t)]

Any substantive or procedural requirement related to pretreatment, other than a National Pretreatment Standard, imposed on an industrial user.

Pretreatment Standard, or Standard [40 CFR 403.3(l)]

Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with section 307 (b) and (c) of the Act, which applies to industrial users. This term includes prohibitive discharge limits established pursuant to § 403.5.

Pretreatment Facility

Industrial wastewater treatment system consisting of one or more treatment devices designed to remove sufficient pollutants from wastestreams to allow an industry to comply with effluent limits (i.e., categorical standards, local limits, and federal and local prohibitive standards).

Priority Pollutants [40 CFR part 423, Appendix A]

The list of pollutants designated by the EPA pursuant to section 307(a)(1) of the Act. The list of 129 priority pollutants can be found at <https://www.epa.gov/eg/toxic-and-priority-pollutants-under-clean-water-act>

Publicly Owned Treatment Works (POTW) [40 CFR 403.3(q)]

A sewage (or wastewater) treatment works which is owned by a state or municipality. This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW treatment plant. The term also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works.

Quality Assurance (QA)

As applied to sampling and sample analysis, an integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that any samples taken and any analysis performed on those samples is of the type and quality needed and expected.

Quality Control (QC)

As applied to sampling and sample analysis, the overall system of technical activities that measure the attributes and performance of sampling and sample analysis against defined standards to verify that they meet the stated requirements established by the operational techniques and activities that are used to fulfill requirements for quality.

Process Wastewater [40 CFR 122.2]

Any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product.

RCRA

The federal Resource Conservation and Recovery Act (PL 94-580). RCRA was enacted to define a federal role in solid waste and resource management and recovery. RCRA's primary goals are: 1) to protect human health and the environment from hazardous and other solid wastes; and 2) to protect and preserve natural resources through programs of resource conservation and recovery. A principal regulatory focus is on the control of hazardous waste through a comprehensive system of identification, tracking, treatment, storage, and ultimate disposal.

Receiving Water

A stream, lake, river, ocean, or other surface or groundwater into which treated or untreated wastewater is discharged.

Representative Sample

A sample from a wastestream that is identical or nearly identical in composition to that in the larger volume of wastewater being discharged.

Sewer Use Ordinance (SUO)/Rules and Regulations

Typically, municipalities establish ordinances and districts establish rules and regulations to implement the Pretreatment Regulations. A sewer use ordinance, or Rules and Regulations, is a legal instrument, approved by the Approval Authority as part of the Control Authority's proposed pretreatment program submission that is implemented by a local governmental entity which sets out all the requirements for the discharge of pollutants into a POTW.

Significant Industrial User (SIU) [40 CFR 403.3(v)]

A significant industrial user is an industrial user (see industrial user definition above) which is either: 1) a categorical industrial user; 2) a user which discharges an average of 25,000 gpd or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); 3) contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW; or 4) is designated a significant industrial user by the Control Authority.

Significant Noncompliance (SNC) [40 CFR 403.8(f)(2)(viii)]

A significant industrial user (or any industrial user that violates 3, 4, or 8 of this section) is in SNC if its violations meet one or more of the following criteria:

1. Chronic violations of wastewater discharge limits, defined as those in which sixty-six percent or more of all measurements taken for the same pollutant parameter during a six month period exceed (by any magnitude) the parameter numeric pretreatment standard or requirement. This is evaluated separately for compliance with instantaneous, daily maximum, and monthly average limits;
2. Technical Review Criteria (TRC) violations, defined as those violations in which thirty-three percent or more of all measurements for the same pollutant parameter during a six month period equal or exceed the effluent limit by 40 percent (for BOD, TSS, fats, oil, and grease) or 20 percent for all other pollutants except pH. This is evaluated separately for compliance with instantaneous, daily maximum, and monthly average limits;
3. Any other violation of a pretreatment standard or requirement (daily maximum, long-term average, instantaneous limit, or narrative standard) that the POTW determines has caused, alone or in combination with other discharges, interference or pass through (including endangering the health of POTW personnel or the general public);
4. Any discharge of a pollutant that has caused imminent endangerment to human health, welfare or to the environment or has resulted in the POTW's exercise of its emergency authority to halt or prevent such discharge;
5. Failure to meet, within 90 days after the schedule date, a compliance schedule milestone contained in a local control mechanism or enforcement order for starting construction, completing construction, or attaining final compliance;
6. Failure to provide, within 45 days after the due date, required reports such as the baseline monitoring report (see definition above), 90-Day Compliance Report (see definition above), periodic compliance report (see definition above), and reports on compliance with compliance schedules, for states and/or POTWs that did not adopt this less stringent definition (i.e., 45 days) allowed in the 2005 streamlining revision to the federal regulations reports that are 30 days late are SNC;
7. Failure to accurately report noncompliance; and
8. Any other violation or group of violations, which may include a violation of best management practices, which the POTW determines will adversely affect the operation or implementation of the local pretreatment program.

Sludge

The settleable solids intentionally separated from liquid wastestreams during treatment typically under quiescent conditions, and the unintentional accumulation of solids in tanks and reservoirs associated with production and manufacturing processes.

Slug Discharge [40 CFR 403.8(f)(2)(vi)]

Any discharge of a nonroutine, episodic nature, including but not limited to an accidental spill or a noncustomary batch discharge that has a reasonable potential to cause interference or pass through, or in any other way violate the POTW's regulations, local limits or permit conditions.

Slug Discharge Control Plan [40 CFR 403.8(f)(2)(vi)]

A plan designed to prevent uncontrolled slug discharges into the POTW. A slug plan must contain, at a minimum:

1. Description of discharge practices, including non-routine batch Discharges;
2. Description of stored chemicals;
3. Procedures for immediately notifying the POTW of Slug Discharges, including any Discharge that would violate a prohibition under §403.5(b) with procedures for follow-up written notification within five days; and
4. If necessary, procedures to prevent adverse impact from accidental spills, including inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site run-off, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants (including solvents), and/or measures and equipment for emergency response.

Spiked Sample (Field)

A sample of a known amount of a particular pollutant constituent prepared in the field by adding a known amount of the analyte in question during sampling. This technique identifies potential sample matrix interference and/or problems with inadequate sample preservation.

Spiked Sample (Laboratory)

A sample of a known amount of a particular pollutant constituent prepared in the laboratory by adding a known amount of the pollutant in question at a concentration where the accuracy of the test method is satisfactory. Spiked samples check on the accuracy of the analytical procedure.

Split Sample (Field)

A sample which is collected and divided in the field into the necessary number of portions (e.g., 2, 3, etc.) for analysis at different laboratories. Equally representative samples must be obtained in the process. The split samples are then analyzed by separate laboratories preferably using the same analytical techniques.

Technology-Based Standards

Direct discharge limits for specific industrial categories established by the EPA based on the use of the Best Available Technology economically achievable (BAT) or the Best Conventional Technology available (BCT). Such standards are based on the cost and/or availability of technology to treat the specific wastestream under consideration.

Toxic Pollutants (40 CFR part 122, Appendix D)

The Toxic Pollutant List specified in 40 CFR 401.15 is a list of 65 pollutant groups negotiated in a 1976 settlement agreement (NRDC et al. vs. Train, June 9, 1976). This list of

pollutant groups was then used to create the original 129 Priority Pollutants List published in 40 CFR 423.

Water Quality Standards

Water quality standards are provisions of state or federal law which consist of a designated use or uses for a given water body and associated water quality criteria which must be met in the stream to achieve these uses. These standards are designed to achieve the water quality criteria established for a given water body. These standards are designed to improve and/or maintain the quality of the receiving water, regardless of the cost or availability of treatment technology.

1. INTRODUCTION

The overall objectives of the General Pretreatment Regulations are to: 1) prevent the introduction of pollutants into publicly owned treatment works (POTWs) which will interfere with the operation of the plant, including interference with the desired use or disposal of its municipal sludge; 2) prevent the introduction of pollutants into the POTW which will pass through the treatment works to receiving streams; 3) improve opportunities to reclaim and recycle municipal and industrial wastewaters and sludges; and 4) reduce the health and environmental risk of the discharge of toxic pollutants to POTWs.

Under the General Pretreatment Regulations, POTWs with approved pretreatment programs are required to inspect industrial users and sample industrial users' wastestreams to assess compliance status with pretreatment program requirements and standards (40 CFR 403.8(f)(2)(v)). This manual is intended to acquaint POTW personnel with the well-established inspection and wastewater sampling procedures that have been used in the National Pollutant Discharge Elimination System (NPDES) program for many years. The information presented will provide the POTW inspector¹ a framework for conducting inspections and wastewater sampling. The manual assumes that the POTW inspector has a basic knowledge of wastewater treatment technologies, as well as all applicable federal, state and local pretreatment requirements.

This guidance is primarily intended for use by POTW inspectors where the POTW has an approved pretreatment program; however, the procedures outlined in this guidance may be used by local POTW inspectors without an approved pretreatment program that need to characterize an industrial user.²

The information contained in this guidance will serve the experienced inspector as a reference, while new inspection personnel will find it useful for learning how to conduct inspections and sampling at significant industrial users (SIUs) and other regulated industrial users. This manual is also intended to assist the POTW's legal counsel and laboratory personnel as a reference for the legal and technical aspects of pretreatment inspections and sampling activities.

Certain elements of this industrial user inspection and sampling framework may not need to be implemented by each POTW in all cases. For example, where there are just a few, very small, industrial users in the system, the POTW may never encounter issues relating to confidential business information (CBI) or have the need to implement some of the safety precautions described in this manual. For large POTWs with many complex industrial users, it may be necessary for the POTW to follow each of the procedures outlined in this manual. When a POTW identifies a new industrial user in its jurisdiction, each of these procedures should be considered in establishing appropriate inspection and monitoring requirements for that industrial user. For additional assistance, POTW staff can contact their U.S. Environmental Protection Agency (EPA) or state pretreatment coordinator.

¹As used in the text and throughout this manual, the term "inspector" includes all field personnel who collect information that may lead to or support an enforcement action.

² For industrial user inspection and sampling activities that are conducted by state or EPA inspectors, the inspector should follow applicable state or EPA inspector requirements and guidelines. Applicable guidelines for EPA inspectors include the most current version of EPA Order 3500.1, *Training Requirements for EPA Personnel Who Are Authorized to Conduct Civil Compliance Inspections/Field Investigations and EPA Inspector Supervisors*, and EPA Order 3510, *EPA Federal Credentials for Inspections and Enforcement of Federal Environmental Statutes and Other Compliance Responsibilities*, and the *Policy Affirming the EPA Authority to Access Facilities and Conduct Inspections without Providing Personally Identifiable Information* (January 2015).

1.1 Legal Authority and Regulatory Basis for Conducting Industrial User Inspections and Sampling

The General Pretreatment Regulations are published in the *Code of Federal Regulations* (CFR) at 40 CFR Part 403 and establish the requirements for implementing an approved pretreatment program. The regulations outline the minimum requirements a POTW with an approved pretreatment program must perform to satisfy the obligations established in its NPDES permit. With regard to inspecting and sampling industrial users, 40 CFR 403.8(f)(1)(v) requires the POTW to have the legal authority to:

“Carry out all inspection, surveillance and monitoring procedures necessary to determine, independent of information supplied by industrial users, compliance or noncompliance with applicable Pretreatment Standards and Requirements by Industrial Users. Representatives of the POTW shall be authorized to enter any premises of any Industrial User in which a Discharge source or treatment system is located or in which records are required to be kept under 40 CFR 403.12(o) to assure compliance with Pretreatment Standards.”

Federal pretreatment regulations at 40 CFR 403.8(f)(1)(vi)(B) require POTWs with approved pretreatment programs to have the legal authority to enter industrial user facilities to carry out inspections and monitoring activities. POTWs generally adopt this legal authority in their local sewer use ordinances (SUOs). This gives the POTW’s representatives the authority to enter, inspect, review records, gather information (e.g., take photos, ask questions, copy records), and sample wastewater at an industrial facility. Please note that the Federal pretreatment regulations do not specifically provide the legal authority to take photos; EPA recommends that the local pretreatment programs specifically establish this legal authority.

Section 403.8(f)(2)(v) of the regulations requires POTWs to:

“Randomly sample and analyze the effluent from Industrial Users and conduct surveillance activities in order to identify, independent of information supplied by Industrial Users, occasional and continuing noncompliance with Pretreatment Standards. Inspect and sample the effluent from each Significant Industrial User at least once a year, except as otherwise specified below.”

The statement “except as otherwise specified below” refers to reduced inspection and sampling requirements for SIUs that meet Middle Tier Categorical Industrial Users (MTCIUs) and Nonsignificant Categorical Industrial Users (NSCIU) criteria. Reduced inspection and sampling requirements are discussed further in Section 2.2 of this manual.

Inspection and sampling activities form the core of the POTW’s compliance monitoring program and require POTW personnel to enter private property to gather information to assess or determine the compliance status of the facility. These compliance monitoring activities must be performed in accordance with minimum constitutional protections, for example, protecting against unreasonable searches and seizures, as well as other rights and “due process” considerations available to individuals under federal, state or local law. Consequently, all POTW representatives, including any authorized agents of the POTW, who enter industrial facilities, should be familiar with the section of their local ordinance that provides the inspector (or the POTW’s agent) the authority to enter an industrial user’s facility to conduct an inspection and/or sample the wastewater. In addition, each inspector should be familiar with the POTW’s standard procedures for entering industrial facilities, including how to obtain a warrant if entry is denied or withdrawn.

In some instances, the POTW may employ an independent contractor to perform all or a certain aspect of the pretreatment program. POTW personnel should consult with state or local law to ensure that the POTW may, in fact, designate such contracted personnel as inspectors. The POTW is responsible for making compliance determinations and policy decisions that affect the conduct of inspections or sampling. The POTW is also responsible for ensuring that industrial user employees and contract

employees are operating all systems in a manner that comply with the requirements of the industrial user's discharge permit.³ Furthermore, if the industrial user reports submitted to the POTW are signed by a contract employee, the POTW must ensure that the contract employee meets the signature requirements at 40 CFR 403.12(l).

It is important that the inspector keep current on applicable regulations. Sources of information for the inspector include:

- The *Federal Register*.
- The *Code of Federal Regulations*.
- Subscribing to a service that summarizes the EPA regulations, such as <http://listserv.access.gpo.gov>.
- Attending conferences and workshops.
- Taking online and/or classroom training courses.
- Consulting on a regular basis with the POTW's legal counsel, and/or EPA or state pretreatment coordinator (as needed).

1.2 Purposes and Objectives for Inspecting and Sampling Industrial Users

Each POTW with an approved pretreatment program must implement a compliance monitoring program⁴ that: 1) meets the requirements and intent of the General Pretreatment Regulations, 2) is effective and timely in determining compliance with categorical standards, local limits and discharge prohibitions, 3) provides representative data required to meet POTW reporting requirements to the state or the EPA, and 4) provides sampling data that would be admissible in court, if an enforcement action were to be undertaken by the POTW, state or federal government.

Specifically, the objectives of the POTW's compliance monitoring program are to:

- Evaluate industrial user compliance
 - Verify the completeness, accuracy, and representativeness of self-monitoring data from the industrial user as well as whether required sampling and analysis techniques were used.
 - Verify production/flows at applicable production-based categorical industrial users (CIUs) to validate accurate equivalent concentration permit limits.
 - Determine compliance with all applicable requirements, such as industrial user permit conditions and SUO provisions⁵.
 - Evaluate best management practices (BMPs) and pollution prevention measures.
 - Evaluate the industrial user's standard operating procedures (SOPs), chemical waste handling procedures, preventative maintenance programs, process/pretreatment equipment and general housekeeping.

³ The General Pretreatment Regulations refer to industrial user *permits* as well as *control mechanisms*. The regulations use the two terms interchangeably and, therefore, this same practice is applied throughout this guidance document.

⁴ Compliance monitoring programs include activities such as on-site inspections and sampling, as well as review of self-monitoring reports and other information submitted by industrial users.

⁵ It is important to note that inspectors should never make compliance determinations while at the facility.

- Determine if the industrial user has corrected problems identified in previous inspections.
- Support past and future enforcement actions against noncompliant industrial users, including ensuring the industrial user complies with obligations imposed through prior enforcement actions.
- Assess the potential for spills and slug discharges and evaluate the effectiveness of slug discharge control measures.
- Evaluate the adequacy of the industrial user’s hazardous waste management and disposal practices.
- Consider potential compliance issues with other statutes or regulations (e.g., Occupational Safety and Health Administration (OSHA), RCRA, etc.)
- Develop and revise industrial user permit requirements
 - Confirm applicability of appropriate categorical standards for the facility.
 - Confirm the accuracy of information in the most current permit application (or survey form) with respect to the industrial user’s operations. Specifically, assure raw materials and chemicals used, production, treatment, and disposal practices, and all wastestreams are accurately captured in the application (or survey form).
 - Evaluate the impacts of the industrial user on the POTW’s influent, treatment processes, sludge and effluent (including water quality impacts from the effluent).
 - Assess the adequacy of the industrial user’s self-monitoring program and permit, and support permit revisions as appropriate.
 - Confirm comprehensive process narrative and wastewater flow schematics coincide with current operations at the industrial user (i.e., have there been any changes in either that have not been reported?).
 - Evaluate and document pollution prevention (also known as P2) activities and opportunities (source reduction, environmental management system (EMS), BMPs, water/energy re-use/conservation, in-situ recycling, etc.)
 - Provide a basis for establishing the sampling requirements of the industrial user (above the federal minimums).
 - Evaluate the adequacy of the industrial user’s operation and maintenance (O&M) activities on its pretreatment system.
- Maintain a strong local pretreatment program
 - Evaluate the need for revised local limits.
 - Inform the regulated community of pretreatment requirements.
 - Maintain current data on each regulated industrial user.
 - Generate data that can be used by the POTW in its annual report to the Approval Authority.
 - Establish and maintain good working relationships with the industrial user.
 - Provide a presence in the field so that industrial users understand that the POTW is serious about its regulatory oversight duties.

Industrial user sampling and inspections are the cornerstone of the POTW's pretreatment compliance and enforcement program. The inspector's presence helps to establish the POTW's role as a responsible public agency observing the actions of the regulated industry. Without the inspector on the scene, industrial processes/practices that violate federal, state, or local laws could jeopardize the POTW, the environment, and public health. The inspector may be the only person from the POTW who regularly visits the industrial user's facility. Furthermore, the knowledge that an inspection could occur unannounced encourages industrial plant managers to keep their operations in compliance.

1.3 Outline of the Manual

This guidance manual is designed to lead the POTW inspector through the inspection and sampling process step-by-step. The Introduction in Chapter 1 provided the legal authority, specific regulatory requirements, and purpose for performing inspections of industrial users under the General Pretreatment Regulations at 40 CFR Part 403.

Chapter 2 discusses developing and maintaining an industrial user inventory, required frequencies for inspections, types of inspections, CBI requirements, responsibilities of the inspector, and inspection documentation. Chapter 2 also presents a chronological outline for conducting an inspection at an industrial user, beginning with the pre-inspection activities, such as the preparation and entry considerations. The chapter covers the on-site activities of the inspector, including pre-inspection observations, the opening conference or initial meeting at the facility, the records review process, observations and illustrations, and the closing conference, or exit interview. Further, Chapter 2 discusses follow-up activities that should be conducted by the POTW (e.g., inspection report writing, enforcement actions, data tracking) to complete the inspection. Chapter 2 concludes with an inspection checklist.

Chapter 3 presents a detailed framework for conducting sampling at the industrial user. This chapter covers the objectives of sampling, required frequencies of sampling, pollutants to be monitored, analytical methods, development of a Sampling and Quality Assurance Plan, quality assurance/quality control (QA/QC) considerations, pre-sampling considerations, on-site sampling activities, flow measurement, and compliance issues related to sampling and analysis.

Chapter 4 provides important information about safety considerations that must be followed when conducting industrial user inspections and sampling. Health and safety of all individuals involved is of utmost importance.

Chapter 5 provides a list of additional resources that are available to supplement this manual.

2. INSPECTING INDUSTRIAL USER FACILITIES

This chapter presents procedures that POTW personnel can use when conducting on-site inspections at industrial facilities that discharge process wastewater to the POTW. The principal intent of this chapter is to assist POTW personnel in planning inspections, and collecting and documenting sufficient information to determine industrial user compliance with all applicable federal, state, and local pretreatment standards and requirements. New POTW inspection personnel are encouraged to read and understand the material presented in this chapter before beginning any inspection activities.

This chapter begins with a discussion of general inspection topics such as: developing and maintaining an industrial user inventory; criteria to be used in setting the frequency of inspections and sampling activities; the types of inspections that can be performed by the POTW; how to handle CBI; the general responsibilities of the POTW inspector; and the documentation of observations and findings. The chapter then details specific inspection activities. The topics covered in this discussion include pre-inspection activities, on-site activities, and follow up activities. An inspection checklist that can be used by the inspector as the basis for the inspection and the inspection report is included at the end of the chapter.

2.1 *Developing and Maintaining an Inventory or List of Industrial Users*

It is required that the POTW maintain an up-to-date listing of each industrial user that discharges to the POTW (40 CFR 403.8(f)(2)(i)). All permitting, compliance monitoring and enforcement activities that the POTW undertakes are derived from accurate, ongoing identification of the regulated industrial users in the POTW's system. Once this list is established, the POTW should update this information on an ongoing basis. In addition to continually tracking and updating lists of industrial users, the POTW is required to report its list of SIUs as part of its annual report submittal to the state or EPA (40 CFR 403.12(i)). Sources of information for updating industrial user inventories include:

- Applications for water or wastewater service.
- Enforcement and Compliance History Online (ECHO), RCRA information, the Discharge Monitoring Report Pollutant Loading Tool, the Toxics Release Inventory, as well as the state's hazardous waste generators list.
- Building permit and business license applications.
- Industrial waste questionnaires.
- Internet searches.
- Local chamber of commerce.
- Coordination with internal departments and local agencies such as utilities, code enforcement, health departments, and fire departments.
- Drive-by reconnaissance of the jurisdiction by POTW personnel.
- Newspapers, yellow book advertising, etc.

To keep the list current, the POTW should also establish procedures for working closely with planning and business development offices. For example, some municipalities have developed a system so that the POTW operator is automatically notified of any new business license applications. POTWs should also establish requirements for contributing jurisdictions to notify the POTW of any new industrial users or develop the legal authority and procedures to identify industrial users in contributing jurisdictions. The POTW should periodically document its industrial waste survey activities and results.

A current inventory of all industrial users is essential to the POTW's ability to ensure compliance with its NPDES permit and provide accurate information to the NPDES permitting authority for permit development. This list of industrial users also provides the basis for developing a plan for scheduling inspections at industrial users.

2.2 Frequency of Inspections

The General Pretreatment Regulations require POTWs with approved pretreatment programs to develop procedures to randomly sample and analyze the effluent from all industrial users and conduct surveillance activities to identify, independent of information supplied by the industrial users⁶, occasional and continuing noncompliance with pretreatment standards (40 CFR 403.8 (f)(2)(v)).

When considering how often to inspect an industrial user, the POTW should consider (at a minimum) the following criteria:

- The minimum inspection requirements established in the General Pretreatment Regulations.
- POTW problems (such as interference or pass through) that have no known cause.
- POTW problems known or suspected to have been caused by the industrial user.
- The industrial user's potential to adversely affect the POTW's operations.
- The compliance history of the industrial user.
- The period of time since the last inspection.
- Public tips and complaints, including communication with local departments/agencies.
- The volume and variability of the discharge.
- The quantity and nature of materials stored or in use at the industrial user and their relative risk of accidental spill.
- The type and reliability of industrial user control methods used to achieve compliance.
- New or additional pretreatment standards and requirements that apply to the industrial user.
- Available POTW resources for compliance monitoring activities.
- Special considerations or circumstances such as seasonal production schedules or batch discharges at the industrial facility.

The General Pretreatment Regulations require POTWs to inspect and sample SIUs at least once each year (40 CFR 403.8(2)(v)). EPA established this minimum frequency of annual inspections for all SIUs, including those with good compliance histories, to ensure that the Control Authority does not rely exclusively on self-reported data when evaluating industrial user compliance.

For industrial users that are not permitted or controlled SIUs, the POTW should develop procedures for routine inspections, in addition to other methods to gather information. The procedures should provide an objective basis for scheduling inspections by establishing a system for setting priorities to ensure that industrial users are not unfairly selected for inspection. For example, scheduling could be built around volume of discharge or discharge of pollutants of concern for the POTW, alphabetical order of SIUs, or geographic locations of SIUs. POTWs should also develop an inspection plan (discussed below) to

⁶ SIUs must report results from sampling data a minimum of two times per year. POTWs that have approved Streamlining Regulation program modifications may allow reduced reporting for CIUs. NSCIUs may have reduced sampling and reporting if approved by the Control Authority. MTCIUs may have their monitoring reporting reduced by the Control Authority from a minimum of twice per year to once per year.

establish the criteria under which the POTW will conduct SIU inspections at a frequency greater than the once per year minimum.

For example, a large SIU facility with a poor compliance history might be scheduled for monthly site visits, some of which could be inspections without sampling. On the other hand, an SIU with a fairly consistent record of compliance, a cooperative attitude toward the pretreatment program, and a relatively constant manufacturing process might need to be inspected only once per year. When establishing an inspector's site visit schedule, adequate time must be allotted to allow inspectors to prepare for each visit and document their findings in a site visit report.

There are some exceptions to the requirement that POTWs inspect SIUs a minimum of once per year. Where the POTW's approved program has incorporated changes, including revision of its legal authority, into its approved pretreatment program in accordance with procedures at 40 CFR 403.18, the POTW has the discretion to reclassify SIUs that meet certain conditions as MTCIUs (see 40 CFR 403.12(e)(3)) or as NSCIUs.

For MTCIUs, the POTW may reduce the inspection frequency of the CIU to at least one sampling inspection every two years (40 CFR 403.8(f)(2)(v)(C)). If the industrial user no longer meets the conditions for classification as Middle Tier (defined in 40 CFR 403.12(e)(3)) the POTW must immediately begin inspecting the CIU at least once a year. The Control Authority must retain documentation to support the Control Authority's determination that a specific industrial user qualifies for reduced reporting requirements for a period of three years after expiration of the term of the control mechanism.

MTCIUs are defined as CIUs that discharge categorical wastewater (wastewater from a facility subject to a categorical standard in 40 CFR Chapter I, Subchapter N, Parts 405-471) that does not exceed any of the following:

- 0.01 percent of the design dry weather hydraulic capacity of the POTW, or 5,000 gallons per day (gpd) whichever is smaller, as measured by a continuous effluent flow monitoring device.
- 0.01 percent of the design dry weather organic capacity of the POTW.
- 0.01 percent of the maximum allowable headworks loading for any pollutant for which approved local limits were developed by a POTW.

Also, to be classified as an MTCIU, the industrial user must meet the following conditions:

- The industrial user has not been in significant noncompliance (SNC), as defined in 40 CFR 403.8(f)(2)(viii), for any time in the past two years.
- The industrial user does not have daily flow rates, production levels, or pollutant levels that vary so significantly that decreasing the reporting requirement for this industrial user would result in data that are not representative of conditions occurring during the reporting period.
- The industrial user must notify the Control Authority immediately of any changes at its facility causing it to no longer meet these conditions. Upon notification, the industrial user must immediately begin conducting self-monitoring twice a year.

An NSCIU (defined in 40 CFR 403.3(v)(2)) never discharges more than 100 gpd of total categorical wastewater (excluding, noncontact cooling and boiler blowdown wastewater) and meets the following conditions:

- Consistently complied with all applicable categorical requirements for a period of 2 years.
- Submits annual certification statement required in 40 CFR 403.12(q).

- Never discharges any untreated concentrated wastewater.

NSCIUs are CIUs that are no longer SIUs. As CIUs, NSCIUs are still required to comply with applicable categorical pretreatment standards. Where the POTW has determined that a CIU meets the criteria for classification as an NSCIU, the POTW must evaluate, at least once per year, whether the NSCIU continues to meet the criteria above. As part of the annual evaluation, EPA recommends that the POTW conduct an on-site inspection of the facility in order to maintain awareness of the facility's process and, to the extent possible, to determine whether the discharger is complying with its pretreatment program requirements. As part of the evaluation, the POTW should verify the NSCIU's certification under 40 CFR 403.12(q) and review any other documentation provided by the facility. The level of effort devoted to an evaluation can be tailored to the facility.

Future references in this document for MTCIUs and NSCIUs are made with the assumption that the Control Authority has incorporated these optional provisions into its approved pretreatment program. Users of this manual must check the applicability of these optional provisions to its individual program.

2.3 Types of Inspections

Inspection activities at industrial facilities may be: 1) *scheduled or routine*; or 2) *on-demand*, usually in response to a specific problem or emergency situation, such as a spill at the industrial user or an upset at the POTW. The POTW may use either of these inspection types, but to satisfy the sampling and inspection requirement established by the General Pretreatment Regulations (40 CFR 403.8(f)(2)(v)), the POTW must annually conduct at least one complete compliance inspection at each SIU.

During *scheduled/routine inspections* POTW inspectors conduct surveillance activities to identify, independent of information supplied by the industrial user, whether the industrial user is in compliance with General Pretreatment Regulations and discharge permit requirements. These inspections are required for approved pretreatment programs and POTWs must inspect SIUs annually, at a minimum. Scheduled/routine inspections can be announced or unannounced (see section 2.7.4, Notification of the Facility). Also, these types of inspections can be used to determine whether the industrial user should be subject to the POTW's pretreatment program. This is part of an ongoing industrial user survey process that the POTW should administer.

On-demand inspections are usually initiated in response to known or suspected violations, usually identified as a result of reviewing a self-monitoring report, a public complaint, a violation of the POTW's NPDES permit requirements, POTW operating difficulties, unusual influent conditions at the POTW, or emergency situations (e.g., sewer line blockages, fires, or explosions). When emergency situations arise at the POTW or within the collection system, the POTW should immediately initiate inspections of industrial users that may have caused or contributed to the emergency conditions. (Note: Sampling is almost always a part of an on-demand inspection because the purpose of the inspection is to identify or verify the source of a known problem and to gather information that might be used in a subsequent enforcement action.) Depending on the nature of the problem at the facility, in some instances, the POTW may want to notify or invite other appropriate local agencies (e.g., the fire department, the state hazardous waste response team, or the EPA). Depending on the scope of an on-demand inspection, it may not sufficiently satisfy the regulatory requirement for annual inspection and sampling of SIUs.

2.4 Confidential Business Information (CBI)

The very nature of inspections involves gaining access to and collecting information that companies or facilities would not ordinarily make available to the public. When conducting compliance inspections, the inspector may have to address claims of business confidentiality. States that implement NPDES and pretreatment programs generally have their own regulations for handling information that businesses consider sensitive or business confidential. State and POTW pretreatment inspectors should know and

follow applicable state and local law when handling such confidential business information, and should know what types of information are typically claimed as CBI.

The pretreatment regulations at 40 CFR 403.14 specifically distinguish what EPA must do (as described in 40 CFR part 2, subpart B) to protect confidential business information and what states may do to gain access to confidential business information. If a valid claim of confidentiality is made by a facility at the time of submission, then EPA must protect this information as described in 40 CFR part 2, subpart B. This claim of confidentiality cannot be made for information deemed by the Agency to be effluent data.

2.5 Responsibilities of the Inspector

The inspection better enables the Control Authority to determine the reliability of self-monitoring reports and the compliance status of each industrial user which is the foundation for any subsequent enforcement action. In order to conduct a thorough inspection and gather information to determine compliance status, the inspector must be knowledgeable about the requirements that apply to the industrial user (i.e., the industrial user permit, the SUO, and federal categorical standards). Local pretreatment program inspectors are responsible for the program areas described below.

2.5.1 Legal

POTW inspectors must conduct all inspection activities within the legal framework established under federal, state and local law. The inspector must be knowledgeable of the conditions established in the industrial user permit, the local SUO and local limits, applicable national categorical standards, best management practices, and any other applicable state or local regulations, including any special requirements regarding entry to the industrial user.

2.5.2 Procedural

POTW inspectors must be familiar with general inspection procedures and evidence collection techniques, such as those described in this manual, to ensure complete inspections and to avoid endangering potential legal proceedings on procedural grounds. These inspection procedures should be set forth in local policies (e.g., the POTW's Enforcement Response Plan (ERP)) and should include procedures for all aspects of a sampling inspection, including sampling, flow monitoring, and documenting the results of these activities in a manner that enables the POTW to produce evidence that is admissible in a judicial action. The standard sequence of activities for conducting inspections is outlined in detail in Table 2-1. These procedural considerations are also discussed later in this chapter.

**Table 2-1
Procedural Responsibilities of the POTW Inspector**

Pre-Inspection Preparation:

- Establish the purpose and scope of the inspection.
- In certain situations, consider sending previous inspection report to industrial user representative to make any updates which have not been previously reported. Request a revised version to be returned prior to inspection.
- Review all pertinent background information, including the industrial user's permit, the permittee's compliance file, the industrial user's permit application (or survey form) any wastewater characterization done previously, sample results both from POTW and industrial user sampling, and applicable categorical standards.
- Review any compliance reports and self-monitoring reports required by the permit.
- Review reports of any previous inspections conducted at the facility.
- Contact appropriate industrial user personnel responsible for the permittee.
- Develop a plan for the inspection.
- Prepare any documents and equipment necessary for the inspection.
- Coordinate scheduling with the laboratory if samples will be collected.
- Contact responsible party for transporting samples and for packing/shipping/preservation requirements.
- Prepare site specific Job Hazard Analysis Safety Protocols.
- Obtain appropriate safety clothing or equipment (e.g., hard hat, protective steel-toed boots, safety glasses, ear plugs).
- If the facility has a laboratory on site, review laboratory records for QA/QC and monitoring data (e.g., flow, pH).
- If the facility has a laboratory on site, review laboratory procedures to verify the use of approved methods.

Entry:

- Present official credentials and clearly identify yourself and any other members of the inspection team.
- Do not sign any enforcement waivers or documents forbidding evidence collection.
- Manage denial or withdrawal of entry, if necessary.

Opening Conference or Meeting:

- Discuss inspection objectives and scope.
- Based on level of experience of industrial user contact (new or old contact?), give overview of the POTW's expectations for the industrial user.
- Establish a working relationship with the industrial user. Review industrial user records (e.g. including self-monitoring, treatment system O&M records, hazardous waste manifests, and other records of offsite disposal) and industrial user's wastewater permit.
- Discuss spill prevention and response actions industrial user must take if there is a spill.
- Discuss authority to gather information, including taking photos.
- Gather information regarding the industrial user and confirm the accuracy of the information the industrial user has provided on the most current permit application or survey forms:
 - Chemical supply, storage, transfer, handling.
 - Raw materials, feedstocks used.
 - Industrial process use or service provided.
 - Wastestream generation and management methods (recycling/reuse, treatment, haul offsite, etc.).
 - Discharge of wastestreams.

Facility Inspection (operations walk-through):

- Conduct visual inspection of the entire industrial facility.
- Review wastewater pretreatment equipment and overall system.
- Inspect monitoring equipment, treatment process(es), and operations.
- Review hazardous waste records.
- Collect samples.
- Document inspection activities (e.g., take notes and photos, complete inspection checklist).

Closing Conference:

- Obtain missing or additional information.
- Identify inspection goals that were not achieved (e.g. if you needed to see something that was not possible that day.)
- Clarify questions and answers with facility officials.
- Review preliminary inspection findings and inform facility officials of follow-up procedures.
- Never make compliance determinations in the field.

Inspection Report:

- Organize inspection findings into a useful, objective evidence package.
- Include all identified deficiencies and required activities.
- Prepare the narrative report, checklists, and documentary information, including photos and sampling results.
- Review any findings of noncompliance with POTW enforcement personnel, supervisor, and enforcement attorney, when necessary.
- Enter findings into tracking database, as appropriate.

Send the industrial user a copy of the results of the inspection in a timely manner.

2.5.3 Evidence Collection

POTW inspectors must be familiar with general evidence gathering techniques because the POTW's case in a civil or criminal prosecution depends in part on the evidence gathered during the inspection. Inspectors must keep detailed records of each inspection. Information gathered during the on-site inspection will be used to develop the inspection report, determine the appropriate enforcement response, and support testimony in an enforcement action. In particular, inspectors must know how to:

- Substantiate facts with items of evidence, including: samples, photographs, document copies, statements from witnesses, and objective observations.
- Collect and preserve data in a manner admissible in legal proceedings, including chain-of-custody procedures.
- Testify in court and administrative hearings.

The standard to which POTWs are held for purposes of evidence collection during an inspection or sampling event is further outlined in 40 CFR 403.8(f)(2)(vii):

“Sample taking and analysis, and the collection of other information shall be performed with sufficient care to produce evidence which is admissible in enforcement proceedings or judicial actions.”

Specifically, this statement means that:

- POTWs must use proper sampling techniques to ensure that the sample is *representative* of the discharge.
- Inspections must be documented appropriately to be admissible evidence. For example, photos, inspection notes, and reports must be specific, clear, and objective documentation of the inspector's observations.
- Sampling and analysis procedures comply with 40 CFR part 136 (or are approved by the EPA) for pollutants covered by 40 CFR part 136.

- The sampler preserves evidence that the samples have not been tampered with or compromised (e.g., chain-of-custody protocol has been followed and access to a composite sampler during sampling events has been controlled).
- Chain-of-custody has to be complete from sampling personnel to receiving lab. All appropriate “relinquished by” and “received by” boxes have to be signed (preferably printed name and signature).
- A QA/QC program is in place and has been adhered to.

2.5.4 Safety

The POTW inspector must follow safety procedures set out by their respective municipal governments and state inspectors must follow their state safety procedures, including: wear appropriate personal protective equipment (PPE) (e.g., steel or composite-toed shoes, hard hat, and safety glasses), maintain safety equipment in good working order, and use safety equipment in accordance with any manufacturer specifications or label procedures. In addition, the POTW inspector should develop a Job Hazard Analysis and a safety plan with consideration of the industrial user that is being inspected, and follow the safety procedures established by the industrial user that is being inspected. For more information on OSHA job hazard analysis requirements see <https://www.osha.gov/Publications/osh3071.pdf>. The expectation for the POTW inspector is that since the industrial user inspection universe contains such a mix of varied industries they should review any hazard communication documents related to the industrial user, such as SDSs (formerly MSDSs), when arriving onsite to assure that the inspector is prepared for the hazards that he/she may encounter.⁷

2.5.5 Professional/Ethical

POTW inspectors must perform their duties with the highest degree of professionalism. In dealing with industry representatives, inspectors must be tactful, courteous, and diplomatic. The inspector is the representative of the POTW, and is often the primary POTW point of contact for the industrial user. A firm but responsive attitude should encourage cooperation and support a good working relationship with the facility. The inspector must not use threatening language. Inspectors should avoid any negative comments regarding any product, manufacturer, or person while conducting the inspection. Inspectors should not accept gifts, favors, lunches, or any other benefits under any circumstances.

2.5.6 Quality Assurance (QA) Responsibilities

The inspector must assume the primary responsibility for ensuring the quality of the compliance data obtained during the inspection. While other organizational elements play an important role in QA, it is the inspector who must ensure that all effluent data collected as part of the sampling inspection and introduced into the inspection file are complete, accurate, and representative of current conditions at the industrial user. To help the inspector meet these responsibilities, the POTW should develop a Sampling and Quality Assurance Plan (described more fully in Section 3.4) that identifies individual responsibilities and detailed procedures for ensuring the highest quality of sampling.

The objective of the plan is to establish standards that will guarantee that data obtained during the inspection or sampling event meet the requirements of all anticipated users of that data. The Sampling and Quality Assurance Plan must be able to be used by compliance personnel to determine the compliance status of the facility, and it must be able to be used by the POTW in court as admissible evidence in an enforcement proceeding. Many elements of QA are incorporated directly into the basic inspection

⁷ Note that EPA inspectors must follow established EPA health and safety procedures, along with any appropriate additional procedures established by the Industrial User, as long as the additional procedures do not conflict with EPA SOPs and guidance or present any risk to the inspector.

procedures and may not be typically identified as QA techniques by the inspector (e.g., chain-of-custody procedures). The inspector must be aware that following established inspection procedures is critical to the inspection program. These procedures should be developed to reflect the following QA elements:

- Valid data collection.
- Approved analytical methods.
- Standard data handling and reporting.
- Quality analytical techniques.

2.5.7 Knowledge and Skills

The federal pretreatment regulations in 40 CFR 403.8(f)(3) require a POTW to have sufficient resources and qualified personnel to carry out the authority and procedures of the pretreatment program, including inspections of industrial users. When conducting a comprehensive inspection at an industrial user, POTW personnel are required to evaluate a broad spectrum of activities at the facility. In some cases, the level of expertise for this evaluation may exceed the qualifications of some inspectors, for example, when evaluating whether the industrial user employs appropriate analytical equipment or procedures. For every inspection, the POTW should make available appropriately trained and skilled POTW or contractor staff, such as analytical chemists, either to assist in the inspection directly or to train other inspectors. The general skills and knowledge that POTW inspectors should have are outlined in Table 2-2.

**Table 2-2
Knowledge and Skills Required of Pretreatment Inspectors**

Pretreatment inspectors must have knowledge of the following:

- Federal, state and local regulations and requirements, including federal categorical pretreatment standards and local limits.
- Any applicable industrial user permit requirements.
- Toxic constituents and conventional pollutants in industrial waste discharges.
- Industrial processes and where wastestreams are generated.
- Spill control procedures.
- Industrial and municipal wastewater treatment technology.
- Wastewater sampling methods.
- Wastewater analytical methods.
- Flow measuring techniques.
- The POTW and how it operates.

Pretreatment inspectors should have the ability to:

- Inspect waste treatment facilities.
- Assess representativeness and quality of data and information.
- Assess impacts to the POTW (collection system, treatment processes, POTW worker safety, biosolids, etc.) from various types of pollutants in industrial effluent.
- Identify safety hazards associated with pretreatment control.
- Evaluate and select monitoring locations.
- Read and interpret mechanical construction drawings and pipeline schematics.
- Practice professional ethics.
- Deal tactfully and effectively with industry representatives.
- Understand other viewpoints and work with industries and other regulatory agencies.
- Maintain accurate records and write clear and concise reports.
- Prepare and maintain proper files and documentation on work performed.
- Keep confidential information and trade secrets.
- Understand and carry out procedures for confidential business information developed by the POTW.

2.6 Inspector's Field Documentation

Documentation maintained by the inspector (hard copy and electronic) may be used as evidence in a court of law. Providing strong documentary support of discrepancies uncovered in an inspection (e.g., conditions at the plant are found to be different than described in the permit application) is one of the inspector's basic responsibilities. During the on-site portion of an industrial user inspection, the inspector takes notes and/or completes a checklist (hard copy or electronic) to provide documentation of all inspection activities. It is important for the documentation to accurately reflect the conditions observed by the inspector at the facility. The language used in recording the inspection information should be objective, factual, and free of personal feelings. The inspector's notes should not contain opinions or any observations not supportable from the facts of the inspection. The inspector can use his or her own format to ensure all pertinent information and observations are documented. These different formats include field notebooks, an inspection form developed by the POTW, or the checklist provided in this manual. Information should be recorded in permanent ink for hard copy documentation. If modifications to the notes are made, the inspector should initial and date the modifications. It is important that the notes taken during the inspection be legible and retained on file, because the information might be used in an enforcement action years later.

Since an inspector may be called to testify in an enforcement proceeding, it is imperative that each inspector keep detailed records of inspections, investigations, samples collected, and related inspection information. Field notes and checklists can become an important part of the evidence package used by the POTW in an enforcement action and can be entered in court as evidence if properly maintained. It is also important for the inspector to document dates and times. The POTW's legal counsel should be consulted for advice on preparing notes so that they may be introduced as evidence in an enforcement proceeding.

2.7 Pre-Inspection Activities

Pre-inspection activities are crucial for conducting efficient and effective inspections because they provide a focus for the on-site inspection activities. By carefully planning the inspection, the inspector will not waste time on-site deciding what needs to be accomplished and how to obtain all of the necessary information. This background work should be completed at the POTW so that inspectors can use their time efficiently when they arrive at the facility.

During inspection planning, the inspector identifies all activities relating to the inspection, from its objective through its execution and follow-up. An inspection plan will explain “why” the facility is being inspected, “what” should be looked for, “how” it will be found, and “where” the inspector should focus attention. This preparation will ensure that the inspector gathers appropriate information for the subsequent compliance determination or enforcement purposes. By the time the inspector goes into the field, he or she should:

- Have a clear idea of the objective for the inspection (e.g., investigation of a reported spill or complaint, routine compliance inspection). The objective will define the scope of the inspection (i.e., the range of activities to be conducted during the inspection). The objective will depend on what type of inspection is being conducted (i.e., scheduled/routine or on-demand).
- Know all applicable program regulations (federal, state, and local), compliance history, and physical layout of the site to help define the scope of activities the inspector will undertake at the facility.
- Know the SOPs for how an inspection should be conducted (e.g., the type of inspection activities to be conducted, familiarity with the inspection tool/checklist to be used, who should be interviewed).
- Know sampling and QA/QC protocol. It is recommended that all Control Authorities develop a Sampling and Quality Assurance Plan (discussed in Section 3.4).
- Know the safety plan for protecting all members of the inspection team from potential hazards or harmful exposures on site.

Pre-inspection preparation can be broken down into the following activities: reviewing facility background information; developing an inspection plan; safety and sampling equipment preparation; and notifying the facility (if appropriate). Each of these are discussed in turn below.

2.7.1 Review of Facility Background Information

To plan effectively and ensure the overall success of an inspection, it is essential that the inspector collect and analyze any available background information on the candidate facility. By reviewing background information, the inspector can minimize the inconvenience to the industrial user caused by requesting information that has already been submitted. Avoiding this situation increases the regulatory credibility of the POTW. The inspector must determine the amount of background information necessary for the inspection and in collecting this information should focus on the characteristics that are unique to the targeted facility (e.g., design and physical layout, historical practices and compliance status, legal requirements). The types of information that might be important for the inspector to review are listed in

Table 2-3. A summary of this information may be kept in a separate file or filed with the final inspection report for each industrial user so that it is conveniently available for any subsequent inspection. Some POTWs compile this information as a fact sheet that accompanies the industrial user's wastewater discharge permit.

**Table 2-3
Information to Review Prior to the Inspection**

<p>General Facility Information:</p> <ul style="list-style-type: none"> • Maps and schematics: showing the facility location, wastewater discharge pipes (i.e., flow schematic), sample points, and geographic features (e.g., topography). • General layout of the facility. • Names, titles, and telephone numbers of responsible facility officials. • Any special entry requirements (e.g., safety equipment [protective-toed shoes, hard hats, etc.]). • Nature of the industrial user processing operations and wastewater characteristics, wastewater treatment systems employed, their capacity, and chemicals used in treatment. • Production levels - past and present (especially for facilities regulated by production based categorical standards, e.g., aluminum forming). • Changes in facility conditions since the last inspection or permit application (e.g., expansion of the facility). • Water use data. • SIU slug control plan. • Raw materials and chemicals used in production processes. • Hazardous and solid wastes produced during production. • Location of storage sites for raw materials, process chemicals, and stored hazardous wastes. • Special permit conditions (e.g., peak flow restrictions, regulation of unusual substances). • Progress toward meeting any applicable compliance schedule. • Sources, volumes, and characteristics of the waste discharges. • Photographs (if available).
<p>Requirements, Regulations, and Limitations:</p> <ul style="list-style-type: none"> • Copies of all applicable federal, state and local regulations and requirements, including any joint agreements or multi-jurisdictional agreements. • Copy of the industrial user's permit and permit application. • Any applicable compliance schedule that the facility might be under.
<p>Facility Compliance and Enforcement History:</p> <ul style="list-style-type: none"> • Previous inspection report(s) (determine if there were any previously identified problems that needed to be addressed by the industrial user). • Any correspondence between the facility and local, state or federal agencies. • Documentation on past violations of permit requirements or compliance schedules (available from the POTW's data tracking system). • Self-monitoring data and reports (periodic compliance reports, 24-hour noncompliance notifications, 30-day resampling submittals, other reports). • Past notices of violation (NOV), formal enforcement, or other enforcement correspondence between the facility and the POTW. • The capability of the industrial user's laboratory to adequately conduct various analytical methods. (if relevant information is available)

Wastewater Treatment Systems:

- Comprehensive description of the wastewater treatment process employed at the industrial user.
- Process description, specifications, and schematic diagram (including treatment chemicals used, whether there is an O&M manual, and whether it addresses staffing levels and operational records).
- Available bypasses for existing pretreatment systems (if applicable).
- Type and amount of wastes discharged.
- Slug discharge control plans.
- Spill control and contingency plans.

The inspector can find the majority of the information described in Table 2-3 in the permit application and permit for the industrial facility,⁸ the POTW's industrial waste inventory, the industrial user's baseline monitoring report (BMR), 90-Day Compliance Reports, Periodic Compliance Reports, and information acquired by inspectors from previous visits at the facility.

It is imperative that the inspector review and understand all industrial permit requirements. The industrial user permit should clearly identify all of the responsibilities and obligations of the industrial user in a single document. The permit should provide information on all applicable effluent limitations (federal categorical standards, prohibited discharge standards, and local limits); requirements and restrictions applicable to all discharges from the facility; slug control plans; monitoring, record keeping and reporting requirements; sampling location; type of samples to be taken; and required analytical methods (i.e., methods approved in 40 CFR part 136). The permit application and BMR should outline the general facility information by describing the facility and providing site plans and layouts of the process areas and other areas of concern. The application should also include all contact persons as well as production levels and flow data from the facility. The previous inspection report for the facility will identify areas of concern from the last inspection which required action on the part of the industrial user. The inspector should review this report carefully and follow up on progress in addressing any problems previously identified.

In general, the information in the list below should be summarized prior to the inspection. Some sections of the checklist provided at the end of this chapter, or any other checklist the inspector has developed, can be filled out in advance of the inspection. During the inspection, this information can be verified and updated as needed.

- *Identifying Information:* Facility name, site address, mailing address, contact name, title, and telephone number.
- *General Background Information:* Applicable categorical standards and local limits, applicable North American Industry Classification System (NAICS) code(s), number of shifts, number of employees per shift, hours of operation, date facility commenced discharge to the sewer, date the categorical process commenced operation, etc.
- *Comprehensive Water and Wastewater Flow Schematics:* The schematic for water flow through the facility and the location of all wastewater discharge lines that flow to the POTW's system, along with major plant features.
- *Comprehensive Discharge Schematic:* A description of each discharge (including any batch discharges and wastewater that is hauled off-site), volume of discharge, regulated pollutants, frequency, and destination.

⁸ For a review of permit requirements and application information, refer to the *Industrial User Permitting Guidance Manual* September, 2012 available at http://www.epa.gov/npdes/pubs/pretreatment_iu_permitmanual.pdf.

- *Comprehensive Process Description:* A description of each process flow from each major product line and process used within the plant, particularly processes that are subject to federal categorical standards. Reactors, plating tanks and all types of process tanks can contain chemicals that may be discharged periodically. Metal cleaning solutions are a prime example. List the amounts of each chemical not by brand name but chemical identity in accordance with the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS), or other technical name and list the frequency of the discharge. In addition, it is important to note how these wastes are disposed, for example, discharged to the POTW or packed in drums as hazardous waste. If pretreatment of these solutions is practiced (e.g., neutralization, etc.), this fact should be noted as well as the method used to determine that the waste has been treated to acceptable levels. General plant washdown (its frequency and quantity of water used) is also important. In many plants, the washdown is the largest and/or the most significant discharge.
- *Pretreatment Systems:* A comprehensive narrative description and comprehensive wastewater flow diagrams of each existing pretreatment facility, including operating data, if available.
- *List of Pollutants:* The list should be divided into two categories: 1) pollutants that come into direct contact with the water that is discharged to the POTW; and 2) pollutants that do not come into direct contact with water discharged to the POTW, but which have the potential to enter the wastewater due to spills, machinery malfunctions, etc.
- *Sampling Locations:* A list of all sampling locations used at the facility.
- *Chemical Storage:* The proximity of chemical storage to floor drains and whether floor drains discharge to storm or sanitary sewers. The volume of all hazardous chemicals encountered should be listed. Any floor drains should be noted. If the chemicals stored are unknown, note the brand name, use and chemical supplier and obtain all SDSs for all chemicals used at the plant. The supplier's address should be noted in case it is necessary to contact them to obtain the necessary chemical information.
- *Slug Control Plans:* A description of all spill control practices used by the industrial user, including information on all past spills, unusual discharges, or temporary problems with any of the process units that may affect the wastewater discharged to the POTW.
- *Air Pollution Control Equipment:* A description of all air pollution control equipment that may generate a wastestream, the pollutants that are likely to be found in this wastestream, and the discharge or disposal method used. In some industries, the effluent from air scrubbing may be the principal waste source and may contain a wide variety of process chemicals that are not encountered in any other wastestreams.
- *Sludge Disposal:* A description of how waste residuals (sludge) from the pretreatment operations are handled, stored, and/or disposed. Many industrial processes such as cleaning, degreasing, grinding, or chemical pretreatment produce sludge that must be disposed. How this occurs, how often, and the quantities involved are all important. For example, vapor degreasers are used for cleaning metal in a wide variety of industrial applications. They almost always produce a sludge and solvent waste, and are usually water cooled, producing a steady stream of uncontaminated cooling water. The presence of these devices should always be noted as well as appropriate answers to questions concerning the wastes associated with them. As is the case with batch discharges, any waste disposal service should be recorded. Sludge production is a function of the reagent used for precipitation. It is important to know the reagent and the amount used. A mass balance can be done using the reagent consumed and the plating bath concentration, if the drag out rate is known. Therefore, it is important to also know the drag out rate.

- *Boiler Blowdown*: A description of the biocide(s) and/or descaling chemicals used in the boiler maintenance program. The chemicals used in this process may be chemicals of concern, especially for sludge disposal by the POTW (e.g., molybdenum compounds).
- *Cooling Tower Blowdown*: A description of any biocide/descaling/corrosion control chemicals (not trade names) as above. Identify the frequency of blowdown, volume and frequency of discharge from blowdown.
- *Facility Clean-Up Days or Shifts*: A description of any chemicals (not trade names) used during the facility's clean-up procedures; how frequent and whether these "clean-up" procedures are scheduled or as necessary. This wastewater could be toxic and a potential slug load. Sampling should also be conducted during these events).
- *Operational Problems*: A description of any operational problems or shut-downs of pretreatment facilities since the previous inspection.
- *Industrial User Water Bills*: The inspector should be familiar with trends in the industrial user's water consumption and wastewater production. This information can be obtained by a careful review of the facility's water bills. A mass balance approach should be taken to pinpoint any areas of water loss or potential bypass. It should be noted that some large facilities have their own water wells and these facilities may not have water bills. The inspector should request water pumping and consumption records from facilities with their own wells.
- *Groundwater Volume*: In assessing industrial user water consumption trends, volumes of any well water used in the facility's processes should be known in the case of production based CIUs or for use in the combined wastestream formula (CWF).
- *Compliance Information*: The inspector should review all previous industrial user compliance sampling data, as well as all data obtained by the POTW on the facility to be inspected.
- *RCRA Hazardous Wastes*: A description of all hazardous waste generated or stored at the site and the manner of disposal for all such waste, especially any disposal to the sewer.

Each of these areas of a complete compliance evaluation is covered in the sample checklist at the end of the chapter. This checklist may provide the basis of the information collected during the inspection, unless the scope of the inspection does not require a complete compliance evaluation; for example, a response to an emergency situation may require only very specific information and not the general information contained in the checklist.

When the facility to be inspected is a categorical industry, the inspector should review any appropriate guidance from the EPA regarding that particular category to become familiar with the specific industrial processes to be inspected (see EPA Inspector Notebooks at http://www.waterboards.ca.gov/rwqcb7/water_issues/programs/pretreatment/docs/addtlresc_toc/f_sector_notebooks_information.pdf). A list of all pretreatment-related guidance documents for specific industries is found in Chapter 5 of this manual. In addition, the inspector should become familiar with the EPA issued guidance documents associated with each industrial category in order to become more acquainted with how each category must comply with national pretreatment requirements (see the Effluent Guidelines page: <https://www.epa.gov/eg/industrial-effluent-guidelines>). General industrial user inspection questions, and questions that apply to specific industrial facility types, are found in Appendices A and B. These are helpful for the inspector to review beforehand and can be incorporated into the inspection checklist provided at the end of this chapter.

2.7.2 Standard Operating Procedures for Inspections

POTWs should develop and implement SOPs for conducting inspections. SOPs promote consistency and the preparation of a high-quality, well documented inspection reports. The SOP should be flexible enough to adapt to unanticipated situations encountered at the site, but should also be designed as an organized approach to guide the conduct of the inspection. The basic purpose of the SOP is to provide the inspector or inspection team with a step-by-step guide to collecting relevant evidence about a facility's procedures and practices that are to be observed during the inspection. All inspection activities (i.e., its scope) are derived from the inspection's objective(s) (i.e., why the inspection is taking place). The objective(s), in turn, depend on the reason for conducting the inspection (i.e., to conduct a routine compliance evaluation, to follow up on information from a previous inspection, to investigate a complaint, or in response to an emergency situation). The SOP should clarify each of these areas (the inspection's objective, scope and activities) for each type of inspection. The basic components of the SOP should cover the following areas:

- *Objectives.* A brief statement of the purpose of (or reason for) each type of inspection and the inspection objectives (i.e., the goal(s)).
- *Tasks.* The scope of the inspection (i.e., what range of activities need to take place to fulfill the objectives of the visit, including areas of the facility to be inspected, the type of evidence to be collected and documented, and number, type and volume of samples to be collected). (NOTE: This may change in the field, since some of the evidence may be unanticipated by the inspector. The inspector must be flexible enough to adapt to unanticipated situations in the field).
- *Procedures.* The specific procedures that will be used to conduct each of the tasks, such as field and analytical techniques, personnel interviews, and sampling protocols.
- *Resources.* Resource requirements, including personnel, based upon the planned activities, and whether a safety plan is needed. Where appropriate, this would include delineation of responsibilities among team members.
- *Schedule.* Estimation of the time required to conduct the on-site inspection based on the tasks, procedures and resources outlined in the plan and the time required to complete the inspection report, and the timeliness goals for providing inspection feedback to the industrial user.

The investment of time required to produce the SOP is worth the effort because it should save time and resources during and after on-site inspections. The inspector must be clear on what questions are appropriate to address during the inspection, and the SOP provides a framework for working through these issues prior to visiting the site. The SOP should contain inspection checklists. The checklist at the end of the chapter can be used for this purpose. The general components of an SOP are outlined in Table 2-4.

Table 2-4
Generic Elements of Standard Operating Procedures for Conducting Inspections

- Objectives (Purpose)
 - What is the purpose of the inspection?
- Tasks (Scope)
 - What coordination with laboratories, attorneys, or other programs are required?
 - What records, files, permits, or regulations will be checked?
 - What information must be collected?
 - Will sampling and analysis be conducted?
- Procedures
 - What specific facility processes will be inspected?
 - What procedures will be used?
 - Will the inspection require special procedures?
 - Has a QA/QC plan been developed and understood?
 - What are the responsibilities of each member of the team (if applicable)?
- Resources
 - Has a safety plan been developed and understood?
 - What personnel will be required?
 - What equipment will be needed (e.g., PPE, sampling, etc.)?
 - Is there a contract in place with an external laboratory for the analysis of any samples not analyzed by the POTW?
- Schedule
 - What will be the time requirements and order of inspection activities?

2.7.3 Safety and Inspection/Sampling Equipment Preparation

After the background information for an industrial user has been gathered and reviewed, and a plan for the inspection has been developed, POTW personnel should review and check the types of equipment that are necessary to meet the objectives of the site visit. An inspector must carry enough equipment to gather the necessary information during the inspection. This part of the pre-inspection process involves obtaining and preparing the equipment necessary for the inspection. The necessary types of equipment may vary with the type of industrial user and the types of activities to be performed by the POTW during the inspection. For example, if confined-space sampling is to be performed during the inspection additional safety equipment would need to be prepared.⁹

All equipment must be checked, calibrated and tested prior to each inspection. The inspector must also ensure that all materials necessary for the inspection are taken to the inspection site. Safety procedures and equipment for a facility will be based on past experience at the facility. For new facilities it is recommended that the POTW telephone or email the facility requesting safety information prior to scheduling the inspection. Safety requirements and equipment must be met to ensure the inspector's safety and to help ensure that the inspector is not denied entry to the facility or parts of the manufacturing operations. Additional information on ensuring worker safety during inspections and sampling is discussed in Chapter 4.

No single list of documents and equipment will be appropriate for every inspection. The majority of the inspections that the POTW undertakes will be routine annual inspections required by the federal pretreatment regulations. There may be instances, however, such as emergencies (e.g., spills at an industrial user), or complaints of problems, which might require an immediate site visit to assess compliance or ascertain the situation at the industrial user. The POTW must be ready to respond to such situations by having all inspection equipment and documents available and ready to go. At a minimum,

⁹ Confined spaces can be very hazardous. Only trained and qualified personnel should enter confined spaces.

the inspector should bring a copy of the industrial user permit to the field to ensure permit requirements are being met. Inspectors can also bring a copy of the permit application to the field, so that the industrial user can review the information and update the inspector on anything that may have changed.

The equipment list in Table 2-5 is intended to guide and aid the inspector in planning for necessary inspection supplies and activities.

**Table 2-5
Inspection and Sampling Suggested Equipment/Supplies**

General Equipment/Supplies:	
<ul style="list-style-type: none"> • Proper personal identification or inspector credential • Camera with backup battery • Pocket calculator • Tape measure • Clipboard • Field logbook/ or electronic tablet • Waterproof pens, pencils, and markers 	<ul style="list-style-type: none"> • Polyethylene bags • Disposable towels or rags • Flashlight and batteries • Pocket knife • Cell phone
Sampling Equipment/Supplies:	
<ul style="list-style-type: none"> • Siphoning equipment • Automatic sampler • Sample bottles/containers (certified clean bottles with Teflon lids) • Ice chest with ice • Flow meter (if applicable) • Preservatives • pH equipment • Thermometer • Evidence tape 	<ul style="list-style-type: none"> • Container/trash bag for contaminated material • Waterproof container labels • Field test kits • Tubing, tape and rope • Manhole hanging device for automatic sampler (if manhole sampling will be conducted)
Documents and Forms:	
<ul style="list-style-type: none"> • Entry warrant (if applicable) • Notice of inspection (if applicable) • Copy of industrial user's permit • Copy of slug control plan and any other applicable plans • List of facility contacts • Safety Plan 	<ul style="list-style-type: none"> • Chain-of-Custody (COC) Forms • Hazardous sample shipping labels • Inspection form/checklist • Copy of the local sewer use ordinance (SUO)

Safety Equipment:	
Inspection	
<ul style="list-style-type: none"> • Safety glasses or goggles • Face shield • Ear plugs • Rubber-soled, protective-toed, non-skid shoes • Gloves appropriate for potential pollutants • Long sleeved Coveralls • Plastic shoe covers • Manhole hook or pick 	<ul style="list-style-type: none"> • Confined space permit (if applicable) • Safety harness, tripod and hard hat • Self-contained breathing apparatus • Respirators and cartridges • Particulate masks • Safety ladder (aluminum, chain, or rope) • Safety cones • Warning flags
Sampling	
<ul style="list-style-type: none"> • Oxygen/combustion/H₂S meter with alarm • Explosimeter (atmospheric testing device) • Air blower with 15-foot hose 	
Emergency Equipment:	
<ul style="list-style-type: none"> • Substance-specific first aid information (e.g., Safety Data Sheets) • Emergency telephone numbers • First aid kit with eyewash 	<ul style="list-style-type: none"> • Two-way communication radio or cell phone • Fire extinguisher • Soap, waterless hand cleaner, and towels • Supply of clean water for washing

2.7.4 Notification of the Facility

The inspector can decide whether to notify the facility prior to the scheduled inspection or whether to conduct the inspection unannounced. Announced inspections can ensure that the appropriate facility staff are available. During unannounced inspections the inspector may have the opportunity to observe things that the facility has not had the chance to clean up or hide (e.g., improperly stored chemicals, inadequate treatment), and to observe the facility operating under normal conditions. When determining compliance with pretreatment standards during both announced and unannounced inspections, the inspector must ensure that the industrial user is operating under normal circumstances at the time of the on-site inspection in order to ensure any samples taken will be representative.

When the POTW chooses to conduct an announced inspection, the POTW has the discretion to decide the appropriate timing for notifying the industrial user. Notification of the industrial user prior to visiting the facility is used primarily before inspecting an industrial user for the first time, so that plant officials are prepared to conduct a tour of the facility to familiarize the POTW personnel with the industrial user's operations. If coordination with the industrial user is necessary for the inspection, for example, to ensure that appropriate plant personnel are present, then the POTW may notify the facility of the exact date of the inspection and request that certain industrial user personnel be present.

Prior notification should not be given to the facility when illegal discharges or improper records are suspected, or the POTW anticipates that they will not get an accurate picture of "normal" operations. The concern that physical conditions may be altered before the inspection or that records may be destroyed or altered justifies an unannounced visit to the facility. Likewise, an on-demand inspection (e.g., an inspection conducted as a result of a spill at the industrial user or upset at the POTW) cannot typically be planned in advance. The POTW must be ready to conduct these types of inspections on very short notice and at any time of the day or night.

2.8 Entry to the Industrial Facility

The POTW's ability to conduct an inspection at a regulated facility stems from its authority to enter the industrial user's premises. Proper, lawful entry onto an inspection site is crucial. Failure to adhere to the requirements for exercising the POTW's entry authority could jeopardize any enforcement actions, and may subject the inspector to liability. Any evidence that may have been collected from an inspection where proper entry was not followed could be ruled inadmissible in an enforcement proceeding because it was obtained unlawfully.

This section discusses the legal basis for entry onto an industrial user's premises. It is always preferable to enter an industrial user's facility with the consent of the plant personnel, but there may be circumstances where such consent is not granted, or consent to enter particular areas of a facility may be denied. In situations where consent is denied, or where consent is withdrawn part way through an inspection, it will be necessary to follow certain procedures to ensure the legality of the inspection. This section covers both of these situations and explains what procedures should be followed by the inspector when consent is not granted to conduct or continue the inspection.

2.8.1 Legal Basis for Entry

Federal pretreatment regulations at 40 CFR 403.8(f)(1)(vi)(B) require POTWs with approved pretreatment programs to have the legal authority to enter industrial users to carry out inspections and monitoring activities. POTWs generally adopt this legal authority in their local SUOs. This gives the POTW's representatives the authority to enter, inspect, review/copy records, and sample at an industrial facility. The POTW inspector is usually required to present proper credentials prior to entering the facility. An inspector's credentials are his or her proof of authority to enter and inspect a facility, and should always be presented when entering the facility.

There may be times when an inspector wishes to inspect a facility that assumes it is a non-discharging facility, for example, if the POTW suspects that the non-discharging facility has commenced a discharge without a permit, or if the POTW desires to verify that no discharge is occurring at the facility. Under these circumstances, the same authority that allows the POTW to enter the premises of discharging facilities should enable the POTW to gain access to the potentially non-discharging facility. Of course, if the facility refuses entry, for whatever reason, the POTW has the same recourse as with any other facility (i.e., seek a warrant to enter the premises). In this case, the POTW should follow the denial of entry procedures outlined in section 2.8.2.

In some instances, the POTW may employ an independent contractor to perform all or a certain aspect of the inspection (e.g., sampling at the industrial facility). POTW personnel should consult with their legal counsel to ensure that the POTW may, in fact, designate such contracted personnel as inspectors. This designation must be made in accordance with the law. The POTW should be aware that contractors may not perform functions that are inherently governmental, such as determining compliance or initiating enforcement action. All inspectors (whether POTW or contractor) must follow the POTW's written procedures for inspecting and sampling. The POTW is the ultimate authority when compliance determinations or policy decisions are made that affect inspection and sampling activities.

The right of the government (federal, state or local) to enter an industrial facility, and the protection against unlawful entry by the government, has been the subject of numerous court decisions. These court decisions influence the manner in which a POTW inspector may enter a regulated facility. Several decisions by the United States Supreme Court pertaining to the right to enter, and the use of warrants for entry, have bearing on the POTW inspection process because these decisions define the limitations under which a POTW inspector may lawfully gain entry to a regulated facility. The principal court case dealing with these issues is *Marshall v. Barlow's*, 436 U.S. 307 (1978). Under this decision, the Court concluded that where consent for the inspection was not voluntarily given by the facility, the inspector is required to

obtain an administrative warrant to gain lawful entry. The Court held that an inspector is not permitted to enter the non-public areas of the worksite without either the owner, operator, or designated representatives' consent or a warrant. The Court further established the conditions under which a civil or administrative warrant can be issued by a judge or magistrate. These conditions are: 1) reasonable cause to believe that a circumstance (e.g., a violation) addressed by a statute or ordinance (for a POTW this would be a state statute and/or local ordinance) justifies a reasonable suspicion and 2) that the facility to be entered was identified and selected by the POTW based on a pre-existing administrative plan or scheme for entries. The basis for the "plan" or "scheme" was required by the Court to be "neutral". The message of the Court was simply that the government (federal, state and local), through its field agents, cannot "pick on" regulated facilities with subtle harassing techniques or through the exercise of entry, search, inspection, investigation, or correctional rights or powers. The appropriate exercise of government authority is not to threaten an industry. This is why it is important that the POTW develop an inspection plan that is based on "neutral" conditions (e.g., geographical location) and to stick to this plan when conducting site visits or to conduct the inspection when there is a justified suspicion of a violation. The procedures that an inspector should follow when entry is denied are discussed in Section 2.8.2.

There are two important exceptions to the limitations described above. In these two situations, there is a right to enter without a warrant:

- *Emergency Situations:* These are situations such as potential imminent hazard, as well as situations where there is potential destruction of property or where evidence of a suspected violation may disappear if time is permitted to elapse while a warrant is obtained. In an emergency, when there is insufficient time to obtain a warrant, a warrantless inspection is allowed. The POTW will have to exercise considerable judgment as to whether a warrant should be served when dealing with an emergency situation. However, even in emergency situations, the POTW would probably need the assistance of the police, sheriff, or fire department to gain entry. During the time it takes to get this assistance, a warrant could probably be obtained if there is close coordination with the POTW's legal counsel.
- *"Open Fields" and "In Plain View" situations:* Observations by an inspector of things that are in plain view (i.e., they can be seen by anyone in a lawful position or place to make such observations) do not require a warrant. For example, an inspector's observations from the public area of a facility or even from certain private property not normally closed to the public, are also proper and valid. Further, even when a warrant is obtained for entry, those areas outside of the warrant's scope are also "in plain view" so long as the warrant permits the inspector to be where they are when they make such viewing.

More recently, in 2004, the *James M. Knott, Sr., and Riverdale Mills Corporation ("Riverdale") v Justin Pimpare and Daniel Granz* case was decided by the U.S. Court of Appeals for the First Circuit. The plaintiffs alleged that the EPA agents conducted sampling of the plaintiff's wastewater discharge on private property without warrant or consent, constituting a violation of the Fourth Amendment. The First Circuit Court ruled in the EPA's favor, stating that the sampled wastewater, whether it was on private property or not, is irretrievably flowing into the public sewer. The Court said that the law did not clearly establish a Fourth Amendment right to expect privacy in industrial wastewater on its way to a public sewer.

The inspector's authority is usually not limited to entering and examining the industry's treatment plant (effluent sources) alone. The inspector may inspect other areas of the permitted facility as well. The inspector should consult with the POTW's counsel to ensure a complete knowledge of the local law which authorizes their activity. Coordination with the POTW's counsel is also important when situations arise where entry is denied. Under these circumstances it may be necessary to contact the POTW's legal counsel to gain entry into the facility.

2.8.2 Arrival for the Inspection

The inspector should enter the industrial facility in the following manner to avoid allegations of “unreasonable search” or other procedural issues:

- Arrive during normal business hours, unless it is an emergency situation or if other arrangements have been made with the industry.
- Enter the facility through the main gate, unless the facility has designated another point for entry.
- Locate the “person in charge” at the facility as soon as possible. Consent to enter the facility must be given by the owner or operator, or their designated representative. The inspector should learn who this individual is and develop a working relationship with that person. The inspector may want to have several industry contacts to grant entry in case the primary contact is not available. As long as the inspector is allowed to enter, the inspection is considered voluntary and consensual. A clear expression of consent is not necessary because an absence of an expressed denial is considered consent.
- The inspector should present their credentials, or POTW identification, to the person first encountered (e.g., receptionist or guard) and suggest that they contact the responsible industry representative. The credential/identification indicates that the holder is a lawful representative of the POTW and is authorized to perform pretreatment inspections. These credentials are important documents and should *never* leave the possession of the inspector.

If the facility provides a sign-in sheet, log, or visitor’s register, it is acceptable for the inspector to sign it, as long as there is no restrictive language associated with it. The inspector must not sign any type of “waiver” or release from liability form that would limit in any way the ability of the POTW to use the information obtained during the inspection. The inspector must not agree to any such restrictive condition of entry. In addition, the inspector must not sign any safety or personal harm waiver absolving the facility of any injury that the inspector may incur while on-site. If the industry insists on such a waiver, the inspector should politely explain that he or she cannot sign it. If the waiver is attached to a sign-in sheet, the inspector should request a blank sign-in sheet. In some instances, it may be possible to simply cross out the restrictive language before signing, obtain a photocopy and make a note about it. The inspector should also look out for an indemnification statement or waiver statement when communicating with a facility by emails.

The inspector should not sign any pledge of secrecy or confidentiality agreements or any agreement that would limit the POTW’s ability to disclose or use the information obtained while inspecting an industrial user. Often, facility sign-in sheets include a clause that prohibits reporting of information seen in the facility, in which case the inspector should not sign the form. This statement is not always on the same page that the inspector is asked to sign, and the inspector should inquire as to whether the statement is embedded elsewhere in the sign-in documents. If the inspector determines that he or she should not sign the form, the facility must make other sign-in arrangements for entry into the facility. Such secrecy agreements are not a legitimate precondition for inspector entry to the facility.

If the inspector is refused entry because they do not sign a release, they should leave and immediately report all pertinent facts to their supervisor or, preferably, the POTW’s legal staff. All events surrounding the refused entry should be fully documented, and problems should be discussed cordially and professionally. Officials at the regulated facility must not be subjected to any form of intimidation or threats for their failure to allow an inspector entry to the premises. The inspector’s authority to inspect should not be abused, nor should the industrial user’s right to refuse entry be undermined. Keep in mind that the inspector is at the facility to conduct an inspection, not to see a specific individual. If the normal contact is not in, the inspection should generally not be postponed.

The POTW inspector cannot be required to take a facility's safety training course prior to entry, but if the company has a relatively short safety briefing that will not interfere with the inspector's ability to complete the planned inspection, it is recommended that the inspector attend the briefing.

Reluctance to give consent. The receptiveness of facility officials toward inspectors is likely to vary from facility to facility. Most inspections should proceed without difficulty. However, because compliance inspections may be considered an adversarial proceeding to some industries, the inspector's legal authority, techniques, and competence may be challenged. If consent to enter is flatly denied, the inspector should follow the denial of entry procedures outlined below. In other cases, officials may be reluctant to give consent for entry because of misunderstandings of responsibilities; for example, officials may feel that the inspection is part of an enforcement proceeding against the company, that it is an inconvenience to the facility's schedule, or other reasons that may be resolved through diplomacy and explanation on the part of the inspector.

One of the typical obstacles encountered by the inspector is a receptionist refusing entry because the inspector does not have an appointment. In this case, remind the receptionist that POTW staff are not there to see a specific individual but to inspect the facility, therefore an appointment is not needed. If entry is still refused, ask to speak to the environmental manager or owner of the facility. If that does not work, follow the denial of entry procedures outlined below.

Another common obstacle is the statement, "There is nobody here who can authorize the inspection." In this instance, ask to speak to a supervisor, or show the receptionist the section of the SUO that authorizes the inspector's access to the facility. Do not threaten legal action, but clearly state the intent to inspect. Be professional, assertive and persistent, but if entry still cannot be gained, follow the denial of entry procedures outlined below.

Whenever there is difficulty in gaining consent to enter, inspectors should tactfully probe the reasons and work with officials to overcome any problems. In any instance where there is a misunderstanding or conflict due to the inspection, the inspector must avoid threats, inflammatory discussions, or other unprofessional language. The inspector should be aware of their personal safety during such confrontations and avoid actions that may enrage an individual who is irrational. If the situation is beyond the ability or authority of the inspector to manage, the inspector should leave, report the situation to his or her supervisor and consult with the POTW's legal counsel.

Persons not directly employed by the POTW accompanying the inspector. The consent of the owner or agent in charge (i.e., industry representative) must be obtained for persons accompanying an inspector to enter a site if they do not have specific authorization (e.g., acting as an agent of the POTW or the EPA). If consent is not given, such individuals may not enter the premises. If consent is given, these individuals may not view CBI unless officially authorized for access.

Access to facilities requiring security clearances. Certain federal, state, local, and private facilities, including those with military, intelligence, public safety (airports, transportation terminals) or nuclear-related activities may have special security or access requirements. POTW inspectors have the right to gain access to these facilities to the same degree they have authority to enter any industrial facility that discharges to their system, but it is necessary for POTW personnel to comply with any special entry requirements. POTW inspectors must obtain the appropriate clearances for access to national security information, or facilities, or restricted areas at federal facilities. Where compliance information has been classified, restricted or protected for national security, all information is to be maintained in accordance with the originating agency's requirements. This information should be treated as CBI and protected to the same degree as other CBI (e.g., access to this information should be restricted and this information should be kept under lock and key with only authorized personnel having access to the key). The POTW should contact the facility prior to the inspection to do what is necessary to gain access to the facility (fill out paperwork and provide identification and information to obtain clearance). In the interim, it may be

necessary to contact the state or the EPA Regional Office personnel to see if they have access to the facility for assistance in conducting inspections at these facilities.

Denial of Entry. If an inspector is refused entry into a facility to conduct an inspection under an applicable state or local law, the following steps should be taken:

- *Present Credentials/Identification.* The inspector should show his or her credentials and/or identification and present the documentation that provides the inspector the right to access the facility (i.e., the industrial user discharge permit and the SUO).¹⁰
- *Tactfully Discuss the Reason for Denial.* If entry is not granted, courteously ask why. Diplomatically probe the reason for the denial to see if obstacles (such as misunderstandings) can be resolved. If the resolution of these conflicts is beyond the inspector's authority, he or she may suggest that the facility officials seek advice from their attorneys regarding a clarification of the POTW's inspection authority and right of entry.
- *Carefully Record Observations.* All observations pertaining to the denial should be noted carefully in the inspector's notes or checklist. Specifically, note the following:
 - Facility name and exact address.
 - Name, title, and authority of the person who refused entry.
 - Name, address, and telephone number of the facility's attorney (if readily available).
 - Date and time of refusal.
 - Reason for the denial.
 - Facility appearance (e.g., neat and orderly or chaotic).

All of this information will be helpful in case a warrant is sought.

- *Avoid Threatening or Inflammatory Statements.* Under no circumstances should the inspector discuss potential penalties or do anything that may be construed as coercive or threatening.
- *Leave Premises and Contact Supervisor.* If entry is still denied after attempting to resolve the obstacles, the inspector should leave the premises after obtaining the information noted above in the inspection notes or checklist. The inspector should contact his or her supervisor immediately after leaving the premises, and the supervisor should confer with the POTW's legal counsel regarding the desirability of seeking a warrant. The POTW's legal counsel should attempt to resolve the conflict by contacting the facility's representatives prior to obtaining a warrant.

Denial of Access Based on CBI. In some cases, entry to a facility may be denied based on a claim that there is confidential information at the facility. In such cases, the inspector should inform the industry of the relevant subsections of the state or local law regarding confidentiality so that they are clearly understood by all parties involved. CBI procedures should also be included in industrial user permits and the inspector should remind the industrial user of these permit requirements. The inspector should then explain the procedures used by the POTW to keep information confidential. In this instance, it would be helpful if the POTW had already notified the industrial user of its right to claim confidentiality and the industrial user's response (assuming it acknowledges this right and agrees that information must be provided to the inspector under the expectation that a valid claim will be honored by the POTW). If the facility representative still refuses entry, the inspector should not contest the issue but should treat the

¹⁰ Note that inspectors are under no obligation to provide personal information such as social security numbers and EPA inspectors must not provide any personal identification information.

matter in the same manner as any denial of entry and follow established procedures for gaining entry (see discussion of Entry to the Industrial Facility later in this chapter). It is **not** appropriate for the inspector to determine whether an industrial user's claim of confidentiality is justified. Once such a claim is made, the information should be kept confidential until a determination is made by the POTW's legal counsel.

Withdrawal of Consent during an Inspection. Occasionally, a facility may consent to an inspection and later withdraw the consent while the inspection is in progress. Consent for the inspection may be withdrawn at any time after entry has been made. A withdrawal of consent is tantamount to a refusal of entry. Therefore, the inspector should follow the procedures cited above under "Denial of Entry" unless the inspection has progressed far enough to accomplish its purposes. All observations and findings obtained prior to the withdrawal of consent are valid and may be used in an enforcement proceeding against the facility.

Denial of Access to Parts of the Facility. If, during the course of the inspection, access to some parts of the facility is denied, the inspector should make a note of the circumstances surrounding the denial of access and of the portion of the inspection that could not be completed. The inspector should then proceed with the rest of the inspection and should contact his or her supervisor after leaving the facility to determine whether a warrant should be obtained to complete the inspection.

Downstream Sampling in Response to Denial of Entry. When access to a facility is denied, the inspector should consider whether a sample should be obtained at a manhole immediately downstream of the facility, if available. Sewer connections and manholes are within the POTW's right-of-way and the POTW has legal access to them. The inspector should be aware of the potential uncertainty associated with such a sample since there may be other facilities connected to that part of the sewer that also discharge the pollutants of concern or dilute the wastestream. This type of sampling, however, may help with any further enforcement actions or investigations that the POTW may undertake at the facility by uncovering activities that the industry is attempting to hide. This type of sampling is also effective when an on-demand inspection is being conducted because the POTW personnel can then compare the results of sampling from inside and just outside the plant to see if they match. This can provide evidence of any batches being dumped prior to entry to the facility.

2.9 Conducting an Inspection under a Warrant

As an alternative to conducting an inspection with the consent of the facility, inspectors may conduct inspections under a search warrant issued by a magistrate or judge. If a search warrant is obtained prior to the inspection, the inspection may be conducted whether or not the facility officials consent to the inspection. Under these circumstances, it may be necessary to have the assistance of the police or sheriff to gain entry. This situation would only occur where the POTW knows that entry will be denied to the inspector. The *Barlow* decision from the Supreme Court (discussed earlier), authorizes the issuance of a warrant to inspect facilities without showing possible cause that violation is occurring. When the POTW seeks a warrant, it must show that it has the authority to inspect industrial facilities. Obtaining such a warrant may be an appropriate part of the pre-inspection preparation process when the POTW suspects that entry may be denied, either absolutely, or temporarily until processes or records can be altered, or other actions taken to obscure violations of applicable pretreatment requirements.

2.10 On-Site Activities

The on-site activities conducted at the facility form the core of the inspection. Once on-site, the inspector is responsible for developing a complete picture of the industrial users' manufacturing and process operations, wastewater treatment operation, compliance activities, and records management. The success of the inspection will depend upon the ability of the inspector to ask the right questions and to look closely in the appropriate locations while on-site. This will require inspectors to become thoroughly familiar with the facility's treatment processes and wastewater sources and treatment technology. The

principal goal of the industrial user inspection is to gather information that can be used to determine compliance with all applicable requirements, including permit conditions, regulations, and other state or local requirements.

An industrial pretreatment facility consists of wastewater treatment processes designed to remove pollutants from wastestreams prior to discharge to the local sewer system. Pretreating these wastes is the method used by many industries to comply with local waste discharge ordinances and permits, and also federal and state regulations. The sources, amounts, and types of wastes generated at an industrial manufacturing or processing site depend on the age of the facility, raw materials used, production processes, and the ability to recover or recycle wastes generated as a result of industrial activity. Some industries attempt to minimize the different wastestreams by controlling them at the source (i.e., pollution prevention), while others gather all wastestreams together for treatment at one central location. The inspector should also inspect all sumps, pits, sand/oil traps, other tanks, and gather information about cleaning and pump out schedules. The inspector should review waste hauler manifests to check how often waste is hauled, by whom, and where it is disposed.

Physical, chemical, and sometimes biological treatment processes are used by industrial users to separate or remove pollutants from these wastestreams. These treatment processes should be closely controlled by plant personnel to produce discharges that are acceptable to the POTW and meet the effluent limitations in the industrial user's permit. To ensure that industrial dischargers meet all applicable requirements, the pretreatment facility inspector should inspect each of the treatment processes or facilities at any industrial site that has the potential to discharge wastes that could adversely affect the POTW (i.e., cause pass through or interference). This section outlines the procedures used in the NPDES program for inspecting industrial users.

2.10.1 Pre-Inspection Observations

Prior to entering the permittee's facility, the inspector should examine the facility's perimeter. By doing this, the inspector may detect leaky storage areas and other general housekeeping practices at the facility that might affect the discharge to the POTW. In addition, the inspector should also evaluate the environmental conditions near the facility, such as vegetation, odor problems, or direct discharges to streams. It may also be appropriate to take a sample at a manhole immediately downstream from the facility (if available) to determine the nature of the flow from the plant. This type of sampling may indicate problem areas that require further investigation. The inspector should verify whether there are other users discharging to that manhole, or whether the facility being inspected is the only contributor of discharge.

2.10.2 Opening Conference

Once identification/credentials have been presented and legal entry has been established, the inspector can proceed with the on-site inspection activities. The on-site activities should begin with an opening conference with facility officials to outline what will be covered during the inspection, the purpose of the inspection, and the procedures that will be followed. The inspector should gauge the level of awareness of the industrial user representatives with the POTW's role in the pretreatment program. This section addresses the role of the inspector in the opening conference, along with relevant meeting agenda topics. This section also describes possible mid-course adjustments that might be needed as a result of the information discussed during the opening conference.

The opening conference establishes a forum for exchanging information between the POTW inspector and facility personnel. This information exchange should focus on the inspection, but it does not need to be limited to the inspection itself. The inspector should use the following principles when conducting the opening meeting:

- Gain an early rapport.

- Start the meeting on a positive and professional note.
- Prepare and use any supporting information that will enhance the discussion (e.g., the industrial user's permit, a copy of the local regulations or statute authorizing the inspection, pollution prevention materials, technology transfer information which might allow the industrial user to operate more efficiently.) If the inspector can provide the industrial user with information which it might find useful, the inspector will be viewed as a resource and not a burden on the facility.
- Acknowledge that the inspection may disrupt daily facility routines, but assert that reasonable efforts will be made to minimize such disruption.
- Listen carefully and be willing to answer the facility representative's questions, but do not be maneuvered into bending POTW policies/procedures or overstepping authority in an attempt to accommodate them. For example, facility representatives may be curious about how they are performing with respect to the requirements of the pretreatment program. Do not forget that the inspector's primary objective is to inspect the facility for compliance with discharge requirements. The inspector is not there as a consultant to solve technical problems for the company, but if through the inspector's experience or technical expertise the inspector can describe how similar problems have been handled successfully, the inspector may be able to help the industry solve its problem. Be cautious about giving advice. It is not the inspector's job to "advise" the industrial user on how it could come into compliance. Such information, if followed, could be used as a defense in a future enforcement proceeding. The industrial user has the primary responsibility to ensure compliance. It is the inspector's job to evaluate the industrial user based on the requirements established in its permit or in the local SUO. A cooperative working relationship developed during this opening meeting can set the tone for the rest of the inspection. It can also be used as the foundation for strengthening ties between the POTW and its regulated industries. If approached properly, the opening conference provides an ideal opportunity for the inspector to function as a public relations liaison and educator. The inspector should ensure that he or she provides tactful assistance before, during and after the inspection, but does not provide information that the industrial user can use as a defense in a later enforcement action. Inspectors should remember that they provide compliance assistance rather than technical assistance. In other words, the primary role of the inspector is to make the industry aware of their compliance requirements and evaluate whether they are meeting the requirements.
- By informing facility officials of the purpose and scope of the inspection, it may help to avoid misunderstandings and facilitate the work of the inspector.
- If the inspector also discusses the order in which the inspection will be conducted, it will eliminate wasted time by allowing officials at the industrial user the time to make any requested records available.
- The inspector should schedule meetings with key industrial user personnel (perhaps beforehand) to allow facility officials adequate time to spend with the inspector during the inspection. It is important that a facility representative accompany the inspector during the inspection, not only to answer questions about the facility and to describe the plant and its operating processes, but also for safety and liability considerations. If these needs are discussed prior to the inspection, it allows the industrial user an opportunity to make someone available.
- The inspector should verify the pertinent sections of the industrial user permit (e.g., name and address of the facility, discharge points) and proper use of the CWF, if applicable.

- The inspector should verify which safety requirements (if any) are required at the facility, to ensure that appropriate preparations were made.
- Photographs are a useful tool for documenting inspection information, and may prove useful in any enforcement proceedings against the facility. Facility officials, however, may object to the use of cameras on their property (especially federal military facilities or defense contractors). As discussed previously, the federal pretreatment regulations do not provide the specific authority to take photos as the right of entry, therefore, the local pretreatment program should adopt this authority in their ordinance or rules/regulations. If a mutually acceptable solution can not be reached, and if photographs are considered essential for the inspection, the inspector should conclude the inspection without photographs and consult the POTW's legal counsel for guidance. If facility officials request that photographs be considered confidential, as with any other information so identified, the POTW is obliged to comply with this request pending further legal determination. When taking photographs, it may be useful for the inspector to use a camera that takes pictures with the dates imprinted on the photograph. This can prove useful when storing and retrieving photographs for enforcement purposes. Also, when taking pictures, it is often useful to include reference objects in the photograph to judge the distance and size of objects. This creates a more substantial picture of the scene and may be useful when pursuing an enforcement action. The inspector might also find it helpful to make a note of each photograph taken in the field notebook, including the location and general subject of the photo. Refer to the EPA's 2006 guidance entitled *Digital Camera Guidance for EPA Civil Inspections and Investigations* found at <https://www.epa.gov/compliance/guidance-digital-camera-guidance-epa-civil-inspections-and-investigations>.

Industrial users are required to report changes in the volume or character of pollutants in their discharge to the Control Authority (see 40 CFR 403.12(j)). The inspector should always inquire whether any changes have been made at the plant since the last inspection. This can be done during an official opening conference or it may be done informally at the beginning of the inspection. If the industrial user has not reported such changes, it should be considered a reporting violation and brought to the attention of appropriate industrial user representatives, and the POTW's ERP should be followed to address this violation.

2.10.3 Physical Plant Review

When an inspector performs an industrial facility site review, his or her primary areas of investigation include the facility's pretreatment units, monitoring equipment, production processes, and chemical storage areas. This overall review allows the inspector to review areas that may indicate problems with plant operations or effluent limitations. In particular, the inspector should focus attention on areas of the industrial user's premises where regulated pollutants are produced, pumped, conveyed, treated, stored or sampled. This type of facility site review requires that the inspector understand fully the wastewater treatment process(es) used at the industrial facility and how each process fits in with the overall treatment scheme. The objectives of this type of comprehensive review are to:

- Verify that the industrial user has been classified correctly, and if it is a CIU, that the correct categorical standards are being applied.
- Evaluate the flow of water used for production culminating in wastewater discharged to the POTW, the facility's water consumption and distribution usage, and the hydraulics of the facility's drainage and collection system.
- Understand the flow of raw materials and any additives used in production as well as all end-products, by-products, and other liquid, gaseous, and solid wastes resulting from the production process.

- Evaluate the wastewater characteristics. This is usually done by sampling. However, there are many instances where visual observations can provide information about wastewater characterization (e.g., presence of oil sheens, or failure to generate sludge).
- Evaluate the industrial user's O&M activities.
- Check the completeness and accuracy of the industrial user's performance/compliance records (e.g., production levels and results of self-monitoring).
- Verify that facility conditions are consistent with information in the POTW's industrial user files.
- Check Safety Data Sheets about specific chemicals used at the facility to make sure the industrial user has the required chemical information on-site and to ensure that the industrial user is aware of what chemicals are actually on-site.

In the course of the site visit, the inspector should become more knowledgeable about the facility's process area, including areas that may indicate problems with effluent limits and overall operation and maintenance of the facility. It is to the inspector's advantage to conduct the process area review as soon as possible upon entering the facility. This prevents the permittee from altering any problem areas while the inspector is conducting the opening conference or conducting other parts of the inspection, such as the records review. After completing the preliminary discussions with the plant officials, the inspector is ready to tour the facility. During the plant tour, the inspector should be alert to, and inquire about, any of the following areas:

- Vital treatment units out-of-service for repairs. The inspector should determine when the units were taken out of service, the type of failure experienced, and when the units will be back in service.
- Equipment or operations such as special pumps, floating aerators in diffused air systems, chemical feeders, construction, temporary structures, or any rigged systems intended to correct operational problems.
- Safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical failures.
- Any evidence of spills and/or leaks, including in chemical storage areas that may enter the sewer. The inspector should ask questions of the employees to see if they are familiar with any required spill or slug control measures at the plant and to determine if the industrial user provides training on safety or slug control measures. The inspector should determine if any floor drains, trenches or sumps are containment only or if they function as conveyance to the POTW or elsewhere (such as leach fields or hauled disposal).
- Unauthorized discharge points and/or bypasses, channels, or other areas likely to experience overflows. The inspector should determine if spills or unauthorized use has recently occurred as a result of facility staff attempting to correct operational problems.
- Disposal of collected screenings, slurries, sludges, or other by-products of treatment. These materials, including wastewater, should be disposed of in a manner that prevents the materials from entering navigable waters or their tributaries, and in accordance with all applicable waste disposal requirements.

One of the principal areas that the inspector should evaluate is whether various changes to production or discharge practices have occurred at the facility. Industries frequently make production changes because of advances in technology and the availability of new products. Therefore, during the tour of the facility, the inspector should inquire whether the permittee has made any changes to: production equipment;

production processes; raw material usage; amount of finished product; water use; waste treatment processes; process wastewater discharge volumes, treatment or process chemicals; and other such changes. The inspector should also inquire whether the permittee has modified any production process that would change the pollutant loading to the POTW, and whether the POTW had been notified of such changes. This is especially critical if the industry has limitations that are based on the CWF. The inspector must assess the impact that changes in the discharge of wastewater will have on any existing limits based on the CWF.

Finally, the inspector must ensure excessive flows are not used as dilution to meet any applicable pretreatment limits. Flow increases are not the only sign of dilution as a substitute for treatment. Evaluation of the water usage (e.g., running rinses without parts) compared with adequacy of treatment may be a sign of dilution as a substitute for adequate treatment.

While not all inclusive, questions asked during this part of the inspection should include:

- Why counter-current flow rinses aren't used as make-up water in previous heated "work tanks"?
- Are conductivity meters used to determine when rinses need to be discharged?
- Are flow restrictors in place to reduce continuous flow rinse tanks water usage?
- Are flows to rinse tanks shut off when not processing?

If dilution is suspected at an industrial facility, the inspector should trace each relevant plumbing line to determine where it originates. This may be very time intensive, but it is the only way to accurately assess the existence of dilution at the facility, since it is unlikely that dilution lines will show up on any schematics that the company provides. Based on discussions with facility representatives, comparison of current conditions with past inspection reports, permit conditions, etc., and visual observation of the facility, the inspector should document any changes in production processes or pollutant loadings in the inspection report. If necessary, the inspector should follow up with the appropriate POTW personnel to ensure that the industrial user discharge permit is revised to address these changes.

In addition, the inspector should check the appropriateness of monitoring locations, the existence, condition and calibration of the permittee's self-monitoring equipment (both field and laboratory), and the facility's maintenance program for this equipment. During the physical "walk through" of the facility, the inspector should observe all areas that have current or potential problems. Each of these observations should be carefully documented in the inspector's notes, or checklist. It is often useful when trying to understand the industrial facility's process to follow the process in a sequential order of production.

Appendix A contains a list of general questions the POTW can use to assess the types of discharges from an industrial user and the potential to impact the POTW. Appendix B includes questions that can be used to assess conditions at specific types of industrial users (e.g., aluminum forming, battery manufacturing).

2.10.4 Self-Monitoring Program Review

The inspection should include a review of the permittee's self-monitoring program. To perform this review thoroughly, it is the inspector's responsibility to be familiar with the monitoring requirements contained in the facility's permit. The inspector should also be thoroughly familiar with all approved test methods and the specified sample holding times and preservation techniques, or in the case of a complex array of methods, the inspector should have a reference list available of the approved methods for those samples required by the permit. (see Chapter 3 for an overview of appropriate holding times and preservation and analytical methods for various pollutant parameters.)

The objectives of the self-monitoring program review are to confirm that: 1) sampling is conducted by the industrial user in accordance with its permit; 2) sampling and flow measurement equipment are provided as required in the permit and that they are being operated, calibrated and maintained properly; 3) the

analytical test methods used to evaluate pollutants or parameters specified in the industrial permit conform with the EPA's regulations at 40 CFR 136; 4) samples collected are representative of the industrial user's typical discharge; and 5) the industrial user is maintaining adequate documentation of all sampling activities. When conducting the self-monitoring review, the inspector should verify that:

- Flow measurement devices are in use (if required), adequately calibrated with logs of calibration dates and are adequate to handle the expected ranges of flow rates.
- Samples are taken at the locations prescribed in the industrial user permit.
- The sampling location specified in the permit is adequate to provide a representative sample of the regulated discharge.
- The appropriate limits are being applied at the specified sampling locations.
- The frequency of sampling is performed in accordance with the permits requirements and that this frequency is adequate for the nature of the facility.
- Samples are collected and preserved in accordance with 40 CFR part 136.
- Samples are analyzed within the holding times and analyzed according to approved test methods in 40 CFR part 136.
- Observation that the industrial user is properly sampling for compliance purposes and observe the industrial user when it conducts its measurements of flow and/or pH. It should be a common practice for the inspector to take a pH sample and compare the results with the industrial user.
- The industrial user has adopted and is implementing QA/QC procedures.
- All sampling, monitoring, and laboratory equipment is in working order and has been operated, maintained and calibrated per manufacturers specifications and at the required frequency.
- Required logs are maintained and available for review (e.g., flow, O&M, pH calibration¹¹ and pH logs¹²).

2.10.5 Operations Evaluation

The operating factors at the facility range from qualitative factors such as the skills and aptitudes of the operators (e.g., process knowledge and general aptitude) to physical deficiencies in laboratory equipment or a lack of flexibility in process equipment. The evaluation of operation activities must focus on wastewater treatment and laboratory analysis. This evaluation should be based on the following topics:

- Policies and Procedures.
- Staffing and Training.
- Health and Safety.
- Management controls.

Appendix C presents the basic review questions that an inspector may ask to evaluate the O&M activities at the facility. These questions are detailed and comprehensive, and it is probably not necessary to cover all of these points with each inspection. The POTW should make sure that these areas are covered during the course of the industrial user's permit cycle. For example, if the industrial user's permit is issued every three years¹³, the POTW should cover the O&M questions at least every three years, unless there are suspected problems at the facility that relate to its operation and/or maintenance.

¹¹ pH calibration logs can vary. Industrial users can use any format, including one that may come with the instrument. Information logged typically includes, at a minimum, date of calibration and signature and initials of person performing the calibration.

¹² pH logs typically contain, at a minimum, date, time of sample, recorded pH value, and sampler initials or signature.

¹³ See 40 CFR 403.8(f)(1)(iii)(B)(1): industrial user permit durations cannot exceed five years.

Policies and Procedures. Written operating procedures and standard reference texts enable the operator of the process lines or wastewater treatment equipment to achieve efficient plant operation. The operations manual prepared for the facility is the most important reference that an inspector should review when evaluating plant policies and procedures. Other reference materials that should be available relating to the operation of the facility include manufacturer's literature, publications by professional organizations such as the American Chemistry Council, and EPA publications.

Staffing. Staff interviews are an important component of this evaluation, and the questions outlined in Appendix C can be used to ascertain the quality of the operations at the facility. The inspector should make an attempt to interview the individual in charge of overall operation at the facility, the chief operator (if different), specific unit process operators, and the laboratory staff, if they have a laboratory on site.

Health and Safety. At all times, safe operating procedures should be followed by the industrial user's personnel. Employees must be trained in emergency shut-down, fire control, and spill response procedures, as well as in the use of safety equipment. Each of these areas can adversely affect the nature of the discharge to the POTW by allowing unregulated or uncontrolled amounts of pollutants to enter the POTW's system. The authority for such an evaluation is found at 40 CFR 403.8(f)(2)(vi) which requires an evaluation of each SIU for the need to develop and implement a slug discharge control plan. The inspector can request SDSs or required by OSHA and hazardous wastes records to assist in the facility evaluation. The General Pretreatment Regulations include notification requirements to various authorities of any hazardous waste discharge to a POTW. These notification requirements are found at 40 CFR 403.12(p). The inspector should also determine whether the industrial user is properly storing and handling its chemicals to ensure that incompatible chemicals that may be discharged to the sewer are not stored together. For example, caustic compounds must not be stored with acid compounds, as this could cause an explosion.

Management Controls. Monitoring practices are a good indicator of both the emphasis placed on operations and the operator's understanding of process controls. Factors affecting a facility's monitoring capabilities are:

- The sampling program.
- Performance testing.
- Analytical capabilities.
- Record keeping practices.

An effective process control program is essential to a treatment facility's optimal performance. However, process control cannot be quantified easily by the inspector, therefore, in most cases, the inspector must rely on discussions with plant personnel to supplement available records and the technical evaluation. Again, the questions outlined in Appendix C can be used to evaluate the quality of the facility's operations.

2.10.6 Maintenance Evaluation

Facility maintenance of wastewater pretreatment equipment directly affects the ability of the facility to run efficiently and to comply with its permit. There are two types of facility pretreatment equipment maintenance that are generally conducted at industrial users:

- *Preventative Maintenance:* Reduces the facility operating costs by eliminating breakdowns and the need for corrective maintenance. It improves the facility's reliability by minimizing the time the equipment is out of service. It increases the useful life of the treatment and process equipment, thus avoiding the need for costly premature replacement that may cause an

interruption of wastewater treatment at the facility. Each of these items, if adequately addressed, reduces the possibility of compliance problems at the facility. Therefore, it is important that the inspector evaluate these areas to ensure compliance with all applicable program requirements.

- *Corrective Maintenance*: Returns the malfunctioning equipment to operation. This has compliance implications (see 40 CFR 403.16, Upset Provisions) because the malfunctioning equipment may be in a treatment process necessary for compliance with the pretreatment program requirements. Therefore, the inspector should evaluate the procedures the facility uses to identify and correct instances of malfunctioning equipment.

The principal areas of concern for both the operations and maintenance of wastewater equipment evaluation are: staffing and training, planning and scheduling, and management control (i.e., records systems and inventory control). Only well trained, competent staff can be expected to perform adequate physical inspections, repairs, and preventative maintenance. Maintenance of wastewater equipment is complex and requires a variety of skills. Because many of these skills are not readily available, an ongoing training program is essential. The planning and scheduling of maintenance is also essential for effective preventative and corrective maintenance. Ensuring that an adequate plan and schedule is in place is an important task for the inspector.

A detailed records system is the basis of any maintenance program. Records are used to establish the maintenance histories of equipment, diagnose problems, and anticipate (and thereby avoid) equipment failure, making records an effective tool for preventative maintenance. A central inventory of spare parts, equipment and supplies should be maintained. The extent of the inventory should be adequate to avoid process or treatment interruptions. A maintenance cost control system should be an integral part of every wastewater treatment facility at the industrial user. Evaluating costs in this manner serves to control expenditures and can be used as a baseline for future budgets. This will help ensure that all necessary process and treatment equipment is operated continuously and effectively, thereby ensuring that the regulated facility operates within the limits specified in its permit.

2.10.7 Best Management Practices and Equivalent Mass Limit Provision Review

Best management practices (BMPs) are management and operational procedures that are intended to prevent pollutants from entering a facility's wastestream or reaching a discharge point. Some categorical standards allow CIUs to implement BMPs in lieu of meeting a numeric limit while other standards require compliance with BMPs as the categorical standard. Discharge permits issued to industrial users by the POTW should describe BMP activities and recordkeeping that the industrial user must implement or may be allowed to implement to reduce, or eliminate, self-monitoring requirements. The inspector should be familiar with the BMP requirements in the industrial users' permit in order to thoroughly assess whether the BMPs are still appropriate and are being adequately implemented.

An example of a BMP that Metal Finishing (40 CFR 433) and Electroplating (40 CFR part 413) facilities are allowed to implement is the option of developing toxic organic management plans (TOMPs) in lieu of sampling to demonstrate compliance with the total toxic organics (TTO) limits¹⁴. Additionally, transportation equipment cleaners regulated under 40 CFR part 442 are allowed to seek approval of development for a pollutant management plan (PMP) in lieu of monitoring for copper, mercury, and non-polar material.¹⁵ (See section 3.2 for more information about TOMP and PMP requirements.)

¹⁴ For information on required contents of a TOMP see Guidance Manual for Implementing Total Toxic Organics (TTO) Pretreatment Standards (September 1985) <http://www.epa.gov/npdes/pubs/owm0021.pdf>

¹⁵ For information on required contents of PMPs see Permit Guidance Document: Transportation Equipment Cleaning Point Source Category (March 2001) at https://www3.epa.gov/npdes/pubs/pretreatment_transportation_equipment.pdf

In some cases, BMPs are actually required categorical standards. For example, the Pulp, Paper, and Paperboard (40 CFR part 430) categorical standards require implementation of BMPs. Also, POTWs can establish BMPs as local limits that industrial users are required to implement to meet the general and specific prohibitions at 40 CFR 403.5.

BMPs can include such elements as:

- Prohibitions of practices.
- Timeframes associated with key activities.
- O&M procedures.
- Treatment requirements.
- Practices to control plant site runoff, spillage or leaks.
- Compliance certification, reporting and recordkeeping.
- Sludge or waste disposal.
- Drainage from raw materials storage.

POTWs may also impose additional requirements as BMPs. Depending on the industry being controlled, not all elements may be necessary or appropriate.

SIUs are required to maintain records of BMP compliance in the same way that other records are maintained, in accordance with 40 CFR 403.12(o). Therefore, inspectors should also ensure that proper documentation of BMP compliance is being maintained by the industrial user.

During an inspection, the inspector should note whether BMPs are being properly implemented and whether they are meeting all requirements specified in the permit. The inspector should also consult the CFR in case more detail is provided about what BMPs are required for a specific CIU. The inspector should ensure that the BMPs in use continue to be appropriate for current conditions at the facility. Examples of BMPs used for the control of commercial sources of wastewater can be found in "Appendix W - Best Management Practices Mini-Case Studies" of the "Local Limits Development Guidance Appendices," EPA 833-R-04-002B, July 2004 available at http://www.epa.gov/npdes/pubs/final_local_limits_appendices.pdf. The EPA fact sheet on BMPs can be found at http://www.epa.gov/npdes/pubs/pretreatment_streamlining_7.0.pdf.

The equivalent mass limit provision pertains to a provision at 40 CFR 403.6(c)(5) that allows, in limited circumstances, the conditional use of equivalent mass limits in lieu of concentration-based limits to facilitate adoption of water-saving technologies. CIU categories that have pretreatment standards expressed as concentration limits alone are allowed to request that their concentration-based limits be converted to equivalent mass. If the POTW allows this conversion and issues a permit with equivalent mass limits, the continued applicability of the equivalent mass limit depends on the CIU's continued compliance with certain requirements. The CIU must:

- Maintain and effectively operate control and treatment technologies adequate to achieve compliance with the equivalent mass limits.
- Record the facility's flow rates through the use of a continuous effluent flow monitoring device.
- Continue to record the facility's production rates and notify the Control Authority if the rates vary by more than 20 percent from the production rates used as the basis for the equivalent mass limits.
- Continue to employ the same or comparable water conservation measures which made the facility eligible for receiving the equivalent mass limits.

The inspector should review the CIU's information provided with its request for adoption of equivalent mass limits and ensure that the facility is meeting the above conditions. A listing of which industries this provision applies to, and more specific information about the provision to allow equivalent mass limits, can be found in the fact sheet at https://www3.epa.gov/npdes/pubs/pretreatment_streamlining_3.0.pdf.

2.10.8 Records Review at the Industrial User Facility

Every inspection should include an on-site review of industrial user records. These records contain a variety of information that may be useful to ascertain the facility's compliance status with its permit requirements. Examining these records, and ensuring that they are being maintained as required, is a key part of the inspection process for the POTW.

Records and files may be stored in a variety of information retrieval systems, including hardcopy materials and electronic files such as databases.¹⁶ Conducting an effective records review is an important investigative skill for the POTW industrial user inspector.

Facility representatives may receive electronic production and flow data directly to their computers from each station "on the floor". In cases like this, it may be necessary to review screen-shot data to verify production and flows from the various "stations" (subparts) in the case of a production based categorical standard. A long term average of both production and flow will help determine if the facility's equivalent concentration permit limits should be revised taking into account the "+/- 20 percent change" rule of thumb.

The inspector should ask the industrial user representative to provide a copy of the facility's wastewater discharge permit. This shows that they know it exists, where it is, and if it is readily available. The inspector should verify that the facility's operations meet permit requirements. Some of the information needed to verify permit compliance can be obtained during the opening conference and compared with the facility permit. This general information may include: correct facility name and address, correct name of the facility contact, number and location of discharge point(s) to the POTW, and the facility's principal products and production rates (where there are production-based standards in place).

The inspector should check for records that will verify that proper notification was made by the facility to the POTW if: 1) discharges have changed from those stated in the industrial user permit (e.g., additional discharges, significant increase in flow); 2) a permit violation has occurred (e.g., the permittee is required to notify the POTW within 24 hours of becoming aware of an effluent violation and to resample and submit results within 30 days); 3) any discharge of a hazardous material (as defined in 40 CFR part 261) has occurred from the industrial user¹⁷; 4) notice of potential problems to be reported immediately (including slug loads); 5) Notification of changes affecting potential for a slug discharge; or 6) a bypass has occurred. These notification requirements are outlined in the federal regulations at 40 CFR 403.12.

The inspector should also check that the appropriate records are being kept for a minimum of three years (as required at 40 CFR 403.12(o)). These records will likely include many of the following types of information:

- Sampling and Analysis Data:

¹⁶ On October 13, 2005 the Cross-Media Electronic Reporting Rule (CROMERR) was published in the *Federal Register* under 40 CFR, Part 3. CROMERR provides the legal framework for electronic reporting under all of EPA's environmental programs. A POTW can accept electronic reporting from industrial users if it has been approved by EPA to do so. If the POTW is CROMERR-compliant then the inspector must verify that the industrial user has retained appropriate documentation of required self-monitoring reports.

¹⁷ This notification must be sent to the POTW, the U.S. EPA Regional Waste Management Division Director, and the state hazardous waste control authorities.

- Dates, times, and location(s) of sampling.
- Sample type (e.g., grab or composite) and analytical methods used.
- Dates of the analyses.
- Name(s) of laboratory and sampling personnel.
- Results of the analyses.
- Original charts for continuous monitoring instrumentation and bench sheets for analyses.
- Sample equipment calibration logs.
- Self-Monitoring Reports and Records:
 - Self-monitoring reports (if applicable), including such permit required elements as flow, pollutant parameters.
 - Documentation associated with BMP implementation.
- Laboratory Records:
 - Calculations (e.g., bench sheets or laboratory reports).
 - QA/QC analysis data.
- Facility Operating Records:
 - Daily operating log.
 - Summary of results of all laboratory tests run and other required measurements (if applicable).
 - Chemicals used (pounds of chlorine per day, etc.)
 - Weather conditions (temperature, precipitation, etc.).
 - Sludge/RCRA disposal records and waste hauling manifests.
- Slug Discharge Control Plan (if applicable):
 - When required, a properly completed slug discharge control plan should be available to the inspector.
- Corrective Actions Documentation (if applicable):
 - When the industrial user is required under enforcement action to correct deficiencies, a schedule and description of corrective actions should be available to the inspector.

The inspector should document all records review activities and should note all inadequacies, discrepancies, or other problems disclosed or discovered during this review. Any identified problems may warrant a more intensive investigation. This decision should be made by the inspector in conjunction with POTW officials.

A primary objective of the records review at the industrial user includes a comparison of the bench sheet data (if it is available) and laboratory report summaries to the values reported on the self-monitoring reports submitted by the facility. This evaluation is critical to determine whether *all* required data are correctly summarized on the self-monitoring reports received by the POTW.

Industrial users are required to maintain complete and accurate sampling records (40 CFR 403.12(o) and 40 CFR 403.12(g)) and failure to do so is a violation of the General Pretreatment Regulations. The POTW should treat this failure to keep records as a violation and respond with the appropriate enforcement

response, as identified in its ERP. A review of facility records determines whether the industrial user is complying with the sampling and the record keeping requirements of the General Pretreatment Regulations contained in its industrial user permit. In particular, the inspector should verify, at a minimum, that the industrial user is keeping the following records for all samples: the date and time for each sample, the date(s) of each analysis, the exact place the sample was taken (i.e., location of the sample point), the analytical techniques/methods used for all samples, the name of the person who took each of the samples, the name of the person who performed the analysis, the results of each of the analyses, and most importantly a complete COC form(s) from the sampler through the facility's contract laboratory.

2.10.9 Obtaining Copies of Necessary Records

When copies of records are necessary the industrial user must make these records available in accordance with 40 CFR 403.12(o). The inspector must consider how to retrieve and store the required records. The following outline may be useful in determining the appropriate means of accessing and securing certain records.

- Written or printed records generally can be photocopied on-site. Portable scanners may be available to the POTW inspector, but in the absence of this equipment, inspectors should be authorized to pay a reasonable price for the use of facility copying equipment.
 - At a minimum, all copies made for or by the inspector should be initialed and dated for identification purposes (see identification details below).
 - When photocopying is impossible or impractical, close-up photographs may be taken to provide suitable copies.
- Computer or electronic records may require the generation of hard copies. Arrangements should be made at the time of entry or during the opening conference for these copies. Photographs of computer screens *may* provide adequate copies of these records if no other means are available. In some cases inspectors may want to obtain electronic files of facility records.

2.10.10 Record Identification Procedures

Immediate and adequate identification of the records reviewed by the inspector is essential to ensure a legally binding custody process which ensures the admissibility of the records in court. If an inspector is called to testify, he or she must be able to identify positively each particular document and state its source and the reason for its collection. This identification can be accomplished by initialing, dating, numbering, and entering each of the records in the inspector's notes under the facility's name.

- *Initialing/Dating*: Each inspector should develop a unique system for initialing and dating the records and copies of records so that he or she can easily verify their validity. This can be done by initialing each document in a similar position, or by another method, at the time of collection. Both the original and the copy should be initialed in the same fashion. All record identification notations should be made on the back of the document. The inspector must be able to identify positively that he or she so marked the document.
- *Numbering*: A copy of each document or set of documents substantiating a suspected violation(s) should be assigned an identifying number unique to that document. The number should be recorded on each document copy and in the inspector's notes or checklist.
- *Logging*: Documents obtained during the inspection should be entered in the notes or checklist by a logging or coding system. The system should include the identifying number, date, and other relevant information, such as: the reason for copying the material (i.e., the nature of the

suspected violation), the source of the record (i.e., type of file, individual who supplied the record), and the manner of collection (i.e., photocopy, other arrangement).

The originals of each document must be returned to the proper person or to their original location, and related records should be grouped together for ease of reference. Confidential business records should be handled according to the special confidential provisions discussed earlier in this chapter.

2.10.11 Closing Conference

To achieve the most effective results from the compliance inspection, the inspector must communicate the draft results of the inspection promptly to the facility's management and/or operating personnel. The inspector's discussion, however, should be limited to the specific observations and findings of the site visit. During the closing conference, inspectors can answer final questions, prepare necessary receipts for documents provided by the facility, provide information about the pretreatment program, and identify a timeline for the facility to provide additional information requested by the inspector.

Even though a discussion of the inspection findings is important, certain precautions are essential when conveying this information. The inspector should keep the following guidelines in mind when presenting any findings from the site visit.

- The inspector is not authorized to discuss with a facility what specific future enforcement action may be taken or make violation determinations.
- After the inspection, the inspector should follow-up with POTW legal counsel and escalate enforcement, if necessary, according to the POTW's ERP.
- If there are deficiencies identified during the inspection then the inspector may bring these deficiencies to the attention of the industrial user representative while clearly noting that the deficiencies are not necessarily violations and that all potential deficiencies may not have been identified at the time of the inspection, but will be included in the report. Both deficiencies and violations require follow-up. For example, improper spill containment is a potential for spills to reach the POTW, this is a deficiency that needs to be acted on, but not necessarily resulting in enforcement as a violation.
- The inspector should inform the facility that the facility should take action to correct deficiencies noted, but the inspector should be clear that the POTW has not waived its right to pursue enforcement against any violations.
- The inspector should refrain from recommending a particular consultant or consulting firm, or any particular treatment system, method or practice, even if asked to do so. Inspectors should tell the permittee's representative to contact a professional society or approved listing for advice on how to come into compliance with all applicable permit requirements. Also, the inspector may refer them to compliance assistance materials or websites.

2.11 Follow-Up Activities

Follow-up activities from the inspection are necessary because this is how the information from the inspection is translated into an action by the POTW, for example, an enforcement action or decision to modify the industrial user's permit. The POTW has the primary responsibility to ensure compliance with all applicable pretreatment requirements, and the inspection is an important mechanism for achieving this goal. Once the inspection has been completed, the inspector should review his or her notes to identify areas that may require follow-up activities. Follow-up activities include: following-up on immediate action that must be taken; proper documentation of the inspection; and uploading information into the POTW's inspection tracking system. It is in the POTW's best interest to conduct timely follow-up activities with the industrial user so that identified problems can be addressed as soon as possible. Such

follow-up activities will usually include some form of enforcement action in accordance with the POTW's ERP, perhaps even formal enforcement action for significant violations.

2.11.1 Initiate Follow-up Actions

After the inspection is conducted, the inspector may need to initiate immediate follow-up actions. Situations such as the following may warrant immediate action on the part of the inspector:

- The industrial user is violating its permit requirements.
- Identification of significant changes in processes or discharge practices.
- The industrial user should be put on a compliance schedule to take corrective actions to address deficiencies.
- Unsafe conditions were found.
- Other agencies must be contacted, such as hazardous waste authorities, OSHA, or the fire department.

2.11.2 Inspection Documentation

It is up to the POTW to decide what format to use to summarize inspection observations and findings. The report should be written shortly after the inspection while the observations and findings are still fresh in the inspector's mind. Often, the report consists of a completed checklist, including narrative discussion and photographs. The inspection checklist at the end of the chapter can be used by POTWs as the basis for inspection reports. This report should be filed in the POTW's files for that industrial user for future reference as background material for subsequent inspections. This report may be used as admissible evidence in an enforcement proceeding.

Finalization of the inspector's report or checklist is one of the most important points of the inspection process, yet it is often ignored. The need to file a clear and concise report that contains pertinent information to be used as a basis for future permitting, compliance, and enforcement decisions cannot be stressed enough.

Inspection documentation should accomplish the following three objectives: 1) organizes and coordinates all information in a comprehensive, usable manner for use by the POTW's compliance personnel; 2) identifies areas that may require follow up activity; and 3) provides significant background information on the facility that can be reviewed prior to conducting subsequent inspections at the facility. The quality of this documentation will, to a large degree, determine how effective these follow up activities will be at the facility. The information in the inspection report must be presented in a clear, concise, and well-organized manner. The information must be objective and factual, and should make no statements of compliance determination or potential for enforcement. Of particular importance in the inspection report are the following items:

- *Accuracy*: The information in the report must be factual and based on sound inspection practices. Observations in the report must be the verifiable result of firsthand knowledge so that compliance personnel can depend on the report's accuracy when determining appropriate follow-up action (if any).
- *Relevance*: The information in the report must be relevant to the compliance status of the facility. Irrelevant facts and data will clutter the report and may reduce its clarity and usefulness. Personal comments and opinions must be avoided.
- *Comprehensiveness*: All information pertinent to the industrial user's compliance status should be organized as a complete package. Documentary support (e.g., photographs, statements,

sample results) accompanying the report should be referenced clearly so that anyone reading it will get a complete, clear overview of the situation at the facility. The more comprehensive the observations and findings the easier it will be for enforcement personnel to make a compliance determination.

All documentation that is produced or collected by the inspector to provide evidence of suspected violations should be part of the facility inspection file and can be used for documentation of the inspection report. This type of documentation may include: the inspector's field notes, checklist, statements, photographs, drawings and maps, mechanical recordings, and copies of records. In general, the types of information contained in the report should reflect the type of information collected during the inspection.

2.11.3 Tracking System

Every POTW should have systematic procedures for tracking industrial user problems, including records of all problems kept in office files (such as updating the industrial user's fact sheet) or electronically, for future reference. If the inspector took effluent samples as part of the site visit, the results of these tests should be placed into the POTW's compliance tracking system (preferably automated) and appropriate action (as defined in the POTW's ERP) should be taken if a violation is detected.

2.12 Inspection Checklist and Instructions

This industrial user inspection checklist can be used by POTW inspectors when conducting routine compliance inspection at industrial users. This checklist may be altered by the POTW to meet its specific needs. Some states and POTWs have already developed inspection checklists and they are free to continue to use any checklist that aids in the collection of pertinent information.

The questions in the checklist are meant to guide the inspector to inquire about all relevant aspects of the industrial user's facility. It is not meant to be limiting, and can be expanded upon, or reduced by the inspector. The inspector is encouraged to add notes to any of the sections and the *Notes Section* at the end. If the POTW inspector follows these checklist questions, all necessary compliance information should be obtained during the site visit. Some of the information contained in the checklist may not change (e.g., industry name or NAICS codes) but the POTW inspector should continue to gather the information in case of a change that might affect the discharge of pollutants to the POTW; for example, a new NAICS code might indicate a new industrial process that may discharge additional pollutants to the POTW.

The inspector is the eyes and ears for the industrial user permit writer. What is observed in the field that impacts the permit requirements, must be brought to the attention of the permit writer, so that the industrial user permit can be modified or updated. For example, if the inspector finds a wastestream that is not accounted for, the permit must be adjusted to recognize the wastestream.

These instructions are intended to be used in conjunction with the description of the inspection process detailed in sections 2.10.3 through 2.10.8.

I. General Inspection Information

To expedite the inspection, the general information for this section of the checklist may be obtained and written up in advance of the inspection. This section captures general information about the inspection including industry name, date of visit, purpose for the inspection, names of inspectors and affiliations, when the last inspection was performed and who conducted that inspection. The inspector should also note whether the previous inspection identified deficiencies required to be corrected and whether the corrections were made. The inspector should note whether the POTW has any enforcement actions pending for this industrial user, and if so, an explanation should be provided. Also, the names, titles, and

phone numbers of the facility representatives that were present for the inspection should be documented. This information will facilitate routine communication with the industry.

II. General Facility Information

The inspector should obtain basic identifying information about the industrial user when conducting the inspection, including: physical address and mailing address (the two are often different); the industrial user's permit number and expiration date; industrial user classification (denote all applicable CIU classifications); if it is a CIU, whether it is classified correctly (i.e., correct category and whether or not it is an existing or new source), and if not, an explanation of the findings about incorrect classification(s); and NAICS codes(s) (NOTE: there may be more than one NAICS code for a given facility).

The inspector should also check to see if the industrial user has a copy of its permit on file. If not, this may be an indication that the industrial user does not understand or realize its obligations under the local pretreatment program. The inspector should provide, in the inspection report, a brief description of the facility (e.g., type of operation, general nature of the products produced, length of time in business, etc.) or refer to it in the facility's fact sheet. The nature of the business operation should be understood by the inspector. Therefore, the inspector should cover: how many employees the facility has; the number of shifts per day; the hours of operation each day; the number of work days per week; whether there is any seasonal production schedule (and whether this impacts number of employees); whether there are regularly scheduled shut down periods and the nature of the operation including the products produced. The inspector should also note the number of wastewater discharge points to the POTW and whether all the discharge points are accounted for in the industrial user's permit. The inspector should also review any available process or wastewater flow diagrams. If the inspector finds that there are any unregulated outfalls in use he or she should note this. Any potential for by-pass should be investigated as soon as possible to ensure that the POTW is not receiving pollutants of a kind or an amount that it cannot handle.

III. Production/Process Areas

In this section of the checklist the inspector should provide more detail about the production areas by identifying the amount of finished product produced and amounts of raw materials used and stored. It is best for the inspector to follow the chronological sequence of the production process in the step-wise sequence of production to comprehend the activities at the plant. The inspector should not allow the industrial user contact to improperly direct or control the inspection or the sequence of the inspection. How the inspection is conducted is up to the inspector alone. Once the inspector understands the operation at the facility, a comprehensive schematic of the production/manufacturing process, water use and wastewater production, and a step-wise description of all chemicals used or discharged during production should be developed and compared on subsequent inspection visits.

The inspector should describe any substantial changes in manufacturing processes, that have occurred and that are planned¹⁸. The inspector should note whether these changes were reported to the POTW. Tracking such changes in a plant's operation is important and provides a history of the manufacturing process to aid in future inspections.

Additional information about the process area(s) that can be collected include information on: possible floor drains that discharge to the POTW (the inspector should note this fact, then consider if this highlights an area that is bypassing necessary treatment); proper storage of process/raw materials; and whether the industrial user uses water hoses in the production area as part of the production process, or for a potential source of wastestream dilution. The checklist also prompts the inspector to collect production process schematics.

¹⁸ EPA's defines substantial change as an "increase or decrease in volume of 20 percent" as stated in EPA's *Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula* (Sept. 1985).

The inspector should also note whether the industrial user is required to implement BMPs and check to see that they are being properly implemented, and that the industrial user is maintaining BMP records, as required.

IV. Wastewater Production

The inspector should note the industrial user's water source and describe the wastestreams discharged to the POTW. By reviewing the industrial user's water bills (and possible verifiable groundwater volumes used in its processes) prior to the inspection the inspector should be familiar with trends in the industrial user's water consumption and wastewater production. A mass balance approach should be taken to pinpoint any areas of water loss or potential bypass. The checklist includes a list of typical types of wastestreams at industrial users and the inspector should fill these out including flow information, when available. The inspector should describe any substantial changes in wastewater flows that have occurred and changes that are planned. It is important for the inspector to track any changes in the plant's wastewater discharge practices. This information provides a history of the facility's discharge practices and will aid in future inspections. The inspector should note whether these changes were reported to the POTW. The inspector should determine whether any of the process wastewater is hauled off-site and should note the name(s) of the haulers and the final destination of the hauled wastewater. The inspector should also denote whether there is any dilution of the wastewater stream occurring or whether there is potential for dilution. The checklist also prompts the inspector to collect wastewater production and discharge point schematics.

V. Pretreatment System

The wastewater treatment system at the industrial user must be operated and maintained in a manner that allows the system to prevent the discharge of pollutants in excess of the industrial user's permit limits. The treatment system is important to the industrial user's ability to control its discharge of pollutants. Therefore, it is necessary for the inspector to evaluate the treatment system's condition and use/operation. The inspector should check for the following items: equipment maintenance record keeping; instrument calibration frequency; critical spare parts inventory; inadequate detention time or inadequate mixing in the pretreatment tanks; and current condition/operational status. The inspector should also note whether the pretreatment system operator is certified (if required in that state) and trained to properly run the system.

The inspector should note whether the industrial user has a pH monitoring system, whether it is working properly and whether it is a continuous pH monitoring system. The inspector should check to see if the industrial user has policies for notifying the POTW of all pH violations (i.e., lower than 5.0 standard units) and whether the industrial user has appropriately notified the POTW if any of these pH excursions have occurred.

VI. Slug/ Spill Control Plans, Best Management Practices

The inspector should note whether the facility has been required to develop and implement a slug discharge control plan or spill plan. The inspector should review the plans to determine whether they are still appropriate for current conditions. If the facility is not currently required to have a slug discharge control plan and the inspector determines that it should be required, the inspector should note this and explain the rationale for the requirement. The inspector should note whether the employees are being adequately trained to report slugs and spills and who at the facility as the authority to halt the facility discharge if spills or slugs occur. If an industrial user's permit authorizes the use of BMPs, the inspector should verify that the industrial user is implementing the BMPs correctly and that required documentation is available for review. The BMPs may be physical or procedural measures. The inspector may need to physically inspect treatment and spill/slug prevention BMPs such as oil/water separators or berms around chemical storage areas. The inspector may also need to review BMPs that consist of documentation or

procedures, such as, a TOMP or staff training procedures and schedules. Among other measures, BMPs can include treatment (as discussed above) and proper chemical storage (discussed below).

Some BMPs may be required by industrial user permits, some permits allow the use of particular BMPs if the industrial user elects to implement them, and some industrial users may implement BMPs voluntarily. The inspector should review all of the BMPs implemented at the facility.

Some industrial user facilities implement EMSs. If facilities have EMSs that foster acceptable BMPs a record of this activity should be noted. Some foreign companies do not recognize the term EMS (“Kaizen” for the Japanese and the EU), but have their own “continuous improvement” programs very similar to an EMS. An overview of these should also be noted.

Because of global trade, ISO 14001 certification is also used at many facilities. ISO 14001 was developed by the International Organization for Standardization to set out the criteria for creating and implementing EMSs. It does not state requirements for environmental performance, but maps out a framework that a company or organization can follow to set up an effective EMS. This certification should also be noted in the facility’s fact sheet. See http://www.iso.org/iso/iso_14001_key_benefits.pdf.

VII. Chemical Storage

It is important for the inspector to trace the use of all process and non-process chemicals that may be discharged to the sewer. The inspector should focus on areas where chemicals are stored, floor drains are located, manufacturing is taking place, or areas of spill containment to determine which, if any, chemicals are finding their way to the sewer. The inspector should verify that incompatible chemicals (e.g., strong acids and bases, or chemicals that may interact to form toxic compounds) are not stored near each other in the event of a spill.

The inspector should walk around all chemical storage areas to identify all chemicals stored onsite and to note whether they are stored properly. The inspector should note whether there are any onsite spill control measures to prevent spills from occurring and whether additional chemical containment is needed. Other avenues for chemicals reaching the POTWs system besides spills should be considered, such as floor and equipment washing procedures.

The inspector should note whether the industrial user is required to have a slug discharge control plan, whether it is available onsite for review, if the plan is still adequate for current conditions, and whether the industrial user has had any past slug discharges to the POTW. The inspector should also note whether signs are posted in the facility informing employees about proper discharge practices. For example, signs that warn employees not to wash any process wastewater down a sink.

Also, the inspector should be aware of the chemicals that are being used as biocides in the boiler blowdown or cooling system blowdown because some of these chemicals (e.g., molybdenum compounds) may interfere with the operation of the treatment plant or interfere with the POTW’s final sludge use or disposal.

VIII. Sludge Generation

This section applies to industrial users that create and handle sludge. How the industrial user handles its sludge is an indication of its commitment to the proper handling of all its wastes, liquid or otherwise. The inspector should examine the industrial user’s sludge disposal methods to ensure that no sludge from the treatment system is being discharged to the sewer (except in accordance with a permit). Information should be gathered about the sludge dewatering method used, amount of sludge generated, sludge moisture content, disposal method, names of haulers and disposal locations, shipment/pick up frequency, and quantity of sludge stored. The inspector should also ask to review sludge hauler manifests to ensure that they are available for review and contain the same information provided verbally by the industrial user representative during the inspection.

IX. Hazardous Waste Generation

If the facility produces hazardous wastes (e.g., electroplating sludge), as defined at 40 CFR part 261, the inspector should verify where the waste is being ultimately disposed, and ensure that it is not being discharged to the POTW. The inspector should ensure that all hazardous wastes are properly drummed and labeled; have not been held longer than 90 days, and should review hauler manifests to determine that proper handling and hauling procedures are followed. The inspector should document any problems identified with the hazardous waste and should notify the proper authorities.

X. Solid Waste Production

The inspector should note what types of solid waste (other than sludge) are produced during the manufacturing process. Examples of solid waste produced during processing that is not considered hazardous waste includes food waste, cardboard waste, etc., that may be disposed of in a landfill, recycled, or reused (e.g., food waste is often fed to livestock). Disposal methods and approximate volume of solid waste produced should be documented. The inspector should ensure that solid waste is not being discharged to the POTW and is being disposed of properly.

XI. Monitoring, Record Keeping and Reporting

It is crucial for the inspector to evaluate the industrial user's monitoring, record keeping and reporting practices because this information forms the basis of the POTW's regulation of the industry. If the industrial user is not sampling correctly or if the samples are not analyzed using the required procedures, the information derived from that sampling cannot be used to evaluate compliance. Likewise, if the facility does not keep records, the POTW cannot know the conditions at the facility during the reporting period. It is necessary for the inspector to compare the results of sampling to the actual reported values to ensure that there are no discrepancies. If a discrepancy is found, the cause should be determined.

The inspector must determine if the current permit conditions are adequate to control the industrial user's discharge to the sewer. The checklist questions are designed to give the inspector a comprehensive overview of the industrial user's monitoring, record keeping and reporting procedures. If there are any problems, the source of the problem should be determined.

XII. Combined Wastestream Formula/Permit Limits

If the CWF is being used to calculate alternative discharge limits, the flow of each wastestream must be known and measurable. The inspector should ensure that flow can be measured at all necessary points and that flows are being measured correctly at these points. The inspector will need to evaluate any dilution streams being discharged to the sewer and whether these streams are being used to meet any permit limits. Dilution streams for purposes of the CWF might include: sanitary wastewater, boiler blowdown, non-contact cooling water or blowdown, demineralizer backwash, cooling tower bleed-off, condensate, and rainwater/stormwater, provided however, that these wastestreams do not contain a significant amount of pollutants. The POTW may exercise discretion to classify whether these streams should be considered unregulated wastestreams (40 CFR 403.6(e)). If it appears that dilution or unregulated streams are being co-mingled with regulated streams prior to treatment, then the POTW should initiate the procedure to have the permit changed and new limits applied. If appropriate, the POTW should also initiate any applicable enforcement action as dictated by the POTW's ERP. In addition to dilution streams, the inspector should check for any unregulated streams at the facility. Unregulated wastestreams for purposes of the CWF include any wastestream that is not currently regulated by a categorical pretreatment standard and does not meet the definition of a dilute stream. Determining such unregulated wastestreams requires a familiarity with the categorical industry in question. Refer to the EPA issued Development Document for more information on regulated and unregulated wastestreams for an industrial user in question. Also refer to the EPA *Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula* (September 1985) for more information on this topic.

XIII. Notes

The *Notes Section* is available for all other inspector observations such as any unusual conditions and problems.

INDUSTRIAL USER INSPECTION CHECKLIST

I. General Inspection Information			
Name of industry:			
Date of visit:	Visit start time:	Visit end time:	
Inspection Type/Purpose	<input type="checkbox"/> Scheduled	<input type="checkbox"/> Unscheduled	<input type="checkbox"/> Enforcement
	<input type="checkbox"/> Complaint	<input type="checkbox"/> New Company	<input type="checkbox"/> Follow-up
	<input type="checkbox"/> Permit Renewal	<input type="checkbox"/> Spill/Slug	
Name of inspectors/affiliation:			
Printed name:		Signature Date:	
Last inspection date:			
Inspected by:			
Did the previous inspection identify deficiencies that the industrial user was required to correct? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Were deficiencies corrected? <input type="checkbox"/> Yes <input type="checkbox"/> No		Explain:	
List all observed noncompliance issues and any corrective action that has been taken, or is planned:			
Provide the name(s) and title(s) of industry representative(s)			
Printed Name(s)		Title/Phone number(s)	
Email(s)			
Signature		Date:	
II. General Facility Information			
Physical address of industry:			
Mailing address of industry:			
IU Permit Number:	Permit Exp. Date:	IU Classification(s):	NAICS Code(s):
Is the industrial user permit on file at the facility? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If the facility is a CIU, is it correctly categorized? <input type="checkbox"/> Yes <input type="checkbox"/> No		Explain:	
Nature of operation and reason for industrial user classification:			
Number of employees:		Number of shifts:	Hours of operation/Days per week:
Are there scheduled shut down periods <input type="checkbox"/> Yes <input type="checkbox"/> No		When:	
Seasonal production? <input type="checkbox"/> Yes <input type="checkbox"/> No		When:	

Number of wastewater discharge points to the POTW:	
All discharge points accounted for? <input type="checkbox"/> Yes <input type="checkbox"/> No	If no, explain:
III. Production/Process Areas	
Comprehensive process description (identify raw materials, processes used, products produced/amount of finished product, and wastes and their destination; attach a process diagram if available) or if in City's file, so reference:	
Describe any substantial changes in manufacturing processes (changes that have occurred and changes that are planned):	
Production and flows verified for Production-Based CIUs? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Has there been any production or flow changes since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes to either, has production or flow increased or decreased greater than 20% <input type="checkbox"/> Yes <input type="checkbox"/> No	
Did the industrial user report changes in process(es) to the POTW? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Describe the condition of process area(s):	
Describe any housekeeping concerns:	
Do floor drains/troughs lead to the POTW? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Are incompatible process/raw materials separated? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Are pipes labeled/color coded with directional flow arrows for easy identification? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Are temporary hoses in place as part of production? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Is a comprehensive piping diagram available at the facility? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Are process tanks labelled? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Are storage tanks labelled? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Is the industrial user meeting its best management practices requirements? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
How often is the production area cleaned?	
What chemicals are used in the cleaning of the production area?	
Is the wastewater generated from cleaning the production area discharged to the POTW? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
<i>Attach a schematic description of the production process(es) at the facility (or if in City's file, so reference).</i>	
IV. Wastewater Production	
Water source(s):	
Water usage:	
Is water consumption balanced with wastewater production? <input type="checkbox"/> Yes <input type="checkbox"/> No Explain:	
Wastestream flow(s) discharged to the POTW (describe and include flow when available):	
Production process(es):	
Contact cooling water:	
Boiler blowdown/makeup:	
Evaporation (loss):	
Non-contact cooling water:	
Lawn maintenance/Irrigation (loss):	

Are there any diversion meters in use (credit given for water used in final product, evaporation or lawn care)? Yes No

Sanitary:

Wastewater hauled offsite (include names of haulers and destination):

Other:

Sanitary: (gpd) | Process: (gpd) | Combined: (gpd)

Describe any substantial changes in wastewater flow (changes that have occurred and changes that are planned):

Did the industrial user report changes in wastewater flow to the POTW? Yes No NA

Is dilution of the wastewater stream occurring, or is there any potential for dilution? Yes No

Attach a comprehensive schematic of wastewater production and wastewater discharge points to the POTW's system or if in City's file, so reference.

V. Pretreatment System

Does the industrial user treat its process wastewater prior to discharge to the POTW? Yes No NA

Type of pretreatment system (Describe and include comprehensive schematic description if available or if in City's file, so reference):

Check which of the following are utilized for pretreatment prior to discharge to sanitary sewer:

<input type="checkbox"/> Dissolved air floatation	<input type="checkbox"/> Membrane Tech.	<input type="checkbox"/> Ion Exchange	<input type="checkbox"/> Biological Treatment
<input type="checkbox"/> Centrifugation	<input type="checkbox"/> Flow Equalization	<input type="checkbox"/> Ozonation	<input type="checkbox"/> Chlorinating
<input type="checkbox"/> Chemical Precipitation w/Clarifier	<input type="checkbox"/> Oil/Water Separation	<input type="checkbox"/> Reverse Osmosis	<input type="checkbox"/> Grit Removal
<input type="checkbox"/> Sludge Filter Press	<input type="checkbox"/> Grease Trap	<input type="checkbox"/> Rotary Macro Screen	<input type="checkbox"/> Solvent Distillation
<input type="checkbox"/> pH Adjustment	<input type="checkbox"/> Sand Trap	<input type="checkbox"/> Sedimentation	<input type="checkbox"/> Silver Recovery
<input type="checkbox"/> Belt/Disk/Rope Oil Skimmer	<input type="checkbox"/> CN Destruct	<input type="checkbox"/> Hex Cr Reduction	<input type="checkbox"/> Segregation of Streams
<input type="checkbox"/> Surfactants	<input type="checkbox"/> Work Tank Agitation	<input type="checkbox"/> De-Foaming	<input type="checkbox"/> Chelating Agents

Continuous flow Batch Combined

Condition/operation of pretreatment system: Good Fair Poor

Explain condition rating

Are equipment maintenance records maintained and available for review? Yes No NA

Are equipment calibration records available, and are calibration frequencies adequate? Yes No NA

Does the industrial user have a critical spare parts inventory? Yes No NA

Is the detention time/mixing time in the pretreatment system adequate? Yes No NA

Is the pH monitoring system working properly? Yes No NA

Does the industrial user have a continuous pH monitoring system? Yes No NA

Is the pretreatment system operator trained and certified? Yes No NA

Is there an operator for each shift? Yes No NA

Has the system experienced operational/upset problems since the last inspection? Yes No NA

Describe:

VI. Slug/Spill Controls, Best Management Practices

Who has the authority to halt the discharge from the facility should a spill or slug discharge occur?

How are employees informed of whom to call at the POTW in case of a spill or slug discharge?

Is the facility required to implement a slug discharge control plan? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
If a slug plan is not currently required, should one be? <input type="checkbox"/> Yes <input type="checkbox"/> No Explain:	
Is the slug discharge control plan appropriate for current conditions? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Does the permit require or allow BMPs? <input type="checkbox"/> Required? <input type="checkbox"/> Allowed? <input type="checkbox"/> Voluntary? <input type="checkbox"/> NA	
Types of BMPs	
<input type="checkbox"/> Installation of treatment	
<input type="checkbox"/> Prohibitions on certain practices, activities or discharges	
<input type="checkbox"/> Requirements for operation and maintenance of treatment units	
<input type="checkbox"/> Timeframes associated with key activities	
<input type="checkbox"/> Compliance certification, reporting and records retention	
<input type="checkbox"/> Slug discharge control plan	
<input type="checkbox"/> Solvent management plan	
<input type="checkbox"/> Other	
Description of Required BMPs:	
Description of Allowed BMPs:	
Description of Voluntary BMPs:	
P2 Equipment/Practices in use:	
<input type="checkbox"/> Overflow Alarms	<input type="checkbox"/> Aqueous Cleaning Solutions
<input type="checkbox"/> Fog/Halo Spray Rinsing	<input type="checkbox"/> Countercurrent Cascade Rinsing
<input type="checkbox"/> Dragout Collection Trays	<input type="checkbox"/> Seal-Less Pumps
<input type="checkbox"/> Air Jets/Curtains	<input type="checkbox"/> Horizontal Work Tank Negative Air Blankets
<input type="checkbox"/> Electrolytic Recovery	<input type="checkbox"/> Cartridge or Membrane Filtration
<input type="checkbox"/> Aqueous Paint Stripping Solutions	<input type="checkbox"/> Bead/Powder Blast Paint Removal
<input type="checkbox"/> Biocide Addition to Lengthen Coolant Life	<input type="checkbox"/> Centrifugation of Machining Coolant
<input type="checkbox"/> Flow Restrictors	<input type="checkbox"/> Overspray Recycle
<input type="checkbox"/> In-Situ Recycle (Ion Exchange, Reverse Osmosis)	<input type="checkbox"/> Conductivity Probes
<input type="checkbox"/> Dead/Stagnant Rinse Tanks	<input type="checkbox"/> Evaporation
Are BMPs installed correctly? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
If Yes, does the BMP require installation of further treatment technology? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Explain:	
Does facility have its own EMS or a similar version? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Is the facility ISO 14001 certified? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Corrective actions necessary? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Explain:	

Completion Date:		
VII. Chemical Storage		
Chemical storage area (identify the chemicals that are maintained on site and how they are stored):		
Any floor drains?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Any spill control measures? <input type="checkbox"/> Yes <input type="checkbox"/> No
Can chemicals reach floor drains if spilled? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Is chemical containment needed? <input type="checkbox"/> Yes <input type="checkbox"/> No		
How often are floors washed?	What chemicals are used?	
How often is equipment washed?	What chemicals are used?	
Does the facility have the potential for a slug discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Is the facility required to have a slug control program? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Is the slug discharge control plan available onsite? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Is the slug discharge control plan still adequate? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Has the facility had any past slug discharges? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Are signs posted to inform employees about improper discharge practices? <input type="checkbox"/> Yes <input type="checkbox"/> No		
VIII. Sludge Generation		
If the facility generates sludge or hauls regulated wastes, please complete the following information. <i>(If not, go to next section)</i>		
Sludge dewatering method (plate/frame filter, belt press, rotating drum vacuum, centrifuge, indexing paper filters, etc.):	Amount generated (55 gal barrel [bbl]/mo):	
Where does the liquid from dewatering go?	Disposal method:	
Sludge Storage (bbl):	Shipment frequency:	Manifests available? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sludge hauler(s):	Disposal location(s):	
Is the sludge generated characterized as a hazardous waste? <input type="checkbox"/> Yes <input type="checkbox"/> No		
If yes, are hauling manifests available? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Is any sludge sent off as a valuable raw material? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Examples: Zn sulfate sold to fertilizer mfg.; hydrochloric acid pickle liquor for local POTW's coagulation and phosphorous removal; spent sulfuric pickle liquor to formulate with ammonia for fertilizer; Al hydroxide filter cake in alum form for sale to POTWs; chrome/nickel sludge used to produce ferronickel alloy; etc.		
IX. Hazardous Waste Generation		
Is hazardous waste generated <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA		
Is hazardous waste discharged to the POTW <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA		
Manner of hazardous waste disposal:		
Are hazardous wastes drummed and labeled? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Are hazardous wastes held onsite for more than 180 days? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Does the industrial user have hazardous waste manifests? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Any other problems associated with hazardous waste? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Explain:		
X. Solid Waste Production		
Are solid wastes (other than sludge) produced during manufacturing process? <input type="checkbox"/> Yes <input type="checkbox"/> No		

Describe the types and approximate volumes of solid waste produced:		
Solid waste disposal method(s):		
XI. Monitoring, Recordkeeping, and Reporting		
Description of sample location:		
Are there any concerns regarding the cleanliness or location of the sampling point? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please explain:		
Sampling method/technique:		
Evaluation of self-monitoring data: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA If yes, was self-monitoring adequate: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA If not, explain why data was inadequate.		
Who performs the self-monitoring analysis?		
Are the permit requirements appropriate for:		
Sample location(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No	If no, explain:	
Permit limit(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No	If no, explain:	
Sample method? <input type="checkbox"/> Yes <input type="checkbox"/> No	If no, explain:	
Sample frequency? <input type="checkbox"/> Yes <input type="checkbox"/> No	If no, explain:	
What changes, if any, are needed in the permit?		
Samples are analyzed according to 40 CFR part 136 method where they exist? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, Explain:		
If alternative test procedures or modified methods are used (40 CFR 136.4-6), were all requirements met?		
Samples are analyzed within required holding times? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Samples are analyzed in-house or contract?		
If outside lab, what is the lab name?		
Samples are preserved according to 40 CFR part 136? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Samples in required bottle type per 40 CFR part 136?		
Samples are taken during periods of process discharge only? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Chain-of-custody (COC) form is used? <input type="checkbox"/> Yes <input type="checkbox"/> No		
If COC is not used, describe documentation:		
COC form is filled out properly? <input type="checkbox"/> Yes <input type="checkbox"/> No		
<i>Record Keeping</i>		
All information kept for 3 years? <input type="checkbox"/> Yes <input type="checkbox"/> No		
All required information available, current and complete? <input type="checkbox"/> Yes <input type="checkbox"/> No		

- The date, exact place, method, and time of sampling and the names of the person or persons taking the samples;
- The dates analyses were performed;
- Who performed the analyses;
- The analytical techniques/methods used; and
- The results of such analyses.

Explain:

Reporting

Did the facility report results of any more frequent sampling in the last reporting period? Yes No

If so, were all results reported? Yes No Comments:

POTW notified of all violations identified by industrial user within 24 hours of becoming aware? Yes No NA

If NA, does the POTW do all the facility's monitoring? Yes No

Resampling results following violations identified by industrial user submitted within 30 days of becoming aware? Yes No

Do sample results match what is reported by the industry? Yes No

Explain:

Are there any violations that were not reported to the POTW? Yes No

Explain:

Have bypasses been reported?

Have upsets been reported (CIUs)?

XII. Wastestreams Verification/Combined Wastestream Formula

Can flow be measured at all sampling locations? Yes No

Are flows measured at each sampling location? Yes No

What type of measuring device is used?

How often are the flow measuring device(s) calibrated?

Is there a calibration log for the flow meter?

Are dilution wastestreams present at the sample location? Yes No

Is the CWF used at the facility? Yes No

How are the flows determined?

Is the facility using dilution to meet its effluent limits? Yes No Explain:

Should the facility be using the CWF? Yes No

Are there any new flows that need to be considered in the application of the CWF? Yes No

Are there any dilution flows that have not been accounted for? Yes No

XIII. Notes:

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3. SAMPLING INDUSTRIAL USERS

This chapter presents a detailed and comprehensive framework to be used by POTW sampling personnel when conducting sampling and flow measurements at the facilities of regulated industrial users. The purpose of this chapter is to familiarize POTW inspectors with proper sampling procedures and to establish consistent procedures for all POTWs with approved local programs. This chapter will assist POTW personnel in planning and conducting sampling activities at industrial users that discharge to the POTW. The chapter is divided into nine sections to accomplish these objectives: frequency of sampling, pollutants to be monitored, analytical methods for samples, Sampling and Quality Assurance Plan, QA/QC procedures, pre-sampling activities, on-site sampling activities, flow measurement, and compliance issues related to sampling and analysis. This last section discusses specific compliance issues related to the POTW's and industrial user's compliance monitoring program and provides recommendations for handling certain compliance information. POTW sampling personnel are encouraged to read and understand the material presented in this chapter before beginning any sampling activities.

An effective local pretreatment program must include the ability to collect and analyze wastewater samples so that laboratory results are of high quality, defensible, and able to support the two primary goals of the General Pretreatment Program. The first goal is to determine the impact of industrial wastes from a particular industry or group of industries on the POTW's collection and treatment system, including the impact on treatment plant operations, sludge management (including final use or disposal), and receiving stream quality. The second goal is to evaluate compliance by all industrial users with applicable pretreatment standards and requirements. In addition to these primary objectives, the POTW's sampling and analysis program is designed to satisfy one or more of the following program objectives:

- Verify that industrial user's sampling program complies with permit sampling requirements, or other control mechanisms.
- Verify the quality of self-monitoring data and accuracy of reporting.
- Verify that sampling location(s) are representative.
- Verify compliance with instantaneous, daily maximum, and monthly average effluent limits (local limits or categorical standards).
- Support enforcement actions.
- Support development of local limits and, development/reissuance and revision of permit or other control mechanism.

These objectives can only be supported if the data produced by sampling are adequate. The quality of the data resulting from the POTW's sampling activities can be ensured by using the following procedures and techniques: collecting representative samples; maintaining the integrity of samples through proper handling and preservation; adhering to chain-of-custody and sample procedures required at 40 CFR Part 136; and practicing adequate QA and QC activities. Sampling and analysis of wastewater can be done independently or in conjunction with a compliance inspection visit, and can be performed by the same or different POTW personnel. If sampling and analysis are performed independently and by POTW personnel different from the inspection personnel, it is strongly recommended that the sampling personnel familiarize themselves with the procedures and guidelines used by the inspection personnel. Annual POTW compliance sampling is required to provide information independent of the industrial user.

Sampling, just like inspections, can be announced or unannounced. The goal of the sampling visit will determine whether the industry is notified. As with inspections, the sampling personnel can decide whether or not to announce the sampling event to the industrial user. The sampling technician may want

to contact the facility beforehand to ensure that the industrial operations are representative of normal operations and may need to contact the industrial user to inquire about current operations. However, sampling during atypical operations (i.e., maintenance) may evaluate whether or not effluent limits are violated during such operations. Or, the sampling technician can simply show up unannounced. On-demand sampling visits, which may be in response to known or suspected problems or in response to a complaint or may be intended to evaluate compliance on a typical discharge day, should be unannounced so that the facility does not have time to alter any of its activities. Industrial users may choose to take a sample at the same time and place as the POTW sampling technician (or request split samples from the POTW sampling technician) and this is acceptable.

In the pretreatment program, the vast majority of sampling will be routine compliance evaluation sampling mandated in 40 CFR 403.8(f)(2)(v). In these situations, it is necessary for the POTW to ensure that the sampling data collected will be of a quality sufficient for the POTW to draw a proper conclusion about the compliance status of the facility and to ensure that the data will be viewed as credible evidence substantiating the POTW's position should an enforcement action be pursued. This is the fundamental objective of any sampling carried out for compliance and enforcement purposes, and when developing local limits, since the basis for these limits must be justifiable and defensible.

There may be situations where other types of sampling may be conducted by the POTW, not intended for meeting more extensive routine compliance sampling requirements. In these situations, samples may be collected from the process or treatment system prior to the final effluent. Examples include operation or maintenance evaluations, or the POTW may conduct a wastestream verification study to ensure all pollutant sources have been accounted for. If a sample is to be used for other than compliance evaluation purposes, it need not comply with the strict requirements of compliance sampling (i.e., to obtain results that are admissible in court). However, POTW personnel must be aware that results of these studies may identify new outfalls, or other conditions, that may need to be accounted for in the industrial user permit, requiring permit or other control mechanism modification. POTWs are reminded that if samples are collected at the permitted sampling point using approved sampling and analytical procedures, then the results of the sampling must be used in the determination of industrial user compliance.

3.1 Frequency of Sampling

Similar to requirements for annual compliance inspections (section 2.2) the General Pretreatment Regulations require POTWs to sample each SIU at least once each year, except for NSCIUs and MTCIUs (defined in Section 2.2). Both NSCIUs and MTCIUs are CIUs and subject to categorical pretreatment standards and requirements. NSCIUs are CIUs that are no longer SIUs. Sampling is not required by the POTW at NSCIUs, however, if during the inspection or certification evaluation¹⁹, the POTW determines that the industrial facility no longer meets the criteria of NSCIU in 40 CFR 403.3(v)(2), the facility reverts to a CIU and annual sampling, as an SIU subject to categorical pretreatment standards, must be reinstated. POTWs must randomly sample and analyze the effluent from MTCIU at least once every two years. Again, if during the inspection or sampling the POTW determines that the industrial facility no longer meets the criteria of MTCIU in 40 CFR 403.12(e)(3), the facility reverts to an SIU and annual sampling, as an SIU subject to categorical pretreatment standards, must be reinstated.

If the POTW decides to conduct all monitoring for an industrial user, in lieu of requiring the industrial user to conduct its own self-monitoring, the POTW must meet the following minimum sampling frequencies: at least twice a year for SIUs; at least once a year for MTCIUs; at least once during the effective period of the industrial user's control mechanism for CIUs with monitoring waivers; sampling is not required at NSCIUs, as they are not SIUs.

¹⁹ This evaluation is described in section 2.2.

Factors the POTW should consider when establishing sampling frequencies beyond the minimum requirements are discussed in the EPA's *Guidance Manual for POTW Pretreatment Program Development* (October, 1983).

3.2 Pollutants to be Monitored

The pretreatment regulations at 40 CFR 403.8(f)(2)(v) require POTWs to randomly sample and analyze the effluent from industrial users in order to identify, independent of information supplied by industrial users, occasional and continuing noncompliance with pretreatment standards and requirements in industrial user permits or other control mechanism. In order to ensure that industrial users are meeting established limits, the POTW must sample and analyze all pollutants that the industrial user is required to monitor for in its control mechanism. The pollutant parameters established in the industrial user permit are either required to be regulated (i.e., categorical limits) or were deemed warranted for regulation when the POTW wrote the established limits (i.e., applicable local limits or other limits). Therefore, to verify self-monitoring results submitted by an SIU, the POTW must sample all parameters that the industrial user is limited for, at least annually.

Industrial user permits (or other control mechanisms) must also specify which pollutants must be monitored by the permittee. The POTW may decide to require sampling for additional parameters based on changes in processes or discharge practices, or to investigate whether the industrial user is a source of a pollutant found downstream. If new processes or products have been introduced at the industrial user, additional sampling will help provide the basis for necessary control mechanism modifications.

The General Pretreatment Regulations allow some CIUs to reduce self-monitoring frequencies and/or the pollutants they are required to monitor. Examples of reduced monitoring options include:

- Where the approved pretreatment program has incorporated applicable provisions, the regulations at 40 CFR 403.12(e)(2) allow CIUs to opt out of monitoring for pollutants that they demonstrate through sampling and other technical factors²⁰ that the pollutants are not present in the process wastewater or not expected to be present (often referred to as a “pollutant not present” waiver). These CIUs may be granted a monitoring waiver from the POTW and must meet certain conditions in order to continue to opt out of sampling for these parameters. These conditions are listed at 40 CFR 403.12(e)(3). If the conditions are not met, the CIU must begin to sample for all applicable categorical standards and can no longer practice reduced monitoring. Industrial users must submit a new request for a waiver for each permit cycle.
- Electroplaters (40 CFR part 413), metal finishers (40 CFR part 433), electrical and electronic component manufacturing (40 CFR part 469) are allowed to develop a TOMP, referred to as a solvent management plan in the regulation, in lieu of monitoring for the applicable TTOs. After the POTW has determined that the plan is complete and appropriate for the facility, a CIU that implements this option is required to certify annually that none of the listed toxic organics have entered its wastestream and that it is implementing its TOMP. The CIU must also submit and sign the required certification statement.
- Transportation equipment cleaners regulated under 40 CFR part 442 can opt out of monitoring for copper, mercury, and non-polar material if they submit a certification statement and prepare and implement a PMP that meets requirements specified at 40 CFR 442.15(b)(2), 40 CFR 442.15 (b)(5)(i)-(x) and 40 CFR 442.16(b)(5)(i)-(x).

²⁰ “Other technical factors” may include a facility-wide accounting of raw materials, products, by-products, and other chemicals with the potential to be discharged or spilled and SDSs as evidence that a particular pollutant is not present.

The regulations at 40 CFR 403.8(f)(2)(v)(A) specifically require POTWs that have granted a CIU a pollutant not present waiver to sample for the waived pollutants once during the permit cycle (in addition to the regulated pollutants that must be sampled annually).

The regulations do not specifically require POTWs to conduct compliance sampling for TTOs when a CIU implements a TOMP, or for copper, mercury, and non-polar material (for TECs) when a CIU implements a PMP. Although CIUs may be allowed to reduce monitoring frequency via the use of TOMPs or PMPs, the regulations at 40 CFR 403.8(f)(2)(v) require that POTWs ensure independently that CIUs are in compliance with numeric categorical standards and that any of the monitoring alternatives used are effective and properly documented or certified, as required. The most effective way to verify compliance is for the POTW to conduct compliance monitoring of all regulated pollutants. For CIUs that implement a TOMP or PMP, EPA strongly recommends that POTWs collect at least one compliance sample during the term of the CIU's permit cycle to confirm that no changes have occurred and that the TOMP or PMP is still effective. EPA has concluded that the most appropriate time to conduct this monitoring is during the renewal of the permit. However, EPA also asserts that the timing is best left to the discretion of the POTW. If the POTW's sample results show noncompliance, the POTW can require the CIU to conduct sampling for the regulated parameters and take remedial actions necessary to come into compliance with applicable standards as expeditiously as possible.

Inspectors should review TOMPs and PMPs during inspections to ensure that they remain appropriate for existing conditions. Inspectors should also review recordkeeping associated with TOMPs and PMPs to assess whether all certification requirements are being met.

3.3 Analytical Methods

POTWs with approved pretreatment programs may, at their discretion (as authorized by their local ordinances and regulations), require their indirect dischargers to achieve specific minimum levels when performing analyses or may require the use of specific analytical methods to enable the POTW to better characterize contributions into their system. Where a state or the EPA is the pretreatment Control Authority, the specific requirements for analytical methods can be specified in the control mechanism issued to the indirect discharger. The General Pretreatment Program requirements at 40 CFR part 136 and 40 CFR 403.12(g)(5) require that samples be analyzed using the approved methods listed in 40 CFR part 136. Inspectors should be aware that oftentimes labs use incorrect solid waste analysis methods (e.g., SW-846) for wastewater analysis. These results are not acceptable under the pretreatment program. The approved analytical methods for analyzing wastewater samples can be found at 40 CFR part 136 (<http://www.ecfr.gov/cgi-bin/text-idx?SID=84cf955ff2ed8a177336883e83603d11&node=pt40.23.136&rgn=div5>).

The EPA Office of Water analytical methods website is (<https://www.epa.gov/cwa-methods>).

The inspector and laboratory analyst should consult the current regulations at 40 CFR part 136 as analytical methods may be updated and/or deleted.

The methods in 40 CFR part 136 are derived from six different sources (see “approved CWA methods” <https://www.epa.gov/cwa-methods>): (1) *Methods for the Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, revised March, 1983; (2) other EPA sources such as the Office of Water, Office of Science and Technology, Engineering and Analysis Division; (3) *Standard Methods for the Examination of Water and Wastewater*; (4) ASTM International; (5) *Methods for Analysis of Inorganic Substances in Water and Fluvial Sediments* – United States Geological Survey; and (6) additional sources.

3.3.1 Alternate Test Procedures and Modified Methods

POTWs and industrial users can apply for approval to use alternate test procedures not listed in 40 CFR part 136 if they can prove that the proposed method of analysis is comparable to the method listed in 40 CFR part 136. This alternate method must be approved by the EPA if the results are to be used to comply with 40 CFR 403.12(g)(5). The POTW is not allowed to grant this variance with analytical methods. The application and approval procedures for instituting an alternative analytical method are outlined in 40 CFR 136.4 and 136.5. The EPA's alternative test method protocols entitled *Protocol for Review and Validation of Alternate Test Procedures for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program*, *Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program (February 2016)* and *EPA Microbiological Alternate Test Procedure (ATP) Protocol for Drinking Water, Ambient Water, Wastewater Monitoring Methods* (September 2010) can be found at: <https://www.epa.gov/cwa-methods/alternate-test-procedure-documents>.

It is important that the POTW work with reputable laboratories²¹ that understand the analytical requirements at 40 CFR part 136 and stay current with methods updates. The laboratory manager can assist POTW staff with determining the most appropriate methods. Choosing the appropriate analytical method for the samples collected is an important task. If more than one method is listed for a parameter (which is common), the method which is chosen should be based on the effluent limit in the control mechanism and what the detection limit is for that parameter and for that specific analytical method. The method used must not have a higher detection limit than the effluent limit stated in the control mechanism. The inspector should check with the analytical laboratory about detection limits for certain methods because detection limits for methods will vary with different matrices and laboratories must establish their own method detection limits using Appendix B to 40 CFR part 136. Laboratories must use the most recently promulgated version of 40 CFR part 136 Appendix B that can be found at http://www.ecfr.gov/cgi-bin/text-idx?SID=5d11a60e659eaac007bb4dc4917ae3fd&mc=true&node=ap40.23.136_17.b&rgn=div9. The POTW is responsible for ensuring that its contract laboratory has the capability to meet required detection levels. If the POTW's current laboratory cannot meet these requirements, the POTW should contract with a laboratory that can.

The application and approval procedures for instituting an alternative analytical method are outlined in 40 CFR 136.4-5. Examples of allowable modifications to approved methods and related documentation requirements are detailed at 40 CFR 136.6, which allows analysts the flexibility to modify approved methods or to employ the use of a modified method provided the requirements detailed in that section are met. Additional information regarding alternative testing procedures and the flexibility to modify approved test methods may be found at <https://www.epa.gov/cwa-methods/alternate-test-procedures>. Permittees or state or EPA regulators with questions regarding requirements related to alternative test procedures or allowed modifications to approved methods should check with their EPA regional ATP coordinators. A list of Regional ATP Contacts is available in Appendix C of *Protocol for Review and Validation of Alternate Test Procedures for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program* and *Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program* found at <https://www.epa.gov/cwa-methods/alternate-test-procedure-documents>.

See also:

- 40 CFR 136.4, Application for and approval of alternate test procedures for nationwide use.

²¹ Many states have their own laboratory accreditation programs. POTWs should consult these standards, if applicable, when seeking a reputable laboratory.

- 40 CFR 136.5, Approval of alternative test procedures for limited use.
- 40 CFR 136.6, Method modifications and analytical requirements.
- 40 CFR 136.7, Quality assurance and quality control.

3.4 Sampling and Quality Assurance Plan

In order to ensure the quality of POTW sampling, the POTW should develop a general plan that lays out all of its procedures for conducting sampling to meet the requirements under its pretreatment program²². Here, this plan is referred to as the Sampling and Quality Assurance Plan, or simply *the plan*. Many POTWs have a plan(s) that encompasses the information suggested here, but they are called something different, such as SOPs. It does not matter what it is named, however, it is important for POTWs to have documented procedures for: QA/QC, sample equipment maintenance, sample collection, sample documentation, sample shipping, chain-of-custody procedure and safety. This plan should be used by all inspectors and/or sampling personnel so that samples are collected consistently and the data are of high quality and will be admissible in court, if necessary. The plan should ensure that representative samples are collected; 40 CFR part 136 sample collection and preservation procedures are followed; sample integrity is maintained; safe practices are followed during sampling events; and QA/QC procedures are followed. The inspector should contact the laboratory in advance of any sampling to discuss the sampling plan and QA/QC procedures, to allocate laboratory time, and obtain sample identification numbers and field and trip blanks.

The Sampling and Quality Assurance Plan should be a guide, or reference, for inspectors and sampling personnel. Based on review of the Sampling and Quality Assurance Plan, the inspector or sampling personnel should customize a sampling action plan specific for each industrial user. The Sampling and Quality Assurance Plan, in general, should lay out all preparation and sampling actions for the sampling team. Not all items in the POTW's plan will apply to all industrial user sampling events. In certain situations, the inspector and sampling personnel may need to deviate from procedures outlined in the plan due to uncontrollable circumstances at the industrial user facility. The inspector has discretion to deviate from the plan if, in the opinion of the inspector, circumstances at the facility warrant such a change. Whenever possible, however, the elements in the plan should be followed for consistency. If circumstances arise in the field that make it unrealistic or physically impossible for the procedures to be followed, the inspector should document any deviation from the plan and the reason for the deviation. See Appendix J for suggestions for elements to be included in a Sampling and Quality Assurance Plan.

3.5 Quality Assurance/Quality Control (QA/QC) Procedures

QA/QC procedures are tools that are necessary to maintain a specified level of quality in the measurement, documentation, and interpretation of sampling data. The QA/QC procedures the POTW will use to assure data of good quality for both POTW sampling and industrial users and for industrial user self-monitoring should be specified in the Sampling and Quality Assurance Plan. Quality Assurance is the program function used to prevent mistakes and assure the quality of measurement data, while QC is the process of carrying out those procedures stated in the QA Plan. The QA activities of the plan should be general while QC activities are specific. A QA program should *control* the quality of the data through use of set procedures to meet the program requirements. A QC program is designed to ensure the routine application of procedures necessary for the measurement process to meet prescribed standards of performance (e.g., through instrument calibration and analysis of reference unknowns). A program describing the schedule for calibration is QA, while the actual calibration procedures are QC.

²² Refer to the EPA's Guidance Manual for POTW Pretreatment Program Development

All data generated or used by the POTW must be of known, defensible, and verifiable quality. This includes data that are generated through self-monitoring at the industrial facility. Therefore, the industrial user should also have QA/QC procedures in place to ensure the adequacy of the data submitted as part of its periodic compliance report. All inspections, and the data obtained as a result of the inspection, have the potential to be used in an enforcement proceeding and should be treated as potential evidence to be admitted in court.

To produce evidence that is admissible in an enforcement action, QA and QC procedures are necessary both in the field (during sampling) and in the laboratory. The QA/QC procedures used in the field are separate from those used in the laboratory, but both are crucial for obtaining reliable data. Both laboratory and field QA/QC are discussed in this section. QA/QC procedures are used to obtain data that are both precise (degree of closeness between two or more samples) and accurate (degree of closeness between the results obtained from the sample analysis and the true value that should have been obtained). By following QA/QC procedures, the POTW's confidence in the validity of the reported analytical data is increased.

3.5.1 Quality Assurance Procedures for Sampling

A QA program for sampling equipment and for field measurement procedures is necessary to ensure data of the highest quality. The inspector should recognize the importance of implementing quality assurance in sample collection to minimize such common errors as improper sampling methodology, poor sample preservation, and lack of adequate mixing during compositing and testing. Again, each of these activities should be a part of the POTW's Sampling and Quality Assurance Plan, so that all POTW sampling personnel are familiar with the proper sampling procedures. Quality assurance checks will help the inspector determine when sample collection techniques are inadequate for the intended use of the data. In addition to the general plan components discussed in Section 3.4, the POTW's Sampling and Quality Assurance Plan should also contain these field QA elements which sampling technicians should understand and apply:

- The required analytical methodology for each regulated pollutant; special sample handling procedures; and the precision, accuracy, and detection limits of all required analytical methods.
- The basis for selecting the sampling and analytical methods. For example, each analytical method should consist of approved procedures. Where the method does not exist, the Sampling and Quality Assurance Plan should state how the new method will be documented, justified, and approved for use.
- The number of analyses for QC (e.g., the percentage of spikes, blanks, or duplicates), expressed as a percentage of the overall analyses, (e.g., 10 percent (one duplicate sample per 10 samples)) to assess data validity. Generally, the QA program should be approximately 15 percent of the overall program, with 10 percent and 5 percent assigned to laboratory QC and field QC respectively. The Sampling and Quality Assurance Plan should include shifting these allocations or decreasing these allocations depending on the degree of confidence established for collected data.
- Frequency and procedures to calibrate and maintain field instruments and automatic samplers.
- A performance evaluation system that addresses the following areas:
 - Qualifications of personnel for a particular sampling situation.
 - Determining the best representative sampling site.

- Sampling techniques (including the location of sampling points within the wastestream, the choice of grab or composite samples, the type of automatic sampler, special handling procedures, sample preservation procedures, and sample identification).
- Flow measurement, where applicable.
- Completeness of data, data records, processing, and reporting.
- Calibration and maintenance of field instruments and equipment.
- Use of QC samples, such as field duplicates, or splits to assess the validity of the data.
- Training of all personnel involved in any function affecting data quality.

By following these QA procedures, the inspector or sampling personnel can ensure that proper quality data is obtained during compliance sampling.

3.5.2 Quality Control Procedures for Sampling

Sampling QC begins with calibration and preventative maintenance procedures for sampling equipment. The POTW's Sampling and Quality Assurance Plan should include a calibration plan and documentation record for all field sampling and analysis equipment used. A complete document record should be kept in a QC logbook, including equipment specifications, calibration date, and calibration expiration data, and maintenance due date. The person sampling should keep in mind that field analytical equipment should be recalibrated in the field prior to taking the sample. Personnel conducting sampling should be well-trained in the use, cleaning, calibration, and maintenance of all instruments or samplers used. Automatic sampler tubing, bottles, and the sampler itself should be cleaned prior to each sampling event. Automatic samplers should be calibrated for sample quantity, line purge, and the timing factor, if applicable. This calibration should be checked in the field to verify draw. The manufacturer's directions should be reviewed and followed for cleaning and calibrating all equipment.

In addition to calibration procedures, the person conducting field sampling should conduct control checks during the actual sample collection to assess the performance of sample collection techniques. In general, the most common monitoring errors usually are improper sampling methodology, improper preservation, inadequate mixing during compositing and splitting, and excessive sample holding time. In addition, the inspector or sampling personnel should collect and analyze the following QC samples to check sample collection techniques:

Blanks

- Trip Blank. This is a sample vial(s) filled at the laboratory with analyte free deionized water. The blank(s) follows the same handling and transport procedures as the samples collected during the event. The blank(s) functions as a check on sample contamination originating from sample transport, shipping and from site conditions. Note: Expose the trip blank vial(s), to the same environmental conditions (e.g., light or temperature) as the sample vial(s) but do not open until it is time for analysis.
- Field Blank/Field Reagent Blank. These are similar to the trip blanks except they are prepared in the field with analyte free deionized water exactly as the sample(s) that are collected. Field blanks are used to check for analytical artifacts and/or background introduced by sampling and analytical procedures.
- Equipment/Rinsate Blank. Collect a blank when using an automatic sampler or other non-dedicated equipment during the sampling process. The blank is a check of the equipment cleanliness. For automatic samplers, prepare blanks prior to collecting samples, by pumping deionized water that is free of organics and other analytes, through the sampler and collecting the discharge purge water in a sample container for analysis for the constituents of concern.

Field Duplicate. This is a precision check on sampling equipment and sampling technique. At selected stations on a random time frame, duplicate samples are collected from two sets of field equipment installed at the site, or duplicate grab samples are collected from a single piece of equipment at the site. Duplicate samples check analytical precision as well as evaluate the “representativeness” of the sample aliquot.

Split Samples. These are samples that have been divided into two containers for analysis by separate laboratories. These samples provide an excellent means of identifying discrepancies in the industrial users’ (or their contracted laboratory) analytical techniques and procedures. When filling split samples from a single composite jug, shake the composited sample well and half fill the sample container, then shake the composite again and fill half of the permittee’s container. Repeat the procedure for each sample collected for a specific parameter or location of interest. Sometimes a sample is split between the industrial user and the POTW, both of whom sends their split of the sample to a separate laboratory for analysis. Please note that oil and grease samples cannot be split due to the nature of the pollutant.

3.5.3 Laboratory Quality Assurance/Quality Control

Laboratory QA/QC procedures ensure correct and representative analyses through instrument calibration and the processing of control samples. The precision of laboratory findings refers to the reproducibility of results. In a laboratory QC program, a sample is analyzed independently (more than once) using the same methods and set of conditions. Precision is estimated by comparing the measurements. Accuracy refers to the degree of difference between observed values and known or actual values. The accuracy of a method may be determined by analyses of samples to which known amounts of a reference standard have been added.

Laboratory QA/QC procedures can be quite complex. Often, the analytical methods specify QA/QC requirements for calibration, interference checks (for inductively coupled plasma mass spectrometry (ICP) analyses), control samples, spiking (including the method of standard additions), blank contaminant level, and instrument tuning. Accuracy is normally determined through the analysis of blanks, standards, blank spikes, laboratory control samples, and spiked samples. Precision is determined through the comparison of duplicate results or duplicate spiked results for organic analysis. For more information on laboratory QA/QC, the POTW should contact their quality assurance manager or Approval Authority.

The methods used by in-house or contract laboratories to analyze industrial user samples must be methods that are EPA-approved under 40 CFR part 136 and thus are acceptable to a court of law as the most reliable and accurate methods of analyzing water and wastewater. Although some field test kits are useful as indicators of current conditions (and, thus, may be used for process control considerations), they are not appropriate for sampling that is conducted to verify or determine compliance. If non EPA-approved methods are used for analysis, the data will not be considered admissible as evidence of noncompliance. When choosing a contract laboratory, POTWs should consult their state’s accredited laboratory standards, when applicable, or obtain and review a copy of the laboratory’s QA/QC plan. For more information on laboratory considerations the POTW should see the EPA’s *Guidance Manual for POTW Pretreatment Program Development* (October, 1983).

The laboratories performing the sample analyses should use the following control measures as part of their QA/QC Plan:

- **Prep/Reagent Blank.** A sample consisting of reagent(s), without the target analyte or sample matrix, introduced into the analytical procedure at the appropriate point and carried through all subsequent steps to determine the contribution of the reagents and/or the contribution of the analytical steps to any error in the observed value.
- **Quality Control Sample.** This is an uncontaminated sample matrix spiked with known amounts of analytes from a source independent from the calibration standards. Use this sample

to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurements' system.

- **Matrix Spike (MS) and Matrix Spike Duplicate (MSD)**. Two aliquots of an environmental sample to which known quantities of the analytes of interest and surrogates (if applicable) are added in the laboratory. The MS/MSD are prepared and analyzed exactly like a field sample. Their purpose is to quantify any additional bias and imprecision caused by the sample matrix. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the MS/MSD corrected for background concentrations.
 - Use an MS to verify accuracy of the analytical procedures.
 - An MSD is a duplicate of an MS sample. It measures the precision of the analysis in terms of relative percent difference.
- **Laboratory Duplicate**. This is a sample that is received by the laboratory and then subsequently divided into two or more portions. Each portion is separately and identically prepared and analyzed. The results from laboratory duplicate samples check the laboratory precision.

3.6 Field Preparation Activities

The success of each sampling task depends on adequate preparation. Pre-sampling activities include identifying and collecting necessary equipment, selecting proper sampling containers, cleaning containers and sampling equipment, and preparing field equipment. Inspection personnel should follow the Sampling and Quality Assurance Plan when conducting on-site sampling. Inspection personnel should be briefed, as well, on all field procedures, particularly safety requirements. The inspector should make sure that the appropriate sampling equipment is available and in good working order. When sample analyses are to be performed in the field (e.g., pH), the necessary instruments should also be included. Equipment must be checked prior to going into the field to ensure accurate operation and calibration. In addition, a review of necessary safety equipment, including PPE should be made and the inspector should be aware of any potential hazards at the facility.

3.6.1 Checklist of Field Sampling Equipment

A checklist of field sampling equipment should be used to ensure proper preparation (see example checklist in Appendix K). When the type of waste to be sampled is known ahead of time, the list can be narrowed to the actual equipment necessary for the specific sampling required.

3.6.2 Selection of Sample Containers

The selection of sample containers must be made prior to going out into the field. It is essential that the sample containers be made of chemically resistant material unaffected by the concentrations of the pollutants measured. In addition, sample containers must have a closure that will protect the sample from contamination. Wastewater samples for chemical analysis must be collected in plastic (polyethylene) containers. Exceptions to this general rule are samples of oil and grease, pesticides, phenols, polychlorinated biphenyls (PCBs), and other organic pollutants. Collect these in properly cleaned glass jars or bottles and properly seal them. Collect bacteriological samples in properly sterilized plastic or glass containers. Collect samples that contain constituents that will oxidize when exposed to sunlight (such as iron cyanide complexes) in dark containers. Sample collection containers, preservation techniques and holding times must comply with the requirements in 40 CFR part 136 Table II and its footnotes, see Table II – Required Containers, Preservation Techniques, Holding Times at

http://www.ecfr.gov/cgi-bin/text-idx?SID=5d11a60e659eaac007bb4dc4917ae3fd&mc=true&node=se40.23.136_13&rgn=div8.

For automatic samplers, containers with wide mouths are recommended to facilitate the transfer of the liquid from the sampler to the sample container. In addition, the container must be large enough to contain the required volume for laboratory analysis.

Container lids and closure linings must be intact and of the right material so they do not interfere with the pollutant parameters to be measured. Most containers have tight, screw-type lids. Plastic containers are usually provided with screw caps made of the same material as the container, so cap liners are usually not required. Glass containers usually come with rigid plastic screw caps. Liner materials may be polyethylene, polypropylene, neoprene, aluminum foil, or Teflon.

3.6.3 Cleaning and Preparation of Sampling Equipment

It is very important that sample containers are properly cleaned to ensure freedom from contamination. Sampling equipment must be demonstrated to be free from contamination through the analysis of equipment blanks and bottle blanks. Many vendors now sell precleaned sample bottles with varied cleaning specifications. It is recommended that the laboratory perform analysis on a bottle blank when analyzing the samples to verify that the bottles are not a source of sample contamination. One bottle blank is recommended per lot number.²³

The cleaning and preparation methods for sampling equipment will vary depending on the parameters being sampled. For example, 40 CFR part 136, Appendix C, Section 8.1 (Inductively Coupled Plasma – Atomic Emission Spectrometric Method for Trace Element Analysis Method 200.7) describes the cleaning procedures for metals sampling as summarized in Table 3-1. It should be noted that more stringent procedures apply when conducting very low level analyses of mercury and other metals. Refer to EPA method 1669 as a resource for clean sampling techniques, which may be important. Other procedures will apply to the analyses of organics which may be referenced in specific test methods.

**Table 3-1
Metals Cleaning Procedures**

Use the following procedures when cleaning sample bottles and/or vessels for metal sampling and analysis:

- 1) Detergent wash.
 - 2) Tap water rinses.
 - 3) (1:1) Nitric Acid rinse.
 - 4) Tap water rinses.
 - 5) (1:1) Hydrochloric acid rinse.
 - 6) Tap water rinses.
 - 7) Deionized distilled water rinses.
- (Current as of July 2013)

Automatic sampling equipment must also be cleaned. If automatic sampling equipment does not perform self-cleaning all tubing and other sampling system parts must be scrubbed with hot water and detergent, rinsed several times with tap water, and then rinsed with distilled or deionized water. Further rinsing with acetone is advised only when the type of tubing (e.g., Teflon) is not susceptible to dissolution by the solvent. In most cases, the container should be rinsed three times with the wastewater to be sampled

²³ A lot number is an identification number assigned to a particular quantity or lot of material from a single manufacturer.

before the sample is taken.²⁴ However, some sample containers, such as those used for bacteriological sampling, require special cleaning procedures. Bacteriological sample containers must be sterilized prior to sample collection. The inspector should refer to *Standard Methods for the Examination of Water and Wastewater* and 40 CFR part 136 for proper procedures on sample container preparation.

3.6.4 Preparing Field Instruments

The most common parameters tested in the field are: pH, residual chlorine, temperature, and dissolved oxygen. For these four parameters, 40 CFR part 136 states that they must be analyzed immediately. The term “analyze immediately” means that a sample taken for the parameter should be analyzed within 15 minutes of sampling. Samples collected for measurement of these analytical parameters cannot be preserved and therefore, must be analyzed in the field. The electronic and photometric instruments used to monitor these different parameters should be checked for proper operation prior to leaving the office. The instruments should be in good condition, have charged batteries, and be calibrated. Best management practices indicate that recalibrating the instrument at the sampling location is optimal. Inspectors must use 40 CFR part 136-approved methods and should follow manufacturer’s specifications for calibration.

3.7 On-Site Activities

Once a sampling plan has been established and pre-inspection activities have been completed, the focus of the inspection turns to the on-site activities performed by the inspector. This section outlines the procedures that POTW inspectors should follow when conducting on-site sampling at industrial users. The first thing POTW inspectors should do is conduct an opening conference with the industrial user representatives. However, when there are suspected violations, the sampling personnel may want to proceed immediately with sampling and then conduct a closing conference after sampling is completed.

3.7.1 Sampling Location

The first step in preparing to sample is to verify that the sample location is appropriate. The industrial user permit must specify the sampling location for compliance sampling (40 CFR 403.8(f)(1)(iii)(B)(4)). Sampling points should be located where there is no discharge other than the discharge from the industrial user process effluent being monitored. This sampling location must be representative of the actual discharge from the facility. A representative sampling location is where a sample can be obtained that is as close as possible to the same composition as that in the larger volume of wastewater being discharged and is typical of the discharge from the facility on a normal operating day. Convenience, accessibility and safety are important considerations, but are secondary to the representativeness of the sample. The most representative samples will be drawn from a wastewater depth where the flow is turbulent and well mixed and the chance of solids settling is minimal. The depth of sample collection should be 40 to 60 percent of the wastestreams depth. To avoid contamination, the inspector should take care to collect samples from the center of the flow with the opening of the sampling device or container facing upstream. Wide channels or paths of flow may require dye testing to determine the most representative sampling site. If dye testing is inconclusive, multiple samples may need to be collected by cross sectional sampling.

The inspector should use the sampling location specified in the industrial user’s permit. If the sample location specified in the permit is not adequate to collect a representative sample, the inspector should determine an alternative location. This determination should be based on the inspector’s knowledge of the plant itself, the production processes, and the outfalls. If there is a conflict between the sample location described in the permit and the location the inspector believes is most representative, samples should be collected at both sites. The reason for the conflict should be thoroughly documented for later resolution

²⁴ Except when sampling for oil and grease, volatile organic compounds, and coliform bacteria. In these situations, the sample container should not be rinsed with the wastewater prior to sampling.

by the POTW. If necessary, the permit or other control mechanism must be amended to reflect the more representative sampling location(s).

The Clean Water Act (CWA) federal categorical standards apply at the end-of-process (or at the end of treatment, if treatment exists) unless the standard specifies a different location to collect the sample (e.g., in 40 CFR part 433, metal finishing, the sample location for cyanide is after the cyanide destruct system prior to dilution with other streams). If process effluent is mixed prior to treatment with unregulated wastestreams or dilution water, the CWF²⁵ must be used (40 CFR 403.6). In this case, the POTW will designate, in the industrial user's permit or other control mechanism, where the sampling point(s) will be (end-of-pipe, end-of-process, or both). The POTW must ensure that any change in the industrial user's sampling point(s) will not allow the user to substitute dilution for adequate treatment to achieve compliance with applicable standards. Where a treated, regulated, process, wastestream is combined prior to treatment with wastewaters other than those generated by the regulated process, the industrial user may monitor either the segregated process wastestream or the combined wastestream for the purpose of determining compliance with applicable pretreatment standards.

3.7.2 Type of Sample

There are two basic types of samples: grab samples and composite samples. The type of sampling that will be undertaken at the industrial user must be understood clearly and should be outlined in the POTW's Sampling and Quality Assurance Plan. It is very important that the POTW establish specific procedures for collecting grab and/or composite samples. According to 40 CFR 403.12(g)(3), grab samples must be used for pH, cyanide, total phenols, oil and grease, sulfides, and volatile organic compounds. For all other pollutants, 24-hour composite samples must be obtained through flow-proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is authorized by the POTW. Where time-proportional composite sampling or grab sampling is authorized by the POTW, the samples must be representative of the discharge and the decision to allow the alternative sampling must be documented in the file for that facility or in any control mechanism.

The correct sample type for each regulated parameter must be included in the industrial user's permit or control mechanism and for compliance determination purposes the inspector must collect the specified type of sample. Any problems noted with the type of sample specified in the industrial user's permit or the control mechanism should be documented. If necessary, the permit or other control mechanism may need to be revised or amended.

3.7.2.1 Grab Samples

A grab sample is an individual sample collected over a period of time not to exceed 15 minutes. Grab samples are usually taken manually, and the sample volume depends on the number of analyses to be performed. The sampler must make sure that sufficient volume of sample is taken to conduct all necessary analytical procedures, including QA/QC. Grab samples represent the conditions that exist at the moment the sample is taken and do not necessarily represent conditions at any other time. Grab sampling is the appropriate method of sampling under the following conditions:

- 40 CFR 403.12(g)(3) requires grab samples for pH, cyanide, total phenols, oil and grease, sulfides, and volatile organic compounds.
- When the effluent is not discharged on a continuous basis (i.e., batch discharges of an hour or less), and only when the batch is continuously stirred or well-mixed and the pollutant can be safely assumed to be uniformly dispersed.

²⁵ Also refer to EPA's *Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula* (September 1985) for more information on using the CWF.

- When sampling a facility where a statistical relationship can be established between previous grab samples and composite data.
- When the effluent is being screened to see if a parameter is present (NOTE: This is only true when the sample is well-mixed and representative of the discharge).
- When the waste conditions are relatively constant (i.e., are well-mixed and homogeneous) over the period of the discharge. In lieu of complex sampling activities, a grab sample provides a simple and accurate method of establishing waste characteristics.
- When a POTW or state has adopted an instantaneous local limit which is based on grab samples.
- Grab samples are useful in characterizing an industrial user's fluctuations or extremes in wastewater flow and quality (i.e., changes in pollutant concentrations or loadings) and, therefore, are useful in identifying slug loads.

For additional guidance on when it is appropriate to use grab samples for determining compliance see the EPA memorandum, "The Use of Grab Samples to Detect Violations of Pretreatment Standards" at http://www.epa.gov/npdes/pubs/pretreatment_memo_grabsamplesdetectviolations.pdf.

3.7.2.2 Composite Samples

Composite samples are samples collected over time, either continuous sampling or by mixing discrete samples. Composite samples represent the average characteristics of the wastestream during the compositing period. Composite samples are collected when:

- Average pollutant concentration during the compositing period is desired.
- Mass per unit time loadings are calculated.
- Wastewater characteristics are highly variable.

The primary methods of composite sample collection are time compositing and flow proportion compositing. The permit may specify which type of composite sample to use. Composite samples are collected either manually by combining multiple grab samples or by using automatic sampling equipment. Inspectors should consider variability in wastestream flow rate, parameter concentrations and approved EPA methods when choosing compositing methods, sampling equipment, and QA procedures. The compositing methods, all of which depend on either continuous or periodic sampling, are described below:

- Time-Proportional Composite Sampling: Composed of constant volume discrete sample aliquots collected at constant time intervals. This method provides representative samples when the flow of the sampled stream is relatively constant (i.e., when the flow does not vary by more than 10 percent of the average flow rate over time).
- Flow-Proportional Composite Sampling: There are two methods used to collect a flow-proportional composite sample.
 - In the first method, the time between samples is constant, and the volume of each sample is proportional to the flow at that given moment in time (i.e., the volume of the sample varies over time as the flow changes). This is the preferred method of sampling when taking a manually composited sample. This method requires that discrete samples be collected over the operating day and then be manually composited. It is crucial, when using this method, to have accurate flow data continuously recorded during the sampling period.

- The second flow-proportional sampling method involves collecting a constant sample volume for each volume of wastestream flow (e.g., 200 milliliter (mL) sample collected for every 5,000 gallons of flow) at time intervals inversely proportional to the stream flow. This is the preferred method when taking composite samples using an automatic sampler. This method is based on taking a sample after a set amount of wastewater has been discharged. This method provides representative samples of all wastestreams when the flow is measured accurately. A composite sample should be collected over a workday. If a facility operates and discharges 24 hours per day, then the composite sample should be taken as a 24-hour composite (either flow proportional or time composite). If a facility operates 24 hours per day but only discharges wastewater for six hours, a six-hour composite sample should be collected. In general, composite samples should be collected to assess compliance with categorical standards and local limits, as long as the limits are daily, weekly, or monthly averages, except for those parameters listed above that must be taken by grab sample. If the POTW is using an automatic sampler with discrete sample containers, the inspector should keep track of any sample bottles that are empty and seek an explanation from the industrial user for all empty sample bottles from the automatic composite sampler.

Table 3-2 lists the advantages and disadvantages of each composite sampling method. Either manual or automatic sampling techniques can be used. If a sample is composited manually, sample manipulation should be minimized to reduce the possibility of contamination. The inspector must use the sampling method specified in the permit or other control mechanism, which in turn must reflect the requirements at 40 CFR 403.12(g)(3).

**Table 3-2
Composite Sampling Methods**

Method	Advantages	Disadvantages	Comments
Time-Proportional Composite Constant sample volume, constant time interval between samples.	Minimal instrumentation and manual effort. Requires no flow measurement.	May lack representativeness especially for highly variable flows.	Widely used in both automatic samplers and manual handling.
Flow-Proportional Composite <ul style="list-style-type: none"> • Constant sample volume, time interval between samples proportional to stream flow. • Constant time interval between samples, sample volume proportional to total stream flow at time of sampling. 	Minimal manual effort. Minimal instrumentation.	Requires accurate flow measurement reading equipment. Samples must be manually composited. Discrete samples must be taken. Chance of collecting samples that are too small or too large for a given composite volume.	Widely used in automatic as well as manual sampling. Used in automatic samplers and widely used as manual method.

3.7.2.3 Compositing Grab Samples

As stated earlier, some pollutant parameters must be collected as grab samples, but may be composited, if specific sampling/preservation techniques for each parameter are followed. If the POTW will composite

the grab samples, it must²⁶ follow the procedures presented in 40 CFR part 136 or *Standard Methods for the Examination of Water and Wastewater*. As stated at 40 CFR 403.12(g)(3) multiple grab samples collected during a 24-hour period may be composited prior to analysis as follows: for cyanide, total phenols, and sulfides, the samples may be composited in the laboratory or in the field; for volatile organics and oil and grease the samples may be composited in the laboratory. Composite samples for other parameters may be authorized by the POTW, as appropriate, as long as approved EPA methodologies in 40 CFR part 136 are used.

Oil and Grease

The currently approved methods for measurement of oil and grease listed at 40 CFR part 136 are EPA Method 1664, Revisions A and B and Standard Method 5520 B-2001. Standard Method 5520 B-2011 has been proposed for approval at 40 CFR part 136 as part of the Feb. 19, 2015, Methods Update Rule (MUR). All samples must be acidified and/or verified in the lab to $\text{pH} \leq 2$ immediately prior to analysis. If analysis is to be delayed for more than four hours, adjust the sample pH to less than two with hydrochloric acid (HCl) or sulfuric acid (H_2SO_4) solution (Section 7.2) at the time of collection and refrigerate at 0-6 ° C (40 CFR part 136, Table III). To establish the volume of HCl or H_2SO_4 required, collect a separate aliquot, adjust the pH of this aliquot to less than 2 with acid, and add the volume of acid determined to each sample bottle prior to collection. During the sample collection, do not dip pH paper, a pH electrode, a stirring rod, or other materials into a sample that will be used for Hexane Extractable Material (HEM) or Silica Gel Treated Hexane Extractable Material (SGT-HEM) determination because substance in the sample may adhere to these items. EPA Method 1664 Revisions A and B contain procedures for compositing samples collected for measurement of oil and grease in the laboratory prior to analysis. These procedures are detailed in Section 8 – Sample Collection, Preservation and Storage in each of the methods (see Oil & Grease: <https://www.epa.gov/cwa-methods/cwa-methods-regulatory-history>).

The high probability that extractable matter may adhere to sampling equipment and result in measurements that are biased low precludes the collection of composite samples for determination of oil and grease. Therefore, samples must be collected as grab samples. If a composite measurement is required, individual grab samples collected at prescribed time intervals must be analyzed separately and the concentrations averaged. Alternatively, samples can be collected in the field and composited in the laboratory. For example, collect four individual 250-mL samples over the course of a day. In the laboratory, pour each 250-mL sample into the separatory funnel, rinse each of the four bottles (and caps) sequentially with 30 mL of n-hexane, and use the 30 mL of n-hexane for the extraction.

Cyanide (Total)

The following methods are approved at 40 CFR part 136 at 4500–CN C, D, E and F-2011 and from *Standard Methods for the Examination of Water and Wastewater*. They are Standard methods not EPA Methods. EPA Method 335.4, Rev 1.0 is also approved at 40 CFR part 136 for measurement of total cyanide. Additionally, updated guidance on sample collection, preservation and interference mitigation for samples to be measured for total cyanide is provided in footnotes 5 and 6 to Table II at 40 CFR 136.3. These updated procedures are located at http://www.ecfr.gov/cgi-bin/text-idx?SID=a21b2873e4cffda2da79b7a04570c2a8&mc=true&node=se40.25.136_13&rgn=div8.

NOTE: Any technique for removal or suppression of interference may be employed, provided the laboratory demonstrates that it more accurately measures cyanide through QC measures described in the analytical test method. Any removal or suppression technique not described in D7365-09a or the analytical test method must be documented along with supporting data.

²⁶ Footnotes 2, 4, 6 and 7 of Table II at 40 CFR 136 contain information regarding requirements for collection, preservation and analysis of grab samples.

3.7.3 General Sample Collection Techniques

To obtain a representative sample, sampling must be conducted where wastewater is adequately mixed. Ideally, a sample should be taken in the center of the flow where the velocity is highest and there is little possibility of solids settling. The inspector should avoid skimming the surface of the wastestream or dragging the channel bottom. Mixing of the flow is particularly important for ensuring uniformity. Sampling personnel should be cautious when collecting samples near a weir because solids tend to collect upstream and floating oil and grease accumulate downstream of the weir.

Samples can be collected either manually or with automatic samplers. The following general guidelines apply when collecting samples:

- Take samples at the site specified in the industrial user permit or the control mechanism. If the inspector determines that the site specified in the permit is not appropriate, he or she should sample at a location that yields a more representative sample and document where the sample was taken and why it was taken there. If the sample site is determined to be inappropriate, appropriate modifications to the permit must be made.
- Use the sampling method (grab or composite) required by the industrial user permit or other control mechanism. If the permit sampling method is inappropriate (e.g., if it calls for composite sampling for pH), then the inspector should note this in the field notebook and take two samples: one using the permit method and one using the method under 40 CFR 403.12(g)(3). The inspector should document how the samples were collected and why the permit method may not be representative. The permit should be modified, if appropriate.
- Samples of certain pollutant parameters may not be taken by automatic samplers, but must be taken by manual grab samples. Federal regulations at 40 CFR 403.12(g)(3) require that grab samples must be used for pH, cyanide, total phenols, oil and grease, sulfide, and volatile organic compounds.
- Temperature and pH both must be analyzed within 15 minutes of sampling in accordance with 40 CFR part 136.
- Avoid collecting large nonhomogeneous particles and objects.
- Collect the sample facing upstream to avoid contamination.
- Do not rinse the sample container with the effluent when collecting oil and grease and microbiological samples, but fill the container directly to within 2.5 to 5 cm from the top.
- Fill the container completely if the sample is to be analyzed for purgeable organics, dissolved oxygen, ammonia, hydrogen sulfide, free chlorine, pH, hardness, sulfite, ammonium, ferrous iron, acidity, or alkalinity.
- Collect sufficient sample volume to allow for QA testing. (NOTE: Table 3-3 provides a guide to numerous sample volume requirements but additional volume may be necessary for QA testing).

When taking a grab sample, the entire mouth of the container should be submerged below the surface of the wastestream. A wide mouth bottle with an opening of at least two inches is recommended for this type of sampling. When using a composite sampler, the sample line should be kept as short as possible and sharp bends, kinks, and twists in the line (where solids can settle) should be avoided. The sample line should be placed so that changes in flow will not affect sample collection. Sample collection procedures should also include collection of the appropriate QC samples as discussed in section 3.5.2.

Sometimes grab samples must be taken from holding tanks with contents that will be released as a batch discharge. If this wastewater contains settleable solids, a grab sample from such a tank will only be representative if the contents are mixed at the time of the grab. The agitation must be enough to suspend all of the solids that are present.

There are a number of mixing methods to consider. The effectiveness of each is dependent on the material being mixed, the size and shape of the tank, the sizing of the equipment, the amount of time allowed for mixing, and, for some, the technique used. In other words, an engineer would be needed to determine the requirements. Whatever method is selected, it would need to be in active use when sampling is done.

Depending on the material being mixed, there are at least two other considerations when selecting a mixing technology.

1. Some methods are more likely than others to cause the tank contents to foam.
2. Some methods are more likely than others to cause out-gassing of volatile and semi-volatile compounds.

Mixing methods include:

1. Commercial mixer/agitator. These utilize various technologies including:
 - A. Propeller
 - B. Reciprocating disk
 - C. Recirculating jet sprayer.
2. Use a submersible discharge pump powerful enough, and with a discharge line flexible enough, so that the discharge can be directed to, and reach, the full area of the tank floor. This would be duplicating the effect of step 1.C.
3. Use a pumper truck to recirculate the contents of the tank. This would also be duplicating the effect of step 1.C.
4. When there is only a slight difference in density between the settleable solids and supernatant, a sludge judge "core sample" may be representative.
5. A tank with multiple sample ports at different depths might be able to produce a representative composite sample. As with the sludge judge, this will not be effective if there are very dense solids that have settled to the bottom.
6. If one holding tank is to be emptied into another, a composite sampler could be used on the flow as it is being transferred to obtain a representative sample.

An EPA guidance (excerpt below) for obtaining representative subsamples when particulates are present states that mixing cannot be relied upon to produce representative grab samples (because settling begins as soon as mixing has stopped).

From EPA *Guidance for Obtaining Representative Laboratory Analytical Subsamples from Particulate Laboratory Samples*:

"Many analysts rely on mixing (or blending) as a preliminary "homogenization" step before taking a grab sample. Unfortunately, many samples cannot be made homogeneous enough for sampling by mixing, and such a procedure should not be relied upon to reduce GE. Segregation of particles by gravitational effects usually occurs at the moment that the mixing has stopped. Some samples will remain segregated even during the mixing process. Even if the mixing was effective, the subsampling step will still involve the same minimum error contributions from the

fundamental error and the grouping error due to the random placement of analyte particles within the sample. The incorrect nature of grab sampling exacerbates the uncertainty by maximizing the error components from grouping, segregation, delimitation, and extraction processes. Grab sampling has been shown to be an unacceptable sampling method and should not be used with particulate samples (Allen & Khan, 1970; and Gerlach *et al.*, 2002)."

“When collecting samples from a tank, the tank contents must be well mixed. It is recommended that three samples are collected with each sample event. One sample should be collected at the inlet of the tank, one mid way in the tank volume, and one near the discharge point of the tank. Even if the tank is not getting good mixing, the collection of three samples should allow representative sample collection.”

3.7.4 Sample Volume

The volume of samples collected depends on the type and number of analyses needed. This will be determined by the parameters to be measured and the requirements of the analytical laboratory being used. Sample volume must be sufficient for all analyses, including QA/QC and any repeat analyses used for verification. Laboratory personnel should be contacted for the sample volume required to complete all analyses, since the laboratory is in the best position to estimate the necessary volume of sample. Individual, minimum composite portions should be 100 mL, with a total composite volume of 2 to 4 gallons. Larger volumes may be necessary if samples are to be separated into aliquots or if bioassay tests are to be conducted.

Volume requirements for individual analyses range from 40 mL for pH and volatile organic determinations to 1,000 mL or more for biochemical oxygen demand (BOD), oil and grease, and settleable solids. The inspector should always collect more than the minimum sample volume to allow for spillage and laboratory reruns. A summary of common sample volumes for various pollutant analyses is provided in Table 3-3.

Table 3-3²⁷
Volume of Sample Required for Analyzing Various Industrial Pollutants

Analyte Classes	Volume of Sample ¹ (mL)
PHYSICAL	
Color and Odor ²	100 to 500
Corrosivity ²	flowing sample
Electrical Conductivity ²	100
pH, electrometric ²	100
Radioactivity	100 to 1,000
Specific gravity ²	100
Temperature ²	flowing sample
Toxicity ²	1,000 to 20,000
Turbidity ²	100 to 1,000
CHEMICAL	
Dissolved Gases:	
Ammonia ³ , NH ³	500
Carbon Dioxide.....	200
Chlorine ³	200
Hydrogen ³	1,000

²⁷ Inspectors should always follow the most up-to-date test methods.

Analyte Classes	Volume of Sample ¹ (mL)
Hydrogen Sulfide ³	500
Oxygen ³	500 to 1,000
Sulfur dioxide ³	100
Miscellaneous:	
Acidity and alkalinity.....	100
Bacteria, iron.....	500
Bacteria, sulfate reducing.....	100
Biochemical Oxygen Demand (BOD).....	100 to 500
Chemical Oxygen Demand (COD).....	50 to 100
Chloroform extractable matter.....	1,000
Detergents.....	100 to 200
Hardness.....	50 to 100
Hydrazine.....	50 to 100
Microorganisms.....	100 to 200
Volatile and filming amines.....	500 to 1,000
Oil and Grease.....	3,000 to 5,000
Organic Nitrogen.....	500 to 1,000
Phenolic compounds.....	800 to 4,000
pH, colorimetric.....	10 to 20
Polyphosphates.....	100 to 200
Silica.....	50 to 1,000
Solids, dissolved.....	100 to 20,000
Solids, suspended.....	50 to 1,000
Tannin and Lignin.....	100 to 200
Metals:	
(Cations)	
Aluminum, Al ⁺⁺⁺	100 to 1,000
Ammonium ³ , NH ₄ ⁺	500
Antimony, Sb ⁺⁺⁺ to Sb ⁺⁺⁺⁺	100 to 1,000
Arsenic, As ⁺⁺⁺ to As ⁺⁺⁺⁺	100 to 1,000
Barium, Ba ⁺⁺	100 to 1,000
Cadmium, Cd ⁺	100 to 1,000
Calcium, Ca ⁺⁺	100 to 1,000
Chromium, Cr ⁺⁺⁺ to Cr ⁺⁺⁺⁺	100 to 1,000
Copper, Cu ⁺⁺	200 to 4,000
Iron ³ , Fe ⁺⁺ to Fe ⁺⁺⁺	100 to 1,000
Magnesium, Mg ⁺⁺	100 to 4,000
Manganese, Mn ⁺⁺ to Mn ⁺⁺⁺⁺	100 to 1,000
Mercury, Hg ⁺ to Hg ⁺⁺	100 to 1,000
Potassium, K ⁺	100 to 1,000
Nickel, Ni ⁺⁺	100 to 1,000
Silver, Ag ⁺	100 to 1,000
Sodium, Na ⁺	100 to 1,000
Strontium, Sr ⁺⁺	100 to 1,000
Tin, Sn ⁺⁺⁺ to Sn ⁺⁺⁺⁺	100 to 1,000
Zinc, Zn ⁺⁺	100 to 1,000
(Anions)	
Bicarbonate, HCO ₃ ⁻	100 to 200
Bromide, Br ⁻	100
Carbonate, CO ₃ ⁻	100 to 200
Chlorine, Cl ⁻	25 to 100
Cyanide, Cn ⁻	25 to 100

Analyte Classes	Volume of Sample ¹ (mL)
Fluoride, F ⁻	200
Hydroxide, OH ⁻	50 to 100
Iodide, I ⁻	100
Nitrate, NO ₃ ⁻	10 to 100
Nitrite, NO ₂ ⁻	50 to 100
Phosphorous, ortho, PO ₄ ⁻ , HPO ₄ ⁴⁻ , H ₂ PO ₄ ⁻	50 to 100
Sulfate, SO ₄ ⁻ , HSO ₄ ⁻	100 to 1,000
Sulfide, S ⁻ , Hs ⁻	100 to 500
Sulfite, SO ₃ ⁻ , HSO ₃ ⁻	50 to 100

(Associated Water and Air Resource Engineers, Inc., 1973, Handbook for Monitoring Industrial Wastewater, U.S. EPA Technology Transfer)

Notes:

¹Volumes specified in this table should be considered as guides for the approximate quantity of sample necessary for a particular analysis. The exact quantity used should be consistent with the volume prescribed in the standard method of analysis, whenever a volume is specified.

²Aliquot may be used for other determinations.

³Samples for unstable constituents must be obtained in separate containers, preserved as prescribed, completely filled, and sealed against all exposure.

3.7.5 Sample Preservation and Holding Times

Preservation techniques ensure that the sample remains representative of the wastestream at the time of collection. Since most pollutants in the samples collected are unstable (at least to some extent), this instability requires that the sample be analyzed immediately or that it be preserved or fixed to minimize changes in the pollutant concentration or characteristics between the time of collection and analysis. Because immediate analysis is not usually possible, most samples are preserved regardless of the time of analysis. This preservation must take place as soon as possible after collecting the sample. This means that preservation must take place in the field (see 40 CFR 136.3). The most common procedures used for preserving samples include icing, refrigeration, pH adjustment, and chemical fixation. When chemical fixation is used, the chemical preservative must be added before the samples are transferred to the laboratory. Likewise, refrigeration should be supplied immediately upon taking the sample. For many samples, if preservation is not appropriately used, bacteria can quickly degrade certain pollutant constituents (e.g., phenols and phosphorous). Other constituents such as cyanide and sulfides may volatilize or in the case of hexavalent chromium may react to form different chemical species. Proper preservation and holding time for each parameter is essential for the integrity of the monitoring program.

Problems may be encountered, however, when 24-hour composite samples are collected. Since sample deterioration can take place during the compositing process, it is necessary to preserve or stabilize the samples during the compositing in addition to preserving the aggregate sample before shipment to the laboratory. Preservation techniques vary depending on the pollutant parameter that is to be measured; therefore, the inspector must be familiar with the 40 CFR part 136 preservation techniques to ensure proper sample handling and shipment. It is important to verify that the preservation techniques for one parameter do not affect the analytical results of another parameter in the same sample. If this is a possibility, then two discrete samples should be collected and preserved independently. Sample preservation should be provided during compositing, generally by refrigeration to less than or equal to 6°C (or icing) as required at 40 CFR 136.3 Table II, footnote 2.

Refrigeration is the most widely used preservation technique because it has no detrimental effect on the sample composition and does not interfere with any analytical methods. Refrigeration suppresses biological activity and volatilization of dissolving gases and organic substances. This technique is used at the start of sample collection in the field and during sample shipment, and continued until the sample is

analyzed by the laboratory. Sample temperature should be verified and recorded by the inspector. This is particularly important if the analytical results are to be used in an enforcement action.

In addition to preservation techniques, 40 CFR part 136 indicates maximum holding times. Times listed are the maximum times between sample collection and analysis that are allowed for the sample to be considered valid. Some parameters have separate holding times from the time of sample collection to extraction/preparation, and from extraction/preparation to analysis. A composite wastewater sample becomes a sample when the last aliquot is collected. A grab sample holding time begins when the sample is collected. At that point, holding time limitations begin. A list of preservation methods and holding times appears in Table II of 40 CFR 136.3. Inspectors should consult 40 CFR part 136 for the most current and detailed specifications. These sample preservation procedures and holding times were selected by the EPA because they retard sample degradation and minimize monitoring costs by extending holding times as long as possible.

3.7.6 Sample Documentation

Documentation is an integral part of any pretreatment program. The validity of the samples collected and the data obtained both in the field (e.g., pH and flow) and in the laboratory (i.e., chemical analyses) is ensured through documentation and record keeping. All the information documented must be complete and accurate. Failure to maintain records and documentation according to set procedures could result in these documents being deemed inadmissible as evidence in court. All field records containing data must be signed by the inspector at the time of collection, including all COC forms.

3.7.6.1 General Documentation Procedures

Since many sampling reports may be used in enforcement proceedings, the inspector must keep a precise record of all sample collection and data handling. The POTW's Sampling and Quality Assurance Plan should specify that the following information must be documented in the field record:

- **Unique Sample or Log Number:** All samples should be assigned a unique identification number. If there is a serial number on the transportation case, the inspector should add this number to their field records.
- **Date and Time of Sample Collection:** The date and time of sample collection must be recorded. In the case of composite samples, the sequence of times and aliquot size should be noted.
- **Source of Sample (Facility Name and Address):** The name and address of the facility being sampled shall be recorded as well as a narrative description and/or diagram referring to the particular site where the sample was taken.
- **Name of Sampling Personnel:** The name(s) and person(s) taking the sample should be indicated. For a composite sample, the name(s) of the person(s) installing the sampler and the name(s) of the person(s) retrieving the sample should be included.
- **Sample Type:** Each sample should indicate whether it is a grab or composite sample. If the sample is a composite, volume, and frequency of individual samples should be noted.
- **Preservation Method:** Any preservatives (including the amount) added to the sample should be recorded, including the preservative amount and the method of preservation (e.g., refrigeration).
- **Analysis Required:** All parameters for which the sample should be analyzed shall be specified.
- **Field Analysis:** Field measurements must be recorded at the time that the analysis is completed. Examples of analyses that should be conducted and recorded in the field include:

pH, temperature, dissolved oxygen, residual chlorine, and sulfites. Field analyses should be treated the same as any other sample (i.e., the sampler must record the date of the sample, type of sample, name of the sampler, chain-of-custody, etc.).

- **Flow:** If flow is measured at the time of the sampling, the flow measurement should be recorded. If the sample is to be used to determine compliance, flow must be measured.
- **Production Rates:** Information on products manufactured and production rates should be included since many effluent limitations are based on production rates.
- **Date, Time and Documentation of Sample Shipment:** The shipment method (e.g., air or rail) as well as the shipping papers or manifest number should be recorded.
- **Comments:** This refers to all relevant information pertaining to the sample or the sampling site. Such comments include the condition of the sample site, observed characteristics of the sample, environmental conditions that may affect the sample, and problems encountered in sampling.

Each of these items should be recorded by the POTW inspector when conducting site sampling, but this information should also be kept by the industrial user when it conducts its required self-monitoring. This information should be available for review by the POTW when conducting an on-site inspection or sampling visit.

3.7.6.2 Chain-of-Custody Procedures

Once an appropriate sample has been obtained and the sample collection methods are properly documented, a written record of the possession of that sample should be made. “Chain-of-custody” refers to the documented account of changes in possession that occur for a particular sample or set of samples (see Definition section for a definition of “custody”). To ensure that all necessary information is documented, a COC form should be developed by the POTW.

Chain-of-custody procedures are a critical aspect in monitoring industrial users, and these procedures should be incorporated into the POTW’s Sampling and Quality Assurance Plan. The chain-of-custody record allows an accurate step-by-step recreation of the sample path, from its origin through its final analysis in the laboratory. Every sample needs to be accompanied by a COC form that is properly signed and transferred to each person in the chain, from the original sampler to the final person involved in analyzing the sample. Since it is impossible to predict which violations will require legal action, it should be assumed that all data generated from sampling will be used in court. If a case ultimately goes to trial, the integrity of the data must be established. The sampling results will only be admissible in court if POTW personnel can prove that a sample has been properly collected, preserved, and analyzed, and has not been tampered with or mishandled.

The information that should be addressed in a COC form includes:

- Name of the person collecting the sample.
- Sample identification number(s).
- Sample location.
- Date and time of sample collection.
- Parameters to be analyzed.
- Container type(s) used.
- Preservation method(s).

- Type of sample collected (i.e., grab, composite) for each pollutant to be analyzed.
- Results of any analysis performed in the field (e.g., pH and temperature).
- Name(s), signature(s), dates and times of all persons handling the samples in the field and in the laboratory. Note: Laboratories often have separate chain-of-custody procedures, so the chain-of-custody used in the field may end once the sample reaches the laboratory.

An example of a COC form used by the EPA is found in Appendix E. All personnel handling the sample should receive a copy of the COC form showing the path of the sample from field to laboratory. All sample shipments must be accompanied by the chain-of-custody record while a copy of these forms should be retained by the originator. In addition, all receipts associated with the shipment should be retained. Carriers typically will not sign for samples; therefore, seals must be used to verify that tampering has not occurred during shipment.

When transferring possession of samples, the transferee must sign and record the date and time on the chain-of-custody record. In general, custody transfers are made for each sample, although samples may be transferred as a group, if desired. Each person who takes custody must fill in the appropriate section of the chain-of-custody record. Finally, the person or group at the POTW responsible for permitting and/or, compliance and enforcement should receive a copy of the completed COC form.

Chain-of-custody records are crucial if the analytical data are to be used in an enforcement proceeding because they allow such data to be introduced as evidence without testimony of the persons who made the record. Therefore, it is important that all chain-of-custody records be complete and accurate. To maintain the sample's integrity, chain-of-custody records must show that the sample was properly collected, preserved, and analyzed, and was not tampered with during shipment. Chain-of-custody records also show that samples were received and analyzed in accordance with method requirements. Therefore, all compliance samples taken at an industrial user should follow chain-of-custody procedures.

3.7.7 Sample Identification and Labeling

Each sample must be accurately and completely identified. At the time a sample is collected, a waterproof, gummed label or a waterproof tag that is able to withstand field conditions should be attached to the sample container. This label and/or tag is necessary to prevent any misidentification of samples, since it provides the laboratory with relevant information for analysis, such as: the name of the sample collector, the sample identification number, the date and time of sample collection, the location of the sample collection, the preservatives used, the type of sample (grab or composite) and the identification of the parameters to be analyzed. Sample identification, therefore, is a crucial part of chain-of-custody. Sample tags should be used as part of the chain-of-custody process because they can be removed after the sample has been transported to the laboratory and placed in the evidence file for that sample while labels are usually discarded with the sample. The tags can then be used as evidence in an enforcement proceeding. The sample identification procedures should be incorporated into the POTW's Sampling and Quality Assurance Plan.

Sample seals or cooler seals (i.e., seals placed around a cooler with similar samples inside) should be used to protect the sample's integrity from the time it is collected to the time it is opened in the laboratory. The seal should contain the collector's name, the date and time of sample collection and the sample identification number. Information on the seal must be identical to the information on the label and tag. In addition, the seal must be attached so it must be broken to open the sample container or cooler. Caution should be observed to assure that glue on the sample seals and tag wires does not contaminate samples, particularly those containing volatile organics and metals.

3.7.8 Sample Packaging and Shipping

After the samples are properly labeled, they should be placed in a transportation case along with the COC form, pertinent field records, and analysis request forms. Glass bottles should be wrapped in foam rubber, plastic bubble wrap, or other material to prevent breakage during shipment. The wrapping can be secured around the bottle with tape. Samples should be placed in ice or a synthetic ice substitute that will maintain sample temperature at 6°C or below throughout shipment. Ice should be placed in double-wrapped watertight bags to ensure the water will not drip out of the shipping case. Metal or heavy plastic chests make good sample transportation cases. Filament tape wrapped around each end of the ice chest ensures that it will not open during transport. Sampling records should be placed in a waterproof bag, envelope or airtight sample bottle and taped to the inside lid or other appropriate place inside the transported container to prevent tampering or breach of custody. Shipping containers should also be sealed to prevent tampering. Sample packaging and shipping considerations should be included in the POTW's Sampling and Quality Assurance Plan (discussed in section 3.4).

Most samples will not require any special transportation precautions except careful packaging to prevent breakage and/or spillage. If the sample is shipped by common carrier or sent through the U.S. mail, it must comply with Department of Transportation (DOT) Hazardous Waste Materials Regulations (49 CFR parts 171-177). Air shipment of hazardous waste materials may also be covered by requirements of the International Air Transport Association (IATA). Before shipping a sample, the inspector should be aware of, and follow, any special shipping requirements. Special packaging and shipping rules apply to substances considered hazardous as defined by IATA rules. Typical wastewater samples are not generally considered hazardous materials.

3.8 Flow Measurement

Pollutant limits in the industrial user's permit are often expressed in terms of mass loadings to the POTW (e.g., categorical standards for Organic Chemicals, Plastics, and Synthetic Fibers). To determine a mass loading it is necessary for the inspector to obtain accurate flow data. This section briefly describes the types of devices and procedures used to measure flow. For further information, the inspector should consult the *NPDES Compliance Inspection Manual (July, 2004)*, which is the reference document for the following sections. In situations where flow measuring devices such as those described in the following sections are not available, the POTW may need to rely on the use of water consumption records at the facility. However, when a mass loading needs to be determined for assessing compliance, the POTW should have the ability to assess directly the flow at the facility during the sampling event.

3.8.1 Open Channel Flow

Open channel flow, where the flow occurs in conduits that are not full of liquid, is the most prevalent type of flow at industrial user discharge points regulated by the pretreatment program. Partially full pipes that are not under pressure are classified as open channels as well. Open channel flow is measured using both primary and secondary devices (as described below).

Primary Devices

Primary devices are calibrated, hydraulic structures installed in the channel so flow measurements can be obtained by measuring the depth of liquid at a specific point in relationship to the primary device. Weirs and flumes are examples of primary devices.

The most common type of weir consists of a thin, vertical plate with a sharp crest that is placed in a stream, channel, or partially filled pipe. Figure 3-1 shows a profile of a sharp-crested weir and indicates the appropriate nomenclature. Four common types of sharp-crested weirs are shown in Figure 3-2. The crest is the upper edge of the weir to which water must rise before passing over the structure. The vertical distance from the crest of the weir to the top of the water surface is termed the "head." To determine flow

rate, the inspector must measure the hydraulic head. The rate of flow over a weir is directly related to the height of water (hydraulic head) above the crest. To measure the hydraulic head, a measuring device is placed upstream of the weir at a distance of at least four times the head. To approximate the head, the inspector can measure at the weir plate. However, this value will provide only a rough estimate of flow.

The flume is an artificial channel constructed so the wastestream flows through it. The wastestreams flow is proportional to the depth of water in the flume and is calculated by measuring the head. A flume is composed of three sections: (1) a converging upstream section; (2) a throat or contracted section; and (3) a diverging or dropping downstream section. The two principal types of flumes are the Parshall Flume and the Palmer-Bowlus Flume.

Figure 3-3 presents a sketch of the Parshall Flume, identifying its different parts. In the Parshall Flume, the floor level of the converging section is higher than the floor of the throat and diverging section. The Flume operates on the principle that when water flows through a constriction in the channel, a hydraulic head is produced that is proportional to the flow. Flumes are good for measuring open channel waste flow because they are self-cleaning. Sand and suspended solids are unlikely to affect the device's operation.

A Palmer-Bowlus Flume, which may or may not have a constriction, has a level floor in the throat section and is placed in a pipe for approximately the length of the pipe's diameter. The depth of water above the raised step in the throat is related to the discharge rate. The head should be measured at a distance $(d/2)$ upstream of the throat, where (d) is the width of the flume. The height of the step is usually unknown until the manufacturer's data are consulted, and it is difficult to measure manually the height of water above the step at an upstream point. The dimensions of each Palmer-Bowlus Flume are different. Therefore, the manufacturer's data must be consulted to establish a relationship between the head and the discharge rate. Figure 3-4 contains a sketch of a free-flowing Palmer-Bowlus Flume.

Figure 3-1
Profile and Nomenclature of Sharp-Crested Weirs

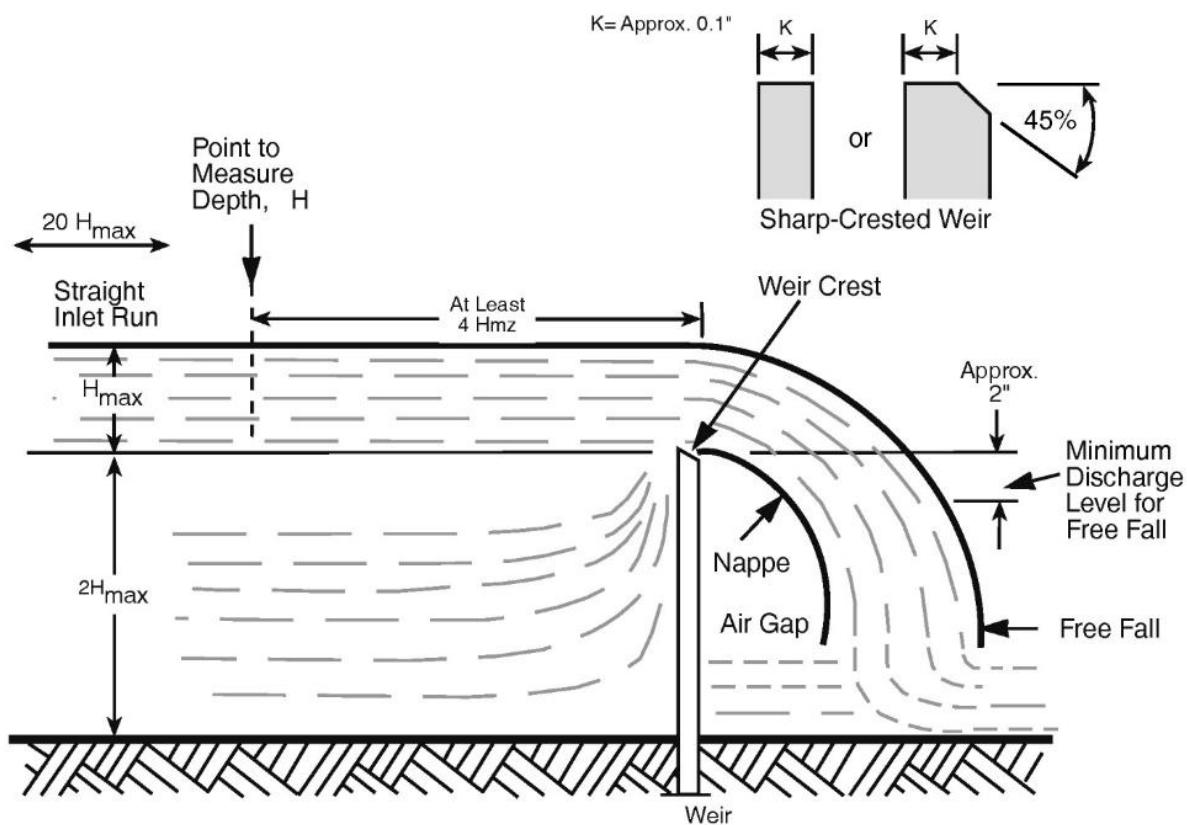
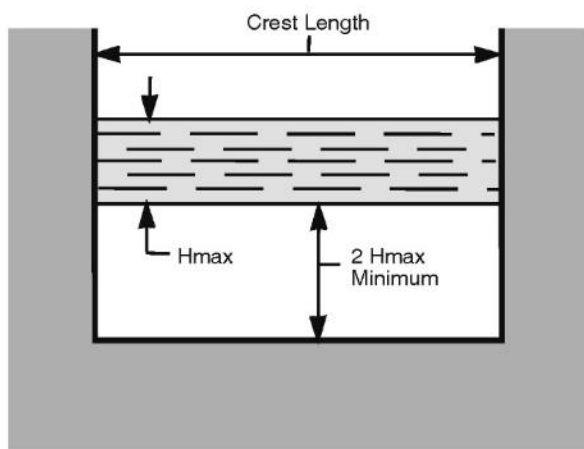
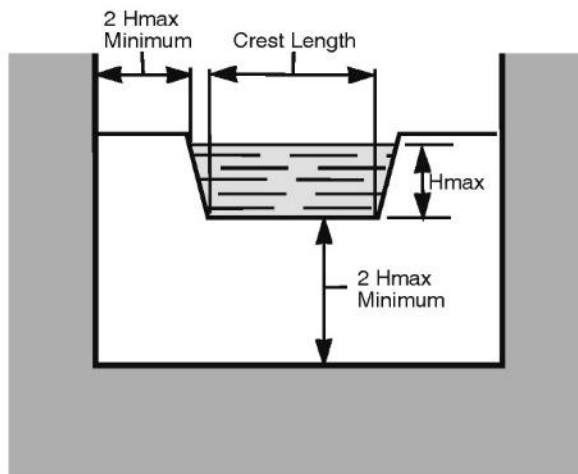


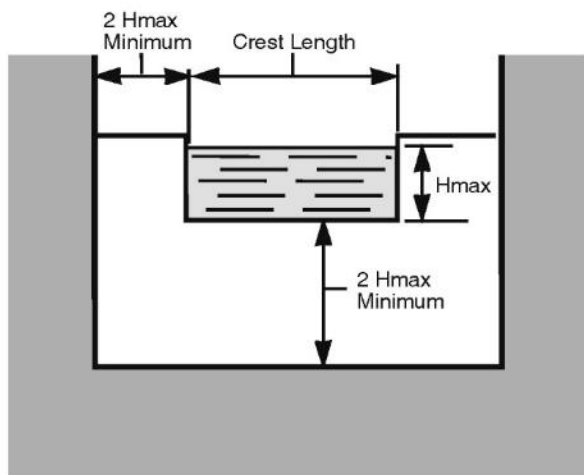
Figure 3-2
Four Common Types of Sharp-Crested Weirs



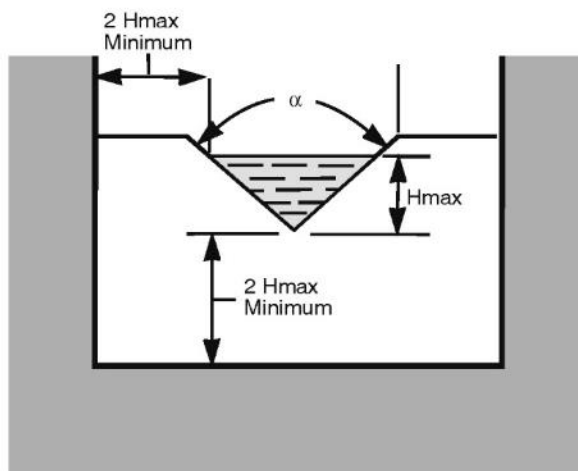
Suppressed (Without End Contractions) Rectangular Weir



Trapezoidal (Cipolletti) Sharp-Crested Weir



Contracted (With End Contractions) Rectangular Weir



V-Notch (Triangular) Sharp-Crested Weir

Figure 3-3
Plan View and Cross Section of a Parshall Flume

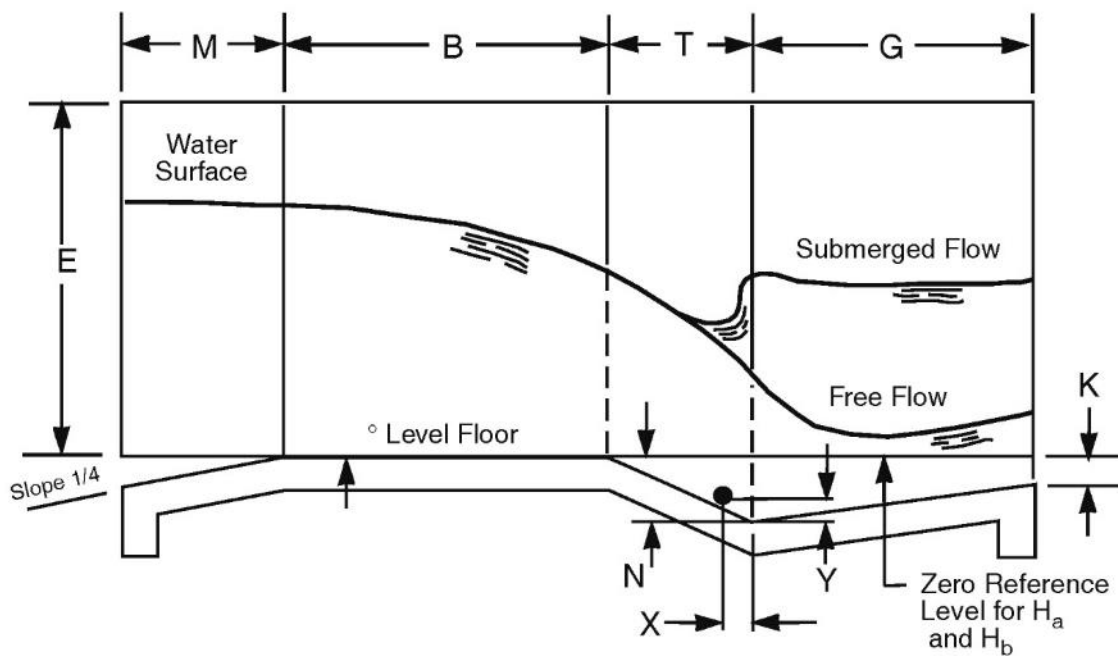
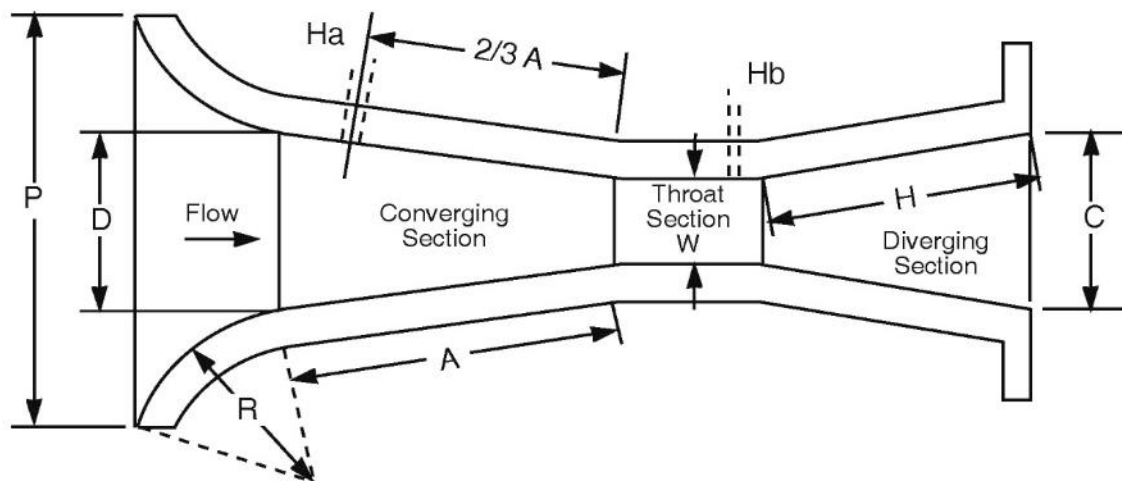
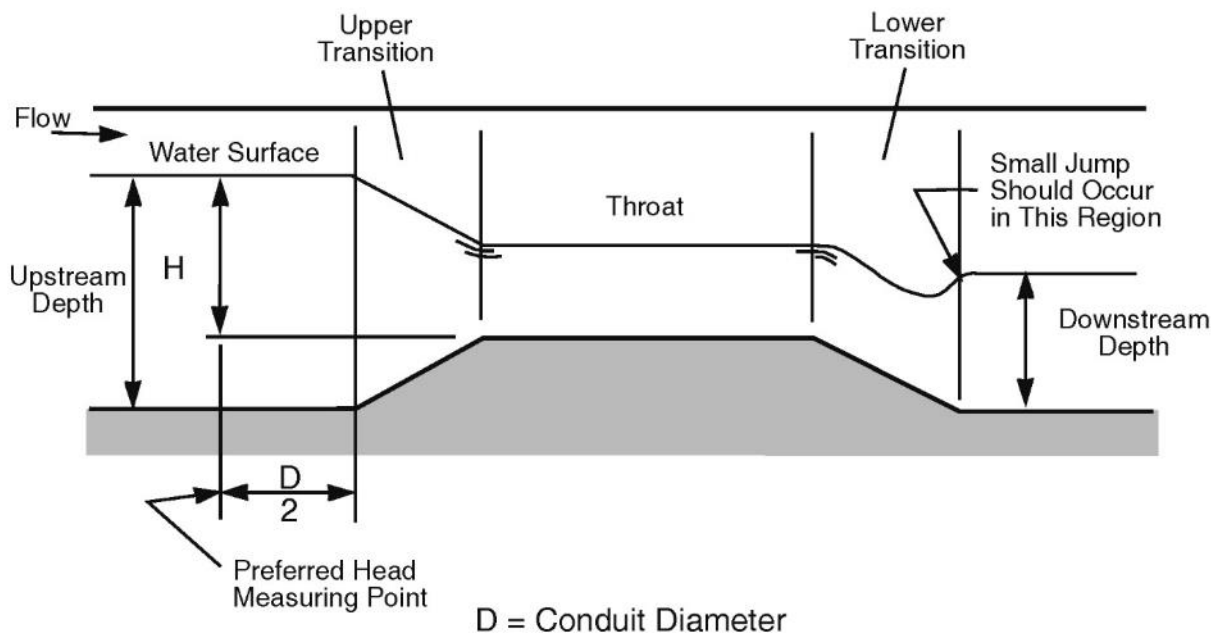


Figure 3-4
Free-Flowing Palmer-Bowlus Flume



Secondary Devices

Secondary devices are used in conjunction with primary devices to determine the actual flow passing the measuring point. Typically, secondary devices measure the depth of water in the primary device and convert the depth measurement to a corresponding flow, using established mathematical formulas. The output of the secondary device is generally transmitted to a recorder and/or totalizer to provide instantaneous and historical flow data to the operator. Outputs may also be transmitted to sampling systems to facilitate flow proportioning. Secondary devices can be organized into two broad categories:

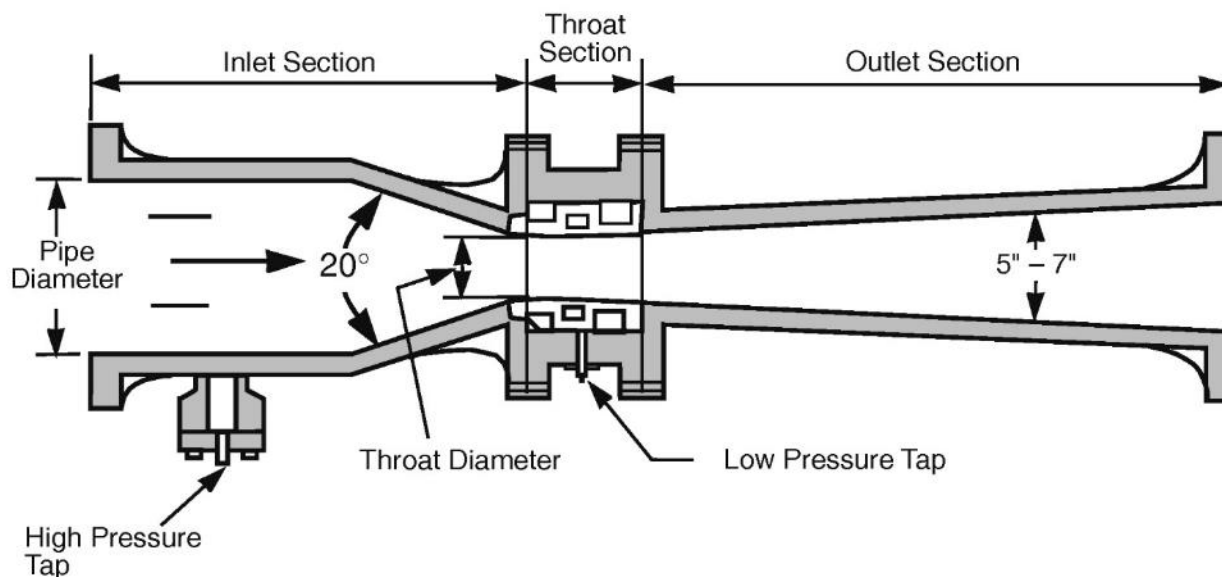
- A non-recording type with direct readout (e.g., a staff gauge) or indirect readout from fixed points (e.g., a chain, wire weight, or float) or
- A recording type with either digital or graphic recorders (e.g., float in well, float in flow, bubbler, electrical, or acoustic).

3.8.2 Closed Channel Flow

Closed channel flow is normally encountered between treatment units in a wastewater treatment plant and after lift stations, where liquids and/or sludges are pumped under pressure. It is also encountered in submerged outfalls. Flow in closed channels is usually measured by a metering device inserted into the conduit. Examples of closed channel flow measuring devices are the Venturi Meter and the electromagnetic flow meter.

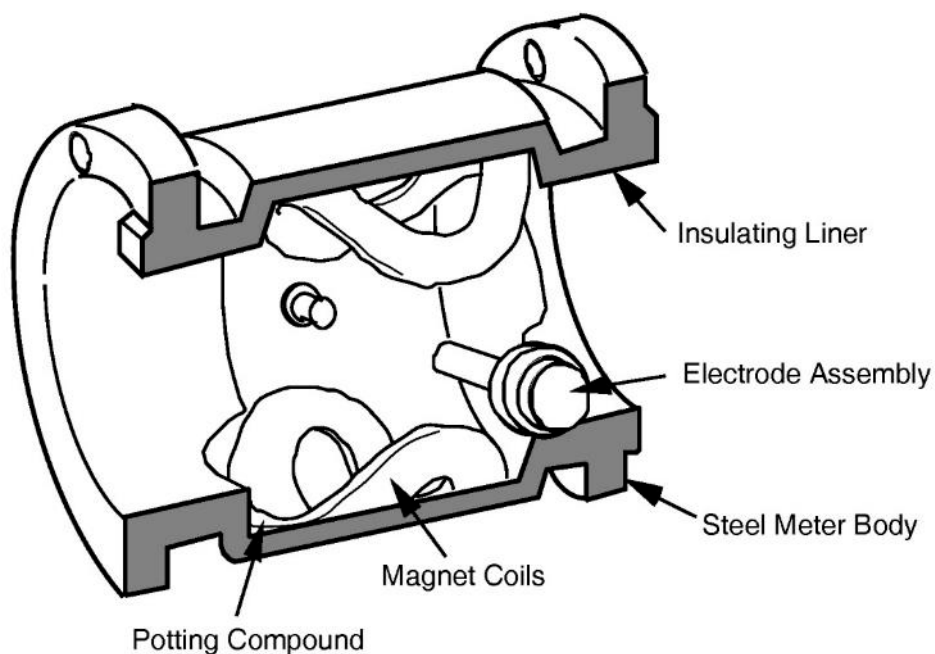
The Venturi Meter is one of the most accurate primary devices for measuring flow in closed channels. It is basically a pipe segment consisting of an inlet with a converging section, a throat, and a diverging outlet section, as illustrated in Figure 3-5. The water velocity is increased in the constricted portion of the inlet section which results in a decrease in static pressure. The pressure difference between the inlet pipe and the throat is proportional to the flow.

**Figure 3-5
Configuration and Nomenclature of a Venturi Meter**



Electromagnetic flow meter operation is based on the fact that the voltage induced by a conductor moving at right angles through a magnetic field will be proportional to the velocity of that conductor as it moves through the field. In the case of the electromagnetic flow meter, the conductor is the stream of water to be measured, and the magnetic field is produced by a set of electromagnetic coils. A typical electromagnetic flow meter is shown in Figure 3-6.

**Figure 3-6
Electromagnetic Flow Meter**



3.8.3 Evaluation of Facility-Installed Flow Devices and Data

For closed-channel flows the facility will usually have a metering device inserted into the conduit that measures flow. Examples of closed-channel flow measuring devices are the Venturi meter, the Pitot tube, the paddle wheel, the electromagnetic flowmeter, Doppler, and the transit-time flowmeter. Open-channel flows are typically measured using primary and secondary devices. Primary devices are standard hydraulic structures, such as flumes and weirs that are inserted in the open channel. Inspectors can obtain accurate flow measurements merely by measuring the depth of liquid (head) at the specific point in the primary device. In a weir application, for example, the flow rate is a function of the head of liquid above the weir crest.

Facilities use secondary devices in conjunction with primary devices to automate the flow measuring process. Typically, secondary devices measure the liquid depth in the primary device and convert the depth measurement to a corresponding flow, using established mathematical relationships. Examples of secondary devices are gauges, floats, ultrasonic transducers, bubblers, and transit-time flowmeters. A recorder generally measures the output of the secondary device transmitted to a recorder and/or totalizer to provide instantaneous and historical flow data to the operator. Outputs may also be transmitted to sampling systems to facilitate flow proportioning.

The inspector must assure the industrial user obtains accurate wastewater flow data to calculate mass loading (quantity) from measured concentrations of pollutants discharged. The industrial user must produce data that meet requirements in terms of precision and accuracy.

The accuracy of flow measurement (including both primary and secondary devices) varies widely with the device, its location, environmental conditions, and other factors such as maintenance and calibration. Faulty fabrication, construction, and installation of primary devices are common sources of errors. Improper calibration, misreading, and variation in the speed of totalizer drive motors are major errors related to secondary devices. When evaluating facility installed devices, the inspector should do the following:

- Verify that the facility has installed primary and/or secondary devices according to manufacturer's manual instructions.
- Inspect the primary device for evidence of corrosion, scale formation, or solids accumulation that may bias the flow measurement.
- Verify that weirs are level, plumb, and perpendicular to the flow direction.
- Verify that flumes are level and smooth-finished, the throat walls (narrowed section of flume) are plumb, and the throat width is the standard size intended.
- Inspect historical records (i.e., strip charts and logs) for evidence of continuous flow measurements and for routine and maintenance operations schedules. Compare periods of missing data with maintenance logs for explanations of measuring system problems.
- Observe the flow patterns near the primary device for excessive turbulence or velocity. The flow lines should be straight.
- Ensure that the flow measurement system or technique being used measures the entire wastewater discharge. Inspect carefully the piping to determine whether there are any wastewater diversions, return lines, or bypasses around the system. Make sure the system meets the permit requirement, such as instantaneous or continuous, daily, or other time interval measures. Note anomalies in the inspection report.
- Verify that the site chosen for flow measurement by the facility is appropriate and is in accordance with permit requirements.

- Verify that the site chosen by the facility for flow measurement is suitable for type of discharge, flow range, suspended solids concentration, and other relevant factors.
- Verify that the facility has closed-channel flow measuring devices where the pipe is always full. If these devices are used, then there must also be a means for the permittee and regulatory agencies/inspector to verify the accuracy of these meters. Primary open-channeled flow measuring devices such as weirs and flumes are ideal for this purpose.
- Verify that the facility uses appropriate tables, curves, and formulas to calculate flow rates.
- Review and evaluate calibration and maintenance programs for the discharger's flow measurement system.
- Verify that the facility calibrates flowmeters across the full range of expected flows.
- Verify that primary and secondary devices are adequate for normal flow as well as maximum expected flows. Note whether the flow measurement system can measure the expected range of flows.
- Collect accurate flow data during inspection to validate self-monitoring data collected by the permittee.
- The facility must install a flow measuring system that has the capability of routine flow verification by the permittee or appropriate regulatory personnel.

3.8.4 Evaluation of Permittee Data Handling and Reporting

The industrial user facility shall submit information showing the measured average daily and maximum daily flow, in gallons per day, to the POTW from each of the following:

- Regulated process streams and,
- Other streams as necessary to allow use of the CWF of 40 CFR 403.6(e).

3.8.5 Evaluation of Permittee Quality Control

The inspection should evaluate the following QC issues during a compliance inspection to ensure:

- Proper operation and maintenance of equipment.
- Accurate records.
- Sufficient inventory of spare parts.
- Valid flow measurement techniques.
- Precise flow data.
- Adequate frequency of calibration checks.

3.8.6 Evaluation of Flow Measurement Compliance

The objectives of flow discharge measured during the industrial user compliance inspection should be to verify the flow measurement data collected by the permittee, support any enforcement action that may be necessary, and provide a basis for reissuing or revising the industrial user permit.

The responsibility of the inspector includes collecting accurate flow data during the inspection and validating data collected during the permittee's self-monitoring.

The inspector must check both the permittee's flow data and the flow measurement system to verify the permittee's compliance with industrial user permit requirements. When evaluating a flow measurement system, the inspector should consider and record findings on the following:

- Whether the system measures the entire discharge flow.
- The system's accuracy and good working order. This will include a thorough physical inspection of the system and comparison of system readings to actual flow or those obtained with calibrated portable instruments.
- The need for new system equipment.
- The existence or absence of a routine calibration and maintenance program for flow measurement equipment.

3.9 Compliance Issues Related to Sampling and Analysis

A POTW's compliance monitoring program consisting of receiving and reviewing industrial user self-monitoring reports, and conducting inspections and sampling at regulated industrial users, is a crucial aspect of the local pretreatment program. One of the main purposes of this manual has been to ensure the ability of the POTW to use the information gained (e.g., through proper chain-of-custody, sample QA/QC, and legal entry procedures) for compliance monitoring. The POTW should follow the procedures and information outlined in this section to ensure that POTW compliance inspections and sampling properly establish the compliance status at these facilities.

3.9.1 Duplicate Samples

The use of duplicate samples (both field and laboratory) is a means of determining if the sample collection and laboratory analyses are adequately precise for compliance determination. In most cases, if proper QA/QC procedures are followed, the analyses from the duplicates should be very close. This indicates that the sample collection technique is sufficiently precise and that the laboratory has a high degree of precision in its analysis of samples. If the duplicate sample results are very close to one another (i.e., within the QC range established by the laboratory) but one is above the limit and the other is below the limit, the POTW should average these results together to determine the compliance status of the industrial user. This can only be done if the sample results are within the QC range of the laboratory.

In other cases, the analytical results from the duplicate samples, even though pulled from the same sample (or a simultaneous second sample) may yield significantly different analytical results. If this happens, the POTW needs to make a judgment as to whether the sample can be used for determining the compliance status of the industrial user. If duplicate samples produce significantly different analytical results, the POTW should follow the procedures outlined below:

1. *Review the Sampling Methodology.* It is possible that a duplicate sample, if taken as two discrete samples, will have very different characteristics. For example, when taking a duplicate sample for oil and grease, it is usually necessary to take two discrete samples because it is not possible to split an oil and grease sample. When the two samples are taken, the sampler may not take each sample in exactly the same way (e.g., one sample may skim the top of the wastestream and the other may be taken from the bottom of the wastestream). This can produce two radically different samples, even though they were taken at the same time from the same place. If duplicate samples are taken from the same sample collection vessel, make sure that the sample is well mixed and homogeneous so that each sample is as close as possible to each other. Sample preservation for the duplicate samples must be checked to ensure that it was the same.

2. *Check the Laboratory QA/QC.* The laboratory and sampling QA/QC procedures should be reviewed when duplicate samples produce different analytical results. The laboratory should check to see if blank and spike sample analyses give appropriate results. If the blanks and/or spikes do not produce expected values, it is highly likely that there is a problem with the analytical procedures. If the blanks and spikes indicate analytic problems, it may be necessary to discard the sample and disregard the results when determining the compliance status of the industrial user.
 - a. If the source of the discrepancy is identified, the POTW should run another analysis from the same sample batch making sure to avoid the mistakes on the original duplicate sample. This is a good reason to take an adequate sample amount when in the field.
3. *Investigate the Analytical Methodology.* The POTW should review the procedures used by the laboratory personnel when analyzing the sample to ensure that all steps were followed properly. The POTW should also evaluate the nature of the samples themselves and whether the samples may be responsible for contributing to any analytical discrepancies (e.g., duplicate samples of very high concentration, which require significant dilution, may produce high relative percent differences which may be due to sampling techniques in the field, sampling of the aliquot in the laboratory, dilution technique, or a combination of these factors). POTWs should be aware of this situation when evaluating whether any duplicate sample results may be used for determining compliance.
4. *Check the Analytic Time Sequence.* Very often the sample analysis for duplicate samples is done sequentially (e.g., as with gas chromatography/mass spectrometry equipment). For such sequential analysis, it is possible to have the sample analyses far apart in time. If this happens, the sample holding time may be exceeded resulting in an unstable sample. Even if the sample holding time has not been exceeded, it is possible that two analyses from the same sample will produce different results if they are far enough apart in time. Therefore, make sure that all duplicate samples are analyzed as close together as possible to ensure sample integrity through the entire analytic process. If the sample has not exceeded its allotted holding time, the POTW can re-analyze two new samples from the original sample collection vessel to obtain valid duplicate results.

The POTW also has the option of sending the sample in question to an independent laboratory. This independent laboratory can serve to give impartial analysis of the sample so that the sample results can be used to evaluate compliance. If the POTW chooses this option they should evaluate the independent laboratory in terms of the comparability of its analytical procedures, QA/QC etc., in relation to 40 CFR part 136 as well as comparability to the POTW's and/or the industrial user's laboratory.

3.9.2 Split Samples

Occasionally, an industrial user will request to split its self-monitoring samples with the POTW. Also, a POTW may split its compliance samples with industrial users. Each will conduct analysis on the split sample to compare results. When the POTW accepts a split sample from an industrial user's self-monitoring sample, this is not considered *independent of information supplied by industrial users* at 40 CFR 403.8(f)(2)(v) and should not be counted as the POTW's required annual compliance sampling event or for determination of compliance. However, in the second scenario, where the POTW conducts the sampling and splits it with the industrial user, this meets the requirement for independent sampling. All of the analytical results from routine compliance monitoring and additional split sampling deemed *independent* must be used in making a compliance determination.

The 1992 EPA Memorandum entitled *Determining Industrial User Compliance Using Split Samples* describes how to use the data from split samples for determining industrial user compliance in situations where split samples yield different analytical results. This memorandum is included as Appendix F and is also available at http://www.epa.gov/npdes/pubs/pretreatment_letter_splitsamplersresults.pdf.

In general, the memorandum states that whenever split samples are taken and both are properly preserved and analyzed according to requirements in 40 CFR part 136, the POTW should average the results from each sample and use the averaged value for determining compliance and appropriate enforcement responses. Where the sample results are widely divergent, the POTW should investigate each laboratory using QA/QC measures, as outlined in Section 3.9.1 above, to determine the cause of the discrepancy. If one or both of the samples are invalid, the POTW must not use these samples to determine the compliance status of the industrial user. In situations where one or both of the analytic results is determined to be invalid, the average value for that sample is also invalid.

The POTW should inform industrial users during the opening conference of their right to receive a split or duplicate of any physical sample collected by the POTW for laboratory analysis if sufficient sample volume is collected. Industrial user representatives should indicate at this point their desire to receive split and duplicate samples so that arrangements can be made to secure the samples during inspection. The POTW may also consider collecting duplicate samples for splitting with the industrial user when facilities are suspected of potential violations.

Composite samples containing settleable solids are, at the point of collection, routinely poured into smaller bottles for specific tests. This is done because some tests require special preservatives (H₂SO₄, HCl, NaOH, etc.). The sample collector must ensure that each aliquot is representative of the original sample. In practice, the composite sample jug is typically capped and shaken before it is poured into different bottles. Solids begin to settle as soon as the mixing stops, so this method introduces at least some error. Below are two sample splitting methods that can be used.

The New York State Department of Environmental Conservation (NYS DEC) Sampling Guidelines and Protocols include the detailed protocol http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf. Note that this procedure can be difficult and may require two people to perform.

Sample Handling and Mixing: Once a sample has been collected, it may have to be split into separate containers for different analyses. The best way to split liquid samples is to continually stir the sample contents with a clean pipette or pre-cleaned Teflon rod and allow the contents to be alternately siphoned into respective sample containers using Teflon or PVC (Tygon type) tubing. Teflon must be used when analyses for organic compounds or trace metals are to be conducted. Any device used for stirring, or tubing used for siphoning, must be cleaned in the same manner as other equipment.

The NYS DEC Sampling Guidelines and Protocols also provides guidance on a variation for “shake and pour” for compositing samples:

1. Mark the side of the composite carboy so that the contents are divided into thirds.
2. Cap the composite carboy and shake vigorously.
3. Quickly uncapped the carboy and pour enough into each aliquot container so that it is 1/3²⁸ of the way full.
4. Pour the remaining portion of the top marked 1/3 of the carboy into a clean container.
5. Repeat steps 2-4 for the second and final thirds of the composite carboy. All the aliquot bottles should be filled at the end of this process.

²⁸ The specific volume fractions may differ for different situations (in this step and step 4).

6. Should an additional aliquot be needed, use the portion retained in step 4. Otherwise discard that excess.

In addition, EPA's Handbook for Sampling and Sample Preservation of Water and Wastewater (EPA 600/4-82-029, September 1982) references "shake and pour technique." Section 11.4 says the composite sample contents must be mixed or agitated to provide thorough mixing of the sample and the pour up should be done in a timely fashion to prevent settleable solids from dropping to the bottom of the composite container. For splitting the sample, it is recommended that the sample be split into a one gallon container using a funnel, then remixed, then that is split into two separate containers. Another technique would be to use best judgment based on the sample contents to agitate/mix then pour and stop when sample personnel believe that the sample is no longer well mixed, then repeat mixing of the composite sample and then pour up again, then repeat until a complete sample volume is collected.

3.9.3 Compliance with Monthly Average Limitations

There has been some confusion on the part of some POTWs as to how many samples are required to demonstrate a violation of a monthly average. At a minimum, the POTW needs only one valid sample from the month to assess compliance with the monthly average. If an industrial user is in violation of its limit, the violation continues until there is a sample showing the facility is in compliance (see the POTW Enforcement Response Policy).

3.9.4 Closed Cup Flashpoint and Additional Compliance Sampling

The General Pretreatment Regulations at 40 CFR 403.5(b)(1) require that no discharge to a POTW shall "create a fire or explosion hazard in the POTW." The regulation further explains this requirement by setting a closed cup flashpoint limit of less than 140°F (60°C) on wastestreams discharged to the POTW. Since this prohibitive limit is an instantaneous limit, the POTW must use a grab sample to evaluate compliance with the closed cup flashpoint requirement.

The POTW should monitor the industrial user's wastestream periodically for the potential of creating a fire hazard, but this frequency should be based on the nature of the wastestream. If the POTW has reason to believe that the industrial user has a strong potential to create a fire hazard, monitoring for the closed cup flashpoint should be conducted regularly. If the POTW has no reason to believe that the industrial user poses a fire hazard, minimum closed cup flashpoint monitoring can be done.

At a minimum, the POTW should evaluate the industrial user's potential to cause pass-through or interference, as well as the industrial user's potential to violate any of the prohibitive discharge limits, at least once every permit cycle (e.g., every five years if the industrial user's permit duration is five years long).

3.9.5 POTW Sampling In Lieu of Industrial User Sampling

The General Pretreatment Regulations allow for the POTW to take over the periodic sampling and analysis activities for the industrial user. When the POTW collects all the information required for the periodic report, including flow data, the industrial user is not required to submit the periodic compliance report required in 40 CFR 403.12(e) or (h). However, there will be many instances where the POTW will not be gathering all information that is required in the periodic compliance report (e.g., BMP documentation, TTO certifications for metal finishers, flow data if the POTW is not monitoring flow, additional samples collected by the industrial user, etc.). In these cases, the SIU is still required to submit periodic compliance reports with the remaining information not collected by the POTW. The General Pretreatment Regulations also require POTWs to "inspect and sample the effluent from each Significant Industrial User at least once a year" (40 CFR 403.8(f)(2)(v)). The purpose of this inspection and sampling is to provide compliance status information, independent of the industrial user. If the POTW is already conducting the periodic sampling for the industrial user, then the POTW is already evaluating compliance

independent of the industrial user. Therefore, if the POTW is conducting the sampling for the industrial user required under 40 CFR 403.12, the POTW is satisfying the 40 CFR 403.8(f)(2)(v) requirement of annually sampling the industrial user, and the POTW would only be required to conduct one additional sampling event at the industrial user, totaling two events per year, to meet the requirements at 40 CFR 403.12(e). The POTW is still required to inspect each SIU annually.

The General Pretreatment Regulations require industrial users to notify the Control Authority and conduct follow-up sampling if the previous sample taken by the industrial user indicates a violation. The notification to the Control Authority must be conducted within 24 hours of becoming aware of the violation, and the results of resampling must be submitted to the Control Authority within 30 days. As required at 40 CFR 403.12(g)(2), if the POTW is conducting the sampling in lieu of the industrial user, “the POTW must perform the repeat sampling and analysis unless it notifies the industrial user of the violation and requires the industrial user to perform the repeat analysis. Resampling is not required if: (i) The Control Authority performs sampling at the Industrial User at a frequency of at least once per month, or (ii) The Control Authority performs sampling at the User between the time when the initial sampling was conducted and the time when the User or the Control Authority receives the results of this sampling.”

When the POTW is conducting the sampling in lieu of the industrial user and an effluent limit violation is detected, the POTW should notify the industrial user as soon as possible. Although the regulations do not specify a time frame within which the POTW should notify the industrial user, the EPA strongly recommends that the notification occur within 24 hours of noticing the violation so that measures can be taken to return the industrial user to compliance. Prompt notification to the industrial user also allows the industrial user the opportunity to return to compliance with a monthly average limit in some cases, if additional samples are collected that month. In addition, since the EPA SNC criteria are statistically-based, the sooner the industrial user knows about the violation, and takes corrective action, it may have the opportunity to collect more samples in the reporting period, increasing their chances of avoiding being in SNC.

3.9.6 Determining Compliance for Facilities with Multiple Outfalls

POTWs sometimes encounter situations where industrial users have multiple outfalls (i.e., connections to the collection system). The question has been raised as to how the POTW should evaluate such situations for the purpose of determining applicable pretreatment standards to apply to the facility, as well as the compliance status of the facility, especially with respect to SNC.

Multiple outfall situations can arise in three ways:

- Multiple categorical operations with multiple outfalls.
- A single categorical operation with multiple outfalls.
- A waste stream regulated by local limits with multiple outfalls.

Each of these circumstances is discussed below.

If an industrial user has several outfalls to the POTW from separate categorical operations, each of these outfalls and each pollutant parameter per outfall must be evaluated separately for the purposes of determining applicable pretreatment standards and compliance status. For example, if the industrial user has three outfalls from three separate categorical operations the Control Authority would need to sample at the end of each individual process to determine compliance with the applicable standards for each regulated pollutant. Furthermore, if each outfall is regulated for chromium, cadmium and zinc, and the pollutant concentration from each separate outfall exceeds either the chronic or technical review criterion for any individual parameter, then the industrial user meets the criteria for SNC and the POTW must publish a notice of SNC in the newspaper to provide meaningful public notice. When evaluating the compliance status of the industrial user, keep in mind that the industrial user must be evaluated

categorical operation-by-categorical operation, parameter-by-parameter, and outfall-by-outfall because categorical standards apply at end-of-process.

If the industrial user has more than one outfall from the same categorical operation (e.g., several lines from the same metal finishing operation), the POTW should treat those different categorical operations as a single, aggregate line for purposes of determining compliance. For example, if a metal finisher discharges categorical process wastewater generated from different operations in the same process line through two different sewer connections (without any intermediate treatment), compliance with the categorical standard should be determined by using a flow-weighted average of the two lines.

Finally, the POTW should be aware of how to evaluate compliance in situations where local limits control the nature of the discharge and there is more than one discharge point to the POTW. If there is more than one discharge point to the POTW that is regulated by a local limit (even if the separate outfalls come from the same process line) then the facility must meet the local limit at each connection to the sewer.

Likewise, the federal prohibitive standards located at 40 CFR 403.5 must be met *for each discharge point* to the POTW.

Given the variety of options for multiple discharges that may be encountered, it is important to distinguish between the applicability of categorical regulations and local limits. Categorical standards apply at end of process (after treatment) before blending with any other waste streams. Categorical standards are calculated based on best available treatment technologies and are specific to the industrial process for which they were developed. They do not give any consideration for risk or impacts to the receiving waters. Local limits apply at end of pipe and take into consideration water quality, inhibition, and sludge criteria. When assessing any of the scenarios described in the above paragraphs, the Control Authority must insure that compliance with applicable discharge standards is being assessed at the appropriate location. Where multiple waste streams exist, but blend prior to treatment, the CWF must be applied to the discharge to ensure compliance with all applicable categorical standards.

3.9.7 Violation Date

If a sample taken at an industrial user indicates a violation of a pretreatment standard or the industrial user's permit, the date of the violation is the date the sample was taken, not the date the sample was analyzed in the laboratory. For a composite sample, the date of violation is the date the sample was completed. For example, if a sampler is placed at an industrial user at 8AM on Tuesday and picked up at 8AM on Wednesday (the following day), but the sampler stopped taking samples at 5PM Tuesday, the date of violation is 5PM Tuesday (not 8AM Wednesday). (NOTE: In this example, the required holding time for this sample would commence at 5 PM on Tuesday [see 40 CFR part 136 Table II, footnote 4]). It is important to correctly determine which quarter a permit limit violation occurs when the POTW applies the rolling quarters method for determining SNC (as outlined in the EPA Memorandum "Application and Use of the Regulatory Definition of Significant Noncompliance for Industrial Users," September 9, 1991, found in Appendix G). When tracking the compliance status of each industrial user, the POTW should have an automated system that tracks the date each sample was taken at each industrial user regulated by the POTW.

3.9.8 Continuous Monitoring of pH

The regulations at 40 CFR 403.5(b)(2) prohibit the discharge to POTWs of "pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works at the POTW are specifically designed to accommodate such discharges."

Under the pretreatment regulations there is flexibility in how a POTW develops its ERP to define varying levels of response to temporary pH violations. The EPA advises POTWs to incorporate a method into their ERPs that they prefer when dealing with violations of local limits. The EPA encourages POTWs to make their own decisions regarding the utilization of resources in response to low pH discharges when

developing an ERP. Excursions under pH 5.0 standard units are pretreatment standard violations (40 CFR 403.5(b)(2)). In determining the appropriate response, the EPA recommends that POTWs consider the frequency, duration, magnitude, and effect of such excursions, and the compliance history of the facility for such excursions. If pH readings below 5.0 are common, the POTW should check the collection system at the point of discharge to determine if the discharge is causing corrosion. A record should be made of the response, and the person responsible for screening the data should alert enforcement personnel to the noncompliance.

Typically, the industrial users review their pH records at the end of each calendar month to determine compliance for that reporting period and to notify the POTW within 24 hours of becoming aware of the violation, as required in 40 CFR 403.12(g)(2). It may not be adequate, in this instance, for an industrial user to notify the POTW of a significant pH exceedance that occurred earlier in the calendar month that is below pH 5.0 for a significant period of time and if this discharge has a potential to cause or contribute to worker health and safety or corrosion in the collection system. The EPA recommends the POTW require the facility to install a continuous pH monitoring alarm that notifies industrial user personnel in case of a pH below 5.0 to improve the response to the exceedance and notification to the POTW. The EPA recognizes that the POTW's appropriate response (including no further action, a phone call, or a notification letter) may vary. This flexibility is intended to reduce the burdens on POTW programs.

POTWs can prescribe SNC criteria in their ERPs for chronic violations of continuously monitored pH permit limits. The EPA does not provide any official guidance on such criteria. Minimum SNC criteria for chronic pH limit violations are established at 40 CFR 403.8(f)(2)(viii), but the means of implementation is not specified.

Some POTWs have developed a definition for *violation day* (when pH is continuously monitored) and calculate chronic SNC using the number of violation days out of the total number of days monitored. In other words, if 66 percent or more of the total days during the SNC assessment period (i.e. total days monitored) were violation days, the facility would be in SNC for pH (i.e. assuming 7-day-per-week operation, 120 days or more of daily violations per 6-month period). The definition of *violation day* is as follows:

A violation day will have occurred where the pH value is measure outside the local pH limits established by the POTW for any duration during a calendar day.

In addition to SNC based on violation days, a POTW may also consider an SIU to be in SNC for pH should any of the following events occur:

- The exceedance results in a pH below 5.0 standard units at the wastewater treatment plant (or an alternative more stringent limit that the City has specifically designed to accommodate and been approved by the city and/or the water board) at any time during the calendar day.
- The exceedance results in a pH that is outside the limits established by the EPA in an applicable categorical pretreatment standard at any time during a calendar day.
- The exceedance causes interference, worker health or safety concerns, and/or corrosive structural damage to the POTW.

There has also been discussion about whether the pH provisions at 40 CFR 401.17 could serve as a basis for alternative pH requirements. The effluent guideline regulations list certain conditions under which excursions from pH limits are allowed for direct dischargers. The EPA developed 40 CFR 401.17 based on the Agency's determination that direct dischargers could continuously meet a pH limit between 6.0 and 9.0 standard units. In comparison, pretreatment requirements are based on preventing corrosion in POTWs and are less restrictive. It is the EPA's view that it would be inappropriate to attempt to use 40 CFR 401.17 as a basis for alternative pH requirements because the reason behind establishing the pH requirement is different. However, POTWs may implement and enforce local pH limits in a manner that

is more stringent than the federal regulations. The EPA has formally responded to this question in a 1993 letter to the State of New Jersey that can be found at <http://www.epa.gov/npdes/pubs/owm0113.pdf> and in Appendix H.

The inspector must check to see if the industrial user has policies for notifying the POTW of all pH violations (i.e., lower than 5.0 standard units) and whether the industrial user has appropriately notified the POTW if any of these pH excursions have occurred. The inspector should review pH logs and printouts to see if excursions have occurred and should ask to review documentation that the industrial user reported the excursion to the POTW. The inspector should also assess whether appropriate corrective actions have been taken to address recurring pH excursions, such as pretreatment system adjustment.

3.9.9 Reporting All Monitoring Results

The regulations at 40 CFR 403.12(g)(6) require all SIUs that monitor regulated pollutants more frequently than required by the POTW, using 40 CFR part 136 procedures, to report all of the results of this monitoring. Inspectors should inquire as to whether other sampling, beyond sampling required by the industrial user's permit is being conducted, and determine whether the industrial user should be reporting these results to the POTW. All valid results taken at the designated sampling point that meet requirements at 40 CFR part 136 for collection and analysis must be used to determine compliance.

4. SAFETY CONSIDERATIONS DURING INSPECTION AND SAMPLING ACTIVITIES

There are inherent hazards with inspecting and sampling industrial facilities. It is important that inspectors are aware of potential dangers, have accounted for such situations in inspection and sampling plans, and have a policy that extreme caution is taken to avoid threats to health and safety. It is recommended that sampling and inspection teams include at least two people for safety purposes. Under known hazardous conditions (e.g., entering confined spaces) a two-person team should be mandatory. Inspectors and sampling teams must use all required safety equipment and protective clothing. Appendix I lists specific hazards that are associated with various industrial facilities. The inspector should use this appendix as a reference when conducting sampling activities at any of the listed industries. Additional information can be obtained from the OSHA website at <https://www.osha.gov/SLTC/confinedspaces>. This site provides information on obtaining confined space permits, OSHA standards for work place safety, procedures for atmospheric testing, and safety considerations for specific industry types.

The inspector should also be familiar with the regulations at 40 CFR 403.12(p) that require industrial users to notify the POTW, the EPA Regional Waste Management Division Director, and state hazardous waste authorities in writing of any discharge into the POTW of a substance, which, if otherwise disposed of, would be a hazardous waste under 40 CFR part 261.

Continuous education is essential to a successful safety program. The inspector should be familiar with the hazards associated with inspections and sampling and the safety measures to be followed. For example, if the inspector is required to enter a manhole or other confined space, training in confined space entry and rescue procedures should be required. In addition, a permit for confined space entry is required under OSHA, and the permit must be obtained prior to field personnel entering a confined space. Potential hazards in a confined space include toxic gases, such as hydrogen sulfide, chlorine, and carbon monoxide; or explosive gases, such as gasoline vapors or methane. In addition, an atmosphere may be hazardous because there is not enough oxygen to support life due to the presence of other gases. A confined space, such as a manhole, should not be entered until the atmosphere has been tested for sufficient oxygen and the lack of toxic or explosive gases. Such a confined space should never be entered alone or without a lifeline.

In general, the potential hazards that POTW personnel will encounter while performing inspections or sampling at industrial user facilities can be divided into two areas: physical hazards and atmospheric hazards. The ability to recognize these hazards and follow proper procedures will eliminate most accidents.

4.1 Physical Hazards

Physical hazards that can be encountered when conducting inspections are numerous and vary by industry type. The inspector should be constantly aware of his or her surroundings. In production areas there can be structures that an inspector could hit his or her head on, or trip on, and water or other liquids could present slipping and falling hazards. Sometimes extremely loud noises are part of the production lines and caution should be taken to protect from hearing loss. The inspector should never reach into production lines or enter areas that are restricted without proper safety precautions. Wearing all required safety equipment such as hard hats, safety glasses, safety shoes, and ear plugs, are important for preventing possible injuries.

A sampling location can also present potential hazards. Sampling activities are often carried out in locations that meet the criteria set forth in the definition of confined space. A confined space may have limited means of entry or exit that is subject to a deficiency of oxygen, and the accumulation of toxic or

combustible gases. Such locations include manholes, pumping stations, wet wells, storm drains, and water meter vaults.

Care must be exercised when removing manhole covers and entering manholes or other confined spaces. Manhole covers should be opened and removed with a properly designed hook. Manhole covers should *never* be opened with fingers. Improper lifting of a manhole cover may result in back injury. Caution must also be exercised when lowering and lifting sampling equipment. A sampler is much heavier when it is full and is sometimes difficult to lift. Tools should be lowered into and lifted out of the manhole in a bucket to prevent the tools from falling on someone below.

Generally, the top of a manhole is flush with the surrounding surface. Therefore, a person entering the manhole may not have anything to hold on to for support. Ladders and steps leading into manholes and other types of confined spaces are subject to corrosion and may not be well maintained. These structures should be examined prior to entry. If there is any doubt regarding the soundness of the manhole steps, a portable ladder should be used. Other physical hazards in a confined space include the following: excessive depths; high flows; poor visibility; wet/slippery surfaces; harmful animals, insects or pathogens; protruding or sharp objects; and falling objects.

4.2 Atmospheric Hazards

Atmospheric hazards are comprised of three primary types: oxygen deficient atmospheres; explosive/flammable atmospheres; and toxic atmospheres. These types of hazards require air monitoring and ventilation before entering a manhole or other confined space. Air monitoring equipment is discussed later in this chapter. It should be noted that atmospheric hazards caused or contributed to by an industrial user discharge that result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems is violation of the specific prohibition at 40 CFR 403.5(b)(7).

4.2.1 Oxygen Deficient Atmosphere

The minimum OSHA requirement for oxygen concentration in the atmosphere is 19.5 percent. A Self-Contained Breathing Apparatus is necessary to enter an atmosphere with less than 19.5 percent oxygen. An oxygen enriched atmosphere, which exists when the oxygen concentration is greater than 25 percent, is also considered hazardous because of its ability to support combustion. Normal air consists of the gases listed in Table 4-1. Other gases, such as nitrogen and carbon dioxide, which are harmless under normal conditions, may build up in confined spaces in quantities large enough to displace the oxygen necessary to support life. When the concentration of oxygen in the atmosphere falls to 10-16 percent, a person will experience shortness of breath. Loss of consciousness will occur at a 6-10 percent oxygen concentration and death will occur rapidly when the concentration of oxygen falls below 6 percent.

**Table 4-1
Atmospheric Constituents**

Gas	Volume
Nitrogen	78.09%
Oxygen	20.95%
Argon	0.93%
Carbon Dioxide	0.03%

4.2.2 Explosive Atmosphere

Gasoline is the most common flammable liquid found in the sewer system. The major source of gasoline is leaking underground storage tanks and accidental discharge or spills. Gasoline is lighter than water, enabling it to float on top of the wastestream, and the vapors spread out in the collection system. It takes a very small amount of gasoline to generate an explosive atmosphere in a confined space.

Methane is the most common flammable gas encountered in the sewer system. Methane gas is the product of waste decomposition and is the primary component of natural gas. A leak in a natural gas pipe may result in the gas seeping into the collection system. Methane is lighter than air, which allows it to collect at the top of a confined space.

4.2.3 Toxic Atmosphere

There are various guidelines for assessing chemical hazards in the atmosphere. The threshold limit values (TLVs) are guidelines developed and published by the American Conference of Governmental Industrial Hygienists to be used for identifying and controlling potential hazards. One form of the TLV, the time weighted average (TWA), refers to the vapor phase concentration a worker may be exposed to for an eight hour day or 40 hour work week without chronic or acute health effects. TLV-TWA numbers are sometimes used to calculate industrial user discharge screening levels for volatile organic compounds. See TLVs for various chemical substances at <http://www.acgih.org/tlv-bei-guidelines/tlv-chemical-substances-introduction>.

The EPA has issued a guidance document entitled *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001) June 1992. This document should be used to evaluate the potential for exposure to toxic atmospheres and necessary steps for avoiding contact with such atmospheres. Hydrogen sulfide (H₂S) is a common gas found in the collection system. The gas, which is formed by anaerobic decomposition of organic matter, is heavier than air and tends to collect at the bottom of an enclosed space. At low concentrations, hydrogen sulfide has an odor of rotten eggs, at higher concentrations, however, the olfactory system becomes impaired and the gas cannot be detected by smell. The TLV-TWA for hydrogen sulfide is 100 parts per million (ppm). At higher concentrations of H₂S, damage can occur to the eyes, nervous system, and respiratory system. A caustic solution (sodium sulfide) is formed when the gas comes into contact with moist tissue, such as in the eyes and respiratory tract, which causes the irritation and danger from the chemical. At concentrations of 500-1,000 ppm the respiratory system is paralyzed and death will occur.

Hydrogen cyanide gas may be generated when cyanide salts react with an acidic wastestream. Cyanide salts are often found in plating baths and metal finishing facilities. The gas causes death by preventing the transfer of oxygen within the bloodstream.

Chlorine (Cl₂) gas may be encountered at plating facilities where it is used for cyanide destruction. Aside from the irritating odor, chlorine gas is corrosive in the presence of moisture. It combines with moisture in the lungs and the respiratory system to form hydrochloric acid. Pulmonary edema (fluid in the lungs) may occur at 50 ppm and at 1,000 ppm death occurs rapidly.

Carbon monoxide (CO) is another gas that is generated in a collection system from anaerobic decomposition of organic materials. Asphyxiation occurs from exposure to this gas because the hemoglobin of the blood has 300 times more affinity for carbon monoxide than for oxygen. Carbon monoxide combines with hemoglobin to form carboxy hemoglobin. As a result, blood cells with CO cannot transport oxygen to body tissues, and death occurs.

Toxic vapors also present a hazard to inspectors and sampling personnel. Vapors are the volatile form of substances that are normally in a solid or liquid state. Chlorinated solvents used in degreasing or photoresist developing operations generate vapors that may accumulate in the collection system. Some of

the vapors have an anesthetic effect when inhaled. In addition, the vapors are generally heavier than air causing oxygen in a confined space to be displaced which may create an oxygen deficiency in that space.

4.3 Safety Equipment

Recognizing the physical and atmospheric hazards associated with inspections and sampling is important. Simply acknowledging the hazards, however, does not guarantee safe working conditions. An employer is obligated by OSHA to provide safety equipment and establish a training program for employees. The important thing to remember is that the responsibility for using the equipment and following safety procedures rests with the individual inspector. The following discussion will acquaint the inspector with proper safety techniques.

4.3.1 Protective Clothing

Protective clothing is an important aspect of safety, and the guidelines presented below should be followed when conducting inspections and sampling at industrial user facilities.

- *Hard Hat* - All persons entering a confined space are required to wear a hard hat. A full strength hard hat with a brim and chin strap provides protection from head injuries. Hard hats may also prevent injury during process area walk-throughs.
- *Coveralls* - A person's skin should be covered as much as possible to prevent scrapes and cuts and to avoid skin contact with hazardous substances.
- *Gloves* - Hand protection is necessary when collecting and/or handling wastewater samples. In addition to preventing absorption of hazardous chemicals through the skin, gloves will protect the hands from cuts and scratches. Glove material should be selected to protect the sampler from the pollutants and hazards in the wastewater (e.g., solvents, biological hazards, etc.).
- *Shoes* - Rubber-soled, non-skid, protective-toed shoes (e.g., steel, composite) and boots must always be worn in or around a confined space, in process areas, chemical storage areas, etc. Safety shoes are designed to protect against impact and/or hazardous chemicals.
- *Ear Plugs* - Ear plugs should be worn when working in areas with high noise levels (e.g., general manufacturing areas). This equipment will protect the inspector from the cumulative effects of loud noises in the work place.
- *Safety Goggles* - Safety goggles are necessary during inspections and sampling to prevent eye contact with hazardous substances. Contact lenses are often prohibited around some industrial processes such as plating operations. If a hazardous substance comes into contact with a person's eye through splashing or exposure to mists or vapors, that substance may become trapped behind the lens where it would be difficult to flush out and could cause severe eye damage.
- *Safety Vests* - Safety vests are necessary warning devices in areas with vehicle traffic.

4.3.2 Traffic Control

Traffic diversions are necessary when inspecting and/or sampling in areas subject to vehicle traffic. For protection of the public as well as employees, the devices must be installed immediately upon arrival at the site and must not be removed until the work is completed. The following devices may be used to route traffic away from an open manhole.

- *Warning Devices* - Rotating/flashing lights and arrow boards should be placed between the work area and oncoming traffic to alert drivers and pedestrians.

- *Barricades* - A vehicle or heavy piece of equipment should be placed between traffic and the working area. It should not, however, interfere with traffic.
- *High-Level Warning Flag/Cones* - Should be used to route traffic through a jobsite. Flagmen should be used whenever possible and must wear reflective clothing, such as safety vests, hard hats, and safety shoes.

4.3.3 Communication Devices

Two-way radios and cell phones are effective ways to maintain contact with a main office. For hazardous sites, a sampling team should make contact upon arrival and departure from each sampling location. Sampling sites are often located in unpopulated areas; therefore, it is important that the radio or cell phones be kept in working order in the event it is necessary to call for help. If an accident should occur, the rescuer must call for help before any assistance is given to the victim.

4.3.4 Air Monitoring Devices

Before sampling in a confined space, tests should be done for: (1) explosive gases; (2) the presence of toxic gases; and (3) oxygen deficiency. The most effective method for detecting these conditions is with an atmospheric monitor. The gas detectors discussed below are the most commonly used for atmospheric monitoring.

- *Single Purpose Detector* - Designed to detect specific gases, such as carbon monoxide, methane, or hydrogen sulfide. These gases are commonly present in collection systems and confined spaces. Single detection units or tubes are available for measuring gases that are less common.
- *Dual Purpose Detector* - Capable of detecting lack of oxygen and explosive conditions in an area.
- *Combination Detector* - Capable of detecting a lack of oxygen, explosivity and the presence of toxic gases. This type of meter provides maximum protection by detecting the presence of all three hazards. Hydrogen sulfide and carbon monoxide are the gases usually measured because they occur most frequently in a collection system.

The atmosphere in a confined space can change suddenly; therefore, a detector that continuously monitors the atmosphere is recommended. In addition, detectors should be equipped with an audible and visual alarm that is activated in response to specific hazardous conditions or a low battery, thus eliminating the need for taking the time to read a dial or gauge.

It is important to remember that using an atmospheric tester does not ensure safe conditions. Gas detectors are only one source of information pertaining to a potentially hazardous situation. Most gas detectors are designed to test for common gases such as hydrogen sulfide, and are not effective for detecting less common substances such as trichloroethylene vapors. There are test kits available for detecting the less common gases. The kits consist of a bellows-type pump and glass tubes containing an indicator chemical which are sealed at the ends until they are used. The indicator chemical in the detector tube is specific to a particular contaminant or group of gases. A predetermined volume of air is drawn through the tube and the contaminant reacts with the indicator chemical, producing a color change that can be compared to a color calibrated chart to determine an approximate concentration.

When measuring explosivity, gas meters measure the percentage of the Lower-Explosive Limit (LEL) of a calibration gas, which is usually methane. Gases are combustible throughout a range of air mixtures. The meters do not differentiate between gases, but only indicate explosivity relative to the calibration gas. The range begins with the LEL, which is the lowest concentration of a combustible gas or vapor in air that is necessary to support combustion. The explosive range extends upward to the Upper Explosive Limit

(UEL) which is the maximum concentration that will support combustion. If the concentration of gas is below the LEL, there is insufficient fuel to support ignition. Alternatively, if the concentration is above the UEL, there is insufficient oxygen to support combustion. These limitations in the atmospheric monitoring equipment emphasize the need for constant ventilation and awareness of potential hazards.²⁹

4.3.5 Ventilation Devices

Few confined spaces have adequate natural or mechanically induced air movement, and in most spaces, it is necessary to remove harmful gases or vapors by ventilation with a blower or fan. The most common method of ventilation uses a large flexible hose attached at one end to a blower with the other end lowered into the space. The blower will push fresh air into the space to purge the area of hazardous substances. The blower allows the fresh air to enter the space at the lowest point possible. Because the atmosphere in a confined space can change quickly, ventilation should be continuous.

4.3.6 Safety Harness and Retrieval System

Any entry into a confined space must always be performed by a team consisting of at least two people. A standby person must be stationed outside of the confined. OSHA says that the duty of the attendant is to “maintain communication with and keep an accurate account of those workers entering the permit space.” All personnel required to enter the confined space must wear a safety harness. A full body parachute type harness with a lifeline attached at the shoulders is recommended. This type of harness will keep a body vertical and prevent a limp body from falling out when being pulled out of an area.

The lifeline should be attached to a retrieval system which includes a fall arrest mechanism. This type of safety system works in a similar manner as an automobile safety belt where a centrifugal locking mechanism is activated when a fall occurs. If a rescue attempt is necessary, this type of retrieval system eliminates the need to enter the space. Approximately one half of all fatalities that occur in confined spaces are unplanned rescue attempts where a worker instinctively rushes into the confined space to assist an injured co-worker.

The retrieval system should be purchased from a reputable manufacturer or authorized distributor as complete systems, including, repair, and training for proper use. Most components of a retrieval system must meet certain manufacturer specifications and substitution of these components may result in liability for personal injury.

Safety equipment must be maintained and inspected on a regular basis. A safety harness and rescue rope should be examined for frayed strands of fibers, cuts or tears, chemical damage, decay, and kinks or extreme stiffness. Visual inspection of this equipment should be made prior to each use, and formal procedures should be implemented for periodic inspection and maintenance.

4.3.7 Respirators

The primary function of a respirator is to prevent exposure to hazardous atmospheres. It is important to choose a respirator based on the job to be performed and the potential hazards to which an employee may be exposed. The basic types of respirators are:

- *Air Purifying* - Masks that filter dangerous substances from the air.
- *Air Supplying* - Devices that provide a supply of safe breathing air from a tank.

²⁹ Combustible gas meter alarms are usually set at a point well below the LEL of the gas or atmosphere being measured.)

An air-purifying respirator will remove particles of dust and light concentrations of gas or vapors, but it will not protect against heavy gas concentrations. In addition, this type of respirator provides no oxygen other than what is filtered through the mask. Air-purifying respirators include the following types:

- *Gas and Vapor Respirators* - Contaminated air is passed through charcoal that traps gases and vapors.
- *Particulate Respirator* - Contaminated air is passed through a filter for removal of particles.
- *Powered Air-Purifying Respirator* - A blower passes contaminated air through a device that removes contaminants and provides purified air to a facepiece.
- *Combination Gas, Vapor, and Particulate Respirator (referred to as a gas mask)* - Gas, vapors, and particles are filtered out by passing contaminated air through a canister containing a filter and a device that will absorb gases and vapors.

Air-purifying respirators must **never** be used in oxygen deficient atmospheres. Due to this limitation, the air supplying respirator is more appropriate for entering confined spaces that are subject to oxygen deficiency.

Air supplying respirators differ from air-purifying respirators in that the air the wearer breathes is provided from an outside source. Types of air-supplying respirators include:

- *Self-Contained Respirators* - Offer protection from toxic gases and oxygen deficiency by providing a transportable supply of breathable air. An example is the self-contained breathing apparatus (SCBA).
- *Supplied-Air Respirators* - Breathable air is supplied to the wearer from a compressor through an air hose.
- *Combination Self-Contained and Air-Supplying Respirators* - An auxiliary cylinder provides assistance if the supply from the air hose is cut off.

Personnel must be aware of the atmospheric hazards they may encounter and should use respirators that are appropriate for those hazards. Only use respirators that have been approved by the National Institute for Occupational Safety and Health (see 29 CFR 1910.134) found at https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=standards

In an emergency, respirator devices become an essential piece of protective equipment. Failure of this equipment could result in injury or death. Instructions for use, cleaning, and maintenance must be strictly followed for safe use of any respirator. Employees must receive thorough training in the use and limitations of their respirators.

4.4 Confined Space Entry

Confined space entry must always be considered a hazardous task due to the potential exposure to physical and respiratory hazards. Upon arrival to a sampling site subject to vehicular and pedestrian traffic, the sampling team must immediately position the work vehicle and properly place traffic control cones and warning flags, as necessary. Once this has been completed, the atmospheric conditions of the confined space must be tested for oxygen deficiency, explosivity, and toxic gases. The following air monitoring procedures should be followed:

- Calibrate air monitoring equipment. Each gas detector has its own calibration method, and personnel must be trained in the calibration and operating procedures for each piece of equipment available for their use. In addition, personnel must know how to interpret the

readings of the equipment. Calibration data should be documented and included in field records.

- Place the tip of the air monitoring probe into the vent hole of a manhole to test the atmosphere. Nonmetallic probes should be used so that a spark is not accidentally produced.
- If the reading is acceptable, remove the manhole cover and test the manhole. Because gases and vapors may be heavier than air, the atmosphere in the manhole should be tested at several depths, from the top to the bottom.
- If readings inside the confined space are acceptable, proceed with the confined space entry procedures. If the readings are not acceptable due to an explosive atmosphere, the manhole cover may cause a spark and consequently should not be opened. When an explosive atmosphere is encountered, the proper authorities (local fire department) should be contacted immediately. If the reading is unacceptable due to a lack of oxygen or accumulation of gases, the space must be ventilated until the reading is acceptable. The length of ventilation time depends on the size of the space.

All personnel entering a confined space must wear a full body harness in addition to required safety equipment (i.e., hard hat, safety gloves, etc.). Confined spaces should never be entered alone or unassisted. There must always be a second person available for emergency situations. In addition, when entering a confined space, a self-contained breathing apparatus should always be worn in addition to the harness, unless you have proper ventilation and air monitoring equipment. The harness must be attached to a safety line that in turn is attached to a retrieval system located above the ground. In an emergency, the standby person should use the retrieval system to quickly remove the injured person.

4.5 Safety Training

The importance of proper safety training cannot be emphasized enough. If an emergency should arise, sampling personnel must be able to determine the cause of the accident and be prepared to act accordingly. Far too often, the rescuer, because of inadequate preparation, becomes another victim. Safety procedures should become routine, and the best way to accomplish this is through continuous training. Training in the following areas should be provided to all employees required to work in confined space or with a team that performs work in a confined space:

- Cardiopulmonary resuscitation (CPR) and basic first aid.
- Use of applicable safety equipment.
- Confined space entry procedures.

Safety training is available to POTW personnel through approved state agencies and the EPA. Some of these courses may involve fees, and details can be obtained from the POTW's state or EPA Regional Pretreatment Coordinator.

Entry and exit procedures include the following steps:

- *Identification.* Sampling personnel must be able to identify the potential hazards associated with inspections and sampling. Training should emphasize the possible results of improper safety procedures.
- *Testing.* All confined spaces must be tested prior to entry.
- *Evaluation.* Tests must be evaluated for oxygen level, explosivity, and potentially toxic substances. Sampling personnel should also consider necessary safety equipment.

- *Monitoring.* The atmosphere in a confined space is subject to change. Therefore, the area should be continuously monitored during the sampling activities.

Rescue procedures must be developed for each type of confined space that may be encountered by the sampling personnel. A written record of training and safety drills should be kept. Rescue procedures should be practiced frequently enough to ensure proficiency in any necessary rescue situations. In developing a successful training program, the POTW is encouraged to call on other agencies (e.g., local fire and rescue department) with expertise in any of the areas described above.

5. ADDITIONAL RESOURCES

The following are documents that can be used for additional information. These documents can be found on the EPA website at <https://www.epa.gov/npdes/national-pretreatment-program#overview>.

Appendix W - Best Management Practices Mini-Case Studies" of "Local Limits Development Guidance Appendices," EPA 833-R-04-002B, July 2004.
(https://www3.epa.gov/npdes/pubs/final_local_limits_appendices.pdf).

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Controlling Fats, Oils, and Grease from Food Service Establishments, EPA Fact Sheet
[http://yosemite.epa.gov/OA/RHC/EPAAdmin.nsf/Filings/360737AD61D13C6E8525764E0068D812/\\$File/CWA0820090031ATTACHMENTS.pdf](http://yosemite.epa.gov/OA/RHC/EPAAdmin.nsf/Filings/360737AD61D13C6E8525764E0068D812/$File/CWA0820090031ATTACHMENTS.pdf).

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Guide to Industrial Assessments for Pollution Prevention and Energy Efficiency (EPA-625-C-99-003) Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula (EPA 833/B-85-201).

Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors (EPA 812-B-92-001).

Guidance for Developing Control Authority Enforcement Response Plans (September, 1989).

Guidance Manual: Aluminum, Copper, and Nonferrous Metals Forming and Metal Powders Pretreatment Standards (EPA 800B89001).

Guidance Manual for Battery Manufacturing Pretreatment Standards (EPA August 1987).

Guidance Manual for Electroplating and Metal Finishing Pretreatment Standard (EPA-440/1-84/091g).

Guidance Manual for Implementing Total Toxic Organics (TTO) Pretreatment Standards (September 1985) <http://www.epa.gov/npdes/pubs/owm0021.pdf>.

Guidance Manual for Iron and Steel Manufacturing Pretreatment Standards (EPA September 1985).

Guidance Manual for Leather Tanning and Finishing Pretreatment Standards (EPA 833B86101).

Guidance Manual for Pulp, Paper, and Paperboard and Builders' Paper and Board Mills Pretreatment Standards (EPA July 1984).

Industrial User Permitting Guidance Manual (September, 2012) 833-R-12-001A.

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- Permitting Guidance for Semiconductor Manufacturing Facilities (EPA April 1998).
- Permit Guidance Document – Pulp, Paper and Paperboard Manufacturing Point Source Category (EPA 821-B-00-003).
- Permit Guidance Document – Transportation Equipment Cleaning (EPA 821-R-01-021).
- Product and Product Group Discharges (OCPSF) (EPA April 2005).
- Pollution Prevention (P2) Manual for the Pesticide Formulating Packaging and Repackaging Industry.
- Protocol for EPA Approval of Alternate Test Procedures for Organic and Inorganic Analytes in Wastewater and Drinking Water (March 1999) can be found at [2007_02_06_methods_atp_EPA821B98002.pdf](#).
- POTW Sludge Sampling and Analysis Guidance Document (EPA 833-B-89-100).
- NPDES Compliance Inspection Manual (EPA July 2004) EPA 305-X-04-001.
- Pretreatment Compliance Monitoring and Enforcement Guidance (EPA July 1986).
- RCRA Information on Hazardous Wastes for Publicly Owned Treatment Works (EPA 833/B-85-2025).
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- Small Entity Compliance Guide – CWT [Centralized Waste Treatment] (EPA 821-B-01-003).
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- Supplemental Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program: Residential and Commercial Toxic Pollutant Loadings and POTW Removal Efficiency Estimation (EPA 21W-4002).
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Appendices

Appendix A. General Industrial User Inspection Questions

GENERAL QUESTIONS

Usage of Chemicals, Cleaners, and Location of Drains

- Check the proximity of any chemical storage areas to floor drains. What kind of chemicals are stored? Chemicals might include, paint, thinner, solvents, etc. Are the chemicals stored in a way that they could reach the floor drains if spilled?
- Check the floor washdown procedures (frequency, water usage, detergents). What is the frequency (daily, periodical) of the washdown? Are high pressure sprays used? Are detergents used? How is the wash water disposed?
- If floor drains are sealed, do employees have access?
- Check for the use of detergents and chemical cleaners for equipment washdown. Acids (e.g., muriatic, sulfuric, phosphoric, acetic, etc.), surfactants, caustic soda, soda ash, and phosphates are commonly used as cleaners. How are these materials stored? How are working concentrations of chemical prepared, and who prepares them?

Solvents

- Does the facility use any solvents or degreasing agents?
- Are any solvent wastes handled separately from the other cleaning solution wastes?
- Is there any batch pretreatment prior to discharge?
- How are any residual materials, sludges at the bottom of the tank disposed?
- Is there a solvents management plan to reduce solvent waste at the facility?
- If solvents are used, are they redistilled on-site? Does this process generate uncontaminated cooling water? Where is it discharged?

Cooling Waters

- Are there any sources of uncontaminated cooling water in the plant? Are there any sources of recirculated or once-through cooling waters? What is the disposal method of the cooling water?
- If contact cooling water is used, is it treated in any way before discharge? What contaminants would be in the water? Are conditioning chemicals added to cooling waters?
- Is there any water cooled machinery used by the facility? What contaminants would be in the water? What is the volume and how is the cooling water disposed?

Boiler Discharge

- Check the frequency and volume of any boiler blowdown. Check on the usage of additives to the boiler make-up waters. Do the additives contain any metals or priority pollutants?
- What types of boiler pretreatment is used (e.g., ion exchange, chemical addition, etc.)? Are there any boiler wastes generated?

- What is the frequency and volume of boiler blowdown?
- Is the wastestream acting as a dilution stream at a process monitoring point?
- Are there air pollution control devices which use water? How is the water disposed?

Steam Supply and Noncontact Cooling

Steam Supply

- Is the system high or low pressure steam?
- What, if any, are boiler additives? Do they contain chromates?
- How frequent and what is the quantity of boiler blowdown?
- What is the use of the boiler? (hot water? steam? other?)
- Is major cleaning and maintenance done? How often?
- Are ion exchange systems used for boiler feed water? If yes, what types of wastes are generated?
- What water treatment chemicals are used for the boiler? How frequent is preventative maintenance conducted (i.e., cleaning/descaling of the boiler tubes and the boiler drum)?

Noncontact Cooling Water

- Is there any cooling water used? (What type? Single pass? Cooling tower?). If single pass, what is it used for? What is the volume? Where is it discharged?
- Are cooling towers used? If yes, what are the chemical additives?
- How frequently are towers blown down? Where does the blowdown go?
- Are closed systems ever by-passed? Under what circumstances?

Discharge Locations and Sampling Points

- Are the facility's domestic and process wastewaters segregated?
- What method is used to determine domestic and process discharge volumes?
- Are dilution streams accounted for at the monitoring point?
- Does the facility have a sampling point available which is representative of the process wastewaters discharged?

Pretreatment

- What kind of treatment systems does the facility have in place for each of the various types of process wastewaters discharged? What chemicals are added? How often is the monitoring equipment calibrated?
- Are any of the process wastewaters subject to national categorical pretreatment standards? If so, are dilution wastestreams accounted for during monitoring?
- Does the facility combine its waste from the various sources prior to treatment or discharge? Is the combined wastestream formula applicable? If so, is the proposed wastestream volume determination method accurate?

- Does the facility have any oil/water separators or sand traps? How often are they cleaned and by whom? Verify documentation.

Solids Disposal

- How much sludge material is generated? How is the sludge disposed? How much waste is stored on site?
- Is the sludge either a listed RCRA waste or characteristic hazardous waste? Does this facility manifest waste? Who handles the waste transport/disposal?

Radioactive Materials

- Quantify the maximum quantity of each radionuclide used, stored, and discharged at the facility.
- How are liquid and solid radioactive wastes being disposed of?
- Are they being hauled away? If so, what is the name of the hauler and what is the destination of the waste? Are manifests available?
- Are they being discharged to the sanitary sewer? If so, how often and what are the maximum concentrations in curies?
- Obtain a copy of radioactive user licenses.
- Obtain a copy of any protocols for handling radioactive materials at the facility.
- Obtain a copy of any logs pertaining to radioactive discharges.

Appendix B. Industry Specific Questions

QUESTIONS TO CONSIDER DURING THE SITE INSPECTION OF SPECIFIC INDUSTRIES

INDUSTRY SPECIFIC SITE INSPECTION QUESTIONS

Adhesives and Sealants

- What is the product manufactured at the facility? Are the adhesives water-based or organic solvent base materials? What kind of binder material is used?
- Are there any product washing operations? Are reactor vessels washed down between batches? Is water or a solvent used? Would these wastes be discharged to the sewer? What is the frequency and volume of washing operations?
- Check the general questions on solvents listed below.
- Check the usage of cooling waters.

Agricultural Refilling Establishments (see Pesticides)

Aluminum Forming

- What is the production rate of this facility in terms of mass of aluminum or aluminum alloy processes per year? Is there an accurate method for determining off-lbs from individual processes?
- What are the forming processes at the facility? Is there a wastestream generated from any air pollution control unit present?
- What kind of metal forming lubricating compounds are used? Is water recycling feasible?
- How often are the lubricant-wastewater emulsions changed and discharged?
- Is there a continuous overflow from quenching water baths? What is the disposal method for the quench waters?
- Is any casting done on site? If yes, see questions under Metal Refineries and Foundries listed below.
- Are any solvents used as part of the cleaning processes? Refer to the General Industrial Inspections Questions for Solvents.
- Are wastewaters from desmutting and deoxidizing pretreated before discharge to the sewers? What volume is discharged?

Are there any metal finishing processes (anodizing, chemical conversion coatings, coloring, dyeing, chemical sealing, chemical or electrochemical brightening, or etching) done on site? If yes, refer to questions under Electroplating and Metal Finishing listed below.

Auto Body Repair and Paint Shops

- What is the chemical usage, destination, and storage of paints, thinners, and other solvents in proximity to floor drains?

- Do paint booths have a water curtain? If so, how often is it discharged? How is the bottom sludge disposed? Are water conditioning chemicals used?
- What are the floor washdown procedures (frequency, water usage, detergents)?
- What are the paint spray-gun cleaning procedures (destination)? Are employees trained to paint efficiently, thus reducing contaminants to the sewer?
- How does the facility dispose of old unwanted paint?

Auto Parts and Supplies: Wholesale and Retail

- Look for floor drains first.
 - * If floor drains present, quantify storage of oils, paint, anti-freeze, transmission and brake fluids, and any other fluids.
 - * Batteries, battery acid.
 - * Crankcase oil and return facilities.
- Any machining or repair (see auto repair questions).

Auto Repair (mechanical) - Engine and Transmission Work

- How are parts degreasers and solvents used? What types are used?
- Are alkaline or acid cleaning tanks present? If yes, are these tanks discharged to the sanitary sewer system, and if so, at what frequency? What Pretreatment occurs prior to discharge? How is the bottom sludge handled?
- What are the servicing procedures?
- Storage of fluids such as oil, transmission, brake, anti-freeze?
- Look for drains under service bays - destination?
- Presence of gas/oil interceptors (describe).
- Waste oil storage and eventual destination.
- Routine washdown of the work area?

Auto Wash

- Is there any system for water reclamation such as a settling tank?
- If a settling tank exists, how is the sludge from it handled and by whom?
- What types of cleaners are used? Do any specialty cleaners, such as tire cleaners, contain solvents? Do waxes contain solvents?
- Is there an oil and grease separator on discharge lines?
- Are liquids stored near floor drains?
- What is water consumption?
- Can the facility handle trucks? If so, what kinds of materials might be contained in the trucks and what is the wash water contamination from these materials? (Refer to Transportation Equipment Cleaning (TEC))

Bakeries - Retail

- Check the washdown and cleanup procedures.

*Note washdown procedures (sequence of steps).

*Note number of wash downs per day.

*Note types of detergents used.

*Note the location and number of floor drains.

- Check the storage of cleaning agents.
- Check the storage of baking ingredients.
- Check the quantity of deep fry grease generated. Note how it is disposed.
- Check for the presence of any grease interceptor. Describe the size and general condition of the unit. How often and by whom is it serviced? How is the grease disposed?

Battery Manufacturing

- What is the production rate of the facility (number of units manufactured, amp per hour output, etc.)?
- What is the primary reactive anode material (cadmium, calcium, lead, leclanche, lithium, magnesium, nuclear, zinc) used for the batteries produced at the facility?
- What volume of wastewater from electrodeposition rinses, scrubber bleed off and caustic removal is discharged to the sewer?
- Are depolarizers used in the manufacturing process? What type? What is the final disposal method of these materials?
- What kind of electrolytes does the facility use? Check the General Industrial Inspections Questions for Usage of Chemicals, Cleaners and Location of Drains.

Beverages

- Refer to questions under Food Processing listed below.

Blueprinting and Photocopying

- Check to see if they do any offset printing (related questions). What type of blueprinting machines? With some the ammonia is totally consumed while others will have a spent ammonia solution to dispose of.
- Any significant amount of ammonia storage? Are there floor drains nearby?
- Check the usage of other cleaning agents and solvents. Are there any chemicals of concern?

Canned and Preserved Fruits and Vegetables

- What detergents and techniques are used in washing the fruits and vegetables before rinsing?
- Besides water use for washing, rinsing and cooling, is water also used for conveyance? Amounts used?

- Is peeling done chemically (i.e., caustic soda, surfactants to soften the correx)? Is there any discharge?
- Are equipment and floors washed down with water? Daily? Periodically? Are any detergents used? Is the waste water sewerred?
- Does the facility have a grease and solids recovery system? Any other pretreatment before discharge?
- What is water consumption? How much is incorporated into product?
- What percent of water use is recycled? Does this include any uncontaminated water (for refrigeration, machinery, etc.)?
- What types of processing brines are used, if any? Are these sewerred directly or pretreated first?
- Are larger remains of processed waste fruit and vegetables ground up and sewerred or used as by-products?
- Check the refrigeration system for possible leaks.
- Are containers made? Are they washed or sterilized?
- Are there any fungicides or other similar chemicals used in processing? Are they discharged to the sewer?
- Are domestic wastewater and process wastewater segregated?
- Does a representative sampling point exist?

Centralized Waste Treatment

- How are incoming wastes characterized?
- Are there multiple categories of wastes or just one?
- What types of wastestream categories?
- Does the permit contain effluent limits for all subcategories of wastes that are received (metals, oils, organics, mixed)?
- In addition to receiving off-site wastes, does the facility produce any wastes on-site?
- Does the facility accept any RCRA wastes? If so, is the facility permitted to receive RCRA wastes?
- Are different waste categories segregated, or are they combined prior to treatment?
- What are the treatment trains? Are the treatment trains appropriate for all subcategories of wastes that are received?
- Are hauled waste manifests used? Are they used appropriately?
- Are all wastes hauled to the CWT or does the CWT go get the wastes?

Coil Coating (Including Can Making)

- What is the average square footage of metal sheeting processed at the facility (either on a daily or annual basis)?

- What is the base metal processed (aluminum, galvanized steel, and/or steel)?
- Check the General Industrial Inspections Questions for solvents.
- What sort of conversion coating is used at the facility (chromating, phosphating, complex oxides)?
- What solvents are used to control viscosity?
- Is there a continuous overflow from quenching water baths? What is the disposal method from the quench waters?

Can Making (in addition to the questions above)

- What kind of metal forming lubricants does the facility use?
- What is the volume of rinse waters discharged to the sewer? Have the wastewaters been characterized?

Copper Forming

- What is the quantity of copper and/or copper alloy processed by the facility in terms of pounds, kilograms or tons per day?
- What copper forming processes are employed at the facility?
- What kind of metal forming lubricants does the facility use? How often are spent lubricants from hot and cold rolling and drawing processes discharged?
- What acid is used in the pickling process? Are any additional chemicals added to the rinse tanks? How often are acids changed? How is acid disposed of? Are rinse tanks continuous overflow?
- Are any bright dip tanks used? What type? How often are solutions changed? Refer to the questions for Electroplaters and Metal Finishers.
- Refer to the General Industrial Inspection Questions for Solvents.
- Is any hydrostatic testing done on-site? Volume of water used? What pollutants are associated with the discharge?
- Is any casting done on site? See questions for Metal Refineries and Foundries.

Dairy Industry

- What products are manufactured at this plant?
- Are bottles washed? Are containers washed or sterilized? Any chemicals used in the washdown?
- What chemical cleaners are used for equipment washdown? (Acids such as muriatic, sulfuric, phosphoric, and acetic, surfactants, caustic soda, soda ash, and phosphates are commonly used as cleaners.)
- Are acids properly neutralized before they are discharged?
- Are any by-products wasted? (Buttermilk, whey, skim milk are very high in solids and BOD.)
- How are spoiled materials disposed of?

- What sources of uncontaminated cooling water in the Plant? Recirculated or once-through? If once-through, what is the destination? (Cooling water is used in some pasteurization processes, for condensation, refrigeration systems to cool the ammonia compressor jacket, and space air conditioning.)
- What is the water consumption per day on the average? How much is incorporated into the product?
- Any pretreatment units such as settling or grease traps or filtering devices or flocculating tanks?
- Frequency and volume of boiler blowdown, if any? Additives?
- Is there segregation of process wastewater and domestic?
- Does an accessible sampling point exist?

Electric Services

Steam Electric Power Generation

- Are plants coal, oil, or gas fired?
- What type of boiler pretreatment is used - iron exchange, additives, etc.? What are wastes?
- How frequent is major boiler blowdown? Volumes?
- Are there air pollution control devices which use water?
- Are there ash handling systems which use water?
- What is the source of condenser cooling water (e.g., city, river, wells)? Are there any water treatment chemicals added? What is the ultimate destination of condenser cooling water?
- What is done with waste oils? Are they filtered and reused?
- Are process and domestic wastewater segregated?

Pepco Substations

- Look for oil and solvent storage - proximity to floor drains.
- Any contact cooling water discharge.
- Possibility of leaking transformer oil - What would its destination be? What is PCB constituent of oil?

Electronic Components

- What is the product that is manufactured at this facility?
- What metals are used in solution or otherwise present in process tanks? Any photo resist? Explain.
- Does the facility use any solvents or degreasing agents? If yes, check the General Industrial Inspection Questions for Solvents.
- What types of rinse tanks, or rinsing procedures are used?

- Does the facility use any cooling water? Check the General Industrial Inspection Questions for Cooling Waters.
- Does the facility have a clean air room for which it must scrub air? Are there any chemical wastes generated from the scrubber? How is the waste disposed?
- Does the facility conduct any electroplating activities? Check the questions under Electroplating and Metal Finishing.
- Any lead soldering being done? Explain.
- Any water recycle/reuse within the plant? Does the plant employ pretreatment for the recycle streams?
- How are spent or contaminated process tanks handled?
- Does the facility employ any photographic processes?
- Any routine washdown of the process areas?
- Check the General Industrial Inspection Questions for Solids Disposal.

Electroplating and Metal Finishing

- Are any of the following processes performed: electroplating, electroless plating, anodizing, coating, chemical etching and milling or printed circuit board manufacturing? If so, are ancillary processes being performed?
- What metals are being plated? What other metals are in use in solution or otherwise present in process tanks?
- What types of chemicals make up plating baths? Is there cyanide? Chromium? Ammonium persulfate (etching)?
- Are plating (concentrated) bath solutions ever disposed of? If so, how? Any batch pretreatment prior to discharge? How are residual materials at the bottom of the tank disposed of?
- Are there other operations - coloring, brightening, etc., associated with the plating operations?
- If metal coloring is present, are organic dyes used?
- Are any tanks heated?
- Are any cyanide bearing solutions or wastestreams present? What metals are complexed with cyanide? What chelating agents are used to hold metal(s) in solution?
- Are alkaline cleaning or acid cleaning tanks present?
- How often are cleaning solutions - both acidic and alkaline - changed and how are they disposed of? Volumes? Discharged as "slugs?" Any batch treatment prior to discharge? How are any residual metals (i.e., sludge) disposed of?
- Are there any wastewaters discharged without pretreatment?
- Are solvents and/or degreasing agents used? If so, what type and how is the sludge handled? How are they applied? Dip tank, rag applied, or other? Is solvent redistilled if used? Any discharge of solvents to sewer? Toxic Organic Management Plan (TOMP)? Any cooling water used?

- For the TOMP: Do you have a copy? What is the date of the TOMP? Which total toxic organics does the TOMP account for? How do you document compliance with the TOMP?
- Are running rinses used? Countercurrent? Any still or dead rinses used? Spray rinses or fog rinses? Discharged to where?
- Is there any water reuse within the plant? Pretreatment? Any water cooled machinery? Discharge to and volumes? Does the facility use any cooling water? Volume and ultimate destination?
- How is process wastewater from the plating room channeled to the treatment plant or sewers? Are there floor drains in the plating area? Are floors washed down regularly? Are domestic and process wastewater segregated (and cooling water, if applicable)? What is the discharge location for dilution streams? Do representative sampling points exist?
- When did plating operations begin? If the facility is subject to Part 413, were there any metal finishing operations added to the facility after initial construction?
- Is the facility an independent job shop? Or are the materials being process owned by company?
- Is the plant manager aware of how much plating is done in terms of surface area (square feet, etc.)?
- Printed Circuit Board Manufacturing. What type of Printed Circuit Boards are being manufactured. Is silk screening and/or photo developing involved in Printed Circuit Board Manufacturing? What is the purpose of the board? What individual operations are present (i.e., silkscreen, etching, etc.)? What metals are being plated? What other metal bearing solutions are present in process tanks or from other chemical solutions in operations at the facility? Describe. Are only metals complexed with cyanide? Explain. If masking is employed, are photographic processes involved?

Explosives

- What are the products manufactured at this facility?
- Does the facility blend these products into end-use products?
- Is ammonium nitrate used in the product and, if so, how is it monitored for in the wastewater?
- Does the facility have a disposal area for obsolete, off-grade, contaminated, or unsafe explosives and propellants?
- Are the products produced for private sector usage or military usage? Are there any security clearances necessary to enter the facility?
- Check the general questions for Solids Disposal.

Fiberglass Insulation

- What methods are used to bind and cool the glass after it has been drawn into fibers? What wastes are generated from this phase? Are these wastes sewered or pretreated prior to discharge?

- What method is employed for collecting the glass fibers (i.e., wire mesh conveyors, flight conveyors, etc.)? What wastes are generated from this phase? Are these wastes sewerered or pretreated prior to discharge?
- What methods are used to clean the conveyors of any glass fibers? Is this process shut down or in service while cleaned? What type of cleaning agent is used? Is the wastewater sewerered?
- Are wet air scrubbers used? Is wastewater sewerered or pretreated first (i.e., sedimentation for particulates matter)?
- How are backings applied (if applicable)? Heat? Adhesives?
- Any segregation of domestic and process wastewater?

Food Processing

- What are the products processed at this facility? What is the production rate?
- Does the facility use flow equalization prior to discharging into the sewer? Does the facility have any provisions to respond to a produce spill into the wastewater system?
- Does the facility generate any by-products which have associated wastewater?
- Is there any coloring added to the product? Is there any treatment for removal of the color?
- Check for the usage of chemical cleaners for equipment washdown. Acids (e.g., muriatic, sulfuric, phosphoric, and acetic), surfactants, caustic soda, soda ash, and phosphates are commonly used as cleaners. How are these materials stored?
- Check the floor washdown procedures. Are equipment and floors washed down with water?
- What is the water consumption rate of the operation (total gallons per day and by number of pounds of product or pounds of material processed)? How much water is generated by or incorporated into the product?
- What percent of water use is recycled? Does this include any uncontaminated water (for refrigeration, machinery, etc.)?
- What kind of containers does the facility use to package the product? Are containers made on site? Are they washed or sterilized?
- Are any types of processing brines used? Are they sewerered? What is volume?
- Are large remains of processed food stuff ground up and sewerered? Any attempt to restrict solids to sewer?

Fuel Oil Dealers

- Record storage capacity (above or underground).
- Is above-ground storage diked? Is there any leakage access to storm or sanitary sewer?
- Are any oils or fuels stored inside building - proximity to floor drains?
- What type of absorbent is used for spills? How much is stored - proximity to floor drains?
- Does the facility have a spill prevention plan? Do employees receive spill plan training?

Funeral Services

- Embalming room chemical usage - how much formalin? What percentage of usage is discharged to sewer? How much blood discharge/day? What is its destination? Any other chemicals involved in embalming process?
- Chemical storage (floor drains).
- Embalming table - washing and cleaning procedures - detergents and disinfectants used.
- How are infectious wastes disposed of?

Gasoline Service Stations

- Waste oil storage - Is there a waste oil receptacle?
 - * Drums or tanks - proximity to floor drains?
- Parts degreasers - solvents used - how are they disposed of?
- Fluids storage (transmission, brake, anti-freeze, etc.) - proximity to drains?
- Look for drain trough under service bays - is drain connected to sanitary drain?
- Presence and description of gas/oil interceptor.
- How is water removed from gasoline tanks?

Gum and Wood Chemicals Manufacturing

- What volume of product is produced on a yearly basis?
- If gum resin, turpentine, or pine oil are produced, what is the volume of process wastewater from stripping, vacuum jet stream condensates, and unit washdown?
- If tall oil resin, pitch, or fatty acids are produced, what is the volume of wastewater from the acid treatment system, overflow from the evaporative cooling system, process wash downs, and quality control lab wastes?
- Check the General Industrial Inspection Questions for Cooling Water.
- If essential oils are produced, what is the volume of contaminated condensate that is discharged from the batch extraction of oil of cedar wood?
- If resin derivatives are produced, what is the volume of wastewater from the water of reaction; sparge stream, if used; and the vacuum jet stream?

Hospitals

- General layout of facility - types of labs, x-ray equipment, morgue, laundry, food services, etc.
- Chemical usage and storage - quantities and destination, proximity to floor drains.
- Are there any special procedures for handling hazardous or infectious wastes? Names of any haulers picking up such wastes? Are waste hauler manifests being kept in accordance with state and federal laws?
- Cleaning procedures - types and quantities of cleaners and germicides utilized.
- Is there any routine washdown of the work area(s)?

- Is there any vehicle washing at this facility?
- How is routine disposal of HW handled? Volume procedures? Records adequate?
- Disposal of spent photo processing chemicals (i.e., fixer) from x-ray departments.
- Check the General Industrial Inspection Questions for Radioactive Materials.
- Are decontamination showers present (in case of a chemical spill or terrorist attack)?
- Are they plumbed to the sanitary sewer? (They should not be.)
- How is this waste disposed of? (There are normally only a few hospitals in an area designated to take victims of a chemical spill or attack. These showers are often found in or near the morgue. There should be a holding tank with a means for pumping this to a hauler.)

Inorganic Chemicals

- What is the product that is manufactured at this facility?
- Are any brine muds generated by the facility's production or inorganic compounds? Do these brines contain any known heavy metals? How are these brine muds disposed of?
- Does the facility generate any air scrubber wastewater? What is the chemical quality of this water and how is it disposed of?
- Are any cyanide (CN) compounds generated by the facility? Are the CN wastestreams segregated and/or pretreated prior to discharge?
- Check the General Industrial Inspection Questions for Cooling Waters.
- Check the General Industrial Inspection Questions for Solids Disposal.

Institutions (large) (see Universities)

Laboratories

- What type of laboratory operations are conducted (medical, research, analytical)? Which areas have water and/or chemical discharges? What are operations generating wastestream?
- Is any wet chemistry performed?
- Which areas use solvents in their processes?
- Is routine glassware washed or disposed. Any glassware acid washed? Discharge to sanitary sewer?
- How are spent or contaminated chemicals handled?
- Routine washdown of work area?
- Check the General Industrial Inspection Questions for Radioactive Materials.

Laundries

- Is dry cleaning done? If so, what is the solvent?
- Is sludge generated? Disposal?

- If solvent is used, is it redistilled on-site? Does this generate uncontaminated cooling water? Where is it discharged?
- Do washers have lint traps, settling pits?
- How many pounds of laundry are washed per day?
- What is temperature of effluent? Is heat exchange system used?
- Are printer's rags, shop rags, or other industrial materials cleaned?
- What types of detergents and additives are used? What is pH of effluent?
- Are laundry trucks maintained and washed on site? If so, how are waste oils, etc., handled? Any floor drains leading to sewer in the vicinity of vehicles?
- Any boiler blowdown - volumes, frequency of discharge? Are there any additives such as chromates? Where does discharge go?
- Any loss due to evaporation? Volume estimate?
- What is water consumption, source of water?
- Does appropriate sampling point exist?
- Is there separation of process wastewater and domestic wastewater?
- Is the water reclaimed? If so, what is the volume of water and how is it used?
- Is dry cleaning performed at this facility? If so:
 - What type of solvent is used? Tetrachloroethylene (perc), hydrocarbon, silicone, Stoddard
 - If perc, how is separator wastewater managed?
 - Copy of disposal records?
 - Receipts for new perc purchases?
 - Are new and used perc containers stored near floor drains?

Leather Tanning and Finishing

- What method was used to preserve the received hides? (Note: If sheepskins or goatskins are tanned, there will be a separate solvent or detergent degreasing operation.)
- What types of skins and/or hides are tanned? (Note: If sheepskins or goatskins are tanned, there will be a separate solvent or detergent degreasing operation.)
- Is hair saved or pulped (i.e., chemically dissolved)? (Note: In a save hair operation with good recovery of hair, the contribution to the effluent strength is substantially lower than in the pulp hair operation.)
- Is deliming accomplished by treating with mild acids or by bating? What is the destination of these wastes?
- What types of tanning are used? (Note: Chrome and vegetable tannins are the most common. A combination of tannins may also be used.)
- How is chromium discharged into the sewer controlled?

- Are chemicals stored near floor drains? (This is a very appropriate question to ask since many liquid chemicals are used in the leather tanning industry.)
- How is sulfide controlled?
- Are tannins recycled and/or chemically recovered?
- Any pretreatment units employed?
- If sludge is generated, how is it disposed of?
- Any water cooled machinery used? Discharge to?
- Any boiler blowdown to sewer frequency and volume? Any additives such as chromates?
- Any segregation of domestic and process wastewater?
- Does a representative sampling point exist?

Lumber and Building Materials: Retail

- Storage of paint, thinner and other solvents, adhesives (glue), roofing materials (tar).
 - * Proximity to floor drains.
- Paint mixing (dry or does it involve water - sinks?).
 - * Possibility of spillage, cleanup.
- Cutting machinery - water cooled, oil lubed, possibility of spillage, destination of spills and cooling water.

Machine and Sheet Metal Shops

- What type of product is manufactured?
- What kind of material is machined?
- Are coolants and/or cutting oils used and are they water soluble?
- Are hydraulic oils used?
- Would any of these coolants/oils ever be discharged to the sewer? If yes, what frequency? What volume? Where does the discharge occur? If no, how are spent or contaminated materials handled? Who is the hauler? Are they recycled? Where?
- Are any degreasing solvents or cleaners used? What are the chemical make-up and/or brand names of the degreasers and how are they used? How are the spent degreasing chemicals or sludges disposed of? Is degreasing rinse water discharged to the sewer?
- Is there any water cooled equipment such as a vapor degreaser or air compressor? If yes, is the unit water cooled (how-many passes? one-pass not allowed) on a cooling tower or refrigerant type? Where is it discharged, frequency, volume?
- Is any painting done on the premises? How are waste thinners or paints disposed of? Is a water curtain used for control of solvents entering the air and is contaminated water discharged?
- Is any type of metal finishing done, such as anodizing, chromating, or application of a black oxide coating or an organic dye? What are the chemicals used, volumes consumed, and destinations of the finishing chemicals?

- Are there any floor drains where any of the chemicals and oils are stored and used? Any routine wash downs of the work area(s).
- What is water consumption?
- Are there any pretreatment units, traps, etc.?
- Any segregation of domestic and process wastewater?
- Any representative sampling points?

Meat Products/Poultry Products

- What types of livestock are slaughtered and/or processed?
- What are the principal processes employed?
- What methods are used to dehair? Is the hair recovered from the wastewater stream?
- Does the facility cure hides? What brine solution is used specifically (i.e., sodium chloride)? Are hides cured in vats? Are vats ever discharged to the sewer? Frequency and volume?
- What are the by-product processes?
- Is rendering practiced at the plant? What type of process is used? Is the resulting wastewater treated or seweraged?
- Is grease and solids recovery practiced? How (i.e., catch basins, grease traps, air flotation, etc.)? How often are these systems cleaned out?
- What methods are used for clean-up operations? What detergents are used (i.e., caustic, alkaline, etc.)?
- Which wastewater streams, if any (i.e., uncontaminated water) bypass all treatment and discharge directly to a receiving water or municipal plant?
- Any boiler or water tower blowdown to sewer? Frequency and volume? Any additives?
- If poultry, how are feathers removed? Disposal? How are chicken parts (innards) disposed of? Blood?
- Is domestic wastewater segregated from process wastewater?
- Any representative sampling point?

Metal Heat Treating Shops

- Are cyanide salts used in heat treating?
- What kinds of metal are heat treated?
- What fluids are used for quenching metals? Are these ever changed and discharged to the sewer?
- Are sludges ever removed from the quenching tanks? How are the sludges disposed of?
- Is any of the metal cleaned before or after heat treating? Are any degreasing solvents or cleaners used and how are they used?

- Are there any water cooled quenching baths, vapor degreasers or other equipment? Discharge to? Volume?
- Are there any floor drains in the work or chemical storage areas?
- Any boiler blowdown, frequency and volume to sewer? Any additives?
- What is water consumption?
- Is domestic and process wastewater segregated?
- Any representative sampling points?

Metal Refineries and Foundries

- What is the product that is manufactured at the facility?
- Does the facility use any solvents or degreasing agents? Check the General Industrial Inspection Questions for Solvents.
- Does the facility use any cooling water? Check the General Industrial Inspection Questions for Cooling Waters.
- Is there any water recycle/reuse within the plant? Does the plant employ any pretreatment for the recycle streams?
- Does the facility have a spill prevention plan developed? Does the plan include spills to the sewer of highly acidic or caustic materials?
- Check the General Industrial Inspection Questions for Solids Disposal.

Military Installations (see Universities)

Nursing Care Facilities

- Food service (see restaurant questions).
- Any chemical usage (lab facility)?
- Janitorial chemicals - usage, destination and storage of germicides and disinfectants.
- What is the frequency and amount of high pressure boiler blowdown?
- What additives are used? To where discharged?
- Any use of disposable wipes? How are those wipes discarded?

Organic Chemicals

- Are processes batch or continuous?
- If batch processes are used, how frequent is clean-up and what is done with wastes?
- Are waste disposal services used? If so, for what wastes? Are they licensed? Are required manifest records maintained?
- What types of solvents are stored in bulk?
- What are the sources and points of discharge for cooling waters? Are these contaminated or not contaminated? Is there an NPDES permit for discharge to surface waters?

Paint and Ink Formulation

- Are oil-base or water-based inks manufactured?
- What types of inks are made?
- What type of paints are manufactured? Water or solvent based?
- What are the pigments made of?
- Are extenders used?
- Are biocides added? Mercury?
- Are solvents used? If so, what are they?
- What are the resin types?
- What other ingredients are used in formulating the product?
- Describe how oil-based equipment is cleaned. Describe how water-based equipment is cleaned.
- Is there any discharge to the sewer system (washdown) and/or bad batches? Are any chemicals used to clean production equipment?
- Are there any floor drains in chemical storage and mixing areas?
- Is there a scavenger service? If so, for what wastes?
- Is there on-site disposal of solids by burial?
- Any water cooled machinery used? Where is cooling water discharged to?
- Any boiler blowdown to sewer, frequency, volume, additives?
- Is process wastewater segregated from domestic?
- Any representative sampling points?

Paper Mills

- What are the products manufactured at the plant?
- Which specific chemicals are used in the process?
- Is pulp bleached? If so, what is the process and what chemicals are employed?
- Are any chemicals manufactured on-site? (Chlorine dioxide, hypochlorites, etc.) - any discharged from these operations?
- Any recovery systems? (White water recycle, cooking liquor regeneration, cooling water reuse, etc.)
- Where is cooling water used in the plant? (Condensers, vacuum pumps, compressors) Where is it discharged?
- Describe the types of size, fillers, coatings, finishes, etc., in paper making.
- What happens to bad batches, or liquids in case of equipment failure? (To the sewer or treatment plant?)
- How is sulfide controlled?
- How much water is consumed, on the average? Source of water?

- Any boiler/water tower blowdown, frequency, volume, additives?
- Any representative sampling points?
- Is domestic wastewater segregated from process wastewater?

Paving and Roofing

Tar and Asphalt

- Does wastewater from wet air scrubbers used on the oxidizing tower discharge directly to the sewer? Is it created and recycled?
- What method(s) are used to control the temperature of the oxidizing tower (i.e., water)? Is this water discharged or recycled?
- What treatment methods are used to remove suspended solids or oil from wastewater (i.e., catch basins, grease traps, sedimentation, oil skimmers)?
- Is water or air used to cool asphalt products? If water, is it contact or noncontact? If contact, is this water discharged directly to sewer (Note: mist spray used alone causes the largest amount of solids present in waste-water.)
- Any water cooled machinery used? Where is cooling water discharged?
- Are solvents used/stored? Any floor drains nearby?
- Any boiler blowdown, to sewer? Frequency, volume additives?
- Is process wastewater segregated from domestic wastewater?
- Representative sampling point?

Pesticides (including Agricultural Chemicals)

- Does the facility manufacture, blend, package or repackage pesticides at this location?
- What pesticides are manufactured, formulated, packaged or repackaged at the facility? What volumes of product is produced on a yearly basis?
- Check the chemical storage areas and types of containers used.
- How are chemical containers rinsed? Is the rinse water discharged to the sewer?
- What is the volume of wastewater from the final synthesis reaction or the dilution water step used directly in the process?
- Check the procedures for floor and/or equipment washes.
- Check the General Industrial Inspection Questions for Solids Disposal.

Petroleum Refining

- What are the processes employed by the facility and what is the throughput (in barrels per day) of each of the following processes:
Topping: The term includes basic distillation processes;
Cracking: The term cracking includes hydrocracking, fluid catalytic cracking, and moving bed catalytic cracking processes;

Petrochemical: This includes the production of second generation petrochemicals (i.e., alcohols, ketones, cumene, styrene, etc.), first generation petrochemicals, and isomerization products (i.e., BTX, olefins, cyclohexanes, etc.) and

Lube: This term includes hydrofining, white oil manufacturing, propane dewaxing, solvent extractions and dewaxing, naphthenic lubes, phenol extraction, SO₂ extraction, etc.

- Identify the location of any oil interceptors or separators. What kind of unit is it and what is the general operating condition of the unit?
- Does the facility employ any biological treatment prior to discharging to the sewer?
- Are there any controls in place for phenols, sulfides, hexavalent chromium, and/or ammonia? How does the facility dispose of any spent caustic which it might generate?
- Is storm water runoff isolated from the sewer discharge? How is the contaminated storm water runoff disposed of? Does the facility have an NPDES permit for stormwater?
- Check the General Industrial Inspection Questions for Cooling Waters.
- Check the General Industrial Inspection Questions for Sludge Disposal.

Pharmaceuticals Manufacturing

- What type of processes are used to manufacture product(s)? (Fermentation, biological and natural extraction, chemical synthesis, mixing/compounding, and formulation.)
- If processes include fermentation and/or chemical synthesis, are these continuous or batch-type operations?
- If chemical synthesis is involved, what processing steps (crystallization, distillation, filtration, centrifugation, vacuum filtration, solvent extract, etc.) produce wastewaters? Are these wastewaters discharged to the sewer system?
- Are any of the “regulated organics” used or generated in the manufacturing process?
- What types of solvents are used, if any? How are spent solvents disposed of? How stored? Floor drains nearby?
- Any detergent cleaning or acid cleaning of tanks or vessels? Any disinfectants used? Discharged to sewer?
- Is raw water intake purified? If yes, by what method - ion exchange, reverse osmosis, water softening, etc.? What types and volumes of wastes are generated? Frequency of discharge?
- What is done with the spent beer generated by fermentation?
- Regarding equipment and floor washdown - are any chemical cleaners used? What is frequency? Volume of water used? Destination of wash water?
- Is there any chance of spills or batch discharges? Spill plan?
- Does any equipment, such as condensers, compressors, and vacuum pumps, require the use of once-through uncontaminated cooling water? If so, where do these waters discharge?
- Is there a research lab in the plant? What are the wastes generated in the facility? How controlled?

- Is process wastewater segregated from domestic wastewater?
- Any representative sampling point?
- Has certification statement been submitted?

Photographic Processing

It is important to determine what type of chemistry is used because some of the chemicals may be toxic while others may not.

- What types of films are developed? Are prints made? Give an estimate of how much total processing is done per day? How many automatic processors are utilized and how long are they in operation per day?
- Are automated processors used or is work done manually?
- What chemical brands are used: Kodak, 3M, GAF, etc.? What type of process chemistry is used: C-41, E-6, CP-30, etc.? What are the names of each chemical used in each process, what are the volumes used, and which chemicals discharge to the sewer? Do any of the chemicals used contain cyanide?
- Is silver recovery practiced? Is bleach regeneration practiced, and, if so, is it done within the lab? What are the processes and wastes involved?
- What is the wastewater flow from each of the photographic processing operations? Does the rinse water on the processors run continuously or is it shut off when no work is processed? How often are the processors cleaned and the chemicals changed? What chemicals, if any, are used to clean the processor rollers and trays? Are there any floor drains where the chemicals are mixed or stored?
- Any pretreatment? pH control?
- What is water consumption?
- Is process wastewater segregated from domestic?
- Any representative sampling point?

Plastic and Synthetic Materials Manufacturing

- What is the product manufactured?
- What are the raw materials used including any accelerators and inhibitors? Are any known toxics (such as cyanide, cadmium, or mercury) utilized in manufacturing the product?
- Are there any product washing operations? Are reactor vessels washed down between batches? Is water or solvent used? Would these wastes be discharged to the sewer?
- What type of polymerization process is employed? Does the process use a water or solvent suspension? What are the wastes generated from the process; what are the possible contaminants; how are the wastes disposed of?
- Is cooling water, heating or steam used and is it contact or noncontact? What is the destination of these streams?
- Any boiler blowdown to the sewer - frequency, volume, additives?
- Is there segregation of domestic and process wastewater?

- Any representative sampling point?

Porcelain Enameling

- What is the square footage of material enameled at the facility on annual basis?
- How is the base metal prepared for enameling?
- Is any electroplating done on-site? If yes, check the questions for Electroplating and Metal Finishing.
- What coating application method is used?
- Check the General Industrial Inspection Questions for Usage of Chemicals, Cleaners and Location of Drains.

Printed Circuit Board Manufacturer (see Electroplater and Metal Finishing)

Printing

Some of the following questions may apply while others may not; experience will be the best judge.

- What kind of printing is done: offset, letterpress, silkscreen or other type of printing?
- If offset printing is done: Is film processing and plate developing done in the shop?
- If film processing is done: Is an automatic film processor used or are trays used? Does the processor's rinse waste run continuously or does it shut off after processing is completed? How often are the processor's chemical tanks cleaned out and what volume is discharged to the sewer? How much developer, fixer, and stop bath (if applicable) are used and are these discharged to the sewer? Is silver reclamation practiced? Is cyanide used at all for further reducing negatives? Are phototypesetters used and, if so, what chemicals are discharged?
- If plate developing is done: What type of plates are used? If they are aluminum plates, are they developed with a subtractive color key additive developer? What are the names of the developers and what quantities are used? Is the developer washed off the plates to the sewer or wiped-off with a rag? How many plates are developed?
- If paper plates are used: What type of processor is employed and what are the names, volumes, and destination of the chemicals used? If a silver process is used, is silver reclamation practiced?
- In the press room, what type of fountain solution is used and would this ever be discharged during normal use or cleanup operations? What type of solvent is used to clean the presses and how is this applied? Would this solvent ever be discharged or does it become associated with rags? Are these rags washed on the premises or are they picked up by a commercial laundry? What is the name of the laundry? Are there any floor drains where the solvent or ink is stored? Are any of the presses water cooled? Are there any waste oils from the presses?
- If letter pressing is done: Is old lead type smelted in the shop and, if so, are the molds water cooled? What type of solvent is used to clean the presses and type? How is solvent applied; is it ever discharged to the sewer?

- If silkscreen printing is done: What kind of photosensitive coating and what volume is used? What kind of developer is used and is it discharged? Is a solvent or other cleaner used to clean the screen after printing? Is this discharged to the sewer? Are the screens used over again for making new stencils or are they thrown away?
- If a different type of printing is done, what kind is it, and what are the names and volumes of the chemicals used? Are these discharged to the sewer or collected and disposed of? Who would pick up the collected chemicals?
- Does rinse water from the processors or in the manual rinse operation run continuously, or is it shut off when no work is processed?
- Any water cooled machinery used? Discharged to?
- Is process wastewater and domestic wastewater segregated?
- Any representative sampling points?

Restaurants

- Presence of grease interceptor (describe, size). How is it serviced (frequency)? How is grease disposed of?
- What is done with spent cooking grease? Amount generated?
- How does the facility dispose of edible garbage material?
- Janitorial cleaners (types, usage, storage).
- Do they have an automatic dishwasher? (Hours/day usage, water consumption, discharge water temperature.)
 - * Is it connected to grease interceptors?
- Number of sinks - usage of sinks (pots and pans or hand washing).
- Grill cleaning residual destination.

Radiator Shops

- Any boil out (caustic stripping) tanks? Volume of tanks? Temperature of tanks? What chemicals are added to the boil out tanks? How often is the boil out tank dumped? Is it treated before it is dumped? How is sludge from tanks disposed? How frequently?
- Any ultra-sonic cleaning?
- Any rinse booths or baths? What is the source of the rinse water – fresh water in a once-through system? Wash water from a booth recirculation reservoir? Treated wastewater? Volume of rinse water contained in booth or bath units? How often is booth or bath dumped? Is it treated before it is dumped?
- Any test tanks for leak testing purposes? Volume of tanks? What chemicals are added to the tanks? Is soldering done over the test tank? Is sludge removed from tank? How often is tank dumped? Is it treated before it is dumped?
- Any painting of the radiators? If so, water based or solvent based paints? What is done with waste paint and solvents? Any discharge from paint booth to the sanitary sewer system?
- Are radiators drained thoroughly before transferring them from one tank to another?

- Any drain boards between tanks to divert drippings back into the source tank?
- Any kind of treatment system to treat wastewater before discharge or to allow for water reuse?
- Any solvents used? What is done with spent solvents? What volume of solvents are disposed?
- Floor drains? Do they go to the sanitary sewer? What type of wastes do they receive? Does floor cleaning waste go down floor drains? Are any drains sealed or bermed?
- Any spill prevention measures implemented?
- Is solder dross generated at the facility? Where is it stored? How is it disposed of?
- What type of waste sludges are generated? Are they dried or dewatered? Where are they stored? How are they disposed of?

Rubber Processing

- Synthetic or natural?
- What are the products manufactured?
- Is the rubber natural or synthetic?
- If synthetic rubber is used, is it polymerized on-site and would it be a water or solvent suspension? Is there a discharge associated with the process?
- What are the ingredients of the rubber, including all additives? What kind of anti-crack agents are used? Are any known toxics used in the plant?
- Are there any waste oils from rubber mixers or other processes which require disposal and, if so, how are they disposed of?
- What type of forming process is used? Is cooling water contact or noncontact? Is it recirculated or discharged? If contact cooling water is used, is it treated in any way before discharge? What contaminants would be in the water?
- Is there any wastewater associated with the curing process (e.g., steam condensate), and what would the contaminants be?
- Is rubber reclaimed and, if so, what type of process is used? Are any chemical agents used and how are these disposed of when spent?
- Are any final coatings applied to the rubber, paint, plastics, etc.? Are there any wastes or wastewater associated with the process and how would they be disposed of?
- Does the plant have air pollution control equipment? Does it use water as a scrubbing medium and would this be discharged?
- Any liquids stored? Near floor drains leading to sewer?
- Any water cooled machinery? Discharge to, volume?
- Water consumption?
- Any boiler blowdown to sewer - frequency, volume, additives?
- Are process and domestic wastewater segregated?

- Any representative sampling point?

Schools

- Elementary Schools
 - * Cafeteria (see restaurants).
 - * Janitorial chemicals - usage, destination, storage.
- Junior High Schools
 - * Cafeteria (see restaurants).
 - * Janitorial chemicals - usage, destination, storage.
 - * Labs - chemical usage and disposal practices.
 - * Art department - note any agents disposed of to the sewer (amounts) - paint, thinner.
 - * Wood/Metal shop-solvents, paint, stain usage, destination, storage, access to floor drains.
- High Schools
 - * Same as Junior High Schools, plus:
 - * If vocational, check - auto mechanics department; cosmetology department - note any chemical usage and disposal practices.

Scrap and Waste Materials

- Any processing of the material - welding or smelting of metals?
 - * Processing machinery cooling water - contact or noncontact - frequency of discharge.
- Oil Storage - describe, including capacity.
- Any other liquid storage or reclamation?

Soap and Detergent Manufacturing

General

- Are only soaps manufactured, detergents, or both? Classify the plant.
- Is foaming a problem in POTW sewers or treatment plant?
- How is cooling water used? Discharge to?
- How are liquid materials stored? Floor drains nearby leading to sewer?
- Are air scrubbers used? Do these use water? Caustics?
- In product purification steps, how are filter backwashes handled?
- Are process and domestic wastewater segregated?
- Any representative sampling points?
- What is the basic process employed for manufacturing soap: batch kettles? Fatty acid neutralization? Other?

- Is process batch or continuous? If batch, what is frequency and volume of reactor cleanout?
- Is waste soap from processing sewer?
- Are defoamers added prior to sewer discharge?
- Are perfumes and additives used? If so, what are they?

Detergent

- What are additives used in the product?
- How are spray drying towers cleaned?

Sugar Processing

- Are both liquid and crystallized sugar produced?
- What type of system exists in the plant for "sweet water" recovery?
- Are ion exchange systems used? If so, what are the backwashing systems likely to produce as wastes? How frequent is backwash?
- If charcoal filtering systems are used, does any wash waters or transport water go to the sewer?
- Are trucks or other heavy equipment maintained? Washed? Any floor drains leading to sewers? Any traps?
- What bulk chemicals are stored and how? (Examples are acids used in liquid sugar production.)
- What happens to filter sludges in the plant? What type of filter aids are used?
- Is cooling water used? Discharge to?
- What is the frequency of boiler blowdown and what are the additives used and volumes discharged?
- From cleaning of equipment, what wastes are sewer and what wastes are recycled through the plant? (Examples are filters, evaporation pans, screens, etc.).
- Are process and domestic wastewater segregated?
- Any representative sampling points?

Textile Mills

- What are the products manufactured in the mills? What is the approximate production of the mill?
- What types of fibers are used in the fabric?
- Does the raw fiber require cleaning before spinning and weaving?
- Are the fibers or fabrics scoured, mercerized, fulled, carbonized, or bleached? What chemicals and rinsing operations are used and what is the destination of these wastes?
- Is any kind of sizing applied and, if so, what kind is it?

- Is desizing practiced, and what are the chemicals used? Are these chemicals discharged to the sewer?
- Is dye applied to fabrics? What are the types and chemical constituents of the dyes and are the spent dye solutions and rinse waters discharged to the sewer?
- Are any antistatic agents applied to synthetic fibers before spinning and weaving operations? Would these be removed from the fabric and subsequently enter the wastewater discharged to the sewer?
- Are any further finishing operations practiced, such as printing or application of various coatings?
- What is the volume of wastewater generated by each chemical process?
- Are there any methods of pretreatment employed before discharge of wastewater to the sewer?
- Any water cooled machinery used? Discharged to?
- Any liquids stored near floor drains leading to sewer?
- Any boiler blowdown to sewer - frequency, volume, additives?
- Are process and domestic wastewater segregated?
- Any representative sampling point?

Transportation Equipment Cleaning

- Are tanker trucks, rail cars or barges/tankers cleaned (interior)?
- What types of commodities were contained in tanks (chemicals, petroleum products, food-grade products, etc.)?
- Are manifests available to identify cargoes last contained in the tanks?
- Is the facility currently permitted for the types of commodities actually received?
- Is discharge >100,000 gallons per year?
- Is the facility subject to numerical effluent limitations, or has the facility elected to comply with a Pollutant Management Plan in lieu of numeric effluent limitations?
- How is heel managed?
- How are spent cleaning solutions, caustic washes, and acid washes managed?
- Are cleaning agents they being recycled or reused?
- Are procedures in place to properly train employees on aspects of the Pollutant Management Plan?

Universities (or Military Installations and Other Large Institutions)

- Is a map of the campus available to inspectors which details the site and includes all building, roads, plus water and sewer lines? Is there some way to identify all of water meters associated within institution?

- Can a master list of chemicals used on campus be provided? Which chemicals are used most?
- Is there an organized waste chemicals pickup program? How many pickups per year? How many gallons picked up per year? Who is scavenger(s)? Licensed? Frequency of scavenger pickups? Central storage location(s) for waste chemicals that have been picked up? Are required manifest records maintained?
- Are radioactive materials handled on campus? If yes, in what capacity? Are any wastes generated? If yes, how are these wastes disposed of? Check General Industrial Inspection Questions for Radioactive Wastes.
- Any photo developing, or graphics arts facilities on campus? Any printing facilities?
- Any laundry/ facilities? Describe.
- Any photo type PC board work in the electronics labs on campus?
- Any metal finishing or metal working done on site? Explain.
- Any auto mechanics, maintenance, washing, etc. Describe. Are alkaline cleaning or acid cleaning tanks present? Discharged to sewer? Sludge Handling Practices?
- Any woodworking, carpentry, painting, paint booths, or water curtains? Describe.
- Any eating or dining facilities? Grease interceptors?
- Describe routine handling of herbicides and pesticide residuals and empty contains.
- Describe Hazardous Waste (HW) storage and treatment.
- Any hospitals, clinics, etc. Describe.
- Any laboratories? Describe.
- How are pathogenic organisms disposed of?
- Any pretreatment facilities (marble chip acid traps, dilution pits, etc.)?
- How much water is consumed per year?
- Has a study been done to account for all water uses? Any use of steam generation? Blowdown? Any cooling water in use? Describe. (Cooling water, laboratory wastewaters, cooling tower and boiler blowdowns, evaporation and drift from cooling towers, lawn irrigation, etc.) Describe sources.
- Which and how many of each of the following units, that usually discharge uncontaminated water to the sewer, does the university have in operation at various times: stills, cold rooms, diffusion pumps, centrifuges, electron microscopes, x-ray diffraction units, electrophoresis units, air compressors, ice machines, fermentors.
- What is total campus population, including employees? How many reside on campus?
- Are there floor drains near liquid chemical storage areas (such as building and grounds, chemical "supermarkets," waste chemical storage area(s), fuel oil tanks)?
- Does the site have any active or inactive NPDES permits?

Veterinary Services

- What is the chemical usage and storage; quantities, destination, floor drain proximity?

- * Alcohol, germicides, pesticides, cleaners, medicines?
- Are there washing baths; detergents used and discharge procedures, any hair clogging problems?
- What is done with excreta material (animal boarding)?
- Are there any special procedures for infectious wastes?

Woodworking Shops

- Chemical usage - look for solvents, thinners, paints, stains, cutting oils, adhesives, etc.
- Disposal procedures for chemical wastes.
- How are brushes cleaned? Are any spray guns used - how are they cleaned?
- Chemical storage - proximity to floor drains.
- How is cutting machinery lubricated and cooled?
 - * Are cutting oils discharged?
 - * Any cooling water (contact or noncontact) recirculated or discharged?

Appendix C. General Operations and Maintenance Questions

Operations and Maintenance Questions for Industrial Users Policies and Procedures:

General Questions:

Yes	No	N/A	1. Is there a formal or informal set of policies for facility operations?
			2. Do policies address any of the following:
Yes	No	N/A	• Remaining in compliance?
Yes	No	N/A	• Maintaining process controls?
Yes	No	N/A	• Quality control?
Yes	No	N/A	• Preventative maintenance?
Yes	No	N/A	3. Is there a set of standard procedures to implement these policies?
Yes	No	N/A	4. Are the procedures written or informal?
			5. Do the procedures consider the following areas?
Yes	No	N/A	• Safety?
Yes	No	N/A	• Emergency?
Yes	No	N/A	• Laboratory?
Yes	No	N/A	• Process control?
Yes	No	N/A	• Operating procedures?
Yes	No	N/A	• Monitoring?
Yes	No	N/A	• Labor relations?
Yes	No	N/A	• Energy conservation?
Yes	No	N/A	• Collection system?
Yes	No	N/A	• Pumping stations?
Yes	No	N/A	• Treatment processes?
Yes	No	N/A	• Sludge disposal?
Yes	No	N/A	• Equipment record system?
Yes	No	N/A	• Maintenance planning and scheduling?
Yes	No	N/A	• Work orders?
Yes	No	N/A	• Inventory management?
Yes	No	N/A	6. Are the procedures followed?

Organization:

Yes	No	N/A	1. Is there an Organizational Plan (or Chart) for operations?
			2. Does the plan include:
Yes	No	N/A	• Delegation of responsibility and authority?
Yes	No	N/A	• Job descriptions?
Yes	No	N/A	• Interaction with other functions (such as maintenance)?
Yes	No	N/A	3. Is the Plan formal or informal?
Yes	No	N/A	4. Is the Plan available to and understood by the staff?
Yes	No	N/A	5. Is the Plan followed?
Yes	No	N/A	6. Is the Plan consistent with policies and procedures?
Yes	No	N/A	7. Is the Plan flexible (i.e., can it handle emergency situations)?
			8. Does the Plan clearly define lines of authority and responsibility in such areas as:
Yes	No	N/A	• Laboratory?
Yes	No	N/A	• Process control?

Yes	No	N/A	• Instrumentation?
Yes	No	N/A	• Sludge disposal?
Yes	No	N/A	• Collection system?
Yes	No	N/A	• Pumping stations?
Yes	No	N/A	• Monitoring practices?
Yes	No	N/A	• Mechanical?
Yes	No	N/A	• Electrical?
Yes	No	N/A	• Buildings and grounds?
Yes	No	N/A	• Automotive?
Yes	No	N/A	• Supplies and spare parts?

Staffing:

Yes	No	N/A	1. Is there an adequate number of staff to achieve the policies and procedures established in the plan?
Yes	No	N/A	2. Are staff members adequately qualified for their duties and responsibilities by demonstrating:
Yes	No	N/A	• Certification?
Yes	No	N/A	• Qualification?
Yes	No	N/A	• Ability?
Yes	No	N/A	• Job performance?
Yes	No	N/A	• Understanding of treatment processes?
Yes	No	N/A	3. Is staff effectively used?
Yes	No	N/A	4. Has the potential for borrowing personnel been considered?
Yes	No	N/A	5. Are training programs followed for:
Yes	No	N/A	• Orientation of new staff?
Yes	No	N/A	• Training new operators?
Yes	No	N/A	• Training new supervisors?
Yes	No	N/A	• Continuing training of existing staff?
Yes	No	N/A	• Cross training?
Yes	No	N/A	6. Which of the following training procedures are used?
Yes	No	N/A	• Formal classroom?
Yes	No	N/A	• Home study?
Yes	No	N/A	• On-the-job training?
Yes	No	N/A	• Participation in professional conferences or organizations?
Yes	No	N/A	7. Does the training program provide specific instruction for the following operations and maintenance activities?
Yes	No	N/A	• Safety?
Yes	No	N/A	• Spill prevention, control and response actions?
Yes	No	N/A	• Laboratory procedures?
Yes	No	N/A	• Treatment processes?
Yes	No	N/A	• Instrumentation?
Yes	No	N/A	• Equipment troubleshooting?
Yes	No	N/A	• Handling personnel problems?
Yes	No	N/A	• Monitoring practices?
Yes	No	N/A	• Handling emergencies?
Yes	No	N/A	• Mechanical?
Yes	No	N/A	• Electrical?

Yes	No	N/A	• Automotive?
Yes	No	N/A	• Building maintenance?
Yes	No	N/A	• Inventory control?
Yes	No	N/A	8. Does management encourage staff motivation?
Yes	No	N/A	9. Does management support its first-line supervisors?
			10. Is staff motivation maintained with:
Yes	No	N/A	• Encouragement for training?
Yes	No	N/A	• Job recognition?
Yes	No	N/A	• Promotional opportunities?
Yes	No	N/A	• Salary incentives?
Yes	No	N/A	• Job security?
Yes	No	N/A	• Working environment?

Operations:

Yes	No	N/A	1. How are operating schedules established?
Yes	No	N/A	2. Do schedules attempt to attain optimum staff use?
Yes	No	N/A	3. Are line supervisors included in manpower scheduling?
Yes	No	N/A	4. Are staff involved in and/or informed of manpower planning?
Yes	No	N/A	5. Is there sufficient long-term planning for staff replacement and system changes?
Yes	No	N/A	6. Are there procedures in manpower staffing for emergency situations?
Yes	No	N/A	7. How are process control changes initiated?
Yes	No	N/A	8. How do process control changes interact with management?
Yes	No	N/A	9. How effectively are laboratory results used in process control?
Yes	No	N/A	10. Are there emergency plans for treatment control?
Yes	No	N/A	11. Is there an effective energy management plan? Is the plan used?
Yes	No	N/A	12. To what extent are operations personnel involved in the budget process?
Yes	No	N/A	13. Do budgets adequately identify and justify the cost components of operations?
Yes	No	N/A	14. Are future budgets based on current and anticipated operating conditions?
Yes	No	N/A	15. Do operating and capital budget limits constrain operations?
Yes	No	N/A	16. Can budget line items be adjusted to reflect actual operating conditions?

Maintenance:

Yes	No	N/A	1. Are maintenance activities planned? Is the planning formal or informal?
Yes	No	N/A	2. Does the facility have sufficient management controls to affect realistic planning and scheduling? If the controls exist, are they used?
Yes	No	N/A	3. Are operating variables exploited to simplify maintenance efforts?
Yes	No	N/A	4. To what extent are the supply and spare parts inventories planned in conjunction with maintenance activities?
Yes	No	N/A	5. Have minimum and maximum levels been established for all inventory items?
Yes	No	N/A	6. Does the facility have a maintenance emergency plan?
Yes	No	N/A	7. Is the maintenance emergency plan current? Is the staff knowledgeable about emergency procedures?
Yes	No	N/A	8. Does a plan exist for returning to the preventative maintenance mode following an emergency?
Yes	No	N/A	9. Are preventative maintenance tasks scheduled in accordance with manufacturer's recommendations?
Yes	No	N/A	10. Is adequate time allowed for corrective maintenance?
Yes	No	N/A	11. Are basic maintenance practices (preventative and corrective) and frequencies reviewed for cost-effectiveness?

Yes	No	N/A	12. Do the management controls provide sufficient information for accurate budget preparation?
Yes	No	N/A	13. To what extent are maintenance personnel involved in the budget process?
Yes	No	N/A	14. Do budgets adequately identify and justify the cost components of maintenance?
Yes	No	N/A	15. Are future budgets based on current and anticipated operation and maintenance conditions?
Yes	No	N/A	16. Do maintenance and capital budget limits constrain preventative maintenance (equipment replacement and improvement)?
Yes	No	N/A	17. Does the maintenance department receive adequate feedback on cost performance?
Yes	No	N/A	18. Can budget line items be adjusted to reflect actual maintenance conditions?

Management Controls:

			1. Are current versions of the following documents maintained:
Yes	No	N/A	• Operating reports?
Yes	No	N/A	• Work schedules?
Yes	No	N/A	• Activity reports?
Yes	No	N/A	• Performance reports (labor, supplies, energy)?
Yes	No	N/A	• Expenditure reports (labor, supplies, energy)?
Yes	No	N/A	• Cost analysis reports?
Yes	No	N/A	• Emergency and complaint calls?
Yes	No	N/A	• Process control data, including effluent quality?
Yes	No	N/A	• Spill prevention, control and response actions?
Yes	No	N/A	2. Do the reports contain sufficient information to support their intended purpose?
Yes	No	N/A	3. Are the reports usable and accepted by the staff?
Yes	No	N/A	4. Are the reports being completed as required?
Yes	No	N/A	5. Are the reports consistent among themselves?
Yes	No	N/A	6. Are the reports used directly in process control?
Yes	No	N/A	7. Are the reports reviewed and discussed with operating staff?
Yes	No	N/A	8. What types of summary reports are required?
Yes	No	N/A	9. To whom are reports distributed and when?

Management Controls (Maintenance):

			1. Does a maintenance record system exist? Does it include:
Yes	No	N/A	• As-built drawings?
Yes	No	N/A	• Shop drawings?
Yes	No	N/A	• Construction specifications?
Yes	No	N/A	• Capital and equipment inventory?
Yes	No	N/A	• Maintenance history (preventative and corrective)?
Yes	No	N/A	• Maintenance costs?
Yes	No	N/A	2. Is the base record system kept current as part of daily maintenance practices?
Yes	No	N/A	3. Is there a work order system for scheduling maintenance? Is it explicit or implicit?
			4. Do work orders contain the following:
Yes	No	N/A	• Date?
Yes	No	N/A	• Work order number?
Yes	No	N/A	• Location?
Yes	No	N/A	• Nature of the problem?
Yes	No	N/A	• Work requirements?
Yes	No	N/A	• Time requirements?
Yes	No	N/A	• Assigned personnel?

Yes	No	N/A	• Space for reporting work performed, required supplies, time required, and cost summary?
Yes	No	N/A	• Responsible staff member and supervisory signature requirements?
Yes	No	N/A	5. When emergency work must be performed without a work order, in one completed afterward?
Yes	No	N/A	6. Are work orders usable and acceptable by staff as essential to the maintenance program? Are they actually completed?
Yes	No	N/A	7. Is work order information transferred to a maintenance record system?
Yes	No	N/A	8. Does a catalog or index system exist for controlling items in inventory?
Yes	No	N/A	9. Are withdrawal tickets used for obtaining supplies from the inventory?
Yes	No	N/A	10. Do the tickets contain cost information and interact well with inventory controls and the work order system?
Yes	No	N/A	11. Is the cost and activity information from work orders aggregated to provide management reports?
Yes	No	N/A	12. Is this information used for budget preparation?
Yes	No	N/A	13. Is the maintenance performance discussed regularly with staff?
Yes	No	N/A	14. How is the cost of contract maintenance or the use of specialized assistance recorded?
Yes	No	N/A	15. Are safeguards and penalties adequate to prevent maintenance cards from being returned without the work being done?
Yes	No	N/A	16. Is the preventative maintenance record checked after an emergency equipment failure?

Appendix D. EPA Memorandum, *The Use of Grab Samples to Detect Violations of Pretreatment Standards*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 1 1992

MEMORANDUM

OFFICE OF
WATER

SUBJECT: The Use of Grab Samples to Detect Violations of Pretreatment Standards

FROM: Michael B. Cook, Director *Michael B. Cook*
Office of Wastewater Enforcement & Compliance (WH-546)

Frederick F. Stiehl *Frederick F. Stiehl*
Enforcement Counsel for Water (LE-134W)

TO: Water Management Division Directors, Regions I - X
Environmental Services
Division Directors, Regions I - X
Regional Counsels, Regions I - X

The primary purpose of this Memorandum is to provide guidance on the propriety of using single grab samples for periodic compliance monitoring to determine whether a violation of Pretreatment Standards has occurred. More specifically, the Memorandum identifies those circumstances when single grab results may be used by Control Authorities, including EPA, State or publicly owned treatment works (POTW) personnel, to determine or verify an industrial user's compliance with categorical standards and local limits. Please be aware that the concepts set out below are applicable when drafting self-monitoring requirements for industrial user permits.

REGULATORY BACKGROUND

The General Pretreatment Regulations require Control Authorities to sample all significant industrial users (SIUs) at least once per year [see 40 CFR 403.8(f)(2)(v)]. In addition, the Regulations, at 40 CFR 403.12(e), (g) and (h) require, at a minimum, that all SIUs self-monitor and report on their compliance status for each pollutant regulated by a Pretreatment Standard at least twice per year unless the Control Authority chooses to conduct all monitoring in lieu of self-monitoring by its industrial users.

¹ The POTW should conduct more frequent sampling and/or require more frequent self-monitoring by an industrial user if deemed necessary to assess the industry's compliance status (e.g., a daily, weekly, monthly or quarterly frequency as appropriate).

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The Regulations, at 40 CFR 403.12(g) and (h), also specify that pollutant sampling and analysis be performed using the procedures set forth in 40 CFR Part 136. Part 136 identifies the proper laboratory procedures to be used in analyzing industrial wastewater (including the volume of wastewater necessary to perform the tests and proper techniques to preserve the sample's integrity). However, with certain exceptions, Part 136 does not specifically designate the method to be used in obtaining samples of the wastewater. Rather, section 403.12(g) and (h) require sampling to be "appropriate" to obtain "representative" data; that is, data which represent the nature and character of the discharge.

DISCUSSION OF BASIC SAMPLING TYPES

Sampling may be conducted in two basic ways. Both types of sampling provide valid, useful information about the processes and pollutants in the wastewater being sampled. The first is an "individual grab sample." An analysis of an individual grab sample provides a measurement of pollutant concentrations in the wastewater at a particular point in time. For example, a single grab sample might be used for a batch discharge which only occurs for a brief period (e.g., an hour or less). Such samples are typically collected² manually but are sometimes obtained using a mechanical sampler.

The second type of sample is a "composite sample." Composite samples are best conceptualized as a series of grab samples which, taken together, measure the quality of the wastewater over a specified period of time (e.g., an operating day). Monitoring data may be composited on either a flow or time basis. A flow-proportional composite is collected after the passage of a defined volume of the discharge (e.g., once every 2,000 gallons). Alternatively, a flow-proportional composite may be obtained by adjusting the size of the aliquots to correspond to the size of the flow. A time-proportional composite is collected after the passage of a defined period of time (e.g., once every two hours).

Generally, composite samples are collected using a mechanical sampler, but may also be obtained through a series of manual grab samples taken at intervals which correspond to the wastewater flow or time of the facility's operations. In some cases, composite data is obtained by combining grab samples prior

² Mechanical samplers may not be used to sample for certain pollutants (e.g., those which could adhere to the sampler tubing, volatilize in the sampler, or pollutants with short holding times).

- 3 -

to transmittal to a laboratory. At other times, the samples remain discrete and are either combined by the laboratory prior to testing or are analyzed separately (and³ mathematically averaged to derive a daily maximum value).

DETERMINING APPROPRIATE COMPLIANCE SAMPLING METHODS

EPA policy on appropriate compliance sampling types has been articulated in several pretreatment guidance manuals and regulatory preambles, and continues to be as follows:

A. Compliance With Categorical Standards

- Most effluent limits established by categorical standards are imposed on a maximum daily-average and a monthly-average bases. Generally, wastewater samples taken to determine compliance with these limits should be collected using composite methods.
- There are exceptions to the general rule. Composite samples are inappropriate for certain characteristic pollutants (i.e., pH and temperature) since the composite alters the characteristic being measured. Therefore, analysis of these pollutants should be based on individual grab samples. Alternatively, continuous monitoring devices may be used for measuring compliance with pH and temperature limits. Any exceedance recorded by a continuous monitoring device is a violation of the standard.
- Sampling wastewater from electroplating facilities regulated under 40 CFR Part 413 may be conducted using single grab samples [(assuming that the grab samples are representative of the daily discharge for a particular facility); see also preamble discussion at 44 Fed. Reg. 52609, September 7, 1979]
- A series of grab samples may be needed to obtain appropriate composite data for some parameters due to the nature of the pollutant being sampled. Examples of this situation include:

³ Daily maximum discharge limits are controls on the average wastewater strength over the course of the operating day. They are not intended to be instantaneous limits applied at any single point during that operating day.

- 4 -

- Sampling for parameters which may be altered in concentration by compositing or storage. These pollutants include pH-sensitive compounds (i.e., total phenols, ammonia, cyanides, sulfides);⁴ and volatile organics such as purgeable halocarbons, purgeable aromatics, acrolein, and acrylonitrile.
- Sampling for pollutants with short holding times such as hexavalent chromium and residual chlorine; and
- Sampling for pollutants which may adhere to the sample container or tubing such as fats, oil and grease. Individual analysis for these parameters ensures that all the material in the sample is accounted for.

B. Compliance With Local Limits

- Local limits may be established on an instantaneous, daily, weekly or monthly-average basis. The sample type used to determine compliance with local limits should be linked to the duration of the pollutant limit being applied.
- Compliance with instantaneous limits should be established using individual grab samples. Exceedances identified by composite sampling are also violations.
- Compliance with daily, weekly or monthly average limits should be determined using composited sampling data, with the same exceptions noted in A, above.
- Measurements of wastewater strength for non-pretreatment purposes (e.g., surcharging) may be conducted in a manner prescribed by the POTW.

GRAB SAMPLING AS A SUBSTITUTE FOR COMPOSITE SAMPLING

EPA is aware that a number of Control Authorities currently rely on a single grab sample to determine compliance, particularly at small industrial users, as a way of holding down monitoring costs. It is EPA's experience that the process activities and wastewater treatment at many industrial facilities may not be sufficiently steady-state as to allow for routine use

⁴ Certain pH-sensitive compounds can be automatically composited without losses if the collected sample is only to be analyzed for a single parameter. Additionally, a series of grab samples may be manually composited if appropriate procedures are followed.

- 5 -

of single grab results as a substitute for composite results. Therefore, the Agency expects composited data to be used in most cases. However, there are several circumstances when a single grab sample may be properly substituted for a single composite sample. These situations are:

- Sampling a batch or other similar short term discharge, the duration of which only allows for a single grab sample to be taken;
- Sampling a facility where a statistical relationship can be established from previous grab and composite monitoring data obtained over the same long-term period of time;⁵ and
- Where the industrial user, in its self-monitoring report, certifies that the individual grab sample is representative of its daily operation.

Except for these circumstances, Control Authorities should continue to use composite methods for their compliance sampling.

GRAB SAMPLES AS A COMPLIANCE SCREENING TOOL

Control Authorities may consider using grab samples as a compliance screening tool once a body of composite data (e.g., Control Authority and self-monitoring samples obtained over a year's time), shows consistent compliance. However, in the event single grab samples suggest noncompliance, the Control Authority

⁵ Grab sampling may provide results that are similar to composite sampling. See for example, a March 2, 1989, Office of Water Regulations and Standards (OWRS) Memorandum to Region IX describing the results of a statistical analysis of sampling data from a single industrial facility. These sampling data included both individual grab and flow-proportional, composite sampling obtained during different, non-overlapping time periods. After reviewing the data, OWRS concluded that the composite and grab sample data sets displayed similar patterns of violation for lead, copper, and total metals. In fact, the analyses did not find any statistically significant difference in the concentration values measured between the grab and composited data. Furthermore, additional statistical tests of the two data sets indicated that the means and variances for each pollutant were similar. The statistical conclusion was that the plant was judged to be out of compliance regardless of what data were analyzed.

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and/or the industrial user should resample using composite techniques on the industrial user's effluent until consistent compliance is again demonstrated.

Control Authorities may also rely on single grab samples, or a series of grab samples for identifying and tracking slug loads/spills since these "single event" violations are not tied to a discharger's performance over time.

Any time an SIU's sample (either grab or composite) shows noncompliance, the General Pretreatment Regulations, at 40 CFR 403.12(g)(2), require that the SIU notify the Control Authority within twenty four (24) hours of becoming aware of the violation and resample within 30 days. Furthermore, EPA encourages Control Authorities to conduct or require more intensive sampling in order to thoroughly document the extent of the violation(s). Of course, the use of grab samples should be reconsidered in the event the SIU changes its process or treatment.

SUMMARY

The collection and analysis of sampling data is the foundation of EPA's compliance and enforcement programs. In order for these programs to be successful, wastewater samples must be properly collected, preserved and analyzed. Although the Federal standards and self-monitoring requirements are independently enforceable, Control Authorities should specify, in individual control mechanisms for industrial users, the sampling collection techniques to be used by the industry. Generally, pretreatment sampling should be conducted using composite methods wherever possible, to determine compliance with daily, weekly or monthly average limits since this sampling technique most closely reflects the average quality of the wastewater as it is discharged to the publicly owned treatment works. Grab samples should be used to determine compliance with instantaneous limits. There are circumstances when discrete grab samples are also an appropriate, cost effective means of screening compliance with daily, weekly and monthly pretreatment standards.

⁶ Where grab samples are used as a screening tool only (i.e., consistent compliance has been demonstrated by composite data), the results should not be used in the POTW's calculation of significant noncompliance (SNC).

⁷ When POTWs choose to allow the SIU to collect single grab samples, the POTW should draft the SIU's individual control mechanism to clearly indicate that grab samples are to be obtained thereby preventing any uncertainty at a later date.

- 7 -

In summary, there are limited situations in which single grab sample data may be used in lieu of composite data. Assuming adequate quality control measures are observed, analyses of these grab samples can indicate noncompliance with Federal, State and Local Pretreatment Standards and can form the basis of a successful enforcement action. Grab sampling can also be useful in quantifying batches, spills, and slug loads which may have an impact on the publicly owned treatment works, its receiving stream and sludge quality.

Should you have any further comments or questions regarding this matter, please have your staff contact Mark Charles of OWEC at (202) 260-8319, or David Hindin of OE at (202) 260-8547.

cc: Frank M. Covington, NEIC
Thomas O'Farrell, OST
Regional and State Pretreatment Coordinators
Lead Regional Pretreatment Attorneys, Regions I - X
Approved POTW Pretreatment Programs

Appendix E. Example Chain-of-Custody Form for Use by POTWs

Appendix F. EPA Memorandum, *Determining Industrial User Noncompliance Using Split Samples*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 21 1992

OFFICE OF WATER

MEMORANDUM

SUBJECT: Determining Industrial User Compliance Using Split Samples

FROM: Richard G. Kozlowski, Director *by Henry Gray*
Enforcement Division

TO: Mary Jo M. Aiello, Acting Chief
Bureau of Pretreatment and Residuals

This memo is a response to your letter of September 30, 1991, where you requested written clarification regarding the use of split samples for determining industrial user (IU) compliance under the Pretreatment Program. Specifically, you requested guidance on how to use the data from split samples for determining IU compliance in situations where split samples yield different analytical results. The fundamental question posed by your inquiry is whether all analytical results must be used when evaluating the compliance status of IUs and how to use those results for determining compliance. In situations where split samples exist and both samples were properly preserved and analyzed, POTWs should evaluate compliance with applicable Pretreatment Standards in the manner described below.

When evaluating the compliance status of an industrial user, the POTW must use all samples which were obtained through appropriate sampling techniques and analyzed in accordance with the procedures established in 40 CFR Part 136¹. The Environmental Protection Agency (EPA) has consistently encouraged Publicly Owned Treatment Works (POTWs) to periodically split samples with industrial users as a method of verifying the quality of the monitoring data. When a POTW splits a sample with an IU, the POTW must use the results from each of the split samples.

A legitimate question arises, however, when a properly collected, preserved and analyzed split sample produces two different analytical results (e.g., one which indicates compliance and the other shows noncompliance, or where both indicate either compliance or noncompliance but the magnitudes are substantially different). In these instances, questions arise regarding the compliance status of the IU, and what should be done to reconcile the results.

¹ See Memorandum, "Application and Use of the Regulatory Definition of Significant Noncompliance for Industrial Users," U.S. EPA, September 9, 1991.

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There is inherent variation in all analytical measurements, and no two measurements of the same analyte (even when drawn from the same sample) will produce identical results. When a split sample is analyzed using appropriate methods, there is no technical basis for choosing one sample result over the other for determining the compliance status of a facility. Since this is the case for all split samples which have been properly analyzed, the POTW should average the results from the split and use the resulting average number when determining the compliance status of an IU. Using the average of the two sample results avoids the untenable situation of demonstrating compliance and noncompliance from the same sample.

If the split sample produces widely divergent results or results which are different over a long period of time, then the cause of the discrepancy between the analytical results should be reconciled. When this happens, the POTW should investigate Quality Assurance and Quality Control (QA/QC) procedures at each laboratory involved. For example, the POTW could submit a spiked sample (i.e., a sample of known concentration) to the laboratories involved (preferably blind) to determine which laboratory may be in error.

In situations where one or both of the analytical results is determined to be invalid, there are compliance and enforcement consequences. If one of the analytical results is determined to be invalid, the average value for that sample is also invalid. In this situation, the value for this sample should be the value of the sample which was not determined to be invalid (e.g., if the IU's results are determined to be invalid, the POTW should use its sample for assessing compliance, and vice versa). If both samples are determined to be invalid, the averaged result from that sample should be discarded and not used for compliance assessment purposes. In either case, the POTW must recalculate the compliance status of the IU using all remaining valid sample results.

In summary, whenever split samples are taken and both are properly preserved and analyzed, the POTW should average the results from each sample and use the averaged value for determining compliance and appropriate enforcement responses. Where the sample results are widely divergent, the POTW should instigate QA/QC measures at each of the analytical laboratories to determine the cause of the discrepancy. If one or both of the samples are invalid, the POTW must recalculate the compliance status of the IU using all valid results.

If you have any further questions regarding these questions, please feel free to call me at (202) 260-8304. The staff person familiar with these issues is Lee Okster. Lee can be reached at (202) 260-8329.

cc: Cynthia Dougherty
Regional Pretreatment Coordinators
Approved State Pretreatment Coordinators
Bill Telliard



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 12 1993

OFFICE OF
WATER

Mr. Harold R. Otis
Chairman, Split Sampling Task Force
Greater Fort Wayne Chamber of Commerce
826 Ewing Street
Fort Wayne, IN 46802-2182

Re: Using Split Samples to Determine Industrial User Compliance

Dear Mr. Otis:

In response to your letter of January 12, 1993, and your phone conversation of February 9, 1993, with Lee Okster, I am providing a further discussion of the issues surrounding the use of split samples to determine industrial user (IU) compliance with Pretreatment Standards. In your letter and your phone conversation, you requested clarification from the Environmental Protection Agency (EPA) on three issues. First, you requested a firm definition of what constitutes "widely divergent results" when comparing split sample results. Second, when a publicly owned treatment works (POTW) splits a sample with an IU, you inquired whether a POTW must use the industrial user's data to determine compliance with pretreatment standards. Finally, you requested written authorization from the EPA to incorporate the language from our existing guidance memorandum on split samples into the Rules and Regulations of the Water Control Utility for the City of Fort Wayne.

What are Widely Divergent Results?

As you are aware, the EPA issued a memorandum on January 21, 1992, entitled "Determining Industrial User Compliance Using Split Samples." The "widely divergent results" criterion established in this memo is to be used as an indication that a problem exists with the laboratory analysis. We did not include an indication of what constitutes "widely divergent" in our memorandum because the amount of "normal" analytical variability depends on the pollutant parameter being tested and the method being used to analyze the sample. With appropriate QA/QC, this "normal" analytical variability is small. In general, though, metals analyses have a smaller variation than organics analyses, but the magnitude of the variability depends on the pollutants being tested. Therefore, no hard and fast rules exist for determining what is widely divergent. This determination is left to the discretion of the local authority.

Must the POTW Use All Sample Results?

In the January, 1992, memorandum we state that "the POTW must use all samples which were obtained through appropriate sampling techniques and analyzed in accordance with the procedures established in 40 CFR Part 136." The memo further states "[w]hen a POTW splits a sample with an IU; the POTW must use the results from each of the split samples."

The POTW is required to sample the IU at least once per year to determine, independent of information supplied by the IU, the compliance status of that facility. If the POTW does not wish to be in a position of comparing its own data with the IU when it samples the IU's discharge, it is not required to split its samples with the IU. Furthermore, we do not recommend that the POTW use a split sample with the industry to satisfy its annual sampling requirement. The POTW should pull its own sample so that it has data which are truly independent of the IU's results.

The POTW also has the primary responsibility to ensure compliance by the IU with all applicable pretreatment standards and requirements. One way the POTW can satisfy its requirement to ensure compliance is to split a routine sample taken by the IU. If a POTW splits a routine sample taken by the IU, it must use the IU's data, in conjunction with its own, to determine the compliance status of the facility (assuming all of the data are sampled and analyzed appropriately). We encourage POTWs to split samples in this manner to verify the IU's data. In a similar fashion, if the POTW chooses to split its own sample with the IU, it must use all of the data to determine the compliance status of the facility (assuming all of the data are appropriately analyzed).

When the POTW splits a sample with an IU (whether it is a routine sample by the IU or an annual sample by the POTW) the POTW has the responsibility to determine whether the IU's results from the split sample are valid. Where an IU's results are different than the POTW's, the burden is on the IU to show that all preservation, chain-of-custody, and analytical and QA/QC methods were followed. If the IU cannot make this showing, then the analytical results from the IU should be discarded when determining the compliance status of the facility. If the IU establishes that it followed all appropriate procedures, then the POTW should review its own QA/QC program. If both the IU and POTW have followed appropriate procedures, and there is still a wide divergence, then follow-up sampling should be conducted. If follow-up sampling consistently shows IU noncompliance, or if the POTW is otherwise satisfied with the validity of its own results, it should proceed to follow its enforcement procedures.

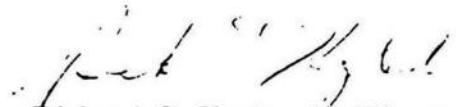
Authorization From the EPA

In regard to your final request, the City of Fort Wayne has the authority to incorporate these procedures into its Rules and Regulations without any authorization from the EPA. As long as the City has the minimum legal authorities to implement its

approved program, it has satisfied its requirements under the Federal regulations. As always, the City is encouraged to adopt the EPA's Pretreatment Guidance whenever possible.

I hope this letter responds to your questions and concerns. If you have any further questions, please feel free to call me at (202) 260-8304 or you can call Lee at (202) 260-8329.

Sincerely yours,



**Richard G. Kozlowski, Director
Water Enforcement Division
U.S. Environmental Protection Agency**

cc: Cynthia Dougherty
Regional Pretreatment Coordinators
Approved State Pretreatment Coordinators

Appendix G. EPA Memorandum, *Application and Use of the Regulatory Definition of Significant Noncompliance for Industrial Users*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 9 1991

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Application and Use of the Regulatory Definition of Significant Noncompliance for Industrial Users

FROM: Michael B. Cook, Director *Michael B. Cook*
Office of Wastewater Enforcement and Compliance

TO: Water Management Division Directors, Regions I-X
Approved Pretreatment State Coordinators

Background:

On July 24, 1990, the Agency replaced the definition of "significant violation" with the definition of "significant noncompliance" (SNC) [see 40 CFR 403.8(f)(2)(vii) and 55 Fed. Reg. 30082]. This change eliminated the inconsistencies which arose in applying the significant violation criteria and established more parity in tracking violations committed by industrial users. The definition of SNC parallels the Pretreatment Compliance Monitoring and Enforcement Guidance (PCME) definition of SNC published in 1986.

This memorandum responds to several questions from States, publicly owned treatment works (POTWs), and industry regarding the application of the SNC definition. One frequently asked question is whether the time frame for determining SNC for technical review criteria effluent violations is a static six month period (i.e., a fixed six month calendar interval) or a rolling six month time frame (i.e., the current day minus six months). POTWs and industry have also inquired whether all data must be used to calculate SNC. The following discussion is provided to promote consistency in the application of this definition. Regions, States and POTWs should determine SNC in the manner prescribed below.

Pretreatment POTWs are required to notify the public of significant industrial users which meet the definition of SNC through publication in the newspaper. The POTW should also use the SNC criteria as the basis for reporting an industrial user's compliance status to the Approval Authority in its Pretreatment Performance Report. According to 40 CFR 403.12(i)(2), the POTW must report on the compliance status of its industrial user universe at the frequency specified by the State or EPA National Pollution Discharge Elimination System (NPDES) permit, but in no case less than once per year. Finally, the definition of SNC is used to determine whether a formal enforcement action against a user is warranted in accordance with the POTW's Enforcement Response Plan (ERP).

Applying the Definition: Use of the Six Month Time Frame:

There are seven criteria set forth in §403.8(f)(2)(vii). Two of these criteria concern violations evaluated over a six month time frame. The Agency intends for Control Authorities to evaluate these criteria on a rolling basis. The EPA's long established practice in the NPDES program is to evaluate SNC for direct dischargers each quarter using data from the previous six months. Similarly, Control Authorities should determine SNC for their universe of industrial users on the same rolling quarters basis using fixed quarters established by the Control Authority to correspond to its "pretreatment year" (e.g., March 31, June 30, September 30 and December 31).

At the end of each quarter, POTWs and States are to evaluate their industrial user's compliance status using the two criteria of the SNC definition which are evaluated on a six month time frame (i.e., the "A" and "B" criteria under the regulatory definition). Under this system, each industrial user is evaluated for SNC four times during the year, and the total evaluation period covers 15 months (i.e., beginning with the last quarter of the previous pretreatment year through the end of the current year). When the POTW is required to publish, it must list in the newspaper all industrial users which have been identified as SNC during the previous year (i.e., the SNC criteria were met during any of the previous four quarters).

If a facility has been determined to be in SNC based solely on violations which occurred in the first quarter of the 15 month evaluation period (i.e., the last quarter of the previous pretreatment year) and the facility has demonstrated consistent compliance in the subsequent four quarters, then the POTW is not required to republish the Industrial User (IU) in the newspaper if the IU was published in the previous year for the same violations.

Use of Industrial User and POTW Data in Determining SNC:

Several POTWs have inquired whether all data, including Control Authority sampling and industrial user self-monitoring, must be used in determining SNC. This question arises from the concern that an industrial user may choose to conduct its sampling efforts at times in which it knows that it is in compliance (e.g., during early morning start-up or during periods in which the industrial process is down). The concern is that use of these unrepresentative data will allow the industry to craft its compliance status such that it will never be in SNC.

The regulation defining SNC clearly requires that all measurements taken in the appropriate six month period must be used to determine a facility's SNC status. Therefore, any and all samples obtained through appropriate sampling techniques which have been analyzed in accordance with the procedures established in 40 CFR Part 136 must be used to determine whether the facility is in SNC.

The General Pretreatment Regulations further state that periodic compliance reports must be based on data obtained through appropriate sampling and analysis, and the data must be representative of conditions occurring during the reporting period [403.8(f)(1)(iv)

and 403.12(g)(3)]. The Control Authority must require that frequency and scope of industrial user self-monitoring necessary to assess and assure compliance by industrial users with applicable pretreatment standards and requirements.

The nature and scope of the sampling undertaken by an industrial user is under the control of the Control Authority through the issuance of an industrial user permit. These permits should specify the sampling locations and sample collection method necessary to ensure that representative samples are obtained for all regulated waste streams. By requiring industrial users to obtain representative samples, the Control Authority will ensure that industrial users do not evade noncompliance through selective sampling of their industrial processes.

Conclusion:

The Control Authority is required to screen all compliance data, whether generated through industrial user self-monitoring or by the Control Authority, to identify any violations of pretreatment requirements. Whenever there is a violation, the Control Authority must take appropriate enforcement action, as defined in its ERP. After this initial enforcement response, the Control Authority should closely track the industrial user's progress toward compliance by increasing the frequency of user self-monitoring, increasing the POTW's monitoring, or both.

When follow-up activity indicates that the violations persist or that satisfactory progress toward compliance is not being made, the Control Authority is required to escalate its enforcement response in accordance with the procedures established in its ERP. **At a minimum EPA expects POTWs to address SNC with an enforceable order that requires a return to compliance by a specific deadline.** When this enforceable order involves a compliance schedule, the industrial user remains in SNC during the period of the schedule (unless the facility returns to compliance prior to the end of the schedule). For example, if the duration of the schedule is two years, the facility should be published in both years. Of course, the POTW should explain in its publication that the violations have been addressed with a formal enforcement action (similar to a "resolved pending" listing on the Quarterly Noncompliance Report).

The definition of SNC provides a benchmark against which the compliance status of an industrial user and the enforcement activities of POTWs can be measured. The concept of significant noncompliance plays a pivotal role in the implementation and enforcement of the National Pretreatment Program. In order for the definition to succeed, it is critical that each Control Authority apply it on a consistent basis. If you have any further questions on this issue, please feel free to call me at (202) 260-5850. The staff person familiar with these issues is Lee Okster at (202) 260-8329.

cc: Cynthia Dougherty
Regional Water Compliance Branch Chiefs
Regional Pretreatment Coordinators
Lead Regional Pretreatment Attorneys

Appendix H. EPA Memorandum, *Compliance with Continuous Monitoring*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 13 1993

OFFICE OF
WATER

Mary Jo M. Aiello, Chief
Bureau of Pretreatment and Residuals
Wastewater Facilities Regulation Program (CN 029)
New Jersey Department of Environmental
Protection and Energy
Trenton, NJ 08625-0029

Dear Ms. Aiello:

Thank you for your letter of January 25, 1993, to Jeffrey Lape of my staff regarding the New Jersey Department of Environmental Protection and Energy's (the Department) proposed policy on waivers from pH limits applicable to industrial discharges to Publicly Owned Treatment Works (POTWs). Subject to the qualifications stated below, your proposed policy is consistent with the federal regulations.

Your letter relates to the application of 40 CFR 401.17, which allows facilities that employ continuous pH monitoring to exceed certain pH limits one percent of the time. Your letter correctly notes that 40 CFR 401.17 applies only to discharges to surface waters, but inquires whether an analogous policy could be applied to discharges to POTWs.

We believe an analogous policy could be applied to discharges to POTWs, subject to several restrictions. First, the federal pretreatment regulations contain a specific prohibition against discharges with a pH below 5.0, from which no waivers are allowed unless the treatment works is specifically designed to accommodate such discharges (40 CFR 403.5(b)(2)). Your letter correctly acknowledges that, except for such specifically designed treatment works, waivers below this minimum limit would not be consistent with federal regulations. Second, although federal pretreatment regulations do not include an upper pH limit applicable to all discharges, some categorical pretreatment standards do so. Waivers from the requirements of those categorical standards would not be allowed unless expressly permitted by the standards themselves.

Third, a POTW may not grant a waiver from a local limit if such waiver would cause pass through or interference. Since local limits are based on considerations at each POTW, it would not be appropriate to institute a waiver of local limits that applies statewide regardless of conditions at individual POTWs.

-2-

So long as POTWs act consistently with their obligations not to allow pass through or interference, however, they might implement waivers that apply either more or less frequently than the 1% you propose. Of course, if it wishes, the State could cap all waivers at 1% and thereby be more stringent than Federal law, which requires no cap.

We note that, if a POTW wishes to provide waivers from pH limits that are technically-based and are part of the POTW's Approved Pretreatment Program, the POTW will have to modify its Approved Pretreatment Program accordingly. The Department should consider for each POTW whether the adoption of this policy is a "change to local limits, which result in less stringent local limits" and therefore requires a formal modification under 40 CFR 403.18(c)(1)(ii), or whether it constitutes a clarification of the POTW's existing local limits.

I hope that this response addresses your concerns. If you have any questions or would like to discuss this further, please call me at (202) 260-5850 or Louis Eby at (202) 260-2991.

Sincerely,


Cynthia C. Dougherty, Director
Permits Division

Appendix I. Hazards Associated with Specific Industrial Categories

Hazards Associated with Specific Industrial Categories

<i>Industry</i>	<i>Physical</i>	<i>Atmospheric</i>	<i>Corrosive</i>	<i>Suggested Protective Gear</i>
Electroplating/ Metal Finishing	<ul style="list-style-type: none"> Cluttered areas Sloppy housekeeping Wet floors/loose boards Heated plating baths High amperage in plating baths 	<ul style="list-style-type: none"> Flammable vapors Exposure to chlorine Sulfur dioxide vapors Cyanide vapors Alkaline vapors/mist Acid vapor/mist 	<ul style="list-style-type: none"> Corrosive chemicals used in plating process Heavy metal baths High voltage 	<ul style="list-style-type: none"> Safety glasses Neoprene gloves Steel-toed boots organic vapor/gas mask
Chemical Blending/ Manufacturing	<ul style="list-style-type: none"> Slippery floors 	<ul style="list-style-type: none"> Leaking mixing or blending equipment 	<ul style="list-style-type: none"> Exposure to chemicals due to leaking equipment 	
Semiconductor Manufacturing		<ul style="list-style-type: none"> Exposure to Freon and chlorinated solvents 	<ul style="list-style-type: none"> Exposure to acids (hydrofluoric and fluoroboric) 	
Pulp, Paper and Paperboard Manufacturing	<ul style="list-style-type: none"> Slippery floors Steam heated tanks Moving equipment (fork lifts) 	<ul style="list-style-type: none"> Exposure to: <ul style="list-style-type: none"> Ammonia (pulping process) Chlorine (bleaching process) Arsenic fumes 	<ul style="list-style-type: none"> Exposure to caustic soda (pulping process) 	<ul style="list-style-type: none"> Ear plugs Safety glasses Latex gloves Dust and mist mask Boots
Battery Manufacturing	<ul style="list-style-type: none"> Heat from steam curing of pasted plates Spills of wash water Exposure to lead metal particles during anode production. 	<ul style="list-style-type: none"> Exposure to sulfuric acid vapors. Lead fumes Acid vapors 	<ul style="list-style-type: none"> Exposure to sulfuric acid (pickling and bleaching process) 	<ul style="list-style-type: none"> Safety glasses Boots Latex gloves Lead fume mask Organic vapor/gas mask
Leather Tanning	<ul style="list-style-type: none"> Slippery floors Moving equipment in wringing operation. 	<ul style="list-style-type: none"> Exposure to: <ul style="list-style-type: none"> sulfuric acid chromium cyanide naphthalene phenol pentachlorophenol 	<ul style="list-style-type: none"> Exposure to sulfuric and hydrochloric acids (acid pickling) 	
Iron and Steel Manufacturing	<ul style="list-style-type: none"> Hot ovens Hot baths Particulates Moving equipment Slippery floors 	<ul style="list-style-type: none"> Exposure to toxic vapors from hot baths 		
Industrial Laundries	<ul style="list-style-type: none"> Heated equipment Slippery floors 	<ul style="list-style-type: none"> Exposure to toxic vapors from solvents 		
Aluminum Formers	<ul style="list-style-type: none"> Moving machinery 	<ul style="list-style-type: none"> Metal particulates 	<ul style="list-style-type: none"> Nitric acid Caustic solutions 	<ul style="list-style-type: none"> Safety glasses Boots Latex gloves Metal fume mask Organic vapor mask

<i>Industry</i>	<i>Physical</i>	<i>Atmospheric</i>	<i>Corrosive</i>	<i>Suggested Protective Gear</i>
Electrical and Semiconductors	<ul style="list-style-type: none"> Wet floors Loose boards 	<ul style="list-style-type: none"> Acid vapors/mists Ammonia vapors Alkaline vapors Metal fumes Freon chlorinated solvents Borane gas 	<ul style="list-style-type: none"> Chlorinates Aromatic solvents Hydrofluoric acid Fluoroboric acid 	<ul style="list-style-type: none"> Safety glasses Boots Latex gloves Lead fume mask Organic vapor mask
Metal Molding and Casting	<ul style="list-style-type: none"> Tripping hazards Hot liquid metals 	<ul style="list-style-type: none"> Metal particulates Degreasing solvents 		<ul style="list-style-type: none"> Safety glasses Boots Latex gloves Hard hat Metal fume mask
Nonferrous Metals	<ul style="list-style-type: none"> Tripping hazards Bum danger from hot metals 	<ul style="list-style-type: none"> Cyanide gas 	<ul style="list-style-type: none"> Cyanide liquid 	<ul style="list-style-type: none"> Safety glasses Boots Latex gloves Hard hat Organic vapor/gas mask
Organic Chemicals	<ul style="list-style-type: none"> Tripping hazards 	<ul style="list-style-type: none"> Organic vapors/mists Phenols Ammonia formaldehyde Chlorine Hypochlorite solvents Plastic monomers 	<ul style="list-style-type: none"> Monomers 	<ul style="list-style-type: none"> Safety glasses Boots Rubber gloves Organic vapor/gas mask
Pharmaceutical	<ul style="list-style-type: none"> Tripping hazards 	<ul style="list-style-type: none"> Radioactive materials Biological materials 		<ul style="list-style-type: none"> Safety glasses Boots Ear protection Latex gloves Dust mask
Soap and Detergent	<ul style="list-style-type: none"> Slippery floors 	<ul style="list-style-type: none"> Detergent dust 	<ul style="list-style-type: none"> Acidic or alkaline solutions High pH Slippery oils 	<ul style="list-style-type: none"> Safety glasses Boots Latex gloves Particulate mask
Welding	<ul style="list-style-type: none"> Electric shock Bums Radiant energy/light. 	<ul style="list-style-type: none"> Exposure to toxic fumes Potential for explosions caused by sparks. 		

Appendix J. Additional Information on the POTW's Sampling and Quality Assurance Plan

The following components should be included in the POTW's Sampling and Quality Assurance Plan. The inspector should consider each of these sampling program components when conducting compliance sampling. These components are discussed in greater detail in the noted sections of this chapter.

Quality Assurance (Section 3.5)

- **QA/QC Procedures:** The Sampling and Quality Assurance Plan should outline QA/QC procedures to ensure that the data collected are valid, including systematic checks to verify that the sample results are sufficiently accurate and precise to evaluate the compliance status of the facility being sampled.

Equipment Maintenance (Section 3.6)

- **Maintenance:** Maintenance activities ensure the constant reliability of sampling equipment, including flow meters. The plan should outline a maintenance schedule for all POTW equipment related to sampling.
- **Calibration:** Calibration of field and laboratory equipment is crucial to the continued reliability of the sample results obtained from sampling. A regular schedule of calibration should be included in the plan and should be adhered to strictly. This calibration should include flow meters, pH meters, and any other equipment requiring calibration, as recommended in the manufacturer's specifications.

Sample Collection (Section 3.7 and 3.8)

- **Sampling Location(s):** Sampling locations should be representative of industrial user discharges. The plan should describe how inspectors should verify that the sampling location(s) are adequate, and that all discharge points are appropriately monitored. The plan should also address how to handle situations that would warrant sampling at locations other than those specified in the control mechanism.
- **Type of Sample:** The type of sample (composite or grab) depends on the parameters to be measured and/or the discharge characteristics (e.g., batch discharge or continuous discharge). This information is specified at 40 CFR 403.12(g) and is required to be specified in industrial user permits. The plan should discuss when each type of sample is most appropriate for specific parameters and discharge characteristics, and should describe the sample type requirements at 40 CFR 403.12(g).
- **Type of Flow Measurement:** The type of flow measurement is dependent on the flow rate, the condition of the wastewater, and the variability of the discharge. Flow measurements are necessary to determine the mass loadings of a discharge. The adequacy of the industrial user's flow measuring device should be verified at the time of sampling. The plan should describe how to determine whether flow measuring devices are appropriate for measuring flow at a particular facility and whether the device is consistent with what is described in the industrial user's control mechanism.
- **Sample Volume:** The volume of sample collected depends on the type and number of analyses to be conducted. The volume of the sample obtained should be sufficient to perform all the required analyses (including laboratory QA/QC and repeat analyses) plus an additional amount to provide for any split samples that may be required. The Sampling and Quality Assurance Plan should discuss these requirements.

- **Type of Sample Containers:** The selection and preparation of sample container type depends on the parameters to be measured and wastewater characteristics. The plan should reference the requirements at 40 CFR part 136, Table II and discuss procedures for obtaining required sample containers.
- **Cleaning and Preparation:** Sampling equipment, grab and composite collection containers, sample bottles, and tubing should be cleaned at a specified frequency outlined in the plan. All cleaning procedures should be included in the plan.
- **Field Analyses:** Certain measurements are typically performed in the field (e.g., flow, pH, and temperature). Procedures for conducting these analyses should be included in the POTW's Sampling and Quality Assurance Plan.
- **Sample Preservation Techniques:** To preserve samples correctly, the appropriate chemicals must be used and/or temperature control must be ensured. Preservation techniques and maximum allowable holding times should be specified in the POTW's Sampling and Quality Assurance Plan.

Sample Documentation (Section 3.7)

- **Chain-of-custody Procedures:** The success of documenting the validity of samples depends on the constant use of COC forms by all involved personnel. The plan should describe chain-of-custody procedures that must be followed for all samples collected by the POTW, and directions for completing standard COC forms should be included.
- **Sample Identification Procedures:** The plan should describe how sample containers will be labeled so that the sample can be tracked accurately.
- **Additional Types of Documentation:**

The plan should also include procedures for implementing the following additional types of sampling documentation:

- **Field Data Record** - The Field Data Record is the primary sampling information document and should include: the sample site identification; the type of sample taken; sampler identification; settings on the sampler; results of field analyses; flow information (where applicable), and any additional information related to the site or effluent characteristics.
- **Field Documentation Log** - The field documentation log is used to record which sites are sampled each day, and any violations, conversations or other notable occurrences during the sampling visit.
- **Field pH Calibration Log** - The field pH calibration log is used to record the calibration of the field pH meter during the sampling event. The field pH meter must be calibrated at each site prior to measuring the pH of the effluent. Calibration and slope should be checked, adjusted as necessary, and recorded, along with the temperature of the buffer.
- **Flow Meter Calibration Log** - The Flow Meter Calibration Log is used to record program information for the flow meter and water level calibration from the initial value shown on the flow meter to the actual measured water level.
- **pH Calibration/Spike Checklist** - The pH Calibration/Spike Checklist is used to record the date and time of field pH meter calibration, calibration data, results and true value for the known sample, and to document the buffer and fill solution changes.

Sample Shipping (Section 3.7)

- **Sample Packaging and Shipping:** Once a sample is collected, it must be delivered to the laboratory for analysis within the prescribed holding time. The manner of packaging and shipment must be addressed through the Sampling and Quality Assurance Plan.

Safety (Chapter 4)

- **Safety Concerns:** The plan should outline the safety precautions which must be followed both at the office and in the field during sampling activities. Industrial monitoring, by its very nature, adds additional hazardous situations to those existing in any field sampling situation. All safety procedures should be outlined in the plan.
- **Hazardous Waste:** Samples of potentially hazardous waste; samples with extremely high or low pH; and samples that may contain toxic, volatile, or explosive substances will require special handling. DOT regulations for shipping these types of wastes must be followed, and the plan should contain these regulations.

Appendix K. Additional Information on Field Sampling Equipment

Checklist of Field Sampling Equipment

Sampling Equipment:

- Siphoning equipment.
- Weighted bottle sampler (grab sampler).
- Liquid waste samplers.
- Auger, trowel, or core sampler.
- Scoop sampler.
- Sample bottles/containers (certified clean bottles).
- Ice chest.
- Flow meter (if applicable).
- Preservatives.
- Chain-of-custody forms.
- Custody seals and tags.
- Strapping tape.
- Automatic and/or composite sampler.
- Container for contaminated material.
- Waterproof container labels.
- Ambient air monitor.
- Field document records.
- Vermiculite or equivalent packing.
- Thermometer.
- Colorimetric gas detection tubes.
- pH equipment.
- Explosimeter (atmospheric testing device).
- Tubing, tape and rope.
- Field sampling logs.
- Sample shipping forms (w/ laboratory phone #s).
- Graduated cylinder.
- Preservatives (e.g., nitric acid and NaOH).