

NPDES Compliance Inspection Manual



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This version of the NPDES Compliance Inspection Manual is released as an interim version in order to allow time for inspectors to use the Manual and provide feedback to EPA's Office of Enforcement and Compliance Assurance (OECA). OECA is interested in user comments that will enhance a future final version of the Manual. In addition, as OECA's efforts with states through E-Enterprise continue, this Interim Revised NPDES Compliance Inspection Manual will inform development of Smart Tools software and hardware for NPDES inspectors to use in the field.

Please send your comments on this Interim Revised NPDES Compliance Inspection Manual to OECA at NPDEScompliance@epa.gov by December 31, 2017.

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- Q. No Exposure Certification Form
- R. NPDES Industrial Stormwater Investigation and Case Development Worksheet (Industrial)
- S. Industrial Source Control BMP Questions
- T. Notice of Termination for Stormwater
- U. Typical “C” Coefficients
- V. Rain Zones of the United States
- W. NOAA Rainfall Worksheet
- X. NPDES Construction Stormwater Investigation and Case Development Worksheet (Construction)
- Y. Construction Control Source BMP Questions

A. BACKGROUND AND HISTORY

REGULATION OVERVIEW (40 CFR 122.26)

In addition to materials in this chapter, inspectors should be familiar with Chapter 1, “Introduction,” Chapter 2, “Inspection Procedures,” Chapter 12, “Combined Sewer Systems,” and Chapter 13, “Inspecting Green Infrastructure Controls.”

1987 Amendments to CWA	
Section 402(p) municipal and industrial stormwater discharges	
(1)	General Rule—prohibits permits for discharges composed entirely of stormwater prior to October 1, 1994 with some exceptions.
(2)	Exceptions—identifies five types of stormwater discharges that are to be permitted prior to October 1, 1994.
(3)	Permit Requirements—identifies permitting approach for industrial and municipal stormwater discharges.
(4)	Permit Application Requirements—identifies application requirements for industrial and municipal stormwater discharges.
(5)	Studies—identifies requirement for report to congress on other sources of stormwater discharges.
(6)	Regulations—requires regulations for permitting other types of stormwater discharges to protect water quality.

The 1972 amendments to the Clean Water Act (CWA) prohibited the discharge of any pollutants to navigable waters from a point source unless the discharge was authorized by a National Pollutant Discharge Elimination System (NPDES) permit. At the time of the 1972 amendments to the CWA, sewage treatment plant outfalls and industrial process wastewater were easily identified as point sources responsible for contributing to the degradation of water quality. However, as pollution control measures were instituted, it became evident that more diffuse sources, such as agricultural and urban stormwater runoff, were also contributing to the problem. In response to this concern, the Water Quality Act (WQA) of 1987 added section 402(p) to the CWA and required the Environmental Protection Agency (EPA) to establish a comprehensive two-phase approach to address stormwater discharges.

The 1987 WQA established new schedules for issuing NPDES permits to industrial and municipal stormwater dischargers. Industrial stormwater discharge permits must include requirements implementing Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) standards, as well as any more stringent requirements necessary to achieve water quality standards. Municipal separate storm sewer system (MS4) permits must require controls to reduce pollutant discharges to the maximum extent practicable (MEP), including management practices, control techniques and system design and engineering methods, and such other provisions as the Administrator deems appropriate for the control of such pollutants.

As required by section 402(p)(4) of the CWA, EPA promulgated Phase I Stormwater regulations on November 16, 1990 (Volume 55 *Federal Register* (FR) 47990). The regulations set forth permit application requirements, including definitions, for the five-point source stormwater

discharge categories subject to NPDES permit requirements under section 402(p)(2) of the CWA:

- A discharge subject to a NPDES permit before February 4, 1987.
- A discharge associated with industrial activity (including construction activities \geq 5 acres).
- A discharge from a municipal separate storm sewer system serving a population of 250,000 or more (large MS4s).
- A discharge from a municipal separate storm sewer system serving a population of 100,000 or more but less than 250,000 (medium MS4s).
- A discharge that an NPDES permitting authority determines to be contributing to a violation of a water quality standard or a significant contributor of pollutants to waters of the United States.

Pursuant to section 402(p)(6) of the CWA, EPA promulgated Phase II Stormwater regulations on December 8, 1999 (64 FR 68722). Section 402(p)(6) of the CWA required EPA to designate additional stormwater discharges not already covered by Phase I regulation, based on studies required under section 402(p)(5) of the CWA, to be regulated “to protect water quality.” The Phase II rule added certain small municipal separate storm sewers systems in urbanized areas (small MS4s) and small active construction sites (disturbing between 1 and 5 acres) as stormwater discharges subject to NPDES permitting requirements. The Phase II rule also established criteria for the permitting authority to designate additional small MS4s and previously unregulated stormwater discharges, and require NPDES permits for those discharges (residual designation authority).

The Phase I stormwater regulations are codified primarily in Title 40 of the *Code of Federal Regulations* (CFR) 122.26 and the Phase II regulations are primarily in 40 CFR 122.30-122.37. A summary of these sections is provided in Table 11-1. Stormwater discharged through combined sanitary and storm sewer systems are not covered by the stormwater regulations.

On November 25, 2014, EPA issued a memorandum noting revisions to the memorandum titled *Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs* (EPA, 2014a). In the memorandum, EPA encouraged permit writers to include clear, specific, and measurable permit requirements and where feasible, numeric effluent limitations in NPDES permits for stormwater discharges. Additionally, permits should contain clear, specific, and measurable elements associated with the implementation of stormwater control measures (e.g., schedule for installation, frequency of a practice, or level of performance), as appropriate. The permit should be supported by documentation that implementation of selected stormwater control measures will result in achievement of water quality standards. Permitting authorities should also consider including numeric benchmarks for stormwater control measures and associated monitoring protocols for estimating stormwater control effectiveness in stormwater permits. Benchmarks can support an adaptive approach to meeting applicable water quality standards. While exceeding the benchmark is not generally a permit violation, exceeding the benchmark

would typically require the permittee to take additional action, such as evaluating the effectiveness of the stormwater control measures, implementing and/or modifying stormwater control measures, or providing additional measures to protect water quality.

Though industrial facilities, construction sites, and MS4s are distinct and are typically permitted separately, there is some crossover between these entities. Industrial facilities and construction sites often discharge to a regulated MS4 and are therefore subject to the local ordinances and requirements established by the MS4 pursuant to its NPDES permit, as well as the requirements of the specific facility or site's NPDES stormwater permit. Industrial facilities and construction sites that are regulated for stormwater are covered under their local MS4 and under either the EPA or state-issued Multi Sector General Permit (MSGP, for industrial) or the Construction General Permit (CGP). While the general permits issued by EPA can only apply to facilities in jurisdictions where EPA is the permitting authority, many states model their own general permits on EPA's general permits. For example, EPA's MSGP for industrial stormwater covers stormwater discharges associated with both industrial activity and some construction activity associated with certain mining and oil and gas facilities. For clarity, the remainder of this chapter discusses industrial, construction and municipal permitted entities separately. Table 11-2 contains a summary of Permitting Requirements under the NPDES Stormwater Program Regulations. EPA encourages inspectors to contact the permit writers and/or the permitting authority for clarification or concerns related to the permit specifications of sites being inspected.

Table 11-1. Summary of Stormwater Permitting Regulations

40 CFR Part 122—EPA Administered Permit Programs: The National Pollutant Discharge Elimination System	
122.1	Purpose and Scope
122.21	Application for a Permit
122.22	Signatories to Permit Applications and Reports
122.26(a)	Permit Requirements
122.26(b)	Definitions
122.26(c)	Application Requirements for Stormwater Discharges Associated with Industrial Activity and Stormwater Discharges Associated with Small Construction Activity
122.26(d)	Application Requirements for Large and Medium Municipal Separate Storm Sewer Discharges
122.26(e)	Application Deadlines
122.26(f)	Petitions
122.26(g)	Conditional Exclusion for "No Exposure" of Industrial Activities and Materials to Stormwater
122.28	General Permits
122.30	What are the objectives of the stormwater regulations for small MS4s?
122.31	As a tribe, what is my role under the NPDES stormwater program?

Table 11-1. Summary of Stormwater Permitting Regulations

40 CFR Part 122—EPA Administered Permit Programs: The National Pollutant Discharge Elimination System	
122.32	As an operator of a small MS4, am I regulated under the NPDES stormwater program?
122.33	If I am an operator of a regulated small MS4, how do I apply for an NPDES permit and when do I have to apply?
122.34	As an operator of a regulated small MS4, what will my NPDES MS4 stormwater permit require?
122.35	As an operator of a regulated small MS4, may I share the responsibility to implement the minimum control measures with other entities?
122.36	As an operator of a regulated small MS4, what happens if I don't comply with the application requirements in 122.33 through 122.35?
122.37	Will the small MS4 stormwater program regulations at 122.32 through 122.36 and 122.35 of this chapter change in the future?
122.42	Additional Conditions Applicable to Specified Categories of NPDES Permits
122.44	Establishing Limitations, Standards, and Other Permit Conditions
122.62	Modifications or Revocation and Reissuance of Permits
40 CFR Part 123—State Program Requirements	
123.25	Requirements for Permitting
123.35	As the NPDES permitting authority for regulated small MS4s, what is my role?
40 CFR Part 124—Procedures for Decision-making	
124.52	Permits Required on a Case-by-Case Basis
Appendix E	Rainfall Zones of the United States
Appendix F	Incorporated Places with Populations Greater Than 250,000 According to Latest Decennial Census by Bureau of Census
Appendix G	Incorporated Places with Populations Greater Than 100,000 and Less Than 250,000 According to Latest Decennial Census by Bureau of Census
Appendix H	Counties with Unincorporated Urbanized Areas with a Population of 250,000 or More According to the Latest Decennial Census by the Bureau of Census
Appendix I	Counties with Unincorporated Urbanized Areas Greater Than 100,000, but Less Than 250,000 According to the Latest Decennial Census by the Bureau of Census

Table 11-2. Summary of Permit Requirements Under the NPDES Stormwater Program Regulations

	Municipal Separate Storm Sewer Systems (MS4s) Regulations	Construction Activity General Permit	Industrial Activity General Permit
Phase I Requirements (November 16, 1990)	Medium and Large MS4s (122.26(d))	Category (x) Construction Activity (5+Acres)	Ten Categories of Industrial Activity (Categories (i)-(ix), (xi))
	<ul style="list-style-type: none"> • Establish adequate legal authority to control discharges to storm sewer, inspect, and enforcement. • Identify major stormwater sources and locations of outfalls, and provide characterization data of discharges. • Develop Stormwater Management Program: <ul style="list-style-type: none"> – Controls for residential and commercial activities. – Illicit discharge detection and elimination program. – Controls for municipal and industrial activities. – Construction site controls. • Assess controls and perform fiscal analysis. • Submit annual report. 	<p><u>CGP:</u></p> <ul style="list-style-type: none"> • Stormwater Pollution Prevention Plan (SWPPP): <ul style="list-style-type: none"> – Site description. – Description of control measures for erosion and sediment, post-construction stormwater management, and other controls. – Self-evaluation and recordkeeping. 	<p><u>MSGP:</u></p> <ul style="list-style-type: none"> • SWPPP: <ul style="list-style-type: none"> – Site evaluation. – Description of appropriate stormwater control measures. – Self-evaluation, monitoring, recordkeeping, and, in some circumstances, reporting. – If discharging into a medium or large MS4, notify the MS4 operator.
	Regulated Small MS4	Small Construction Activity (≥ 1 and <5 acres)	Industrial
Phase II Requirements (December 8, 1999)	<ul style="list-style-type: none"> • Stormwater Management Program: <ul style="list-style-type: none"> – Public education and outreach. – Public participation efforts. – Illicit discharge detection and elimination program. – Construction runoff control program for construction activity disturbing 1 acre or greater. 	<ul style="list-style-type: none"> • Generally similar to category (x) Construction Activity requirements above. • Small construction waivers requirement. 	Option for Conditional no exposure waiver if certain criteria are met.

Table 11-2. Summary of Permit Requirements Under the NPDES Stormwater Program Regulations

	Municipal Separate Storm Sewer Systems (MS4s) Regulations	Construction Activity General Permit	Industrial Activity General Permit
	<ul style="list-style-type: none"> – Post-construction runoff control program for construction activity disturbing 1 acre or greater. – Good housekeeping/pollution prevention for municipal operations. • Conduct assessment of identified stormwater control measures and measurable goals for each minimum control measure. • Submit periodic program assessment reports. 		

B. STORMWATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY (NOT INCLUDING CONSTRUCTION)

APPLICABILITY (WHO IS COVERED)

The stormwater regulations identify 11 categories of industrial facilities that are engaging in industrial activity that is regulated under the stormwater program (40 CFR 122.26(b)(14)(i)–(xi)). EPA defines these categories of industrial facilities using a combination of standard industrial classification codes and descriptions of facility activities. A description of these 11 categories is provided in Table 11-5. One of the 11 categories, category (x), is construction activity disturbing 5 acres or more. This category is discussed separately in Section 11.C because of the significant differences in site activities and requirements at construction sites compared to the other 10 industrial categories.

EPA estimates that nationwide more than 150,000 industrial facilities are required to obtain NPDES permit coverage for stormwater discharges associated with industrial activity.

The NPDES regulations, at 40 CFR 122.26(b)(14), define “stormwater discharges associated with industrial activity.” Specifically, the phrase means “the discharge from any conveyance that is used for collecting and conveying stormwater and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant.” For the 10 categories of industries identified in 40 CFR 122.26(b)(14)(i)–(ix), and (xi), the term includes, but is not limited to, stormwater discharges from the following:

- Industrial plant yards.
- Immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or byproducts used or created by the facility.
- Material handling sites.
- Refuse sites.
- Sites used to apply or dispose of process waste waters (as defined at 40 CFR Part 401).
- Sites used for storage and maintenance of material handling equipment.
- Sites used for residual treatment, storage, or disposal.
- Shipping and receiving areas.
- Manufacturing buildings.
- Storage areas (including tank farms) for raw materials and intermediate and finished products.
- Areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater.

Material handling activities include storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, by-product, or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as the office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with stormwater drained from any of the above described areas (40 CFR 122.26(b)(14)).

One of the first questions a stormwater inspector must consider is the applicability of the stormwater permitting regulations to a specific facility. The inspector should determine what types of industrial activities are performed by the facility, and which SIC codes may apply to the facility. Industrial categories covered by 40 CFR 122.26(b)(14) include:

- Facilities subject to stormwater effluent limitation guidelines (40 CFR chapter I, subchapter N).
- Industries defined by certain Standard Industrial Classification (SIC) Codes (e.g., lumber and wood products, primary metal industry).
- Mineral Industry.
- Hazardous waste treatment, storage, or disposal facilities.
- Landfills, including land application sites and open dumps.
- Facilities that recycle, reclaim, or salvage materials including scrap material.
- Steam electric power facilities.
- Transportation facilities that have vehicle maintenance shops, equipment cleaning operations or airport deicing operations.
- Sewage treatment plants.
- Construction activities.
- Light Industry classified by SIC Code.

Facilities within these industrial categories require a stormwater permit whenever any of the listed activities occur on-site, regardless of the facility's SIC code or other types of activity. See Table 11-5 for a more detailed description of these categories. As mentioned above, some of the covered industrial categories are defined by SIC code. Where multiple industrial activities are conducted at a site, with each activity having a distinct SIC code, the facility's primary SIC code generally determines whether a facility is regulated pursuant to one of the listed SIC codes. The primary SIC code is based on the primary industrial activity occurring at the site (see Table 11-4 for a list of primary SIC codes covered by the stormwater permitting requirements). EPA recommends comparing the value of receipts or revenues and/or number of people employed for each industrial activity to identify the primary activity of the facility. If the SIC code for this primary activity is identified in 40 CFR 122.26(b)(14), then the facility is subject to the stormwater permitting requirements. However, if the facility's primary activity is not included in 40 CFR 122.26(b)(14), the facility is not subject to the permitting requirements even if the facility conducts secondary activities that are identified therein (unless otherwise designated by the Director as needing a permit).

Some of the industrial categories are defined using a narrative description rather than SIC codes. In these instances, any facility engaging in an industrial activity that meets a narrative description is required to obtain permit coverage for those specific activities regardless of the facility's SIC code(s).

Exemption for Mining or Oil and Gas Facilities

Federal regulations at 40 CFR 122.26(c)(1)(iii) specify that stormwater discharges from oil or gas exploration, production, processing, treatment operations, or transmission, do not require NPDES permit coverage unless the facility has had a stormwater discharge that contained a reportable quantity of a designated hazardous substance for which notification is or was required (pursuant to 40 CFR 117.21, 40 CFR 302.6 or 40 CFR 110.6), or has had a stormwater discharge that contributes to a violation of a water quality standard.

Consistent with 40 CFR 122.26(c)(1)(iv), a discharge composed entirely of stormwater from a mining operation associated with oil or gas is not required to submit a permit application unless the discharge has contacted any overburden, raw material, intermediate products, finished product, byproduct, or waste products located on the site of such operations.

For more information on the applicability of stormwater regulations to oil and gas facilities, please visit <http://www.epa.gov/npdes/oil-and-gas-stormwater-permitting#undefined>.

No Exposure Conditional Exclusion

The Phase II No Exposure Conditional Exclusion significantly expands the scope of the original no exposure exclusion eligibility requirements. Under 40 CFR 122.26(g), operators of regulated industrial facilities in any of 10 categories of "stormwater discharges associated with industrial activity," may qualify for the exclusion if none of the facility's industrial materials or activities are exposed to stormwater. See 40 CFR 122.26(g)(1) for a list of qualification criteria. As long as the condition of "no exposure" exists at a qualified facility, stormwater discharges from the facility are excluded from the definition of "stormwater discharges associated with industrial

activity.” The facility operator must submit a no exposure certification exclusion to the permitting authority, EPA or the authorized state, once every five years and is subject to periodic inspections to determine compliance with the “no exposure” conditions. The no exposure certification replaces the previous “light industry” no exposure exemption included under the Phase I Stormwater Program. A no exposure certification form can be found in Appendix Q.

No exposure means all industrial materials and activities are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff. Industrial materials or activities include, but are not limited to, material handling equipment or activities, industrial machinery, raw materials, intermediate products, byproducts, final products, or waste products (40 CFR 122.26(g)).

PERMIT APPLICATIONS FOR STORMWATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY

Industrial facilities have two NPDES permit options for stormwater discharges—coverage under 1) a general permit or 2) an individual permit. Most industrial facilities have permit coverage under a general permit, which is developed for facilities sharing similar discharge characteristics. Individual permits are developed when a facility requires permit coverage but either the facility or the permitting authority does not believe a general permit is appropriate based on the discharge characteristics. Where EPA is the NPDES permitting authority, the Multi-Sector General Permit (MSGP) issued on June 4, 2015 (80 FR 34403), is the most recent general permit available to industrial facility operators. A copy of the 2015 MSGP and related documents are available at <http://www.epa.gov/npdes/stormwater-discharges-industrial-activities#msgp>.

The EPA MSGP covers 29 industrial sectors. Standard Industrial Classification (SIC) codes and narrative descriptions identify the categories of industrial facilities within each of the 29 sectors. Though the EPA MSGP is applicable only in areas where EPA is the permitting authority, similar general permits may be available in NPDES-authorized states. Information related to the EPA MSGP and individual permits is presented below.

General Permit/Notice of Intent

To apply for permit coverage under EPA’s or a state’s MSGP, a facility operator must complete and submit an electronic Notice of Intent (eNOI) form, or the applicable form used by the state NPDES permitting authority. Those facilities already covered under the prior MSGP are required to submit a new eNOI each time the MSGP is re-issued. The eNOI requests a variety of basic facility information, including latitude/longitude of the facility, and information related to the Endangered Species Act and the National Historic Preservation Act. Permit applicants have the option of either providing an internet link to their stormwater pollution prevention plan (SWPPP) or providing compliance information directly on the eNOI form including a description of industrial activities exposed to stormwater, a list of pollutants associated with each industrial activity exposed to stormwater, a description of the control measure that will be employed, a schedule for good housekeeping and maintenance, and a schedule for all required inspections.

The deadline for submission of an NOI to be covered under the 2015 EPA MSGP was September 2, 2015 for most existing sources.

Under EPA's 2015 MSGP, new facilities and facilities that change ownership or operators must generally submit an NOI at least 30 days prior to the commencement of discharge or change in ownership/operator.

EPA has developed the eNOI for industrial facilities that seek coverage under EPA's MSGP, which can be found on EPA's Electronic Multi-Sector General Permit Notice of Intent (eNOI) home page (<http://www.epa.gov/npdes/stormwater-discharges-industrial-activities#overview>). For the 2015 MSGP, permittees submit Notices of Intent (NOIs)—as well as Notices of Termination (NOTs), Annual Reports, and No Exposure Certifications—using the NPDES eReporting Tool for the MSGP (NeT-NSGP). Permittees that are required to submit DMRs use NetDMR to submit them electronically.

In rare circumstances the EPA Regional Office may grant facility operators an electronic reporting waiver when needed. In such cases, the operator mails the paper forms provided in the 2015 MSGP.

Individual Permits

There are circumstances when a general permit is either not available or not applicable to a specific industrial facility. A facility operator may obtain coverage under an individual permit instead, developed by the NPDES permitting authority specifically for that facility. An individual permit may be the only option when:

- The NPDES permitting authority requires a facility operator to apply for individual permit coverage.
- The facility operator is unable to certify eligibility with the conditions of the general permit, because the general permit does not adequately cover the regulated facility, process or discharge.

A summary of the permit application deadlines is presented in Table 11-3. The Transportation Act of 1991 modified the application deadlines for industrial activities owned or operated by municipalities (i.e., types of industrial activities covered by MSGP). The Phase II Rule required industrial activities operated by municipalities with populations less than 100,000 to obtain permit coverage by no later than March 10, 2003, (unless the NPDES permitting authority chooses to phase-in permit coverage on a watershed basis and establishes other deadlines). As such, all industrial activities defined in 40 CFR 122.26(b)(14) are now required to obtain coverage, unless waived.

Stormwater Pollution Prevention Plan Requirements/Office Review

In most cases, operators must prepare a SWPPP for the industrial facility before submitting a Notice of Intent for permit coverage. The SWPPP must be signed by a responsible corporate official such as a president, vice president, or general partner as identified in the EPA MSGP. Under most permits, the SWPPP is to be kept at the facility at all times (or other local location

accessible to the EPA, a state, tribal, or territorial agency with jurisdiction over water quality protection; local government officials; or the operator of a MS4 receiving discharges from the site) and must be available for review when requested by EPA or by the operator of the MS4 when the facility discharges to a municipal separate storm sewer.

For large or complex facilities, it may be appropriate for the inspector to request a copy of the SWPPP prior to inspection to be more familiar with the facility during the inspection. Inspectors should check to see if the facility has posted their SWPPP on line. The eNOI for the 2015 MSGP gives permit applicants the option of either posting their SWPPP on line or providing additional information in their application, such as a description of industrial activities exposed to stormwater, a list of pollutants associated with each industrial activity exposed to stormwater, a description of the control measure that will be employed, a schedule for good housekeeping and maintenance, and a schedule for all required inspections. Otherwise, the inspector will need to obtain a copy of, and review, the SWPPP or at least parts of the SWPPP during the inspection. At a minimum, the inspector should review the site map prior to conducting the field inspection to understand the site and the existing/planned stormwater controls, and carry a copy of the site map during the inspection when possible. Depending on the time available for the inspection and the size of the SWPPP, the inspector may request a copy of the SWPPP for review after the inspection.

In reviewing the SWPPP, the inspector should evaluate whether it contains all the required elements specified in the applicable permit (e.g., the current EPA MSGP, the state General Permit in NPDES-authorized states, or an individual permit issued to the facility).

The 2015 EPA MSGP lists the following specific items that must be included in the SWPPP:

- **Stormwater Pollution Prevention Team** identifying individuals responsible for developing, implementing, maintaining, and revising the SWPPP.
- Description of industrial activities at the facility.
- General location map depicting the facility and location of receiving waters.
- Legible site map indicating:
 - Location of potential pollutant sources and significant materials exposed to precipitation.
 - Locations of all stormwater conveyances including ditches, pipes, and swales.
 - Direction of stormwater flow.
 - Location of existing control measures.
 - Location of all surface water bodies.
 - Location where major spills or leaks have occurred.
 - Locations of activity areas exposed to precipitation, including fueling stations, vehicle and equipment maintenance and/or cleaning areas, processing and storage areas, access roads, etc.
 - Locations of stormwater inlets, outfalls and outline of areas draining to such outfalls.

- Location and description of non-stormwater discharges.
- Location and source of runoff from adjacent property containing significant quantities of pollutants of concern.
- Summary of potential pollutant sources.
- Areas of spills and leaks during prior three-year period.
- Documentation of non-stormwater discharge evaluations.
- Location of salt storage areas.
- Summary of sampling data.
- **Stormwater controls** to include a description of existing and planned control measures.
- **Summary of schedules and procedures** pertaining to control measures, and monitoring and inspections.
- **Documentation to support eligibility considerations** for other federal laws such as those regarding endangered species or historic properties.

These items are detailed in Section 5 of the EPA’s 2015 MSGP, which covers the general requirements for a SWPPP. In addition, the EPA MSGP contains sector-specific SWPPP requirements, which are found in Section 8 of the EPA 2015 MSGP. Finally, a state general permit may contain different and/or additional required items. The inspector should have the applicable state general permit for stormwater discharges associated with industrial activities.

Additionally, regulated small MS4s require post-construction stormwater management in new development and redevelopment projects. Post-construction stormwater management is required on projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into a regulated small MS4. The permittee is required to develop, implement, and enforce a program to address stormwater runoff, including the development, implementation, and long-term operation and maintenance of best management practices (BMPs) appropriate for the community. Such BMPs may include stormwater detention structures, infiltration measures, or velocity dissipation devices installed in outfall channels to prevent erosion. Each state has developed its own program listing the criteria for post-construction BMPs to ensure water quality is maintained after the construction project has been completed. For a list of state programs, visit: https://www3.epa.gov/npdes/pubs/sw_state_summary_standards.pdf.

NOTE: As defined in 40 CFR 122.26(b)(12), significant materials include, but are not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); any chemical the facility is required to report pursuant to section 313 of Title III of Superfund Amendments and Reauthorization Act (SARA) (<http://www2.epa.gov/epcra/consolidated-list-lists>); fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with stormwater discharges.

The SWPPP may incorporate or may be incorporated into other plans that the facility has prepared for other permits or programs, including spill prevention control and countermeasure (SPCC) Plans and BMP programs (specific practices or actions used to reduce or control impacts to water bodies).

SWPPP Implementation/In the Field

In the field, the inspector should verify that the map and description of potential pollutant sources in the SWPPP reflect current conditions. In addition, the inspector should verify that measures and controls described in the SWPPP are being implemented as described in the SWPPP. These measures and controls will include items such as:

- Good housekeeping or upkeep of industrial areas exposed to stormwater.
- Preventive maintenance of stormwater controls and other facility equipment.
- Spill prevention and response procedures to minimize the potential for and the impact of spills.
- Inspections of areas where industrial materials or activities are exposed to stormwater, including evaluation of existing control measures.
- Employee training on pollution prevention measures and controls and recordkeeping (described in detail below).
- Stabilization measures or structural controls to limit soil erosion.
- Traditional stormwater management measures (e.g., oil/water separators, vegetative swales, detention ponds) where they are appropriate for the site.

The inspector should ensure that, if corrective action is needed, the permittee immediately takes all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Any corrective actions taken should be recorded and the documentation kept on-site with the SWPPP. Additionally, the inspector should verify that the permittee modifies the SWPPP as necessary, when a corrective action results in a change in the control measures implemented on-site.

The inspector should evaluate any SWPPP implementation schedules developed by the facility (e.g., dates for putting improved housekeeping measures into practice). The inspector should also determine whether appropriate individuals are assigned to implement the SWPPP and whether these individuals are aware of the implications of that designation. If the SWPPP calls for installation of structural controls, the inspector should verify that the controls are in place and in good working order, or that the facility is meeting its scheduled for installing control features. The inspector should ensure that facility management approves of the implementation schedule and strategy, and is aware of the SWPPP process. The inspector should document stormwater discharges observed during the inspection, taking photographs as necessary to record the observation. The inspector may use the NPDES Industrial Stormwater Investigation and Case Development Worksheet (Industrial), included in Appendix R, to record observations. The NPDES Industrial Stormwater Worksheet contains the components of the industrial stormwater program that should be evaluated during the inspection. The inspection

may use the Industrial Source Control BMP Questions sheet, located in Appendix S, as a resource for recording observations on the condition of on-site stormwater control measures.

In general, SWPPP implementation includes employee training on how to carry out the provisions of the SWPPP and how to implement control measures. In addition, employee training on the components and goals of the SWPPP must, if required by the permit, be performed at all levels of responsibility. The inspector should verify that there are training programs and that the training focuses on spill prevention and response, good housekeeping practices, materials management, and how to perform inspections. Site-specific control measures for industrial activities are summarized in Table 11-6.

MONITORING (INCLUDING SELF-INSPECTIONS)

Self-Inspections

Routine Facility Inspections

The SWPPP must, if required by the permit, have procedures for routine site inspections to be performed at least quarterly at the facility. These consist of examination of stormwater discharges and control measures, looking for indications of stormwater pollutants in the discharge and are intended to determine the need for additional maintenance, good housekeeping, or other control measures. During the quarterly site inspections, qualified personnel must examine the following:

- Industrial materials, residue, or trash that may have or could come into contact with stormwater.
- Leaks or spills from industrial equipment, drums, tanks and other containers.
- Off-site tracking of industrial or waste materials, or sediment where vehicles enter or exit the site.
- Tracking or blowing of raw, final, or waste materials from areas of no exposure to exposed areas.
- Control measures needing replacement, maintenance, or repair.

Quarterly Visual Assessment of Stormwater Discharges

In addition to routine inspections, the permittee must collect a stormwater sample from each outfall and conduct a visual assessment of each of the samples, looking for indications of stormwater pollutants in the outfall discharge. These samples must be collected in such a manner that the samples are representative of the stormwater discharge. During the quarterly visual assessment, qualified personnel must inspect the samples for:

- Color
- Odor
- Clarity (diminished)
- Floating solids
- Settled solids
- Suspended solids

- Foam
- Oil sheen
- Other obvious indicators of stormwater pollution

Both routine facility inspections and quarterly monitoring inspections must be documented and the documentation must be maintained on-site with the SWPPP.

Monitoring Requirements

There are several distinct categories of monitoring requirements and numeric effluent limitations that the facility may be subject to under the 2015 EPA MSGP: 1) quarterly benchmark monitoring, 2) annual effluent limitations guidelines monitoring, 3) state- or tribal-specific monitoring, 4) impaired waters monitoring, and 5) other monitoring required by the permit authority. The monitoring requirements, benchmark concentrations and numeric effluent limitations applicable to the facility depend on several factors, including 1) the type(s) of industrial activities generating stormwater runoff from the facility (i.e., the subsector); 2) the impairment status of the receiving waterbodies; and 3) the state, tribe, or territory where the facility is located. Depending on the facility's sector (identified in MSGP Section 1.1.2), different monitoring requirements and numeric limitations apply. The 2015 EPA MSGP includes specific benchmark monitoring requirements for certain classes of industrial sites based on the pollutants they potentially discharge. State NPDES permitting authorities may, if authorized by state law, include more stringent monitoring conditions (CWA section 510 preserves such authority). Therefore, the inspector should review the facility's permit to identify such requirements.

For specific monitoring requirements, the inspector should review EPA's most current MSGP (where applicable), the state NPDES permit, or the facility-specific individual permit. The permit will contain specific conditions as to the sample type, location, frequency, as well as the specific parameters that must be analyzed. If it is necessary for the inspector to collect samples, the inspector should refer to Chapter 5 of this manual and to EPA's *Industrial Stormwater Monitoring and Sampling Guide* (EPA, 2009) for specific details on sampling and analyses.

Table 11-3. SIC Codes Regulated for Stormwater Discharges	
SIC	Description
MINING	
10	Metal Mining
12	Coal Mining
13	Oil and Gas Extraction
14	Mining and Quarrying or Nonmetallic Minerals, Except Fuels
MANUFACTURING	
20	Food and Kindred Products
21	Tobacco Products
22	Textile Mill Products
23	Apparel and Other Finished Products Made from Fabrics and Similar Materials

Table 11-3. SIC Codes Regulated for Stormwater Discharges

SIC	Description
24	Lumber and Wood Products, Except Furniture
2434	Wood Kitchen Cabinets
25	Furniture and Fixtures
26	Paper and Allied Products
265	Paperboard Containers and Boxes
267	Converted Paper and Paperboard Products, Except Containers and Boxes
27	Printing, Publishing, and Allied Industries
28	Chemicals and Allied Products
283	Drugs
285	Paints, Varnishes, Lacquers, Enamels, and Allied Products
29	Petroleum Refining and Related Industries
30	Rubber and Miscellaneous Plastic Products
31	Leather and Leather Products
311	Leather Tanning and Finishing
32	Stone, Clay, Glass, and Concrete Products
323	Glass Products, Made of Purchased Glass
33	Primary Metals Industry
34	Fabricated Metal Products, Except Machinery and Transportation Equipment
3441	Fabricated Structural Metal
35	Industrial and Commercial Machinery and Computer Equipment
36	Electronic and Other Electrical Equipment and Components, Except Computer Equipment
37	Transportation Equipment
373	Ship and Boat Building and Repairing
38	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks
39	Miscellaneous Manufacturing Industries
TRANSPORTATION, COMMUNICATIONS, ETC.	
40	Railroad Transportation
41	Local and Suburban Transit and Interurban Highway Passenger Transportation
42	Motor Freight Transportation and Warehousing
4221	Farm Product Warehousing and Storage
4222	Refrigerated Warehousing and Storage
4225	General Warehousing and Storage
43	United States Postal Service
44	Water Transportation
45	Transportation by Air
WHOLESALE TRADE	
50	Wholesale Trade—Durable Goods
5015	Motor Vehicle Parts, Used
5093	Scrap and Waste Material
51	Wholesale Trade—Nondurable Goods
5171	Petroleum Bulk Stations and Terminals

Table 11-4. Industrial Categories Associated with Industrial Activity

The 11 categories engaging in industrial activity are described below. Descriptions of SIC codes applicable to the stormwater regulations are provided in Table 11-4.

- (i) Facilities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR chapter I, subchapter N (except facilities with toxic pollutant effluent standards that are exempted under category (xi) below.
- (ii) Facilities classified as SIC 24 (except 2434), 26 (except 265 and 267), 28 (except 283), 29, 311, 32 (except 323), 33, 3441, and 373.
- (iii) Facilities classified as SIC 10 through 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under 40 CFR 434.11(l) because the performance bond issued to the facility by the appropriate SMCRA authority has been released, or except for areas of non-coal mining operations that have been released from applicable state or federal reclamation requirements after December 17, 1990) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge stormwater contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations; (inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator; inactive mining sites do not include sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined materials, nor sites where minimal activities are undertaken for the sole purpose of maintaining a mineral claim).
- (iv) Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA.
- (v) Landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under subtitle D of RCRA.
- (vi) Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards, including but not limited to those classified as SIC 5015 and 5093.
- (vii) Steam electric power generating facilities, including coal handling sites.
- (viii) Transportation facilities classified as SIC 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 that have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or that are otherwise identified under paragraphs (i)–(vii) or (ix)–(xi) of this section are associated with industrial activity.
- (ix) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 million gallons a day (MGD) or more, or required to have an approved pretreatment program under 40 CFR Part 403.

Table 11-4. Industrial Categories Associated with Industrial Activity

- Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and that are not physically located in the confines of the facility, or areas that are in compliance with section 405 of the CWA.
- (x) Construction activity including clearing, grading and excavation activities except: operations that result in the disturbance of less than five acres of total land area that are not part of a larger common plan of development or sale. Note—this category of industrial activity is typically covered under a construction stormwater general permit, and not an industrial stormwater general permit.
 - (xi) Facilities under SIC 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221–4225, (and which are not otherwise included within categories (i)–(x)).

Table 11-5. Examples of Site-Specific Industrial Stormwater Control Measures

Flow Diversion Practices: Flow diversion channels stormwater away from industrial activities to prevent stormwater contact with industrial pollutants. Additionally, flow diversion may be used to channel polluted stormwater directly to a treatment facility.

Flow diversion practices include stormwater conveyances (e.g., channels, gutters, drains, and sewers), diversion dikes, and graded areas and pavement.

Exposure Minimization Practices: Exposure minimization eliminates or minimizes the contact of stormwater with industrial activities and its pollutants. If contact of stormwater with pollutants can be minimized, the costs of collecting and treating and stormwater and the environmental releases that occur will be reduced.

Exposure minimization practices include containment diking, curbing, drip pans, collection basins, sumps, covering, vehicle positioning, and loading and unloading by air pressure or vacuum.

Mitigative Practices: Mitigation cleans up or recovers a substance (i.e., potential pollutant) before it contacts stormwater. Mitigation is a second step after pollution prevention.

Mitigative practices include sweeping, shoveling, excavation practices, vacuum and pump systems, sorbents, and gelling agents.

Other Preventative Practices: Other preventative practices can be taken to limit/prevent the exposure of stormwater to industrial activities. These practices may be either structural or procedural measures taken to reduce/eliminate exposure.

Other preventative practices include preventative monitoring practices, dust control (land disturbances and demolition areas), dust control (industrial activities), signs and labels, security, area control procedures, and vehicle washing.

Sediment and Erosion Prevention Practices: Sediment and erosion prevention can be accomplished using seven general practices: vegetate the site, minimize soil exposure to stormwater, keep runoff

Table 11-5. Examples of Site-Specific Industrial Stormwater Control Measures

from disturbed areas, stabilize disturbed soils, slow down runoff, provide drainage ways for runoff, and remove sediment from the runoff before it leaves the site.

Sediment and erosion prevention practices include vegetative practices, structural erosion prevention, and sediment control practices.

Infiltration Practices: Infiltration practices are measures that increase the infiltration of stormwater runoff into the ground using very porous soils. Infiltration practices may also reduce the velocity of stormwater, thereby minimizing erosion potential of the runoff.

Infiltration practices include vegetated filter strips, grassed swales, level spreaders, infiltration trenches, and porous pavements/concrete grids and modular pavements.

For more examples of industrial stormwater control measures, visit <https://www.epa.gov/npdes/stormwater-discharges-industrial-activities#overview>

C. STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY

APPLICABILITY (WHO IS COVERED)

Stormwater discharged from construction sites is a significant contributor of sediment to our surface waters. Sediment-laden construction stormwater discharges can result in aquatic habitat destruction and detrimental changes to hydrologic patterns, including increased stream flows and flooding. Total suspended solids (TSS) concentrations from uncontrolled construction site discharges can be more than 150 times greater than the concentration of TSS from stormwater discharges on undeveloped land.

Large Construction Activity

As mentioned earlier, the Phase I Rule identifies eleven categories of industrial activity in the definition of “stormwater discharge associated with industrial activity” that must obtain a NPDES stormwater discharge permit (see Section 11.B). Category (x) of this definition includes construction activity (including clearing, grading, and excavation) that results in a total land disturbance of 5 acres or greater. Disturbances of less than 5 acres are also regulated under category (x) if they are part of a “larger common plan of development of sale” with a planned disturbance of 5 acres or greater. Phase I construction activity is commonly referred to as “large” construction activity. The Phase I rule requires all operators of large construction activity to obtain a NPDES stormwater discharge permit before discharging stormwater runoff to a municipal separate storm sewer system or waters of the United States.

Construction activities can include road building, construction of residential houses, office buildings, industrial sites, or demolition.

Land disturbance can include exposed soil due to clearing, grading, or excavation activities.

Larger common plan of development or sale describes a situation in which multiple construction activities occur in a contiguous area.

An operator is a person that has either operational control of construction project plans and specifications, or day-to-day operational control of activities necessary to ensure compliance with stormwater permit conditions.

Small Construction Activity

Under Phase II stormwater regulations, stormwater discharges from construction site activities that result in a land disturbance equal to or greater than 1 acre and less than 5 acres are regulated as “stormwater discharges associated with small construction activity” (see 40 CFR 122.26(b)(15)). Construction activities disturbing less than 1 acre are also included in Phase II of the NPDES stormwater program if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than 1 acre and less than 5 acres, or if they are designated by the NPDES permitting authority.

Small Construction Waivers

Small construction activity does not require permit coverage when the construction operator can certify one of two waivers (see 40 CFR 122.26(b)(15)(i)(A) and (B)). Under the Phase II Rule, NPDES permitting authorities have the option to provide a waiver from Phase II coverage and requirements when the operator certifies to one of two conditions:

1. Low predicted rainfall potential (i.e., activity occurs during a negligible rainfall period), where the rainfall erosivity factor (“R” in the Revised Universal Soil Loss Equation (RUSLE) would be less than 5 during the period of construction activities).
2. A determination that stormwater controls are not necessary based on either:
 - a. A “total maximum daily load” (TMDL) that address the pollutant(s) of concern⁸ for construction activities.
 - b. An equivalent analysis for non-impaired waters that determines allocations are not needed to protect water quality based on consideration of in-stream concentrations, expected growth in pollutant concentrations from all sources, and a margin of safety.

To qualify for the Rainfall Erosivity Factor Waiver, the construction site operator must determine the value of the rainfall erosivity factor (R factor) in the RUSLE and then certify to the permitting authority that the factor is less than 5 during the period of construction. A construction site operator will need site-specific data to calculate the values for rainfall erosivity using RUSLE. Calculations may also be made online by going to the Low Erosivity

⁸ Pollutants of concern include sediment, parameters that address sediment (such as total suspended solids, turbidity, or siltation) and any other pollutant identified as a cause of impairment for a receiving waterbody.

Waiver (LEW) Calculator found at <https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites>.

To qualify for the Water Quality Waiver, the operator of the construction site would need to certify that the facility's construction activity will take place, and the stormwater discharges will occur, within the area covered by the TMDLs or equivalent analysis. A certification form is provided by EPA or the NPDES permitting authority.

An inspector should verify that the construction project qualifies for a waiver. Small construction activities disturbing less than 1 acre previously designated by the permitting authority to need NPDES coverage are not eligible for these waivers.

PERMIT APPLICATIONS FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY

Operators of both small and large construction activities (with limited exceptions discussed above) must obtain coverage under a NPDES construction stormwater permit. Where EPA is the NPDES permitting authority, the EPA Construction General Permit (CGP), issued on February 16, 2017, was, at publication, the only general permit option available. The EPA CGP can be used for discharges from construction sites that will disturb one acre or more where EPA is the permitting authority. The permit and associated resources are located at <http://www.epa.gov/npdes/stormwater-discharges-construction-activities#overview>. In areas where a state is the NPDES permitting authority, construction site operators must obtain coverage under a state-issued permit. NPDES-authorized states typically issue their own CGPs. However, if an EPA or state-issued CGP is either not available or not applicable to a particular construction site, operators must apply for an individual permit. For a list of state construction general permits see <http://www.envcap.org/statetools/swrl/swrl.html> or <https://ofmpub.epa.gov/apex/aps/f?p=GPWI:HOME>.

General Permit/Notice of Intent

Much like the industrial facilities that apply for general permits, operators of construction sites that apply for permit coverage under an EPA or state-issued CGP must complete, certify, and submit to the appropriate NPDES permitting authority an NOI form or other applicable application form. The NOI requests a variety of information, including, for the EPA NOI form, information related to the Endangered Species Act and the National Historic Preservation Act (as described in the "NOI for Stormwater Discharges Associated with Industrial Activity" section earlier in this chapter). The key component of EPA and state-issued CGPs is the development and implementation of a construction SWPPP. For sites with multiple operators, EPA encourages but does not require these operators to develop one comprehensive SWPPP with specific requirements for each operator identified. Other requirements include conducting regular inspections and reporting releases of reportable quantities of hazardous substances. Operators may also be required to comply with local, state, or tribal construction runoff control programs as specified in the permit. To discontinue permit coverage, an operator of a construction activity must complete and submit to the appropriate NPDES permitting authority an NOT form upon satisfying the appropriate permit termination conditions described in the CGP. An example NOT form can be found in Appendix T.

NOIs must be submitted in the timeframe specified in the applicable general permit. For new projects and existing projects transferring to new operators covered under EPA's CGP, the deadline to submit an NOI is at least 14 days prior to commencement of construction. Electronic filing of NOI's (eNOI) is now available for operators where EPA is the permitting authority at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting>. The new project becomes covered under the permit 14 days after EPA acknowledges the receipt of the NOI.

EPA regulations allow permitting authorities to authorize discharges under a general permit for small construction sites without them submitting an NOI, when the permitting authority finds that NOIs would be inappropriate. While EPA does not currently implement this allowance, some states have opted to permit small construction that way (i.e., no NOI required to be covered under the state CGP). A brochure on stormwater pollution prevention for small construction sites can be found at <https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp>

Individual Permit

In the event that an operator of a small or large construction activity chooses to apply for an individual permit, or if the NPDES permitting authority requires the operator to submit an individual NPDES permit application (based on information such as water quality data), or if any of the discharges of stormwater associated with small construction activity identified in 40 CFR 122.26(b)(15) are not authorized by the general permit, the operator is subject to the individual application requirements found at 40 CFR 122.26(c)(1)(ii).

Establishing Eligibility for Coverage under EPA's CGP

Endangered Species Act

EPA's CGP requires the construction site operator to certify their eligibility regarding the protection of threatened and endangered ("listed") species and their critical habitat. Permittees must meet the eligibility criteria that EPA developed in consultation under Section 7 of the Endangered Species Act (ESA) with the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (together, the Services). This certification is unique to EPA's NOI and is not a requirement of most NPDES-delegated states' NOIs. Permittees must follow the procedures in Appendix D of the 2017 CGP and should consult with the state or regional services offices when appropriate. Documentation supporting eligibility under this provision must be included in the facility's SWPPP.

NOIs require certification that the construction activity will not jeopardize endangered or threatened species protected under the ESA. As mentioned above, this NPDES certification requirement is unique to EPA's NOI. All dischargers applying for coverage must include in the application information on the NOI form: 1) whether listed species are in proximity to the stormwater or allowable non-stormwater discharges or discharge-related activity; 2) under which option of the CGP they claim eligibility for permit coverage, and 3) certification that their stormwater and allowable non-stormwater discharges and discharge related activities are not likely to jeopardize listed species, or are otherwise eligible for coverage due to a previous authorization under the ESA. The permittee should consult with applicable state or regional U.S.

Fish and Wildlife Service and/or National Marine Fisheries Service offices to make these determinations of eligibility.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of federal undertakings, including EPA-issued NPDES general permits. Where operators install or modify control measures that involve subsurface disturbance, the area of potential effect (APE) for the activities performed to comply with the permit, for historic preservation purposes, is limited to the location and depth of the earth disturbance associated with the installation or modification of the stormwater control measures. NHPA eligibility procedures that permittees are required to follow are included in Appendix E of the 2017 CGP. Operators need only consider the APE when doing the historic properties screening procedures to determine their eligibility criteria in Appendix E. An electronic listing of the “National Register of Historic Places,” as maintained by the National Park Service, can be accessed at <http://www.nps.gov>.

Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Stormwater Controls

The Safe Drinking Water Act (SDWA) requires that certain provisions be followed for the use of underground injection wells as a form of subsurface stormwater control. Such controls would generally be considered Class V UIC wells: Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system); Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system). The SWPPP must document any contact with the applicable state agency or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA’s implementing regulations at 40 CFR Parts 144–147.

STORMWATER POLLUTION PREVENTION PLAN REQUIREMENTS

The SWPPP as required by the EPA or state-issued CGP must be prepared prior to submission of the NOI. The construction project should follow the provisions of the SWPPP throughout the construction period, as the SWPPP represents what the operator plans to do to meet the effluent limits in the permit. Under EPA’s 2017 CGP, the SWPPP must be signed by a responsible official such as the president, vice president, or general partner. The construction facility must keep the SWPPP on-site throughout the entire construction period or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA. The SWPPP must be submitted for review under EPA’s CGP only when requested by EPA, although some permitting authorities may require submission of the SWPPP along with the NOI.

For large or complex construction sites the inspector may want to request a copy of the SWPPP prior to inspection to ensure familiarity with the site during the inspection. Otherwise, the

inspector should obtain a copy of and review the SWPPP or at least parts of the SWPPP during the inspection. At a minimum, the inspector should review the site map prior to conducting the field inspection to understand the site and the existing/planned stormwater controls.

Depending on the time available for the inspection and the size of the SWPPP, the inspector may complete the remaining portion of the SWPPP review when he or she returns to the office.

In reviewing the SWPPP, the inspector should evaluate if it contains all the required elements specified in the permit (either the most current EPA CGP, the state CGP in NPDES-authorized states, or an individual permit issued for the site). The EPA CGP requires that the SWPPP identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges, and describe and ensure implementation of practices that the operator will use to reduce pollutants in its stormwater discharges. Reviewing the SWPPP implementation is covered in the next section. The following items, which are included in the EPA 2017 CGP, are typically required in all SWPPPs, although the inspector should always refer to the specific permit applicable to a particular construction site:

- **Identification of the stormwater team.**
- **A description of the nature of the construction activity.**
- **Emergency-related projects.**
- **Identification of other site operators.**
- **A sequence (schedule) of major construction activity.**
- **A site map** indicating construction area boundaries, locations of all surface waters, natural buffers, federally-listed critical habitat for endangered or threatened species, topography of site, existing vegetative cover, storm drain inlets, drainage patterns, discharge locations, potential pollutant-generating activities, stormwater control measures, and chemical use and storage areas.
- **Construction site pollutants.**
- **Non-stormwater discharges.**
- **Buffer documentation.**
- **Description of stormwater control measures** including the measures to be used, use of treatment chemicals, and stabilization practices.
- **Pollution prevention procedures** including spill prevention and response and waste management.
- **Procedures for inspection, maintenance, and corrective action.**
- **Staff training.**
- **Documentation of compliance with other federal requirements.**
- **SWPPP certification.**
- **Post-authorization additions to the SWPPP** including copies of the NOI, acknowledgement letter, and the permit.

Typically, measures and controls should include the following:

- **Install erosion and sediment controls**—The permittee is required to complete installation of stormwater controls by the time each phase of earth-disturbance has begun, unless infeasible, and to install these controls according to good engineering practices. The permittee must also ensure that all erosion and sediment controls remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.
- **Provide natural buffers or equivalent sediment controls**—The permittee is required to ensure that any discharges to surface waters through the area between the disturbed portions of the property and any surface waters located within 50 feet of the construction site are treated by an area of undisturbed natural buffer and/or additional erosion and sediment controls to achieve a reduction in sediment load equivalent to that achieved by a 50-foot natural buffer. If it is infeasible for the construction site to maintain a 50-foot natural buffer between earth disturbances and surface waters, erosion and sediment controls may be used. In this case, the permittee must first determine the estimated sediment removal efficiency of a 50-foot natural buffer for the construction site. Appendix G of the CGP contains sediment removal efficiency tables, which may be used to locate the sediment removal efficiencies of various buffer vegetation. Once the removal efficiency of a 50-foot natural buffer is determined, then the permittee should select stormwater controls that will provide an equivalent sediment load reduction.
- **Install perimeter controls**—The permittee must install sediment controls along those perimeter areas of the construction site that will receive stormwater from earth-disturbing activities. Sediment must be removed before it has accumulated to one-half of the above-ground height of any perimeter control.
- **Minimize sediment track-out**—The permittee must minimize the track-out of sediment onto off-site streets, other paved areas, and sidewalks from vehicles exiting the construction site.
- **Control discharges from stockpiled sediment or soil**—For any stockpiles or land clearing debris composed, in whole or in part, of sediment or soil, the permittee is required to:
 - a) locate the piles outside of any natural buffers,
 - b) protect from contact with stormwater (including run-on) using a temporary perimeter sediment barrier,
 - c) where practicable, provide cover or appropriate temporary stabilization to avoid direct contact with precipitation or to minimize sediment discharge,
 - d) do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water, and,
 - e) unless infeasible, contain and securely protect from wind.
- **Minimize dust**—To avoid pollutants from being discharged into surface waters, to the extent feasible, the permittee must minimize the generation of dust through the appropriate application of water or other dust suppression techniques.
- **Minimize the disturbance of steep slopes.**

- **Preserve topsoil.**
- **Minimize soil compaction**—In areas of the construction site where final vegetative stabilization will occur or where infiltration practices will be installed, the permittee must either restrict vehicle/equipment use or use soil conditioning techniques.
- **Protect storm drain inlets**—The permittee, where applicable, must install inlet protection measures that remove sediment from the discharge prior to entry into the storm drain inlet. The permittee is required to clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised.
- **Requirements applicable only to sites using these specific stormwater controls:**
 - Constructed stormwater conveyance channels—The permittee should design stormwater conveyance channels to avoid unstabilized areas on the site and to reduce erosion, unless infeasible.
 - Sediment basins—The EPA CGP requires that when a temporary/permanent sediment basin is installed, it must provide storage for either the calculated volume of runoff from a 2-year, 24-hour storm or 3,600 cubic feet per acre drained.
 - Treatment chemicals—Water treatment chemicals, such as polymers and flocculants, may be used as a form of erosion and sediment control. However, cationic treatment chemicals may not be used under the CGP unless the EPA office authorizes coverage under this permit after appropriate controls and implementation procedures are developed. The permittee should use conventional erosion and sediment controls prior to and after the application of treatment chemicals. Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g., sediment basin, perimeter control) prior to discharge. Chemicals must be selected that are appropriately suited to the types of soils likely to be exposed during construction and discharged to locations where chemicals will be applied, and to the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or area. Treatment chemicals and chemical treatment systems should be used in accordance with dosing specifications and sediment removal design specifications provided by the provider/supplier of the applicable chemicals, or document specific departures from these practices or specifications and how they reflect good engineering practice.
 - Dewatering practices—The permittee is prohibited from discharging ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, unless such waters are first effectively managed by appropriate controls.
- **Stabilization requirements**—Practices must be included for interim and permanent stabilization for the site, including a schedule of when the practices will be implemented. According to the EPA CGP, when construction activities temporarily or

permanently cease on a portion of the site, stabilization measures must be initiated immediately for erosion control.

- **Pollution prevention requirements**—The permittee is required to design, install, and maintain effective pollution prevention measures to prevent the discharge of pollutants. All pollution prevention controls installed must remain in effective operating condition and be protected from activities that would reduce their effectiveness. Certain discharges are prohibited, these include: wastewater from concrete washout, fuels, oils, soaps, solvents, detergents, and toxic or hazardous substances. The following activities require compliance with pollution prevention standards in accordance with CGP Part 2.3: fueling and maintenance of equipment or vehicles; washing of equipment and vehicles; storage, handling, and disposal of construction materials, products, and wastes; and, washing of applicators and containers used for paint, concrete, or other materials.
- **Emergency spill notification**—Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or more than a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302 occurs during a 24-hour period, the permittee must notify the National Response Center (NRC).
- **Fertilizer discharge restrictions**—The permittee is required to minimize discharges of fertilizers containing nitrogen or phosphorus.

The Construction and Development Effluent Guidelines require that sediment controls be designed, installed and maintained to minimize the discharge of sediment from the site. Therefore, certain types of sediment controls such as sediment basins must be adequately sized to retain or detain the appropriate volume of stormwater runoff. The inspector should refer to the particular site's NPDES stormwater permit for specific design requirements related to capacity or volume, as well as any other design standards. For example, as noted above, EPA's 2017 CGP requires that sediment basins provide, at a minimum, storage for either the calculated volume of runoff from a 2-year, 24-hour storm or 3,600 cubic feet per acre drained. To determine whether stormwater controls at a construction site have been designed and installed with adequate capacity, the inspection should consider the following factors: the expected amount, frequency, intensity, and duration of precipitation; the nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features; and, the range of soil particle sizes expected to be present on the site. These factors all affect the nature and quantity of runoff from the construction site. For instance, soils with a very small particle size (clay, silt) has a very low infiltration, meaning the site will likely experience a higher quantity runoff and a higher sediment load in the runoff compared to a site with higher infiltration (sandy soils). The inspector should consider these factors to determine if the stormwater controls implemented at a construction site are sufficient.

Appendix U, "Typical 'C' Coefficients," lists typical runoff coefficient values that may be used to determine the typical infiltration and runoff a certain area (residential, parks, streets, etc.). Additionally, the inspector may refer to Appendix V, "Rain Zones of the United States," to

determine the typical amount of rainfall a region receives, as an aid in evaluating stormwater control measure adequacy. Alternatively, the inspector may refer to EPA's National Stormwater Calculator (SWC), a desktop application, to estimate the annual amount of rainwater and frequency of runoff from a specific site anywhere in the United States. Estimates are based on local soil conditions, land cover, and historic rainfall records. The stormwater calculator may be found at <https://www.epa.gov/water-research/national-stormwater-calculator>.

The SWPPP must also specify the operator personnel who is responsible for inspecting the construction site and the frequency of the inspections. The EPA 2017 CGP requires that the operator inspect at least once every seven days regardless of rainfall, or at least every 14 days and within 24 hours of each rainfall of 0.25 inches or more. To determine if a storm event of 0.25 inches or greater has occurred at the construction site, the permittee must either keep a properly maintained rain gauge on-site, or obtain the storm event information from a weather station that is representative of the construction site location. The EPA inspector should determine how the permittee monitors and records rainfall and if this method is representative of the rainfall at the site and credible. One potential source of rainfall data that the EPA inspector can access in preparation for an inspection is provided by the National Oceanic and Atmospheric Administration (NOAA) and can be found through the National Climate Data Center's (NCDC's) online climate datasets. NCDC online climate datasets may be found at <https://www.ncdc.noaa.gov/cdo-web/>. The inspector should use appropriate rainfall data, either the data maintained by the permittee or provided by another acceptable source, to ensure that the permittee is in compliance with the required schedule for site inspections. Additionally, if rainfall occurred during or prior to an inspection, these datasets can be used to verify the amount of precipitation that has fallen. The NOAA rainfall worksheet, available in Appendix W, may be used to document rainfall.

Some permits may allow reduced monitoring frequencies for portions of sites that have achieved final stabilization (as defined by the applicable permit), or for sites that are in arid (defined as less than 10 inches of rain per year in the EPA 2017 CGP) or semi-arid (defined as 10 to 20 inches of rain per year in the EPA 2017 CGP) areas. EPA's 2017 CGP requires that these areas be inspected at least once a month. The inspector must prepare a report documenting his/her findings on the conditions of the controls and stabilized areas. The inspector should verify that documentation of the routine inspections is included in the SWPPP.

Some permits require an increase in inspection frequency for sites that discharge to a sediment of nutrient-impaired water or to a water that is identified by the state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes (see EPA 2017 CGP Part 4.3). For these sites, inspections should occur once every 7 calendar days and within 24 hours of a storm event of 0.25 inches or greater. Again, the inspector should verify that documentation of the routine inspections is included in the SWPPP.

The worksheet provided in Appendix X, "NPDES Industrial Storm Water Investigation and Case Development (Construction)," can be used to evaluate specific elements of the Stormwater Pollution Prevention Plan for construction activities.

SWPPP IMPLEMENTATION/IN THE FIELD

Are They Doing What the SWPPP Indicates?

When conducting the field inspection of a construction site, inspectors should note several items:

- A current copy of the SWPPP must be kept at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection, or upon request by EPA. Significant delays in producing the SWPPP or finding knowledgeable stormwater personnel may indicate compliance problems.
- The opening conference with the owner/operator is extremely important. Often at larger residential construction sites, there will be multiple builders working together as co-permittees, each responsible for one or more aspects of SWPPP implementation. It is important to identify the permittee and/or co-permittees and their respective responsibilities under the permit.
- It is good practice to review the site map before conducting the inspection because if the inspector does not know the site boundaries, it is difficult to identify and evaluate the runoff potential. The inspector can download aerial photos prior to the inspection to use along with the site map.
- The SWPPP should reflect current conditions and provide a record of past conditions. The inspector should review the construction sequence and BMP sequence given in the SWPPP and evaluate whether these have been met.
- The closing conference provides an opportunity to describe deficiencies found and identify areas of concern (e.g., parts of a SWPPP missing, inspections not being done, silt fence not installed or not installed correctly, discharge of sediment or other pollutants to a storm drain). Given the transient nature of most construction sites, it is good practice to share information with the site owner/operator as quickly as possible (e.g., prior to issuance of final inspection report) so that any environmental harm can be minimized and corrections can be made prior to the next storm event.

In the field, the inspector should: verify that the SWPPP reflects current site conditions including identification of potential pollutant sources and control measures; verify whether structural control measures are properly installed, adequately maintained and in effective operating condition; verify whether nonstructural control measures such as stabilization and good housekeeping are being implemented as required by the SWPPP, are timely and are adequate and appropriate; document all discharges of stormwater observed by the inspector as well as evidence of previous discharges such as accumulation of sediment (whether off-site or in waters, or on-site in gutters, on the street, within storm drains, etc.); and document any evidence of the discharge of other pollutants such as concrete washout or paint.

The inspector should ensure that, if corrective action is needed, the permittee immediately takes all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Any corrective

actions taken should be recorded and the documentation kept on-site with the SWPPP. Additionally, the inspector should verify that the permittee modifies the SWPPP as necessary, when a corrective action results in a change in the control measures implemented on-site.

EPA's 2017 CGP requires facilities to implement control measures and train employees on how to carry out the provisions of the SWPPP. The inspector should evaluate any implementation schedules developed by the facility for carrying out the SWPPP (e.g., dates for putting improved housekeeping measures into practice; installation of structural controls). The inspector should also determine whether appropriate individuals have been assigned to implement the specific aspects of the SWPPP, and whether these individuals are aware of the implications of that designation. At a minimum, the appropriate personnel must be trained to understand: the location of all stormwater controls on the site, how they are maintained; the proper procedures to follow with respect to the permit's pollution prevention requirements; and, when and how to conduct inspections, record applicable findings, and take corrective actions.

Examples of deficiencies an inspector may observe during a construction site inspection include:

- Silt fences that are improperly located or installed (e.g., bottom not buried), falling over, containing an excessive amount of accumulated sediment (e.g., EPA's 2012 requires that sediment be removed before it has accumulated to over one-half of the above-ground height of the perimeter control), or ripped so that the fence is not functioning properly.
- Poor housekeeping such as oil stains on soil; overturned drums; uncovered pails containing liquids; cluttered equipment storage with leaking fluids; fuel tanks with no containment; litter and debris scattered around the site; streets in need of sweeping.
- Storm drain inlet protection that is missing or ineffective such as inlets covered with sediment/debris; ruptured gravel bags with loss of gravel into drain; sediment accumulation resulting in clogging of the filter or otherwise compromising performance; improperly installed inlet protection that leaves gaps.
- Track-out controls that are missing or ineffective such as track-out pads filled with soil or not constructed to the length specified in the SWPPP; dirt being tracked out onto the road.
- Sediment not removed from sediment basins or sediment traps before accumulating to more than ½ the design capacity.
- Lack of proper recordkeeping.

Appendix Y, "Construction Source Control BMP Questions," contains a worksheet that the inspector can use to aid in the evaluation of stormwater control measures. Site-specific control measures for construction activities are summarized in Table 11-6.

Table 11-6. Site-Specific Construction Stormwater Control Measures

Stabilization Practices: Stabilization, which entails protecting bare earth, reduces erosion potential in four ways: 1) by shielding the soil surface from direct erosive impact of raindrops, 2) by improving the soil's water storage porosity and capacity, 3) by slowing the runoff and allowing the sediment to drop out or deposit; and 4) by physically holding the soil in place with plant roots. Vegetative (e.g., grasses, trees, or shrubs) covers are the most common type of stabilization.

Stabilization practices include temporary seeding, mulching, geotextiles, chemical stabilization, permanent seeding and planting, buffer zones, preservation of natural vegetation, sod stabilization, stream bank stabilization, soil retaining measures, and dust control.

Structural Erosion and Sediment Control Practices: Structural erosion and sediment controls divert stormwater flows away from exposed areas, convey runoff to a sediment basin or similarly effective control, capture sediment or otherwise prevent sediments from moving off-site, and reduce the erosive forces of runoff waters.

Structural erosion and sediment control practices include, but are not limited to, earth dikes, drainage swales, interceptor dikes and swales, temporary stream crossing, temporary storm drain diversion, pipe slope drains, subsurface drains, silt fence, gravel or stone filter berm, storm drain inlet protection, sediment trap, temporary and permanent sediment basins, outlet protection, check dams, surface roughening, and gradient terraces.

D. STORMWATER DISCHARGES FROM MUNICIPAL SEPARATE STORM SEWER SYSTEMS

APPLICABILITY (WHO IS COVERED)

Stormwater discharges from municipal separate storm sewer systems (MS4s) were initially regulated under the Phase I stormwater regulations, which were finalized in 1990. There is a two-part stormwater permit application process for medium (serving a population of 100,000 or more, but fewer than 250,000) and large (serving a population of more than 250,000) MS4s described in 40 CFR 122.26(d), pursuant to sections 402(p)(2)(C)–(D) of the CWA. The regulations define medium and large MS4s as those in the 220 cities listed in Appendix F and Appendix G or in the counties listed in Appendix H and Appendix I of 40 CFR Part 122. An MS4 may also be designated as a Phase I MS4 on a case-by-case basis (see 40 CFR 122.26(b)(4)(iii) and 122.26(b)(7)(iii)). In addition to the counties and cities listed in Appendices F – I, other smaller interrelated entities may be regulated under the Phase 1 program such as smaller municipalities, sewer districts or flood control districts that are physically connected to a Phase I MS4. In some states, only the urbanized portions of the state highway systems are regulated, but other states have issued state-wide permits to their Departments of Transportation (DOTs). To date, a total of approximately 1,000 entities (cities, counties, flood control districts etc.) are covered under 270 Phase I permits nationwide. The universe of Phase I MS4s was established under the 1990 Phase I stormwater regulations. Additional MS4 entities cannot be added to the Phase 1 universe but may be regulated under the Phase II regulations discussed below.

The Phase II Final Rule, which was finalized in 1999, requires NPDES permit coverage for stormwater discharges from certain small MS4s. Only a select subset of small MS4s, referred to as “regulated small MS4s,” require a NPDES stormwater permit. Small MS4s are defined as any MS4 that is not a medium or large MS4 covered by Phase I of the NPDES Stormwater Program. Regulated small MS4s are small MS4s located in “urbanized areas” (UAs) as defined by the Bureau of the Census and as determined by the latest Decennial Census, and those small MS4s located outside of a UA that are designated by NPDES permitting authorities. Small MS4s include publicly owned or operated separate storm sewer systems that are similar to such systems within municipalities, such as military bases, large hospital or prison complexes, and highways (40 CFR 122.26(b)(16)(iii)). A small MS4 can be designated by the permitting authority as a regulated small MS4 in one of two ways. One, the small MS4 located outside of a UA is designated as a regulated small MS4 by the NPDES permitting authority because its discharges cause, or have the potential to cause, an adverse impact on water quality. Two, the small MS4 located outside of a UA contributes substantially to the pollutant loadings of a physically interconnected MS4 regulated by the NPDES stormwater program. Note: In authorized states, the NPDES permitting authority was required to designate small MS4s meeting the designation criteria by December 9, 2002, or by December 8, 2004, if a watershed plan is in place (40 CFR 123.35(b)).

Waivers

Permitting authorities may waive permit coverage requirements for small MS4s otherwise regulated under the rule if the MS4s meet the necessary criteria set forth in the regulations. Waiver options are available to operators of small MS4s if discharges do not cause, or have the potential to cause water quality impairment. The state permitting authority is required to periodically review any waivers granted to MS4 operators to determine whether any information required for granting the waiver has changed. At a minimum, such a review needs to be conducted once every five years.

PERMIT APPLICATIONS FOR STORMWATER DISCHARGES FROM MUNICIPAL SEPARATE STORM SEWER SYSTEMS

Permits are required for discharges from regulated large, medium, and small municipal separate storm sewer systems. The permitting authority may also designate stormwater discharges via its residual designation authority. The permitting authority may issue one system-wide permit covering all discharges from multiple permittees within an interrelated municipal separate storm sewer system or issue individual permits to each MS4 on a jurisdictional basis.

Unlike the Phase I MS4 program that primarily utilizes individual permits, the Phase II approach allows operators of regulated small MS4s to choose from as many as three permitting options: 1) general permits (if available), 2) individual permits, or 3) modification of an existing Phase I Individual Permit (Co-Permittee Option). It must be noted that the NPDES permitting authority reserves the authority to determine which options are available to the regulated small MS4s. Where a general permit is available, operators of regulated small MS4s in urbanized areas seeking coverage under the general permit must submit their NOIs within 90 days of permit

issuance. Operators of small MS4s that have been designated by the permitting authority must submit their permit applications within 180 days of notice. Small MS4s must develop and fully implement an MS4 stormwater management program within five years of initial permit issuance.

In contrast to the Phase I MS4 program, the Phase II MS4 program has been designed specifically to accommodate a general permit approach. General permits prescribe one set of requirements for all permittees, though general permits can also include some specific requirements for specific permittees covered by the permit. General permits are drafted by the NPDES permitting authority, then published for public comment before being finalized and issued. A regulated small MS4 operator seeking coverage under a general permit must submit an NOI. The NOI fields are determined by the permitting authority, but generally ask the operator to describe its stormwater management program, including stormwater control measures and measurable goals. The MS4 owner/operator develops an individualized stormwater management program (SWMP) in accordance with the requirements of the permit that addresses the characteristics and needs of its system, subject to review by the permitting authority. Permittees also can choose to share responsibilities for meeting the Phase II program requirements, as provided in 40 CFR 122.35 and further explained below. Unless the permit specifies that another governmental entity is responsible to carry out one or more of the permit requirements, the permittee remains legally responsible for compliance with the permit.

As stated above, individual permits are mostly used for Phase I medium and large MS4s, while general permits are more common for Phase II program implementation. Individual permits prescribe a set of requirements for a permittee or a group of co-permittees. Individual permits require the submission of a permit application, while an NOI submitted for coverage under a general permit is usually less extensive. Once an application for an individual permit is received, the permit is drafted by the NPDES permitting authority, then published for public comment before being finalized and issued. The Phase II rule allows a regulated small MS4 to apply for an individual permit under either the Phase II MS4 program (see 40 CFR 122.34) or the Phase I MS4 program (see 40 CFR 122.26(d)). The NPDES permitting authority may allow more than one regulated entity to apply for one individual permit (i.e., co-permittees), as it may also do for Phase I MS4s.

Under the Phase II Rule, there are two permitting options tailored to minimize duplication of effort among co-permittees. These can be incorporated into both a general permit and an individual permit by the NPDES permitting authority. First, as mentioned above, under 40 CFR 122.35, the permitting authority can recognize in the permit that another governmental entity or the permitting authority itself is responsible under a NPDES permit for implementing any or all minimum measures. Responsibility for implementation of the measure(s) would rest with the other governmental entity, thereby relieving the permittee of its responsibility to implement that measure(s). Second, the permittee may rely on another entity to satisfy the permittee's obligations to implement one or more of the minimum control measures if the other entity agrees to implement the control measures on the permittee's behalf and in fact implements the requirement(s).

The operator of a regulated small MS4 could participate as a limited co-permittee in a neighboring Phase I MS4's stormwater management program by seeking a modification of the existing Phase I individual permit instead of seeking individual permit coverage under the Phase II rule. A list of Phase I medium and large MS4s can be obtained from the EPA Office of Wastewater Management (OWM), the EPA Region, or downloaded from the OWM web site at <http://www.epa.gov/npdes>. The MS4 must follow Phase I permit application requirements (with some exclusions).

STORMWATER MANAGEMENT PROGRAM (SWMP) DEVELOPMENT

Phase I MS4 SWMPs: Comprises Part of the Permit Application

Developing and implementing a stormwater management program (SWMP) is a key requirement of an MS4 permit. While existing structural and non-structural control measures for addressing discharges from MS4s must be described in Part 1 of the permit application, Part 2 of the application must set forth the proposed SWMP in accordance with 40 CFR 122.26(d)(2)(iv).

The discussion that follows provides a general description of SWMP requirements for MS4s. The inspector must review the MS4's permit for specific considerations. Each MS4 covered by a permit must develop a SWMP in accordance with the permit, tailored to system-specific conditions and designed to reduce the amount of pollutants in stormwater discharges from the system to the maximum extent practicable. The permitting authority has the right to review and request changes in the SWMP. Summaries of necessary components of these programs for MS4s are provided below for both large- and medium-size MS4s.

The SWMP must describe priorities for implementing controls and should be based on the following requirements:

1. Structural and source control measures to be implemented during the life of the permit to reduce pollutants from runoff from commercial and residential areas that are discharged from the MS4s. The SWMP must include an estimate of the expected reduction of pollutant loads and a proposed schedule for implementing such controls. At a minimum, the description in the SWMP must include:
 - Maintenance activities and a maintenance schedule for structural controls. The description should include priorities and procedures for inspections.
 - Planning procedures, including a comprehensive master plan, to develop, implement, and enforce controls to reduce discharges from areas of new development and significant redevelopment after construction is complete.
 - Practices for operating and maintaining public streets, roads, highways etc., and procedures for reducing the impact on receiving waters of discharges from MS4s, including pollutants discharged as a result of deicing activities.
 - Procedures to ensure that flood management projects assess the impacts on the water quality of receiving water bodies and that existing structural flood control

devices have been evaluated to determine if retrofitting is feasible for additional pollutant removal.

- Program to monitor pollutants in runoff from operating or closed municipal landfills or other treatment, storage, or disposal facilities for municipal waste, that identifies priorities and procedures for inspections and establishing and implementing control measures for such discharges.
 - Program to reduce, to the maximum extent practicable, pollutants in discharges from the application of pesticides, herbicides, and fertilizers. This may include educational activities, permits, certifications, and other measures for commercial applicators and distributors, and controls for application in public right-of-way and at municipal facilities.
2. A program to detect and remove (or to require the discharger to the MS4 to obtain a separate NPDES permit for) illicit discharges and improper disposal into the MS4, and to prevent such discharges. At a minimum, the proposed program must include descriptions of:
- Inspection procedures, to implement and enforce an ordinance, order, or similar means to prevent illicit discharges to the MS4 (note: there is a category of non-stormwater discharges or flows that shall be addressed where such discharges are identified by the owner/operator as sources of pollutants to waters of the United States (see 40 CFR 122.26(d)(2)(iv)(B)(1)).
 - Procedures to conduct ongoing field screening activities during the life of the permit.
 - Procedures to be followed to investigate where field screening or other information indicate a reasonable potential of illicit discharges or other sources of non-stormwater.⁹
 - Procedures to prevent, contain, and respond to spills that may discharge into the MS4.
 - Program to promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges from MS4s.
 - Educational activities, public information activities, and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials.

⁹ For example, EPA has developed a draft New England Bacterial Source Tracking Protocol applicable to inspectors in Region 1. This protocol is appropriate under circumstances where the inspector suspects bacterial contamination. The protocol relies primarily on visual observations and the use of field test kits and portable instrumentation during dry and wet weather to complete a bacterial screening level investigation of stormwater outfall discharges or flows within the drainage system, in conjunction with sampling for pharmaceuticals and cosmetic to show a link with untreated illicit sewage discharges. The protocol can be found at: <https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixI.pdf>

- Controls to limit infiltration of seepage from municipal sanitary sewers to MS4s where necessary.
3. Program to monitor and control pollutants in stormwater discharges to municipal systems from municipal landfills; hazardous waste treatment, disposal, and recovery facilities; industrial facilities that are subject to section 313 of SARA Title III; and industrial facilities that the municipal permit applicant determines are contributing a substantial pollutant loading to the MS4s. The program must include:
 - Priorities and procedures for inspections and establishing and implementing control measures for such discharges.
 - Monitoring program for stormwater discharges associated with industrial facilities identified above, to be implemented during the term of the permit, including the submission of quantitative data on constituents identified in 40 CFR 122.26(d)(2)(iv)(C)(2).
 4. Program to implement and maintain structural and non-structural best management practices to reduce pollutants in stormwater runoff from construction sites to the MS4. This program must include descriptions of:
 - Procedures for site planning that incorporate consideration of potential water quality impacts.
 - Requirements for non-structural and structural best management practices.
 - Procedures for identifying priorities for inspecting sites and enforcing control measures that consider the nature of the construction activity, the topography, and the characteristics of soils and receiving water quality.
 - Appropriate educational and training measures for construction site operators.

Phase II MS4 SWMP: Comprises Part of the Permit Application or Notice of Intent

The Phase II regulations require regulated small MS4s to develop SWMPs based on similar, but not identical, requirements as apply to medium/large MS4s. Small MS4 permits require at a minimum that the permittee develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act. The Phase II requirements for SWMPs include the six minimum control measures described below:

1. Public education and outreach on stormwater impacts that distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff.
2. Public involvement/participation on stormwater controls, at a minimum, complying with state, tribal and local public notice requirements.

3. Illicit discharge detection and elimination program that includes:
 - A storm sewer system map, showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls.
 - An ordinance or other regulatory mechanism (to the extent allowable under state law), that effectively prohibits non-stormwater discharges into the storm sewer system.
 - Appropriate enforcement procedures and actions.
 - A plan to detect and address non-stormwater discharges, including illegal dumping, to the system.
 - Outreach that informs public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.
4. Construction site stormwater runoff control program to reduce pollutants in any stormwater runoff to your small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre (including construction activity disturbing less than one acre that is part of a larger common plan of development or sale that would disturb one acre or more). The program must include the development and implementation of, at a minimum:
 - An ordinance or other regulatory mechanism (to the extent allowable under state law) to require erosion and sediment controls, as well as sanctions to ensure compliance.
 - Requirements for construction site operators to implement appropriate erosion and sediment control best management practices.
 - Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.
 - Procedures for site plan review that incorporate consideration of potential water quality impacts.
 - Procedures for receipt and consideration of information submitted by the public.
 - Procedures for site inspection and enforcement of control measures.
5. Post-construction stormwater management program in new development and redevelopment for projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4. The controls must include strategies that include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the community; use an ordinance or other regulatory mechanism to address

post-construction runoff from new development and redevelopment projects to the extent allowable under state, tribal or local law; and ensure adequate long-term operation and maintenance of control measures.

6. Pollution prevention/good housekeeping for municipal operations that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. Your program must include employee training to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.

As part of the small MS4 NOI or individual permit application, the MS4 is required to identify the BMPs that will be implemented for each of the six minimum control measures listed above. In addition, the NOI or application must identify the measurable goals for each of the BMPs, including, as appropriate, the months and years in which the MS4 will take the required actions, including interim milestones, the frequency of the action, and the person or persons responsible for implementing or coordinating the SWMP.

SWMP IMPLEMENTATION/IN THE FIELD

The inspector should verify that the SWMP is being implemented as appropriate to meet the current circumstances in the municipality. Implementation of management programs requires the permittee to implement a variety of control measures, programs, and procedures that includes training of various individuals on how to carry out the goals of the program. The inspector should evaluate any implementation schedules specified in the permit or developed by the municipality for carrying out the program and determine whether appropriate individuals have been assigned to implement the specific aspects of the program and if these individuals are aware of the requirements of that designation. The inspector should evaluate the municipality's inspection and enforcement program for industrial facilities and construction sites. In addition, the inspector should verify whether the municipality's monitoring program and dry weather screening program is being implemented according to the permit schedule. If the program calls for the installation or maintenance of structural controls, the inspector should verify that the controls are in place and in good working order or that the facility is on an appropriate schedule for construction of the structural control measures. The inspector should ensure that the permittee is minimizing the discharge of pollutants in stormwater runoff. The inspector should document stormwater discharges and any dry weather discharges observed during the inspection, taking photographs as necessary to record the observation.

The inspection should consist of "in-office" and "in-field" activities. The purpose of the inspection is to evaluate the MS4's implementation of its permit and SWMP. In-office activities should include staff interviews and records review. Records review should be tailored to the MS4's permit and SWMP and can include review of annual reports, training materials, standard operating procedures for inspections and enforcement, inspection reports, and databases. Some of these records may be reviewed prior to or after the inspection. In-field activities should also be tailored to the MS4's permit and SWMP and can include visits to municipal facilities and yards, industrial facilities, municipal and private construction sites, and municipal

and private post-construction BMPs, as well as field screening. With the exception of municipal sites, the inspector should evaluate the effectiveness of the MS4 inspector, rather than leading the inspection during field activities. The inspector may refer to EPA's *MS4 Program Evaluation Guidance* (EPA, 2007) and EPA Region 3 Factsheet on *Evaluating the Effectiveness of Municipal Stormwater Programs* (EPA, 2008) for additional information on evaluating stormwater programs.

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Federal Register (77 FR 47065). August 7, 2012. Final National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Activities; Notice.

Federal Register (80 FR 34403). June 16, 2015. Final National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Industrial Activities; Notice.

CHAPTER 12 – COMBINED SEWER OVERFLOWS

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Related Websites

Office of Wastewater Management (OWM) home page: <http://www.epa.gov/owm>

Office of Enforcement and Compliance Assurance (OECA) home page:

<https://www.epa.gov/aboutepa/about-office-enforcement-and-compliance-assurance-oeca>

A. BACKGROUND AND HISTORY OF THE CSO POLICY

In addition to materials in this chapter, Inspectors must be familiar with Chapter 1, "Introduction," and Chapter 2, "Inspection Procedures."

EPA's 1994 Combined Sewer Overflow (CSO) Control Policy (Volume 59 of the *Federal Register* (FR) 18688 and 18689, April 19, 1994) defines a combined sewer system (CSS) as "a wastewater collection system owned by a state or municipality (as defined by section 502(4) of the Clean Water Act (CWA)) which conveys sanitary wastewaters (domestic, commercial and industrial wastewaters) and stormwater through a single-pipe system to a Publicly Owned Treatment Works (POTW) Treatment Plant (as defined in Title 40 of the *Code of Federal Regulations* (CFR) Part 403.3(p))." During precipitation events (e.g., rainfall or snowmelt), the volume of sanitary wastewater and stormwater runoff entering CSSs often exceeds the capacity of the treatment works to treat it or the sewer system to store it until it can be treated. When this happens, these systems are designed to overflow directly to surface waters. These overflows are combined sewer overflows (CSOs). The CSO Control Policy defines a CSO as "the discharge from a CSS at a point prior to the POTW Treatment Plant." Approximately 746 communities in the United States have CSSs that together have 9,348 permitted CSO outfalls (i.e., the points from which the discharge leaves the CSS) that are regulated by 859 NPDES permits.

Some CSOs occur infrequently; others, with every precipitation event. Because CSOs contain raw sewage, industrial discharges, and urban stormwater, and contribute pathogens, solids, debris, and toxic pollutants to receiving waters, CSOs can create serious public health and water quality concerns. CSOs have caused or contributed to beach closures, shellfish bed closures, contamination of drinking water supplies, and other environmental and public health problems.

The CSO Control Policy "represents a comprehensive national strategy to ensure that municipalities, permitting authorities, water quality standards authorities and the public engage in a comprehensive and coordinated planning effort to achieve cost-effective CSO controls that ultimately meet appropriate health and environmental objectives and requirements" 59 FR 18688). Under the Policy, CSO communities were expected, through requirements in their NPDES permit or enforceable mechanism, to:

- Implement nine minimum controls (NMC) that may be considered minimum best available technology (BAT), best conventional pollutant control technology (BCT), or best professional judgement (BPJ) by the permitting authority. These NMC are measures that can reduce CSO volumes and frequencies, and their water quality impacts, without significant engineering studies or major construction. CSO communities were expected to implement the NMC with appropriate documentation as soon as practicable but no later than January 1, 1997.
- Develop and submit the long-term CSO control plan (LTCP) as soon as practicable, but generally within two years after the date of the NPDES permit provision, CWA section 308 information request, or enforcement action requiring the permittee to develop the plan. Implement the LTCP. Implementation of the individual CSO controls may be phased based on the relative importance of adverse impacts of the CSOs on water

quality standards and designated uses, priority projects identified in the long-term plan, and on the permittee's financial capability.

Select CSO controls that include a post-construction water quality monitoring program adequate to verify compliance with water quality standards and protection of designated uses as well as to ascertain the effectiveness of CSO controls. Permitting and enforcement authorities are expected to take enforcement action against dry weather CSO discharges, which have always been prohibited by the NPDES program.

The CSO Policy outlines the NMCs and the minimum elements of an LTCP. Table 12-1 lists the NMCs, while Table 12-2 lists the elements of the LTCP. The key elements to CSO control is to:

- Eliminate or relocate overflows that discharge to sensitive areas wherever physically possible and economically achievable, and where not possible, provide treatment necessary to meet WQS for full protection of existing and designated uses.
- Coordinate the review and appropriate revision of water quality standards and implementation procedures on CSO-impacted waters with development of long-term CSO control plans.
- Evaluate a reasonable range of alternatives for the CSO control plan that could achieve the necessary level of control/treatment, and select the controls to be implemented based on cost/performance evaluations.
- Develop an implementation schedule based on the relative importance of adverse impacts on WQS and designated uses, priority projects identified in the long-term plan LTCP, and on the permittee's financial capability.
- Maximize treatment of wet weather flows at the existing POTW treatment plant.

Since the CSO Control Policy was published, EPA has released guidance documents on the following implementation areas: long-term control plans, the nine minimum controls, screening and ranking, funding options, permit writing, financial capability and schedule development, coordinating long-term planning with water quality standards reviews, monitoring and modeling, and Post Construction Compliance Monitoring (see the "References" section and/or the CSO website <https://www.epa.gov/npdes/combined-sewer-overflows-csos> for more information).

In the Consolidated Appropriations Act for Fiscal Year 2000, Public Law (P.L.) 106-554, Congress amended the Clean Water Act by adding section 402(q) to require, among other things, that all permits, orders, and decrees issued to control CSOs, after enactment of the Consolidated Appropriations Act, shall conform to EPA's 1994 CSO Control Policy. EPA and state NPDES permitting authorities should refer to Section IV, Expectations for Permitting Authorities, of the Policy (59 FR 16905–16996). This section of the policy presents the major elements that should be in NPDES permits to implement the Policy and ensure protection of water quality.

State and EPA NPDES permitting authorities continue to work with permittees to incorporate CSO conditions into NPDES permits and through other enforceable mechanisms, such as administrative or judicial orders.

Table 12-1. Nine Minimum CSO Controls

- Proper operation and regular maintenance programs for the sewer system and the CSOs.
- Maximum use of the collection system for storage.
- Review and modification of pretreatment requirements to ensure that CSO impacts are minimized.
- Maximization of flow to the POTW for treatment.
- Prohibition of CSOs during dry weather.
- Control of solid and floatable materials in CSOs.
- Establishment of pollution prevention programs.
- Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.
- Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

Table 12-2. Elements of the Long-Term CSO Control Plan

- Characterization, monitoring, and modeling of the Combined Sewer System
- Public Participation
- Consideration of Sensitive Areas
- Evaluation of Alternatives
- Cost/Performance Considerations
- Operational Plan
- Maximizing Treatment at the Existing POTW Treatment Plant
- Implementation Schedule
- Post-Construction Compliance Monitoring Program

B. CSO INSPECTION PROCEDURES

Each municipality's specific CSO requirements will be contained in a NPDES permit, an enforcement order, a consent decree, or combination of these documents. CSO conditions will be specific to that permittee. However, the inspection of one CSS may involve visits to more than one municipality, depending on the configuration and possible shared responsibility for the system. Moreover, a CSS may be subject to several NPDES permits and/or enforcement orders or consent decrees. Before conducting the inspection, the inspector should determine the authorities responsible for operation of the system and define the scope of the inspection. The inspector will obtain information to determine compliance in the following areas:

- CSO prevention during dry weather.
- Implementation of the nine minimum CSO controls.
- Adherence to a schedule for development, submission, and implementation of a LTCP, including any interim deliverables.
- Adherence to schedule for implementation of the CSO controls selected from the LTCP.
- Elimination or relocation of overflows from identified sensitive areas, as defined in the approved LTCP.
- Meeting narrative, performance-based, or numerical water quality-based effluent limitations.
- Monitoring program, including baseline information on frequency, duration, and impacts of CSOs.

PREPARATION

As stated above, the requirements for CSO control will be found in the NPDES permit, or in some cases, in an enforcement order, such as an administrative order or judicial order, or a consent decree. Inspectors should review the permit (and permit amendments) and other enforceable mechanisms (e.g., consent orders) issued to the permittee. The inspector should be aware that in some cases the CSSs and CSO structures (i.e., pump stations) may be permitted separately from the POTW. The inspector may find:

- Requirements to implement and document implementation of technology-based controls (at a minimum, the nine minimum controls) by the date specified in the permit or enforceable mechanism.
- A requirement to submit a report documenting the implementation of the nine minimum controls; the report will usually be required within 2 years of permit issuance.
- Requirements for implementation of the Long-Term CSO Control Plan. Since the CSO Policy has been in place since 1994, all CSO communities should be implementing their LTCPs. LTCP, should have narrative requirements pertaining to the implementation, operation, and maintenance of the selected CSO controls described in the LTCP. There

will also be an implementation schedule for CSO controls either in the permit or in an appropriate enforceable mechanism.

- Water quality-based effluent limits for CSOs. Numeric limits may not be found in the initial permits when the permittee is developing or implementing its LTCP, but may instead include a requirement to immediately comply with applicable WQSs expressed in the form of a narrative limitation. Permittees that have completed and are implementing their LTCPs may include water quality-based effluent limitations in the form of one or more of the following permit conditions for CSOs:
 - A maximum number of overflow events per year for specified design conditions.
 - Minimum percentage capture of combined sewage by volume for treatment under specified design conditions.
 - Minimum percentage reduction of the mass of pollutants discharged for specified design conditions.
 - Other performance-based standards and requirements.
- Requirements to implement a post-construction compliance monitoring program. This will be required for permittees that have completed implementation of their LTCPs.
- Requirement to re-assess overflows to sensitive areas. This will only be imposed in those cases where elimination or relocation of CSOs from sensitive areas were proven not to be physically possible and economically achievable.
- Conditions establishing requirements for maximizing the treatment of wet weather flows at the treatment plant.

The inspector should also review any CSO reports submitted by the permittee. The permittee may have submitted information in response to CWA section 308 information collection requests. The permittee may have submitted CSO monitoring plans or a report characterizing its combined sewer system, a report documenting implementation of the nine minimum CSO controls, or a Long-Term CSO Control Plan. Other documents and/or information that should be reviewed, if available, include:

- Discharge Monitoring Reports (DMRs).
- Citizen complaints.
- Correspondence.
- Notices of Violation.
- Annual reports (including annual capacity reports).
- Facility reports describing CSO discharge points and overflow problems.
- Inspection reports.
- Noncompliance notification reports describing overflows (usually attached to DMRs).
- Maps or reports detailing the proximity of overflows to drinking water sources.
- Reports that describe the potential for CSO impacts to human health or the environment.

Reviewing these permittee reports will help the inspector become knowledgeable about the permittee's specific CSO problems and existing CSO controls. The inspector should make copies of those documents that 1) establish enforceable CSO requirements, 2) provide evidence that an enforceable requirement has been violated or 3) provide evidence of environmental problems related to CSOs. When reviewing the permit, it is also important to review the narrative language that might contain additional non-numeric requirements that may be enforceable, such as: proper operation and maintenance of the system (including the collection system); CSO discharges being free from odors or floatable materials; and CSO discharge not causing or contributing to water quality impairments.

The inspector should make sure that EPA has a complete copy of noncompliance notification reports for the last five years, indicating the date, time, duration, flow rate, cause, and actions to correct, prevent, and mitigate each overflow from the facility. The inspector should also have a map or other document that provides the location of each CSO discharge point and identifies the receiving stream to which the overflow discharges.

ON-SITE RECORDS REVIEW

The inspector should review the following CSO records:

- Logbooks, internal electronic data systems (e.g., operating and maintenance activity data systems, SCADA control system data), reports, or internal memos describing maintenance and operation activities concerning the sewer system and CSO outfalls.
- CSO outfall flow records.
- Monitoring data on CSOs, collection system, or receiving stream.
- Records pertaining to installation of CSO controls.
- Feasibility studies.
- Capital project summaries (description and cost of each project).

Recordkeeping requirements vary by facility depending on the specific CSO controls the facility has selected and is implementing. If the permittee has submitted a report documenting implementation of the nine minimum CSO controls, the inspector should review appropriate records kept at the facility to verify the information in this report. Table 12-3 lists examples of possible records that might be kept to document the implementation of the nine minimum CSO controls. These examples are provided as illustrations and not requirements. The inspector should use the facility's permit or other enforceable document as a guide to determine what specific records the facility is required to keep and maintain. The facility's CSO operations and maintenance manual and CSO control plan can provide the inspector with insight into the specific types of records the facility would have. In addition, many permittees maintain electronic systems to track complaints, responses, and operation and maintenance activities. The inspector should review these systems and other available information sources to identify potential issues such as recurring complaints (indicating improper operation and maintenance) or potentially unreported dry weather overflows.

Table 12-3. CSO Records

Minimum CSO Controls	Examples of Records/Documentation
Proper Operation and Regular Maintenance Program	<ul style="list-style-type: none"> • Standard Operating Procedures, Operations and Maintenance Manual, or similar manual or plan. • Log of sewer system cleaning, flushing, or debris removal. • Log of repair or maintenance of regulators. • Log of lift station malfunctions and repairs made. • Log of preventive maintenance of interceptor lift stations and pumps. • Work orders for corrective activities. • Log of inspections of lift stations, sewer lines, and regulators.
Maximum Use of Collection System for Storage	<ul style="list-style-type: none"> • Hydraulic study of system and evaluation of alternatives to maximize wet weather flow storage capacity. • Records of installation of in-line devices such as dams, regulators, and gates to retard flow. • Installation of separate sanitary and stormwater lines. • Replacement of undersized pipes. • Adjustment of regulator settings or upgrading/adjusting pumping rates at lift stations. • Off-line temporary storage.
Review and Modification of the Pretreatment Program	<ul style="list-style-type: none"> • Inventory of nondomestic discharges. • Public Water Supply records of water usage for top nondomestic dischargers. • Assessment of significance of nondomestic discharges on CSO and receiving waters. • Pretreatment controls to reduce/eliminate industrial contaminants during wet weather.
Maximization of Flows to the POTW for Treatment	<ul style="list-style-type: none"> • Summary of analyses conducted. • Maximum wet weather flow Wastewater Treatment Plant (WWTP) can receive without pass-through or interference. • Description of modifications to be implemented.
Prohibition of Dry Weather Overflows (DWOs)	<ul style="list-style-type: none"> • Log of inspections of CSOs during dry weather and observations made during these inspections. • Log of Dry Weather Overflow (DWO) reports submitted.
Control of Solids and Floatable Materials in CSOS	<ul style="list-style-type: none"> • Installation of screens or booms. • Source control activities such as regular street cleaning, highly visible anti-litter programs. • MS4 stormwater annual report.
Pollution Prevention	<ul style="list-style-type: none"> • Documentation of street sweeping, anti-litter campaigns.
Public Notification	<ul style="list-style-type: none"> • CSO outfalls are posted with correct signage. • Date and proof of public notice, procedure (by newspaper, radio), public notice information.
Monitoring of CSOs	<ul style="list-style-type: none"> • Identification of outfall locations (i.e., latitude and longitude or street address).

Table 12-3. CSO Records

Minimum CSO Controls	Examples of Records/Documentation
	<ul style="list-style-type: none"> • Number and location of overflow events including duration, volume, and pollutant loadings. • Receiving stream data and impact (e.g., beach closings, fish kills). • Monitoring plan.

INTERVIEWS

As with all of the NPDES compliance inspections, interviews with appropriate personnel with firsthand knowledge of CSS/CSO activities can be useful in obtaining factual information. The inspector should interview the person in the highest position of authority responsible for the day-to-day development or implementation of the LTCP. Other personnel, such as the collection crew or others involved in inspecting, operating, and maintaining CSOs or CSO controls should also be interviewed. It is particularly important that the inspector obtain written statements (see Chapter 2) where personnel are providing information that is not or cannot be substantiated by the facility's records or the inspector's own observations.

If the facility is developing or implementing a LTCP, the inspector may want to interview those personnel responsible for that plan. Generally, the facility will be under a schedule with distinct activities and milestones established. This schedule may be in the permit, but will more likely be in an enforcement order. Other schedules, such as those submitted by the permittee in a report or in its LTCP are not enforceable schedules, and should only be referred to if an enforceable schedule does not exist. The inspector should focus on verifying the LTCP development or implementation activities that 1) the permittee has reported have been developed/implemented and 2) the permittee was required to have developed/implemented according to a schedule in the permit or enforcement order.

The following are examples of relevant questions that the inspector can use to obtain a general understanding of the facility. Other questions relevant to the specific NMCs are listed in Table 12-4. The inspector should add to these questions based on the specific requirements in the facility's permit. For example, if the permit requires submission of a "CSO Characterization Report" within 180 days of the permit issuance, the inspector should request the report and verify whether it was submitted within the established timeframe.

- What type of technology is used to control CSO discharges? Describe regulator mechanisms used, including size, type, presence or absence of backflow devices, and location.
- Describe the system, identifying the older and newer facilities that are used.
- Which areas and percentage of the collection system are combined and which areas contain separate storm and sanitary systems? What sewer systems/communities are served by the treatment plant? Is the collection system gravity fed or are pumps used? If pumping stations are used, how many are there and where are they located?

- What flows does the municipality receive from other municipalities? Are these upstream systems combined sewer systems or separate sanitary systems? What kinds of overflow problems have the upstream municipalities reported? What agreements are in place establishing which municipality has authority and duty to maintain various parts of the sewer system?
- How many overflows have occurred in the collection system, including contributing jurisdictions, within the last five years?
- What is the most common cause of overflows?
- What is an estimate of the amount of rainfall or snowmelt needed to cause CSOs?
- Where are the CSO outfalls located? Are any located at pump stations? What receiving stream does each CSO discharge to?
- What is a typical monthly rate of CSO events (including dry and wet weather events)?
- What samples have been taken of overflows? (Ask to see sample results.)
- What steps is the municipality taking to comply with the CSO requirements in its permit? If the municipality is planning to meet a different schedule than that required in the permit, what is its timeline?

Table 12-4. CSO Interview Questions

Minimum CSO Controls	Examples of Interview Questions
Proper Operations and Regular Maintenance Program	<ul style="list-style-type: none"> • How often are CSO discharge locations inspected? Who conducts the inspections? What records do they keep? How is corrective action assured when a problem is discovered? How are the operability and reliability of regulators verified? • Do the pump stations have backup power? Is any other type of redundancy built into the collection system to minimize the occurrence of overflows? • What is the municipality’s budget for collection system operation? For collection system maintenance? How much was spent last year on collection system operation and maintenance? What has been the trend in operation and maintenance budget over time? • How many people are dedicated to maintaining the collection system? What has been the staffing trend over time? • What improvements are planned? Are these projects funded? What is the process for funding capital improvements? • How are personnel trained? • How often is the Operations & Maintenance plan reviewed? When was the last revision? • If green infrastructure is used to reduce flow how are controls being maintained to ensure continued effectiveness? • Have O&M plans been updated to include GI maintenance?
Maximum Use of Collection System for Storage	<ul style="list-style-type: none"> • What steps are taken to maximize use of the collection system for storage? (e.g., install dams, weirs, and regulators)

Table 12-4. CSO Interview Questions

Minimum CSO Controls	Examples of Interview Questions
Review and Modification of the Pretreatment Program	<ul style="list-style-type: none"> • When were the pretreatment requirements last reviewed to ensure minimization of CSO impacts from upstream Industrial Users? What changes have been made to the program to accomplish this goal? What percentage of total flow comes from nondomestic sources?
Maximization of Flows to the POTW for Treatment	<ul style="list-style-type: none"> • What steps are taken to maximize flow to the POTW? • What are the bottlenecks in the sewer system? What facilities in the system are critical to the performance of the CSS? • What are the capabilities of major interceptors and pumping stations delivering flows to the treatment POTW? • How do wet weather flows to the POTW compare with dry weather flows? • How does the current total flow compare to the design capacity? • What, if any, unused treatment facilities are used to store wet weather flows?
Prohibition of Dry Weather Overflows (DWOs)	<ul style="list-style-type: none"> • What has the municipality done to eliminate dry weather overflows? • How does the municipality identify dry weather overflows? If inspections are used, how often are the inspections performed? What type of monitoring is performed to identify dry weather overflows? • Describe the most recent cleaning, sewer repair, or regulator repair performed to alleviate a dry weather overflow. • How does the municipality determine which dry weather overflows could endanger health or the environment?
Control of Solids and Floatable Materials in CSOS	<ul style="list-style-type: none"> • How does the municipality keep solids and floatables out of the CSO discharge? • If solids and floatables do reach the receiving waters, how does the municipality remove them?
Pollution Prevention	<ul style="list-style-type: none"> • What pollution prevention measures (e.g., street cleaning, public education, waste collection or recycling) does the municipality take to keep contaminants from entering the sewer system?
Public Notification	<ul style="list-style-type: none"> • How has the public been notified of the location of CSO discharge points? How does the municipality notify the public of overflow incidents? When was the last notification? • What is the internal mechanism for reporting sewage overflows? How does this information reach the permitting authority?
Monitoring of CSOs	<ul style="list-style-type: none"> • How does the municipality monitor CSOs? How does the municipality use this monitoring to characterize the impacts of CSOs? How does the municipality use this monitoring to evaluate the effectiveness of CSO controls? Does the municipality monitor CSO flow rates? • What information from other groups (e.g., Coast Guard or local volunteer groups) does the municipality collect on water quality or use of waters affected by CSOs (e.g., beach closings, fish kills)?

Table 12-4. CSO Interview Questions

Minimum CSO Controls	Examples of Interview Questions
	<ul style="list-style-type: none"> • Which CSO receiving waters are the most sensitive? Why? (e.g., proximity to drinking water sources)

FACILITY SITE INSPECTION

An inspection of the CSO outfalls should be included in a NPDES compliance inspection to get a complete picture of how the overall POTW (wastewater treatment plant and collection system) is performing. This is especially true if the inspection's focus or one of its objectives is to investigate compliance with CSO requirements. In such cases, an inspection of CSO structures, CSO treatment systems, or key areas of the collection system is necessary. If the intent of the inspection is to observe CSO discharges or treatment, it may be necessary to schedule this inspection during or immediately after a wet weather event. These outfalls would be located throughout the collection system and, therefore, may be several miles from the treatment facility.

It is not necessary to inspect all CSO outfalls. The inspector can select a few either randomly or can use several criteria to select which outfalls to inspect, including:

- Location (closest to the plant, or proximity to other outfalls).
- Size as measured by discharge volume (e.g., the largest discharge volumes).
- Frequency of discharge (during wet weather).
- Treatment of solids and floatables (if the inspector wishes to evaluate the operation and maintenance of such controls).
- Incidence of dry weather overflows (DWOs).
- Discharges to sensitive areas.
- Impact on water quality (those known to impact water quality).
- Lack of previous inspections by the permittee.

If the inspector observes any dry weather CSO discharges, the inspector should make a photographic record (see Chapter 2); note the appearance and approximate flow rate of the discharge; if possible, sample the discharge (assuming that adequate laboratories are available for the analysis); note the present and immediately preceding weather conditions; and conduct in-depth interviews and obtain statements from facility personnel.

C. REFERENCES

The following is a list of resources providing additional information on CSOs.

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- U.S. Environmental Protection Agency. (2012). *Integrated Municipal Stormwater and Wastewater Planning Approach Framework*.

U.S. Environmental Protection Agency. (2014a). *Financial Capability Assessment Framework*.

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D. CSO EVALUATION CHECKLIST

A. IDENTIFICATION OF CSOs			
Yes	No	N/A	1. Are all CSO points identified?
Yes	No	N/A	2. Does facility have maps/schematics of Combined Sewer System (CSS) depicting location of all CSO discharge points?
Yes	No	N/A	3. Is each CSO discharge point located by longitude, latitude, and street address on appropriate maps?
B. DRY WEATHER OVERFLOWS			
Yes	No	N/A	1. Are the locations of all dry weather CSOs known by permittee?
Yes	No	N/A	2. Does permittee have records of quantitative loads and flows on all dry weather CSO events?
Yes	No	N/A	3. Has notification been given to EPA/state of all dry weather CSO discharges?
Yes	No	N/A	4. Are there any unreported dry weather CSOs?
C. RECORDS			
			1. Are the following records kept for CSO events?
Yes	No	N/A	• Location.
Yes	No	N/A	• Frequency of discharge.
Yes	No	N/A	• Flow magnitude.
Yes	No	N/A	• Discharge pattern.
Yes	No	N/A	• Total volume of discharge.
Yes	No	N/A	• Duration of the event.
Yes	No	N/A	• Pollutant characterization.
Yes	No	N/A	• Correlation with rainfall records.
Yes	No	N/A	• Specific causes of overflows.
Yes	No	N/A	• Flow collected/flow diverted?
Yes	No	N/A	2. Are records of CSO flows maintained?
Yes	No	N/A	3. Are records accurate?
D. OPERATION AND MAINTENANCE			
Yes	No	N/A	1. Is there a CSS O&M manual and does it address O&M of CSO structures?
Yes	No	N/A	2. Does the facility conduct inspections of the CSS and CSO structures?
Yes	No	N/A	3. Are these inspections documented? Does documentation include results of various types of inspections, dates and times, corrective action taken if problems were found?

Yes	No	N/A	4. Is a logbook of maintenance and repair on the CSS and CSO structures maintained? Does this note the type of problem (or indicate routine maintenance), repair made, or maintenance activity conducted, date?
E. COMPLIANCE SCHEDULES			
			1. Is permittee meeting CSO compliance schedule for:
Yes	No	N/A	<ul style="list-style-type: none"> Implementing nine minimum CSO controls?
Yes	No	N/A	<ul style="list-style-type: none"> Developing LTCP?
Yes	No	N/A	<ul style="list-style-type: none"> Implementing LTCP?
Yes	No	N/A	2. Has permittee requested an extension of time?

CHAPTER 13 – SANITARY SEWER OVERFLOWS

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Related Websites

Office of Wastewater Management (OWM) home page: <http://www.epa.gov/owm>

A. OVERVIEW OF SSOS

In addition to materials in this chapter, inspectors must be familiar with Chapter 1, "Introduction," and Chapter 2, "Inspection Procedures."

Sanitary sewer collection systems are designed to remove wastewater from homes and other buildings and convey it to a proper treatment facility and disposal location. The collection system is critical to successful performance of the wastewater treatment process. The Environmental Protection Agency (EPA) estimates that collection systems in the United States have a replacement value of \$1 to \$2 trillion. Under certain conditions, poorly designed, built, managed, operated, and/or maintained systems can pose risks to public health and the environment. These risks arise from sanitary sewer overflows (SSOs) from the collection system. SSOs are discharges of wastewater (including that combined with rainfall-induced infiltration/inflow) from a separate sanitary sewer prior to treatment at the wastewater treatment plant. SSOs typically release untreated sewage into basements or out of manholes and onto city streets, public spaces, and into streams.

Effective and continuous management, operation, and maintenance, as well as ensuring adequate capacity and performing rehabilitation, when necessary, are critical to maintaining collection system capacity and performance while extending the life of the system. Many sanitary sewer collection systems, however, have received minimal maintenance over the years resulting in deteriorated sewers with subsequent overflows, cave-ins, hydraulic overloads at treatment plants, and other safety, health, and environmental problems. As one of the most serious and environmentally threatening problems, sanitary sewer overflows are a frequent cause of water quality violations and are a threat to public health and the environment. Beach closings, flooded basements, closed shellfish beds and hydraulically overloaded wastewater treatment plants are some symptoms of collection systems with inadequate capacity and improper management, operations, and maintenance.

Even though separate sanitary sewer systems are designed to collect and transport all the sewage that flows into them, SSOs can still occur. Recurring SSOs typically indicate that something is wrong with the system. Problems contributing to SSOs include:

- **Deteriorating sewer system:** Many sewer authorities neglect to plan and fund long-term sewer rehabilitation and replacement projects.
- **Infiltration and inflow (I&I):** This involves too much rainfall or snowmelt infiltrating through the ground into leaky sanitary sewers, excess water inflowing through roof drains connected to sewers, broken pipes, or badly connected sewer service lines. Unlike combined sewers, sanitary sewers are not intended to collect or convey rainfall or to drain property.
- **Undersized systems:** Sewers and pumps are too small to carry sewage from newly developed subdivisions or commercial areas; this may be exacerbated by I&I.

- **Pipe failures:** Pipe failures result from blocked, broken or cracked pipes. Sections of pipe settle or shift so that pipe joints no longer align with one another, sediment and other material build up causing pipes to break or collapse.
- **Pump station failures:** This results from pump failures, power failures, and inadequate wet well capacity.
- **Sewer service connections:** Discharges occur at sewer service connections to houses and other buildings due to pipe blockages and/or failures.
- **Pipe blockages:** Grease and tree roots are the primary causes of sewer blockages.
- **Vandalism and construction-related spills:** While there are many causes for vandalism, they often result in blockages or failure of pumps. For construction, breaks in lines occur due to improperly marked lines, or errant excavation contractors.

From a compliance standpoint, Chapter X of the *Enforcement Management System (EMS): Setting Priorities for Addressing Discharges from Separate Sanitary Sewers* (EPA, 1996a), establishes a series of guiding principles and priorities for use by EPA Regions and National Pollutant Discharge Elimination System (NPDES) states in responding to separate sanitary sewer discharge violations. Chapter X states:

“For a person to be in violation of the Clean Water Act: 1) a person must own, operate, or have substantial control over the conveyance from which the discharge of pollutants occurs, 2) the discharge must be prohibited by a permit, be a violation of the permit language, or not be authorized by a permit, and 3) the discharge must reach waters of the United States. In addition, discharges that do not reach waters of the United States may nevertheless be in violation of Clean Water Act permit requirements, such as those requiring proper operation and maintenance (O&M), or may be in violation of State law.”

The exact use of language in a NPDES permit disallowing SSOs may vary from one facility to another (often depending on how a state NPDES permit authority contends with SSOs). Some permits explicitly prohibit overflows from the system and in other cases, where the permit may be silent, SSOs that discharge to waters of the United States are treated as unauthorized discharges and a violation of the CWA. In either circumstance, SSOs that discharge to waters of the United States are prohibited and illegal.

Systems have been found to be out of compliance because of overflows (even those that do not reach waters of the United States) that are the result of improper operation and maintenance. The regulations at Title 40 of the *Code of Federal Regulations (CFR) Part 122.41(e)* require, as a standard NPDES permit condition, that permitted wastewater owners or operators must “properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit.”

Another standard permit condition regarding the duty to mitigate states that “the permittee shall take all reasonable steps to minimize or prevent any discharge... in violation of [the]

permit which has a reasonable likelihood of adversely affecting human health or the environment” (40 CFR 122.41 (d)). This may be interpreted to include sanitary sewer overflow discharges.

Most permittees are required to report any noncompliance, including any overflows, regardless of volume, that result in a discharge or that are caused by improper operation and maintenance. Most permits also require that any noncompliance, including overflows which may endanger the health or the environment, be reported within 24 hours, and in writing within five days (40 CFR 122.41(l)(6)). Most permits also require notification to the public and other entities (Third Party Notice) of overflows that may endanger health due to a likelihood of human exposure.

Since there are minor variations among permits regarding how to deal with overflows (except for the standard permit conditions that appear in all permits), the NPDES inspector should rely on the guidance in Chapter X of the EMS (part of which has been summarized above), NPDES permit requirements for municipal sanitary sewer collection systems and SSOs, and the Publicly Owned Treatment Work (POTW) NPDES permit for standards for evaluating compliance.

B. SSO INSPECTION PROCEDURES

During an inspection of a sanitary sewer system, the inspector will obtain information indicating whether the sewer authority is properly managing, operating, and maintaining its collection system and taking all feasible steps to stop sanitary sewer overflows. The inspection of one sanitary sewer system may involve visits to more than one municipality, depending upon the configuration and possible shared responsibility for the system. Before conducting the inspection, the inspector should identify the authorities responsible for operation of the system and define the scope of the inspection.

PREPARATION

In evaluating either a system with a history of SSOs or a system in which overflows may not necessarily be documented, the compliance inspector will rely primarily on the permit¹⁰ as a starting point. The inspector should refer to standard permit language contained in the NPDES permit. The inspector should also review the permit for any overflow-related requirements specific to the system.

An enforcement order, consent decree, or other enforceable document might also indicate prohibition, notification, or special circumstance language. Often, the establishment of a sanitary sewer discharge control program is the result of an enforcement action against a

¹⁰ Municipal satellite collection systems are sanitary sewers owned or operated by a municipality that conveys sewage or industrial wastewater to a POTW that has a treatment plant owned or operated by a different municipality. These types of facilities do not typically have their own NPDES permit. Any discharge from a municipal satellite collection system without a permit would be a violation of the CWA and would be subject to potential enforcement.

system. The inspector should refer to the enforcement document (e.g., consent decree, order, or other settlement) for a compliance schedule for sanitary sewer discharge control programs.

The compliance inspector will be faced with obtaining information to determine compliance in the following areas:

NPDES Standard Conditions

- **Proper Operation and Maintenance**. Regulatory language at 40 Part 122.41(e) states that: “The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit.” Poor operation and maintenance practices frequently lead to unpermitted discharges.
- **Duty to Mitigate**. Regulatory language at 40 CFR 122.41(d) states that: “The permittee shall take all reasonable steps to minimize or prevent any discharge... in violation of [the] permit which has a reasonable likelihood of adversely affecting human health or the environment.” These steps would include activities critical to the operation and maintenance of the system.
- **Non-compliance Reporting**. Regulatory language at 40 CFR 122.41(l)(6) states that: “The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances.” Regulatory language at 40 CFR 122.41(l)(7) states that: “The permittee shall report all instances of noncompliance not reported under paragraphs (l)(4), (5), and (6) of this section, at the time monitoring reports are submitted.”

Notification Procedures

- In general, permits require that any noncompliance, including overflows that result in a discharge or that are caused by improper operation and maintenance, be reported at the end of each month with the DMR (see 40 CFR 122.41(l)(6) and (7)). At a minimum, permits typically require that overflow summaries include the date, time, duration, location, estimated volume, cause, as well as any observed environmental impacts, and what actions were taken or are being taken to address the overflow.
- Most permits also require that any noncompliance, including overflows, which may endanger the health or the environment be reported within 24 hours, and in writing within five days. Examples of overflows which may endanger health or the environment include major line breaks, overflow events that result in fish kills or other significant harm, and overflow events that occur in environmentally sensitive areas. Most permits also require notification to the public and other entities (Third Party Notice) of overflows that may endanger health due to a likelihood of human exposure.

Prohibition of Unpermitted Discharges

- Discharges to waters of the United States must be regulated by a NPDES permit. Any discharge from a location other than the effluent discharge point specified in the permit

constitutes an unpermitted discharge. This includes dry weather overflows and discharges from municipal satellite collection systems without permits.

RECORDS REVIEW

Prior to the inspection, the inspector should review the permittee's DMRs, SSO notification reports submitted by the permittee, sewer overflow service calls, and other documents that may have relevant information (e.g., annual reports). The permittee may have submitted information in response to EPA CWA section 308 information requests on SSOs. As required by an enforcement action, the permittee may have submitted plans or a report characterizing its program to eliminate SSOs or a report documenting progress of its sanitary sewer discharge control programs or describing SSO discharge points and overflow problems. Other documents and information that should be reviewed, if available, include:

- Citizen complaints
- Correspondence
- Notices of violation
- Annual capacity reports
- Inspection reports
- Maps illustrating the proximity of overflows to drinking water sources
- Depth of ground water
- Age of the city
- Extent of city ownership of service connection laterals
- Potential for impact to human health and the environment

Reviewing these reports in advance of the inspection will help the inspector become knowledgeable about the permittee's specific SSO problems, existing SSO controls, and/or plans to reduce or eliminate their SSO problems. The inspector should make copies of those documents that provide evidence of 1) any SSO occurring at the facility within the previous five years or 2) environmental problems related to SSOs at the facility. The inspector should make sure that EPA has a complete copy of the last five years of noncompliance notification reports, indicating the date, time, duration, flow rate, cause, and actions to correct, prevent, and mitigate each sewage overflow from the facility.

During the on-site records review, the types of records that the inspector should find at the facility include logs, reports, or internal memos describing maintenance and operation activities concerning the sanitary sewer system and SSOs. As in any NPDES evaluation, the inspector should review DMRs as well as monitoring results as reported by the laboratory that analyzed the data.

However, during inspections concerned with SSOs, the inspector might also request records pertaining to management, budget, and planning for sewer infrastructure improvements. The inspector might also want to review maps of the sanitary sewer system, indicating the locations of manholes, pump stations, etc. Table 13-1 contains a sample list of documents to review.

Items have been arranged under headings for each of the four major components: Capacity, Management, Operations, and Maintenance (CMOM). There is some overlap between the areas where an inspector would typically use some of the documents listed. For example, POTW flow records would be helpful in the section of the inspection report relating to operations and maintenance as well as capacity. As appropriate, the permittee should have as many of these records readily available as possible.

EPA has an inspection guide for CMOM programs at collection systems, the *Guide for Evaluating Capacity, Management, Operations, and Maintenance Programs at Sanitary Sewer Collection Systems* (EPA, 2005). This guide includes a detailed checklist for conducting evaluations of wastewater collection system CMOM programs. The guide also provides a form that provides examples of the types of information an inspector should attempt to obtain while on-site. In addition, EPA Region 4 has developed materials and guidance to help a municipality with its CMOM program (see references of this chapter).

INTERVIEWS

As with all NPDES compliance inspections, interviews with appropriate personnel are essential to understanding the context and meaning of the documents and records. In the case of SSO investigations, appropriate personnel would include people in the highest position of authority at the facility as well as those responsible for day-to-day operations, maintenance and/or oversight of crews such as the collection crew or others involved in inspecting, operating, and maintaining the system. It is particularly important that the inspector obtain written statements (see Chapter 2) where personnel are providing information that is not or cannot be substantiated by the facility's records or the inspector's own observations.

The following are examples of relevant questions that the inspector can use to obtain a general understanding of the facility.

- What is the capacity of the collection system? Is the capacity adequate? What measures have been taken to prevent SSOs?
- What flows does the municipality receive from other municipalities? What kinds of overflow problems have the upstream municipalities reported? What agreements exist to maintain various parts of the sewer systems?
- What are the causes of overflows, where do they occur, and how are they documented and reported?
- Where are the potential SSO point discharges located? Are any located at pump stations? What receiving stream does each SSO discharge to?
- How many SSOs have occurred in the past five years? What is the plan to reduce/eliminate SSOs?
- What are the SSO remediation policies and emergency Standard Operating Procedures (SOPs)?
- How does the authority identify and assess impact from non-municipally owned lateral lines?

- What preventive and response Best Management Practices (BMPs), such as containment, recovery, and minimization of impact to human health and the environment, are in place?
- How are personnel trained to manage and/or prevent SSOs, and what are current staffing levels?
- Are there any alarms or monitoring systems to alert you of an imminent SSO, and what are they?
- What are the goals of the authority's program for managing, operating, and maintaining the sanitary sewer conveyance system?
- What structural deficiencies have been identified in the system?
- What is the O&M schedule for replacement parts/equipment and collection system improvements?
- What studies have been performed of the authority's program for managing, operating, and maintaining the sanitary sewer collection system?

FACILITY SITE INSPECTION

Previous chapters of this manual provide guidance on general procedures for performing compliance inspections and are a valuable source of information on such topics as entry, legal authority and responsibilities of the inspector. However, there are some issues with entry that are specific to CMOM inspections. The inspector should be aware that some collection system components may be on private property, and they must gain entry properly through the property owner.

After reviewing records of SSO incidents, the inspector should visit previously identified SSO locations. The field inspection of the collection system should be directed by information gathered on prior SSOs, noncompliance notifications, citizen complaints, state reports, municipal studies, etc. Locations where large or representative SSOs have occurred or where SSOs occur more frequently should have higher priority for field inspection. The inspector should review causes (e.g., evidence of illicit connections) and determine whether the situation that led to the spill has been adequately addressed.

Field sampling must be conducted according to approved EPA methodology discussed in other chapters and may include sampling of the discharge and/or the receiving stream. Field sampling may be useful in developing enforcement actions to address chronic or acute violations, and as such, must be conducted with strict adherence to 40 CFR Part 136 and chain-of-custody protocol.

The inspector is reminded to take appropriate safety precautions. Collection systems may present physical, biological, chemical, and atmospheric hazards. Safety equipment should include a hard hat, steel-toed boots, safety glasses, gloves and for those with prescription eyeglasses, eyeglass straps are very important. A flashlight (and/or a small mirror) is also useful for collection system inspections. Collection system operators typically deal with manhole cover removal and other physical activities. The inspector should not enter confined spaces. In sewer collection systems, the two most common confined spaces are the underground pumping

station and manholes. The underground pumping station is typically entered through a relatively narrow metal or concrete shaft via a fixed ladder creating limited access and entry/exit.

Table 13-1. Documents to Review

Capacity	Management	Operations	Maintenance
<ul style="list-style-type: none"> • Information relating to system capacity. • Performance data. • POTW Flow Records. • Capital improvement projects (CIP) plan (including funding and planned improvements). • Collection system master plan. • Infiltration/Inflow studies. • I/I studies and evaluations (including programs for eliminating illegal connections). 	<ul style="list-style-type: none"> • Organization chart(s) and chain of communication for reporting SSOs. • Program goals. • Management policies and procedures. • Job descriptions. • Staffing plans, crew assignments and schedules. • Sewer Use Ordinance, Grease Control Ordinance. • Legal authority establishing control of system equipment and its maintenance. • O&M budget with cost centers for wastewater collection. • Recent annual report if available. • Procurement process. • Information systems. • Training plan. • Training and certification records. • Public education materials. • Policy and procedures for trenching, confined space, lockout tagout, PPE. • CMOM program audits. • Methods to extend good collection systems management to any satellite communities discharging to the central system. 	<ul style="list-style-type: none"> • Detailed maps/schematics of the collection system and pump stations. • O&M manuals. • Inspection strategy, forms, and records. • SSO reports detailing location, receiving water, volume, cause, start and stop date and time, system component, corrective action, and actions to mitigate impacts. • Safety manual. • Emergency response plan/SOP (awareness, notification, training, and emergency response). • SCADA and other alarm system information. • Materials management program. • Vehicle management. • Overall map of system showing facilities such as pump stations, treatment plants, major gravity. • Odor and corrosion control strategy. • Root control program. • Sampling procedures. • Industrial pretreatment oversight of the collection system. 	<ul style="list-style-type: none"> • Routine reports regarding system O&M activities. • Work order management system. • Maintenance tasks and frequencies. • Replacement parts inventory. • Performance measures for inspection, cleaning, repair, rehabilitation sewers, and force mains. • Preventive maintenance cleaning strategy. • Problem diagnosis records. • Repair, rehabilitation, replacement strategy for pipes and pump stations. • Record of citizen complaints and emergencies (normal hours and after hours). • Notifications to public health agencies, NPDES authority, and other entities.

C. REFERENCES

The following is a list of resources providing additional information on SSOs.

- U.S. Environmental Protection Agency. (1995). *Enforcement Efforts Addressing Sanitary Sewer Overflows*. EPA Memorandum.
- U.S. Environmental Protection Agency. (1996a). *The Enforcement Management System National Pollutant Discharge Elimination System (Clean Water Act) Chapter X: Setting Priorities for Addressing Discharges from Separate Sanitary Sewers*.
- U.S. Environmental Protection Agency. (1996b). *Sanitary Sewer Overflows: What are they and how can we reduce them?* EPA 832-K-96-001.
- U.S. Environmental Protection Agency. (1996c). *Sanitary Sewer Overflow and Sanitary Sewer Operation, Maintenance, and Management Draft Unified Paper*.
- U.S. Environmental Protection Agency. (2000a). *Compliance and Enforcement Strategy Addressing Combined Sewer Overflows and Sanitary Sewer Overflows*. EPA Memorandum.
- U.S. Environmental Protection Agency. (2000b). *Brochure: Benefits of Protection Your Community from Sanitary Sewer Overflows*. EPA 832-F-00-005.
- U.S. Environmental Protection Agency. (2001a). *Fact sheet: Why Control Sanitary Sewer Overflows?*
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- U.S. Environmental Protection Agency. (2001c). *Evaluating POTW Capacity Management, Operation, and Maintenance Programs*. Office of Compliance and Region 4.
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- U.S. Environmental Protection Agency. (2002a). *Case Study: Clearwater, Florida Abates Sanitary Sewer Overflows Using the EPA Region 4 Management, Operations and Maintenance Approach*. EPA 833-R-02-001.
- U.S. Environmental Protection Agency. (2002b). *Fact Sheet: Asset Management for Sewer Collection Systems*. EPA 833-F-02-001.
- U.S. Environmental Protection Agency. (2004). *Report to Congress: Impacts and Control of CSOs and SSOs*. EPA 833-R-04-001.

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AB.	Rainwater Harvest Inspection Form
AC.	Green Roof Inspection Form

A. INTRODUCTION

In addition to materials in this chapter, inspectors must be familiar with Chapter 1, “Introduction,” and Chapter 2, “Inspection Procedures.”

An increasing number of National Pollutant Discharge Elimination System (NPDES) permittees are implementing green infrastructure practices that mimic natural processes to infiltrate, evapotranspire, or use stormwater on or close to where it falls. This document is designed for United States Environmental Protection Agency (EPA), state, and local NPDES inspectors and provides background and suggested procedures for inspecting green infrastructure practices for proper installation, operation, and maintenance.

SCIENCE OF GREEN INFRASTRUCTURE

Green infrastructure systems are often designed using soil, vegetation and natural infiltration to more effectively manage urban stormwater and reduce impacts to receiving water. The hydraulic cycle is altered by the land use practices associated with human development, resulting in increased erosion and stream flooding during storms, reduced surface water base flow and interflow (shallow infiltration), groundwater recharge, and degraded water quality. Green infrastructure mimics pre-developed conditions by restoring the natural hydrology and enabling water to infiltrate instead of run off. This effects the timing of water release to rivers and streams, resulting in less flooding, and minimizing the quantity of water released into municipal separate storm sewer systems (MS4s) or combined sewer systems (CSSs). In the same way, green infrastructure can help reduce stormwater flow into combined sewer systems, thereby reducing combined sewer overflows and treatment requirements, which may result in fewer discharges of pollutants.

Green infrastructure can provide a wide variety of environmental, social, and economic benefits in addition to water quality improvements, including improved air quality, reduced urban heat island effect, reduced energy use, improved health, green jobs, recreational amenities, wildlife habitat, and increased property values. Green infrastructure is also an important tool for communities to increase their climate change resilience because it can help manage flooding, prepare for drought, and protect coasts by reducing coastal erosion and storm impacts.

Exhibit 14-1 depicts the impact of urbanization on water infiltration and evapotranspiration.

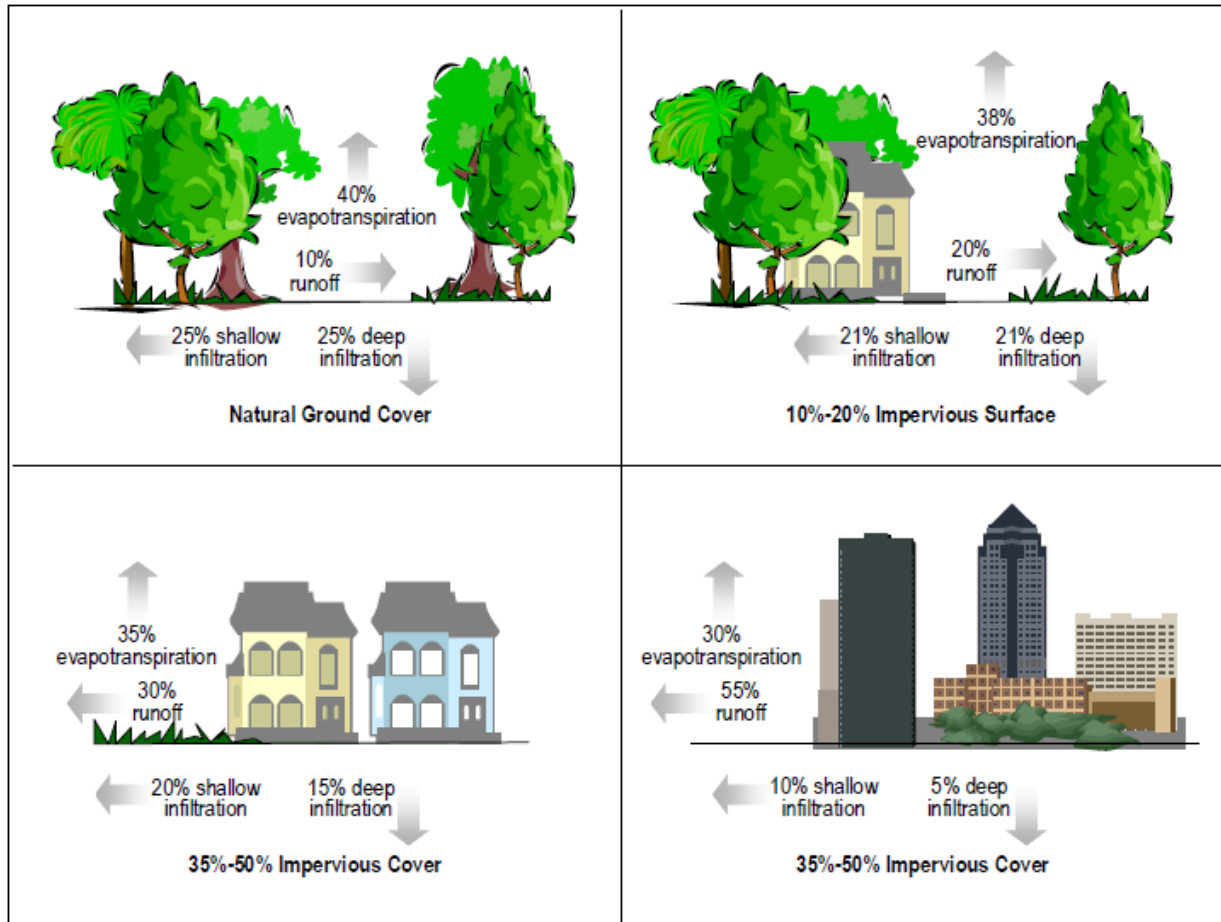


Exhibit 14-1. Impacts of Urbanization (as impervious surfaces are added, less and less precipitation is absorbed, resulting in more runoff) (Source: EPA, 2005)

Green infrastructure controls increase infiltration, filtration, storage, evaporation, transpiration, and rainwater capture and reuse. Green infrastructure can be used at varying landscape scales, including large regional treatment or watershed, as well as a neighborhood or small site in place of, or in addition to, more traditional stormwater controls. Small area stormwater infiltration practices (e.g., rain gardens, bioswales, infiltration planters, and tree plantings) can fit into individual site development or redevelopment sites, while larger area management strategies (e.g., riparian buffers, flood plain and wetland restoration, open space and forest preservation) systems are typically applied at the watershed level.

DESIGN AND INSPECTION PREPARATION

Design requirements for green infrastructure can vary by state and even by locality. Green infrastructure designs are based on a number of detailed design calculations and data (including geographic information system (GIS) data, modeling, soil tests, and other information). Also, many green infrastructure designs include significant components that are not easily visible to inspectors (e.g., soil media depth, underdrains). If as-built drawings are

available, they can be used to assess whether an inspected control still meets the approved design.

Inspection Preparation

To prepare for an inspection, inspectors should be familiar with the local requirements and design standards. Inspectors can review permits, legal agreements (e.g., consent agreements), state/local manuals for design specifications, operations and maintenance manuals, previous inspection reports, and enforcement orders. Though consent decrees and NPDES permits typically authorize the permit authority to access the subject facility, inspectors need to follow the entry procedures in this inspection manual.

On the day of the inspection, inspectors should bring inspection forms or checklists, site plans, maps, and a camera. In some cases, a soil probe to check soil compaction and composition may be useful. Document observations through photographs and using the appropriate inspection form or checklist. Additional information may be obtained from interviews of local residents and/or business owners (who may have observed how the green infrastructure control functions under various weather conditions).

The University of Minnesota has developed an online guidance (“Developing an Assessment Program,” a chapter in *Stormwater Treatment: Assessment and Maintenance*) to help inspectors assess the performance of and schedule maintenance for stormwater controls (Gulliver et al., 2010). This online manual can be found at <http://stormwaterbook.safl.umn.edu/>.

CONSIDERATIONS ON INSPECTION TIMING

When possible, inspectors should schedule green infrastructure inspections during the following timeframes to better observe performance:

During or immediately after a rain event. Conducting inspections during or right after a rain event (within 24 hours) will allow the inspector to view the green infrastructure control in operation, and make it easier to see if the control is functioning as designed. For example, inspections during a rain event allow an inspector to see where the stormwater flows and whether stormwater is bypassing controls. Most controls are designed to drain all stormwater within 24–72 hours, so standing water that has not drained three days after a rain event could indicate that maintenance is required for that infiltration control.

During spring, summer and fall. Spring, summer, and fall are probably the best times to inspect green infrastructure practices in most regions. Winter conditions can impact the vegetation in a green infrastructure control, which can look significantly different than during spring/summer. Also, snow cover in winter months in some areas can make inspecting green infrastructure controls very difficult.

After construction. Inspectors should be aware that vegetation in certain green infrastructure controls can take several years to become fully established. An inspection soon after installation is complete can allow an inspector to more easily see inlets, outlets and other

aspects of the control, but vegetation may be sparse while it becomes established. Therefore, depending on the control, it may be best to inspect green infrastructure practices multiple times, both soon after installation and once vegetation is well-established to get a full picture of how practices are performing.

TYPES OF GREEN INFRASTRUCTURE MANAGEMENT PRACTICES

This chapter details infiltration controls, permeable pavement controls, rainwater harvesting systems and green roofs, as these are the most common types of green infrastructure controls that an inspector would investigate. There are many other types of stormwater and green infrastructure controls that an inspector may see in the field, and the inspection techniques described in this chapter may be applied to many of these controls as well.

Many times, multiple controls are integrated into a site and designed synergistically. Exhibit 14-2 depicts a typical site plan with green infrastructure controls annotated.

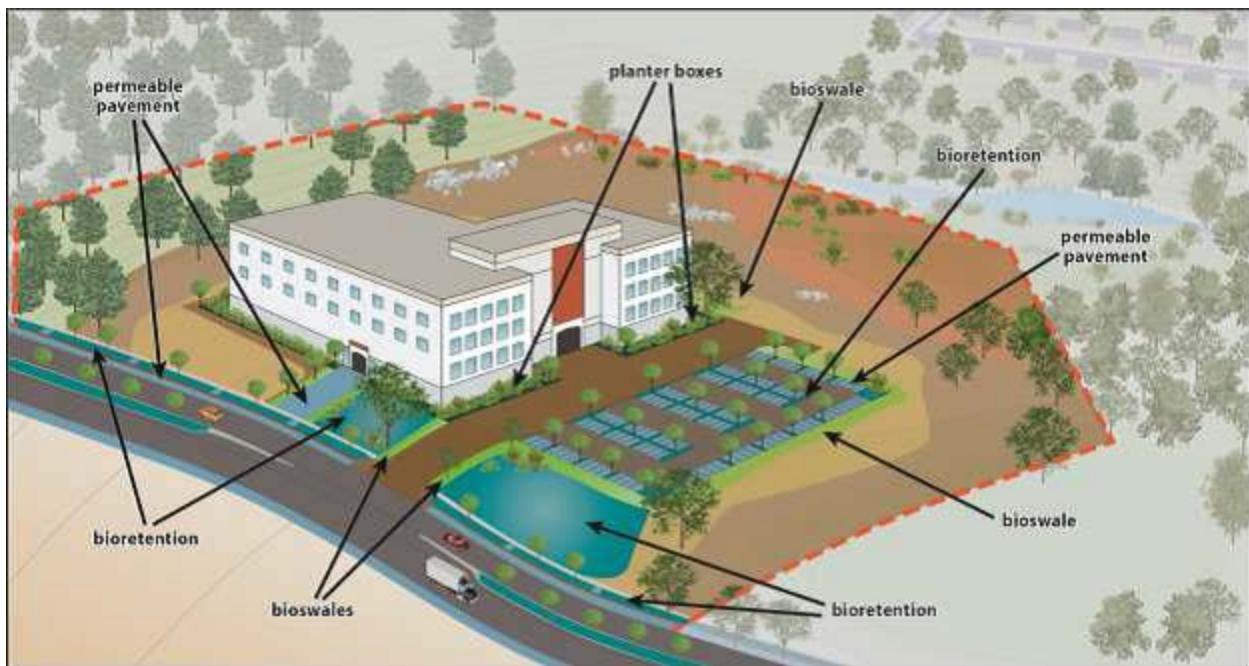


Exhibit 14-2. Multiple Green Infrastructure Controls on a Developed Site
(Source: Dorman et al., 2013)

To help educate inspectors on typical green infrastructure control performance, Table 14-1 provides a site selection matrix based on the desired function of the green infrastructure practice. It also includes pollutant reduction estimates and comparative costs.

Table 14-1. Sample Design Management Practice Selection Matrix According to Site Characteristics (Source: Modified from Dorman et al., 2013)

Attribute		Infiltration Control	Permeable Pavement	Rainwater Harvesting	Green Roof
Typical contributing drainage area (acres)		<5	varies	Rooftop	Rooftop
Practice slope		<2%	<2%	N/A	N/A
Pollutant Removal	Sediments	High	High	Pollutant removal provided by downstream BMP	Typically, water quality is not improved by green roofs (although volume reduction can reduce total loads).
	Nutrients	Medium	Low		
	Trash	High	High		
	Metals	High	High		
	Bacteria	High	Medium		
	Oil and Grease	High	Medium		
	Organics	High	Low		
Runoff volume reduction		High	High	Varies based on cistern size and water demand	High
Peak flow control		Medium	Medium		Medium
Construction costs		Low to medium	Medium to high	Low to medium	High
O&M costs		Low to medium	Medium	Low to medium	Low to medium

B. INFILTRATION CONTROLS

DESCRIPTION

Infiltration controls are engineered systems designed to use temporary surface and underground storage to capture and hold stormwater on-site for enough time to allow a designed stormwater volume to evapotranspire, percolate, and filter into the ground, reducing or eliminating surface runoff depending on the regulatory requirements at the site. Infiltration utilizing landscaped areas, including bioretention, rain gardens and bioswales, typically consists of a combination of some or all of the following elements: a flow-regulating structure (such as a level spreader that slows and spreads the flow out into a control), a pretreatment element (such as a vegetated filter strip), an engineered soil mix planting bed, vegetation, and an outflow-regulating structure. In some places, bioretention (Exhibit 14-3 and Exhibit 14-4) is defined as an engineered structure while rain gardens are simpler structures with no formal engineering and designed/installed by a homeowner. Infiltration controls are designed to hold water for a specific amount of time and remove many of the pollutants through a variety of chemical, physical and biological processes, in a manner similar to natural ecosystems.

Infiltration can occur at both large and small sites. In addition to providing temporary storage that delays the timing of stormwater to waterways, infiltration provides effective treatment/capture for such pollutants as sediments, nutrients, trash, metals, bacteria, oil and grease, and organics. Infiltration practices that include trees have the added benefits of greater

evapotranspiration and water uptake and reduction of energy demand by providing summer shade to buildings.

Infiltration systems are versatile stormwater management practices that can be readily adapted to parking lot islands; street medians; residential, commercial and industrial campus landscaping; and urban and suburban green spaces and corridors.

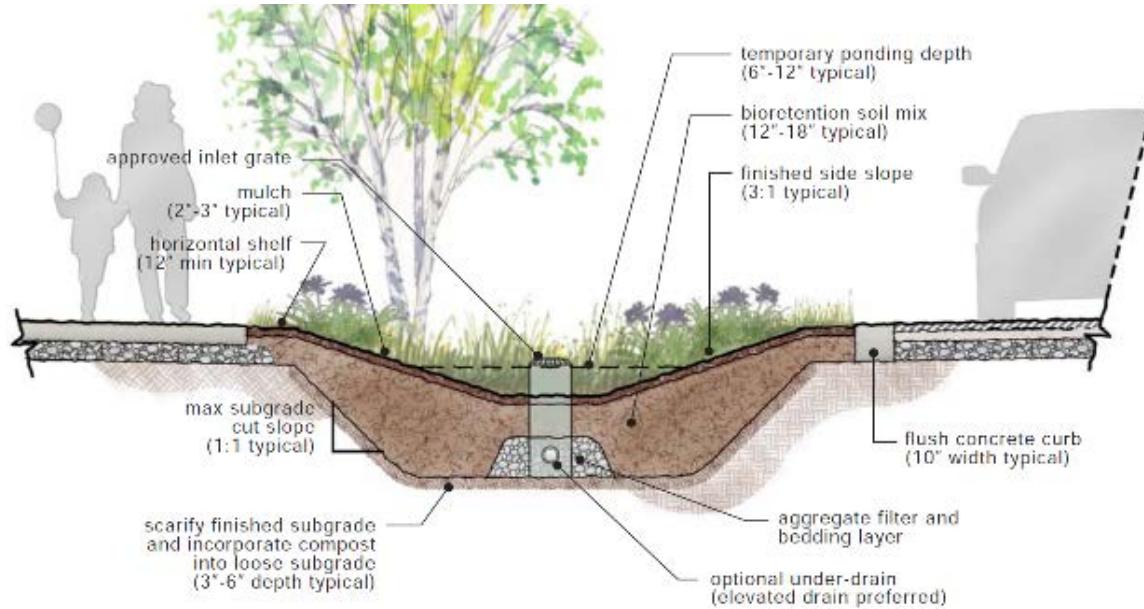


Exhibit 14-3. Example Cross-section of Bioretention with Primary Design Elements (under-drain is optional) (Source: AHBL, 2012)

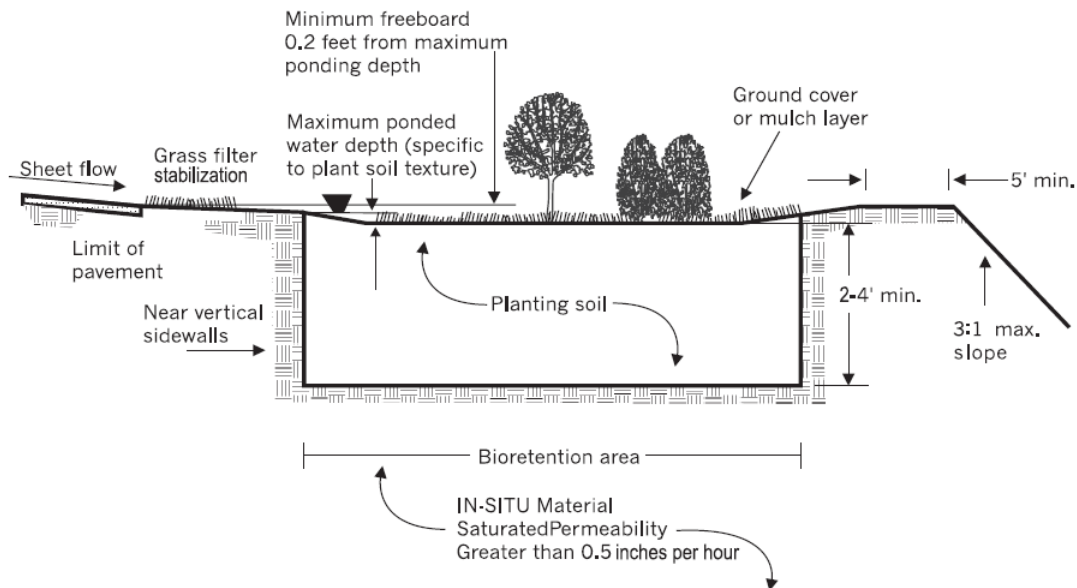


Exhibit 14-4. Example Primary Design Elements of a Bioretention Facility (Source: PGDER, 1999)

DESIGN OF INFILTRATION CONTROLS

Infiltration controls are designed to collect stormwater flows that temporarily collect on the surface in a ponding area. The stormwater then infiltrates or filters through a media layer where it either enters the subsurface soil over 24–72 hours, or is collected by an underdrain (perforated pipe below the media layer) for discharge to a storm drain or waterbody. Typical components of an infiltration control include:

Site applicability—Infiltration controls should generally be at least 10 feet away from any structure (e.g., buildings and parking lots), with a slope away from the structure.

Inlets—An inlet can consist of a curb cut, a flow spreading device such as a stone or gravel diaphragm that distributes stormwater runoff across the length of the control, a grass filter strip, or a similar device.

Outlet—An outlet can take many different forms, such as a riser structure or a curb cut/inlet that discharges stormwater once it exceeds the maximum ponding depth of the control. Controls can also be designed as a bypass system where flow does not enter the system once the maximum ponding depth is exceeded. It is important to review the site plans to determine if the controls are designed as a flow through or bypass system.

Pretreatment—To minimize clogging of the control device, infiltration controls need pretreatment, especially in drainage areas with excessive sediment (such as construction areas or unstabilized slopes). Pretreatment measures, if needed, can include sediment forebays, grass channels, level spreaders, or gravel diaphragms.

Soil media—Soil media mixes vary but generally include a mixture of largely course sand (~85 percent), fines (silt and clay ~10 percent), and organic media (~5 percent).

Vegetation—Infiltration controls can include a wide variety of suitable vegetation, from turf grass to shrubs or trees and should be based on the geographic location. Many jurisdictions recommend using hearty, drought-tolerant native plants to increase survival rates.

Underdrain—Consisting of perforated pipe beneath the media layer, underdrains convey excess stormwater that cannot be infiltrated into the soil within 24–72 hours, generally to the storm or combined sewer system or to a swale, stream or other surface water.

Mulch—Infiltration control designs often include specification for 1–2 inches of mulch to help retain soil moisture, provide a slow release of nutrients to plants, and shade out weed growth. Over mulching can “burn” vegetation and limit storage capacity.

Typical maintenance—The primary maintenance requirement for vegetated infiltration controls is regular plant, soil, and mulch layer maintenance to ensure a healthy vegetation system that promotes infiltration, storage, and pollutant removal. A healthy and densely vegetated system should be free of excess sediment and trash, and a typical system should drain within 72 hours after a storm event.

INSPECTING INFILTRATION CONTROLS

There are several issues that inspectors should look for when inspecting infiltration controls. These include:

Inlet—Improper grading at the inlet could impede flow to the control.

Vegetation/media/mulch—Controls that lack vegetation may indicate poor maintenance practices. Lack of mulch could allow erosion and too much mulch could inhibit plant growth.

Outlet—An outlet that is too low may allow the water to short-circuit the control and reduce its effectiveness.

Appendix Z, “Infiltration Control Inspection Form,” is a sample post-construction inspection form that could be used when inspecting infiltration controls. Inspections should include a review of any available operation logs and maintenance plans.

COMMON INFILTRATION CONTROL ISSUES

Common issues and challenges associated with infiltration controls include:

Poor design or placement of outlet



Photo 14-1. An infiltration basin may be poorly sited or poorly designed to the extent that it is unable to retain and infiltrate stormwater. In the photo above, the outlet is too low as evidenced by the scour path from the curb cut to the grate. This could indicate that sediment is being carried into the drain and that little water is being retained and absorbed. Possible solution: consider adding diffuser along scour path and/or raising the level of the grate. (Credit: EPA Region 5)

Management practice impeding function of infiltration control



Photo 14-2. Bioswale treated with herbicide accidentally. Vegetation is sparse, which may allow erosion. Consider reseeding or replanting and providing adequate signage in English and Spanish to ensure the practice is not continually treated with herbicide. (Credit: EPA Region 5)

Improper grading towards infiltration control



Photo 14-3. Inappropriate grading is another common design flaw in infiltration-based control practices. If a parking lot, street or other impervious surface is not properly graded *towards* the control or is *bypassing* the control, the BMP is not serving its intended purpose. In the photo above, the wet spot on the pavement indicates either poor grading in the installation or poor drainage by the control. Consider adjusting the grade. (Credit: EPA Region 5)

Outlet set too low



Photo 14-4. If the outlet is set too low, then stormwater will not pond and very little water will infiltrate, as it is designed to do. (Credit: John Kosco, Tetra Tech)

The City of Seattle has developed a *Green Stormwater Operations and Maintenance Manual* (Seattle, 2009) that provides photographs and level of service categories for different maintenance levels. These photographs and maintenance levels can educate inspectors on different infiltration control issues. Illustrated examples of problems associated with flow control structures can be found at https://www.seattle.gov/util/cs/groups/public/@spu/@usm/documents/webcontent/spu02_020023.pdf.

C. PERMEABLE PAVEMENT CONTROLS

DESCRIPTION

Permeable pavement combines stormwater infiltration, storage, and a structural pavement consisting of a permeable pavement layer underlain by a storage/infiltration bed. Permeable pavement has not been thoroughly tested on high speed roads in extreme weather conditions, although it has been successfully applied for low speed residential streets, parking lots, parking lanes and roadway shoulders (DDOE, 2013). The permeable pavement layer can consist of pervious concrete, porous asphalt, or various types of interlocking pavers, which are each summarized below (EPA, 2009):

Pervious concrete—Achieves porosity by reducing the number of fines in the mix, giving the concrete surface a much coarser appearance compared to standard impervious concrete.

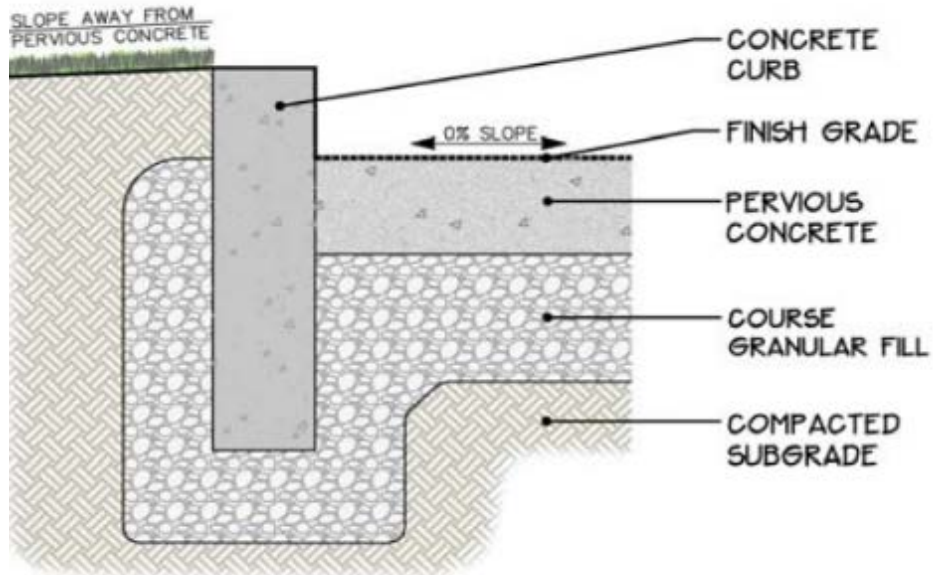


Exhibit 14-5. Example Pervious Concrete Cross-section (Source: EPA, 2009)

Porous asphalt—Like pervious concrete, achieves its porosity by eliminating the fine particles from its mix specification, allowing water to flow through it rather than over it.

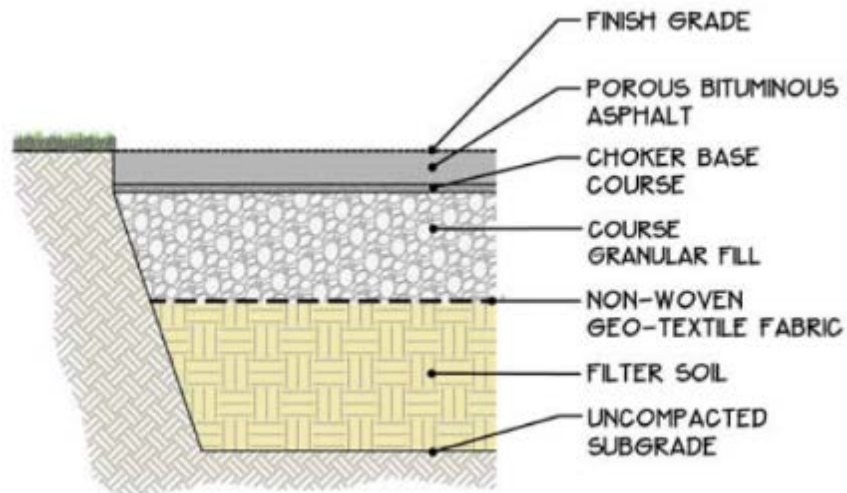


Exhibit 14-6. Example Porous Asphalt Cross-section (Source: EPA, 2009)

Permeable paver blocks—Manufactured units that interlock to create a durable pavement. Void spaces between units are filled with permeable materials such as pea gravel or sand to allow surface water to infiltrate.

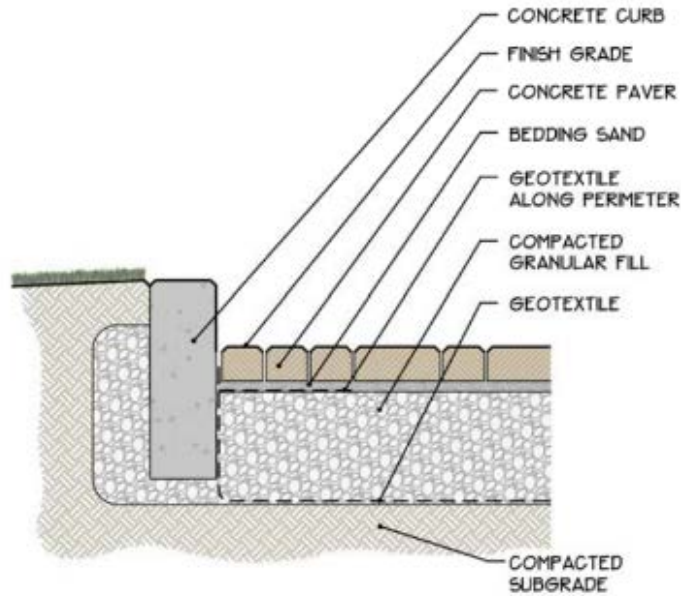


Exhibit 14-7. Example Permeable Paver Blocks Cross-section (Source: EPA, 2009)

Grid pavers—Concrete grid paver (CGP) systems are composed of concrete blocks made porous by eliminating finer particles in the concrete that creates voids inside the blocks; additionally, the blocks are arranged to create voids between blocks. Plastic turf reinforcing grids (PTRG) are plastic grids that add structural support to the topsoil and reduce compaction to maintain permeability. Grass is encouraged to grow in PTRG, so the roots will help improve permeability due to their root channels. Grid pavements provide a cool, green surface solution for vehicular access lanes, emergency access areas, and overflow parking areas, and even residential driveways.



Exhibit 14-8. Grid Pavers—Concrete (left) and Plastic (right) (Credit: Tetra Tech)

DESIGN OF PERMEABLE PAVEMENTS AND PAVERS

The design components of a typical permeable pavement are described below. Note that the specific design components can change based on the type of permeable pavement installed and the local design standard requirements:

Inflow/Surface materials

As described above, there are several different types of surface materials for permeable pavements, from pervious concrete to porous asphalt to grid pavers or paver blocks. Porous asphalt and concrete mixes are similar to their impervious counterparts, but do not include the finer grade particles. Interlocking pavers have openings that are filled with stone to create a porous surface. Permeable pavements can accept runoff from adjacent impervious surfaces, but the impervious area should not exceed three-to-five times the pervious area (some states limit even more or prohibit the impervious area that can discharge to permeable pavements).

Storage

In addition to distributing mechanical loads, coarse aggregate laid beneath porous surfaces is designed to store stormwater prior to infiltration into soils or discharging to a stormwater BMP. The aggregate is wrapped in a non-woven geotextile to prevent migration of soil into the storage bed and resultant clogging. In porous asphalt and porous paver applications, the storage bed also has a choker course of smaller aggregate to separate the storage bed from the surface course.

Infiltration/Outflow

Most of the stormwater that enters a permeable pavement system is infiltrated, however, these systems are often designed with an outflow to prevent flooding or standing water from larger storms. The outflow can be a perforated pipe system, or a positive outflow that consists of a stone buffer that connects to the stone sub-base under the permeable pavement and allows a path for excess water to flow out of the system.

INSPECTING PERMEABLE PAVEMENTS

The primary issue with permeable pavements and pavers is clogging, which can slow infiltration rates or even result in surface ponding. Permeable pavements should not receive runoff from disturbed or vegetated areas—the sediment can quickly clog the system.

Spills can be significant problems on permeable pavements because of the potential for groundwater contamination and the difficulty in cleaning up spills on permeable pavement (as opposed to cleaning up spills on impervious concrete or asphalt). Inspectors should always look for evidence of spills on or near permeable pavements.

Permeable pavements are designed to drain stormwater quickly—any standing water on a permeable pavement typically indicates a problem with the control. Also, permeable pavement should have signage (Exhibit 14-9) to ensure that maintenance staff do not spread chemicals and to help educate the public.



Exhibit 14-9. Porous Asphalt Signage (Credit: Tetra Tech)

Appendix AA provides a sample post-construction inspection form that could be used to inspect permeable pavement. Inspections should include a review of any available operation logs and maintenance plans.

COMMON PERMEABLE PAVEMENT ISSUES

Common issues and challenges associated with permeable pavements include:

Excess sediment on permeable pavement



Photo 14-5. Sediment from the impervious parking is entering the permeable pavement area. This photo also indicates improper grading, with the flow accumulating in one area. (Credit: Bill Hunt, NCSU)

Sediment accumulation between paver blocks

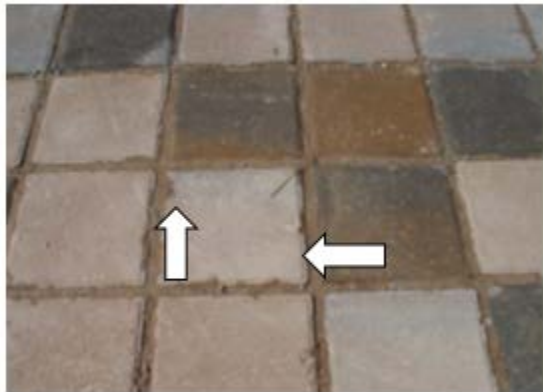


Photo 14-6. Fine mud and silt in between permeable pavers hindering rapid infiltration. (Credit: Bill Hunt, NCSU)

Excessive sediment on permeable pavement



Photo 14-7. Sediment on permeable pavement clogs void spaces thus slowing infiltration. Important to protect permeable pavement from construction stormwater run-off. (Credit: Bill Hunt, NCSU)

Sediment/poor grading



Photo 14-8. Visible silt on the permeable pavement surface, indicates that water is collecting before infiltrating. Maintenance, such as sweeping or vacuuming is needed. (Credit: EPA Region 5)

Vegetation between paver blocks



Photo 14-9. Weeds and moss between pavers may indicate a sediment problem. Herbicides should not be used on permeable pavement systems. (Credit: Bill Hunt, NCSU)

D. RAINWATER HARVESTING SYSTEMS

DESCRIPTION

Rainwater harvesting systems collect rainwater that falls on rooftops or other impervious surfaces and conveys it to above- or below-ground storage tanks, where it can be used between rain events as non-potable water for irrigation or other uses. This technology reduces potable water use while also reducing stormwater discharge off-site. Rain barrels are typically used in residential applications and connect to a rooftop downspout to collect rainwater for irrigation purposes. Cisterns are typically large containers or tanks that hold significantly more

stormwater volume than a rain barrel. Cisterns are more commonly used in commercial applications and can store stormwater for irrigation or a variety of other uses, including re-use inside the building.

Non-potable uses of harvested rainwater may include the following:

- Landscape irrigation
- Exterior washing (e.g., car washes, building facades, sidewalks, street sweepers, and fire trucks)
- Flushing of toilets and urinals
- Fire suppression (i.e., sprinkler systems)
- Supply for cooling towers, evaporative coolers, fluid coolers, and chillers
- Supplemental water for closed loop systems and steam boilers
- Replenishment of water features and water fountains
- Distribution to a green wall or living wall system
- Laundry

DESIGN OF RAINWATER HARVESTING SYSTEMS

There are seven primary design components of a rainwater harvesting system:

1. Contributing drainage area (CDA) or CDA surface
2. Collection and conveyance system (i.e., gutter and downspouts)
3. Pretreatment, including prescreening and first flush diverters
4. Storage system (cisterns)
5. Water quality treatment
6. Distribution systems
7. Overflow, filter path or secondary stormwater retention practice

Contributing Drainage Area (CDA) or CDA Surface

When considering CDA surfaces, note that smooth, non-porous materials will drain more efficiently. Slow drainage of the CDA leads to poor rinsing and a prolonged first flush, which can decrease water quality. Some roofing materials such as tar and gravel, asbestos shingle and treated cedar shakes may leach toxic chemicals and are not suitable CDA surfaces. Cedar shake and other wooden roofs are the least efficient surfaces in regards to rainwater harvesting because they are porous while metal roofs are the most efficient.

Collection and Conveyance System

The collection and conveyance system consists of the gutters, downspouts, and pipes that channel rainfall into cisterns. Gutters and downspouts should be designed as they would for a building without a rainwater harvesting system. Aluminum, round-bottom gutters and round

downspouts are generally recommended for rainwater harvesting. Gutters and downspouts should be kept clean and free of debris and rust.

Pretreatment

Pre-filtration is required to keep sediment, leaves, contaminants, and other debris from the system. Leaf screens and gutter guards are typically used for pre-filtration of small systems, although direct water filtration is preferred. The purpose of pre-filtration is to significantly cut down on maintenance by preventing organic buildup in the cistern, thereby decreasing microbial food sources.

Diverted flows (i.e., first flush diversion and/or overflow from the filter, if applicable) should be directed to an appropriate best management practice (BMP) or to a settling tank to remove sediment and pollutants prior to discharge from the site.

Various pretreatment devices are described below:

- **First Flush Diverters** direct the initial pulse of rainfall away from the cistern. While leaf screens effectively remove larger debris such as leaves, twigs, and blooms from harvested rainwater, first flush diverters can be used to remove smaller contaminants such as dust, pollen, and bird and rodent feces. First flush diverters are typically passive devices that retain a relatively small amount of stormwater that is first captured from the roof system before the remaining roof runoff is directed into the rainwater harvesting system.
- **Leaf screens** are mesh screens installed over either the gutter or downspout to separate leaves and other large debris from rooftop runoff. Leaf screens should be regularly cleaned to be effective; if not maintained, they can become clogged and prevent rainwater from flowing into the cisterns.



Exhibit 14-10. First Flush Diverter (Credit: NCSU BAE)

- **Roof washers** are placed just ahead of cisterns and are used to filter small debris from harvested rainwater. Roof washers consist of a cistern, usually between 25 and 50 gallons in size, with leaf strainers and a filter with openings as small as 30 microns. The filter functions to remove very small particulate matter from harvested rainwater. All roof washers should be cleaned on a regular basis.
- **Hydrodynamic Separator** can be used to filter rainwater from larger CDAs.



Exhibit 14-11. Roof Washer (Credit: NCSU BAE)

Storage System (Cisterns)

The cistern provides the storage for a rainwater harvesting system. Rain barrels typically hold about 55 gallons, but cistern capacities generally range from 250 to 30,000 gallons, but can be as large as 100,000 gallons or more for larger projects. Multiple cisterns can be placed adjacent to each other and connected with pipes to balance water levels and to tailor the storage volume needed. Typical rainwater harvesting system capacities for residential use range from 1,500 to 5,000 gallons. Cistern volumes are calculated to meet the water demand and stormwater storage volume retention objectives.

While the common cistern has a cylindrical shape, cisterns can be made of many materials and configured in various shapes, depending on the type used and the site conditions where the cisterns will be installed. For example, configurations can be rectangular, L-shaped, or step vertically to match the topography of a site.

Water Quality Treatment

Depending upon the collection surface, method of dispersal and proposed use for the harvested rainwater, a water quality treatment device may be necessary to clean the harvested rainwater.

Distribution Systems

Rain barrel systems and small cisterns can use a gravity fed distribution system. Most distribution systems for larger cisterns need a pump to convey harvested rainwater from the cistern to its final destination, whether inside the building, an automated irrigation system, or gradually discharged to a secondary stormwater treatment practice. The rainwater harvesting system should be equipped with an appropriately sized pump that produces sufficient pressure for all end-uses. A backflow preventer should be used to separate harvested rainwater from the main potable water distribution lines.

Overflow

An overflow mechanism is needed as a component of the rainwater harvesting system design to handle an individual storm event or multiple storms in succession that exceed the capacity of the cistern. Overflow pipe(s) should have a capacity equal to or greater than the inflow pipe(s) and have a diameter and slope sufficient to drain the cistern while maintaining an adequate freeboard height. The overflow pipe(s) should be screened to prevent access to the cistern by small mammals and birds. All overflows from the system should be directed to an acceptable flow path that will not cause erosion.

INSPECTING RAINWATER HARVESTING SYSTEMS

Inspectors should look for obvious defects with the rainwater harvesting system such as tanks that are leaking or cracked, inflow controls that are not working properly (such as downspouts not properly connected to the tank), and improper maintenance (including sediment in the tank or debris in the filters or screens).

If available, inspectors should also review maintenance and use records to determine if the rainwater harvesting system is being used properly. For example, is the system largely empty before large rain events? Is the water being used as soon as practical after rain events?

Appendix AB, “Rainwater Harvest Inspection Form,” provides a sample post-construction inspection form that could be used to inspect rainwater harvesting systems. Inspections should include a review of any available operation logs and maintenance plans.

COMMON RAINWATER HARVESTING ISSUES

Common issues and challenges associated with rainwater harvesting systems include:

Overflowing rain barrel



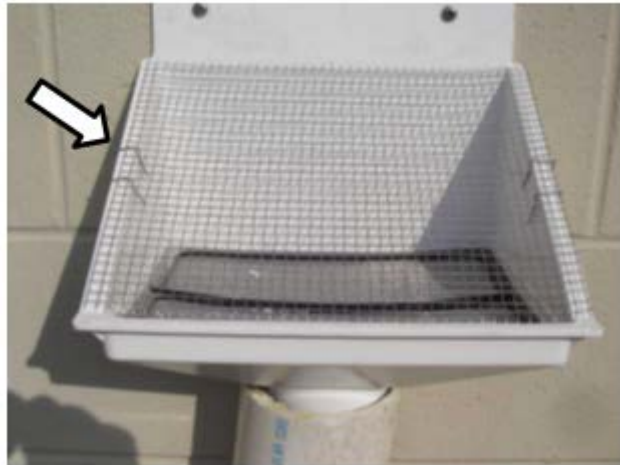
Overflowing rain barrel. Consider larger capacity cistern or higher volume overflow pipe. The overflow pipe may also be clogged. Overflow could cause water problems inside the adjacent building. (Credit: Innovative Water Solutions)

Improper maintenance of gutters



Gutters, which drain to cistern, in need of cleaning (Credit: Jason Wright, Tetra Tech)

Screen maintenance



This screen is clear, but inspectors should check filters to determine if they are clogged (Credit: Tetra Tech)

Overflow devices is clogged or in need of repair



Check overflow features to determine if they are working (Credit: Tetra Tech)

E. GREEN ROOFS

DESCRIPTION

Green, living, or vegetated, roofs are alternative roof surfaces that typically consist of a layer of soil/media and vegetation over waterproofing and drainage materials on a conventional flat or pitched roof to absorb and retain water, like vegetation and soil on the ground.

Design variants include extensive and intensive green roofs. *Extensive* green roofs have a much shallower growing media layer that typically ranges from 3 to 6 inches thick. *Intensive* green

roofs have a growing media layer that ranges from 6 to 48 inches thick. Green roofs are typically not designed to provide stormwater detention of larger storms (e.g., 2-year, 15-year) although some intensive green roof systems may be designed to meet these criteria. Green roof designs may be combined with other green infrastructure practices elsewhere on-site to control large storms.

DESIGN OF GREEN ROOFS

Standard specifications for North American green roofs continue to evolve, and no universal material specifications exist that cover the wide range of available roof types and system components. The American Society for Testing and Materials (ASTM) has issued several overarching green roof standards, which should be consulted when assessing the design of green roofs. Designers and reviewers should also fully understand manufacturer specifications for each system component, particularly if they choose to install proprietary “complete” green roof systems or modules. Common components in a green roof are illustrated in Exhibit 14-12.

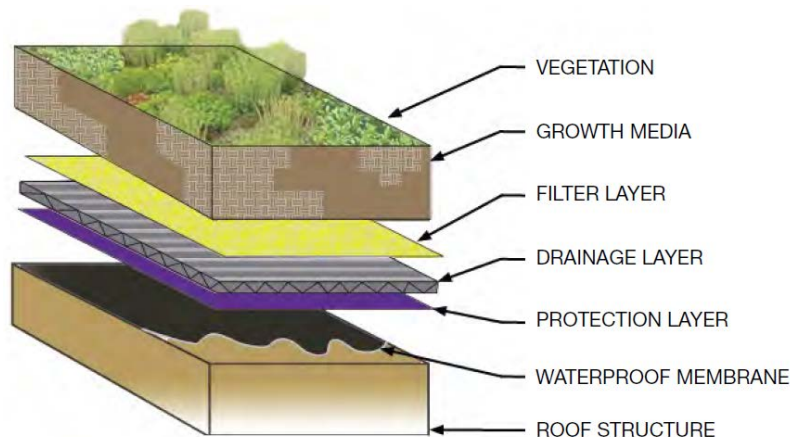


Exhibit 14-12. Extensive Green Roof Illustration (Source: SEMCOG, 2008)

Roof/Deck Layer

The roof deck layer is the foundation of a green roof. It may be composed of concrete, wood, metal, plastic, gypsum, or a composite material. The type of deck material determines the strength, load bearing capacity, longevity, and potential need for insulation in the green roof system.

Leak Detection System

The leak detection system is an optional system used to detect and locate leaks in the waterproof membrane. Leak detection systems are often installed above the deck layer to identify leaks, minimize leak damage through timely detection, and locate leak locations.

Waterproof Membrane

All green roof systems should include an effective and reliable waterproofing layer to prevent water damage through the deck layer. The membrane should be designed to convey water horizontally across the roof surface to drains or gutter and may also act as a root barrier. A wide range of waterproofing materials can be used, including hot applied rubberized asphalt,

built up bitumen, modified bitumen, thermoplastic membranes, polyvinyl chloride (PVC), thermoplastic olefin membrane (TPO), and elastomeric membranes (EPDM). The waterproofing layer needs to be 100 percent waterproof and have an expected life span as long as any other element of the green roof system. The waterproofing material may be loose laid or bonded (recommended). If loose laid, overlapping and additional construction techniques should be used to avoid water migration.

Insulation Layer

Many green roofs contain an insulation layer, usually located above, but sometimes below, the waterproofing layer. The insulation increases the energy efficiency of the building and/or protects the roof deck (particularly for metal roofs). According to *Green Roof Plants: A Resource and Planting Guide* (Snodgrass et al., 2006), the trend is to install insulation on the outside of the building, in part to avoid mildew problems. The designer should consider the use of open or closed cell insulation depending on whether the insulation layer is above or below the waterproofing layer (and thus exposed to wetness), with closed cell insulation recommended for use above the waterproofing layer.

Root Barrier

Another layer of a green roof system, which can be either above or below the insulation layer depending on the system, is a root barrier that protects the waterproofing membrane from root penetration. Chemical root barriers or physical root barriers that have been impregnated with pesticides, metals, or other chemicals that could leach into stormwater runoff, should be avoided in systems where the root barrier layer will contact water or allow water to pass through the barrier.

Drainage Layer

A drainage layer is then placed between the root barrier and the growing media to quickly remove excess water from the vegetation root zone. The selection and thickness of the drainage layer type is an important design decision that is governed by the desired stormwater storage capacity, the required conveyance capacity, and the structural capacity of the rooftop. Depth of the drainage layer is generally 0.25 to 1.5 inches thick for extensive designs. The drainage layer usually consists of synthetic or inorganic materials (e.g., gravel, high density polyethylene (HDPE)) that can retain water and provide efficient drainage. A wide range of prefabricated water cups or plastic modules can be used, as well as a traditional system of protected roof drains, conductors, and roof leaders.

Filter Fabric

A semi-permeable needled polypropylene filter fabric is normally placed between the drainage layer and the growing media to prevent the media from migrating into the drainage layer and clogging it. The filter fabric should not impede the downward migration of water into the drainage layer.

Growth Media

For an extensive green roof, the growing media is typically 3 to 6 inches deep (minimum 3 inches). The recommended growing media for extensive green roofs is typically composed of

approximately 70 to 80 percent lightweight inorganic materials, such as expanded slates, shales or clays; pumice; scoria; or other similar materials. The remaining media should contain no more than 30 percent organic matter. The percentage of organic matter should be limited, since it can leach nutrients into the runoff from the roof and clog the permeable filter fabric. Media should also provide sufficient nutrients and water holding capacity to support the proposed plant materials. The growing media typically has a maximum water retention of approximately 30 percent.

The composition of growing media for intensive green roofs may be different, and it is often much greater in depth (e.g., 6 to 48 inches). If trees are included in the green roof planting plan, the growing media should be sufficient to provide enough soil volume for the root structure of mature trees.

Plant Materials

The top layer of an extensive green roof typically consists of plants that are non-native, slow-growing, shallow-rooted, perennial, and succulent. These plants are chosen for their ability to withstand harsh conditions at the roof surface. A mix of base ground covers (usually Sedum species) and accent plants can be used to enhance the visual amenity value of a green roof. The design should provide for temporary, manual, and/or permanent irrigation or watering systems, depending on the green roof system and types of plants. For most application, some type of watering system should be accessible for initial establishment or drought periods. The use of water efficient designs and/or use of non-potable sources are strongly encouraged.

INSPECTING GREEN ROOFS

Inspectors of green roofs should look for the following issues:

- Dead or dying vegetation
- Roof drains, scuppers, and gutters are overgrown or have organic matter deposits
- Evidence of erosion or loss of media
- Standing water

Other issues with green roofs can be more difficult to assess on a typical NPDES inspection. For example, improper installation, excessive dead loads that exceed what the building can handle, root penetration and leaks can be difficult to detect without extensive knowledge of the approved design and construction. However, inspectors can review maintenance records, which may identify some of these issues.

Caution should be taken when inspecting green roofs that are sloped or are at high elevations. Necessary safety measures should be taken at all times.

Appendix AC, “Green Roof Inspection Form,” provides a sample post-construction inspection form that could be used to inspect green roofs. Inspections should include a review of any available operation logs and maintenance plans.

COMMON GREEN ROOF ISSUES

Common issues and challenges associated with green roofs include:

Poor vegetation on green roof



Roof in Florida with poorly maintained plants
(Credit: Kevin Songer)



Green roof with adequate vegetation (Credit: EPA Region 5)

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AG.	Field and Personal Protective Equipment
AH.	Mapping Tool (Region 5)
AI.	Inspection Checklist
AJ.	Regional Inspection Checklists
AK.	Growth Stages of Field Crops
AL.	Inspection Introduction Letter
AM.	Sampling Procedures and Equipment
AN.	Sample Quality Assurance Project Plan (QAPP)
AO.	Detailed Review of Nutrient Management Plan Implementation
AP.	Inspection Report Template (R7)

A. OVERVIEW OF NPDES CAFO PROGRAM

INTRODUCTION

In addition to materials in this chapter, inspectors must be familiar with Chapter 1, “Introduction,” and Chapter 2, “Inspection Procedures.”

The National Pollutant Discharge Elimination System (NPDES) concentrated animal feeding operation (CAFO) inspector may encounter facilities with no NPDES permit, facilities with a state permit of some kind, and some facilities with NPDES permits. For facilities with NPDES permits, the inspector must be familiar with the requirements of a CAFO permit and know how to evaluate compliance. However, most facilities the inspector encounters will likely not have an NPDES permit.

Inspections of permitted and unpermitted CAFOs can have some similarities, but are generally very different. Throughout this chapter information relevant to each scenario is presented. If the facilities that you inspect do not have NPDES permits, you may want to focus most of your attention on the parts of the chapter dealing with unpermitted CAFOs. However, it is still important for all CAFO inspectors to have a working knowledge of NPDES CAFO permits.

BACKGROUND AND HISTORY OF THE CAFO REGULATIONS

EPA began regulating the discharges of wastewater and manure from CAFOs in the 1970s. In 2003, the Environmental Protection Agency (EPA) updated the original CAFO regulations to address changes in the animal agriculture industry sectors (Volume 68 of the *Federal Register* (FR) 7176). EPA subsequently published revisions to the CAFO Rule in 2008 to address a 2005 decision by the U.S. Court of Appeals (Waterkeeper Alliance et al. v. EPA, 2005) for the Second Circuit in litigation challenging the 2003 regulatory updates (73 FR 70418).

At the time of the 2003 revised regulations, EPA estimated that animal feeding operations (AFOs) annually produce more than 500 million tons of animal manure (U.S. DOA, 2007). The term manure as used here and throughout the Manual refers to manure, litter, and process wastewater. This manure can pose substantial risks to the environment and public health if managed improperly. EPA projected in 2003 that the revised rule would result in annual pollutant reductions of 56 million pounds of phosphorus (P), 110 million pounds of nitrogen (N), and two billion pounds of sediment.

Today, there are slightly more than one million farms with livestock in the United States.¹¹ EPA estimates that about 212,000 of those farms are likely to be AFOs—operations where animals are kept and raised in confinement. Although the number of AFOs has declined since 2003, the total number of animals housed at AFOs has continued to grow because of expansion and consolidation in the industry.

The NPDES regulations identify permitting requirements for AFOs that are classified as CAFOs and that discharge. If CAFOs do not seek NPDES permit coverage, discharges from their land

¹¹ The term manure as used here and throughout the Manual refers to manure, litter, and process wastewater.

application areas only qualify for the agricultural stormwater exemption if the CAFOs implement and document basic nutrient management practices; see Title 40 of the *Code of Federal Regulations* (CFR) Part 122.42(e)(1)(vi)–(ix). EPA generally expects that the nutrient management requirements are being followed when a CAFO has developed and is implementing a comprehensive nutrient management plan (CNMP) in accordance with the U.S. Department of Agriculture (USDA) guidance. For permitted CAFOs, nutrient management plans (NMPs) developed and implemented as a condition of an NPDES permit must be based on applicable technical standards for nutrient management established by the NPDES permitting authority (40 CFR 412.4(c)(2)).

Definition: Animal Feeding Operations (AFOs), Concentrated Animal Feeding Operations (CAFOs)

To determine if an animal facility falls under the purview of the NPDES program, it is essential to understand the definition of an AFO and a CAFO established in the regulations. This chapter reflects the current NPDES regulations and Effluent Limitation Guidelines (ELGs) applicable to CAFOs under the Clean Water Act (CWA), including revisions to the regulations that the U.S. Environmental Protection Agency (EPA) finalized and published in the *Federal Register* (FR) in 2008 (40 CFR 122.23; 73 FR 70418). As a result of a challenge to the 2008 and subsequent Fifth Circuit Court decision, EPA issued a “Compiled CAFO Final Rule” on July 30, 2012 to remove vacated elements and to consolidate the 2008 and 2003 final CAFO rules into a single document. Those requirements are collectively referred to in this chapter as *the CAFO regulations*.

This section explains the definitions of an AFO and CAFO, it describes how the NPDES regulations apply to permitted CAFOs and what those permits contain. In addition, the section explains aspects of the NPDES regulations that may apply to large CAFOs even if they do not have an NPDES permit.

When Congress passed the CWA in 1972, it specifically included the term *concentrated animal feeding operation* in the definition of *point source*. CWA section 502(14). Before EPA defined the CWA term *concentrated animal feeding operations* in the 1976 CAFO regulations, the 1974 ELGs for the Feedlots Point Source Category, formerly 40 CFR 412.11(b), defined a *feedlot* to mean “a concentrated, confined animal or poultry growing operation for meat, milk or egg production, or stabling, in pens or houses wherein the animals or poultry are fed at the place of confinement and crop or forage growth or production is not sustained in the area of confinement.” Similarly, the support documentation for the ELG (see, for example, EPA’s *Development Document for the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operation* (EPA, 2002)) distinguished between animals grown in feedlots and those grown in non-feedlot situations. The development document defines feedlot using the following three conditions:

7. A high concentration of animals held in a small area for periods in conjunction with one of the following purposes:
 - a. Production of meat.
 - b. Production of milk.

- c. Production of eggs.
 - d. Production of breeding stock.
 - e. Stabling of horses.
8. The transportation of feed to animals for consumption.
9. By virtue of the confinement of animals or poultry, the land or area will neither sustain vegetation nor be available for crop or forage.

The 1976 rule defined which facilities were CAFOs, and therefore point sources under the CWA, and established permitting requirements for CAFOs. EPA's 1976 definition of CAFO draws on the definition of a CAFO from the 1974 feedlot definition. Although the definition of the term CAFO was further revised in the 2003 CAFO regulations, the types of facilities covered by the definition are nearly identical to those in the original definition of a feedlot.

A facility must first meet the definition of an AFO before it can be considered a CAFO. AFOs are defined as, "operations where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and where vegetation is not sustained in the confinement area during the normal growing season." 40 CFR 122.23(b)(1). EPA interprets *maintained* to mean that the animals are confined in the same area where waste is generated or concentrated. Areas where animals are maintained can include areas where animals are fed and areas where they are watered, cleaned, groomed, milked, or medicated.

Regulatory Citation

Animal feeding operation (AFO) means a lot or facility (other than an aquatic animal production facility) where the following conditions are met:

Animals have been, are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period.

AND

Crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

40 CFR 122.23(b)(1)

The first part of the regulatory definition of an AFO means that animals must be kept on the lot or facility for a minimum of 45 days in a 12-month period. If an animal is confined for any portion of a day, it is considered to be on the facility for a full day. For example, dairy cows that are brought in from pasture for less than an hour to be milked are counted as being confined (i.e., on the lot or facility) for the day. In addition, the same animals are not required to remain on the lot for 45 days or more for the operation to be defined as an AFO. Rather, the first part of the regulatory definition is met if some animals are fed or maintained on the lot or facility for 45 days out of any 12-month period. The 45 days do not have to be consecutive, and the 12-month period does not have to correspond to the calendar year. For example, June 1 to the following May 31 would constitute a 12-month period. Therefore, animal operations such as stockyards, fairgrounds, and auction houses where animals may not be fed, but are confined temporarily, may be AFOs.

Definition: “Sustained in the normal growing season”

The second part of the regulatory definition of an AFO distinguishes confinement areas from pasture or grazing land. That part of the definition relates to the portion of the facility where animals are confined and where natural forage or planted vegetation does not occur during the normal growing season. Confinement areas might have some vegetative growth along the edges while animals are present or during months when animals are kept elsewhere. If a facility maintains animals in an area without vegetation, such as dirt lots with incidental vegetative growth, the facility meets the second part of the AFO definition.

True pasture and rangeland operations are not considered AFOs because animals at those operations are generally maintained in areas that sustain crops or forage growth during the normal growing season. In some pasture-based operations, animals can freely wander in and out of areas for food or shelter; that is not considered confinement. In general, an area is a pasture if vegetation is maintained during the normal growing season. However, pasture and grazing-based operations can also have confinement areas (e.g., feedlots, barns, milking parlors, pens) that meet the definition of an AFO.

Incidental vegetation in a clear area of confinement would not exclude an operation from meeting the definition of an AFO. In the case of a winter feedlot, the second part of the AFO definition (i.e., no vegetation) is meant to be evaluated during the winter, when the animals are confined. Animals from a grazing operation can be confined during winter months in a confinement area that had vegetation during other parts of the year. If the animals are confined for more than 45 days but not year-round and vegetation emerges in the spring when animals are removed, the presence of vegetation does not prevent that feedlot from being defined as an AFO because the vegetation is growing when animals are not present. In that example, the feedlot will not sustain the vegetation that had emerged in spring once the animals are moved back into the feedlot. Therefore, the facility in the example meets the definition of an AFO. See Chapter 2 of EPA’s *NPDES Permit Writers’ Manual for CAFOs* (EPA, 2012a) for more information and examples of animal feeding operations.

Definition: Concentrated Animal Feeding Operations (CAFOs)

An AFO is a CAFO if it meets the regulatory definition of a large or medium CAFO (40 CFR 122.23 (b)(4) or (6)) or has been designated as a CAFO (40 CFR 122.23(c)) by the NPDES permitting authority or by EPA. Note that some authorized states have adopted regulatory definitions for CAFOs that are more inclusive and, therefore, broader in scope than EPA’s regulations. Those facilities are subject to requirements under state law but not under federal law. See Chapter 2 of EPA’s *NPDES Permit Writers’ Manual for CAFOs* (EPA, 2012a) for more information and examples of concentrated animal feeding operations.

Types of Animal Operations Covered by CAFO Regulations

The CAFO regulations define a large CAFO based on the number of animals confined. Medium CAFOs are defined as meeting specific criteria in addition to the number of animals confined, and those criteria are discussed below. The animal types with specific threshold numbers for the Large and Medium size categories identified in the regulations are cattle, dairy cows, veal calves, swine, chickens, turkeys, ducks, horses, and sheep. An AFO that meets the small or

medium size thresholds can be designated as a CAFO by the permitting authority if certain criteria are met, including that the AFO is determined to be “a significant contributor of pollutants to waters of the United States” (40 CFR 122.23(c)).

Animal Types Not Listed in CAFO Regulations

An operation confining any animal type (e.g., geese, emus, ostriches, bison, mink, alligators) not explicitly mentioned in the NPDES regulations and for which there are no ELGs is subject to NPDES permitting requirements for CAFOs if 1) it meets the definition of an AFO, and 2) if the permitting authority designates it as a CAFO.

AFOs Defined as Large CAFOs

An AFO is a large CAFO if it stables or confines equal to or more than the number of animals specified in Table 15-1 for 45 days or more in a 12-month period. The definition of a large CAFO is based solely on the number of animals confined.

Table 15-1. Large CAFOs

Number of Animals	Type of Animal
700	Mature dairy cows, whether milked or dry
1,000	Veal calves
1,000	Cattle, other than mature dairy cows or veal calves (Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs.)
2,500	Swine, each weighing 55 pounds or more
10,000	Swine, each weighing less than 55 pounds
500	Horses
10,000	Sheep or lambs
55,000	Turkeys
30,000	Laying hens or broilers, if the AFO uses a liquid-manure handling system
125,000	Chickens (other than laying hens), if the AFO uses other than a liquid-manure handling system
82,000	Laying hens, if the AFO uses other than a liquid-manure handling system
30,000	Ducks, if the AFO uses other than a liquid-manure handling system
5,000	Ducks, if the AFO uses a liquid-manure handling system

Source: 40 CFR 122.23(b)(4)

In determining whether the applicable Large CAFO threshold is satisfied, the number of animals actually maintained is considered, not the capacity of the operation.

Practices Constituting Liquid-Manure Handling at Poultry Operations

The thresholds for chicken and duck AFOs in the CAFO definitions are based on the type of litter or manure handling system being used. The two systems are either a *liquid-manure handling system* or *other-than-a-liquid-manure handling system*. The animal number thresholds that determine whether the system is a CAFO for a chicken or duck AFO using a liquid-manure handling system are lower than the thresholds for CAFOs that use other-than-liquid-manure handling systems.

An AFO is considered to have a liquid-manure handling system if it uses pits, lagoons, flush systems (usually combined with lagoons), or holding ponds, or has systems such as continuous overflow watering, where the water contacts manure and litter. In addition, operations that stack or pile manure in areas exposed to precipitation are considered to have liquid-manure handling systems. That includes operations that remove litter from the confinement area and stockpile or store it uncovered in remote locations for even one day.

However, permitting authorities may authorize some limited period of temporary storage of litter of no more than 15 days that would not result in the facility meeting the definition of a liquid-manure handling system (e.g., where time is needed to allow for contract hauling arrangements and precipitation does not occur) (EPA, 2003). If litter is stockpiled beyond that temporary period, the uncovered stockpile would constitute a liquid-manure handling system, and the lower CAFO thresholds for chickens and ducks would apply (see Table 15-1 and Table 15-2).

Wet Lot and Dry Lot Duck Operations

Duck operations are considered to use a liquid-manure handling system if 1) the ducks are raised outside with swimming areas or ponds or with a stream running through an open lot, or 2) the ducks are raised in confinement buildings where fresh or recycled water is used to flush the manure to a lagoon, pond, or other storage structure. In addition, a duck operation that stacks manure or litter as described above for other dry poultry operations is considered to have a liquid-manure handling system.

Dry-lot duck operations include those that 1) use confinement buildings and handle manure and litter exclusively as dry material; 2) use a building with a mesh or slatted floor over a concrete pit from which manure is scraped into a solid manure storage structure; or 3) use dry bedding on a solid floor. Dry-lot duck operations are generally considered to be “operations that use other than a liquid-manure handling system.”

Definition: Production Area

Production area means that part of an AFO that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milk rooms, milking centers, cow yards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons, run-off ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment area includes but is not limited to settling basins, and areas within berms and diversions, which separate uncontaminated stormwater. Also included in the definition of production area is any egg-washing or egg-processing facility, and any area used in the storage, handling, treatment, or disposal of mortalities (40 CFR 122.23(b)(8)).

Definition: Land Application Area

The land application area means all land under the control of the CAFO owner or operator, including where the CAFO owns, rents, or leases the land to which manure from the production area is applied (40 CFR 122.23(e)(3)). It includes situations where a CAFO determines when and how much manure is applied to fields not owned, rented, or leased by the CAFO.

Definition: Process Wastewater

Process wastewater means water directly or indirectly used in the operation of the AFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other AFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater also includes any water that contacts any raw materials, products, or byproducts, including manure, litter, feed, milk, eggs, or bedding (40 CFR 122.23(b)(7)).

AFOs that Are Medium CAFOs

An AFO is a medium CAFO if it meets both parts of a two-part definition. The first part addresses the number of animals confined, and the second part includes specific discharge criteria. In addition, a medium-sized AFO can be designated a CAFO by the permitting authority or EPA. Table 15-2 lists the animal number ranges associated with the medium CAFO definition. If an AFO confines the number of animals listed in Table 15-2 for 45 days or more in a 12-month period, it meets the first part of the definition of a medium CAFO.

An AFO meets the discharge criteria for the second part of the medium CAFO definition if pollutants are discharged in one of the following ways:

- Into waters of the United States through a man-made ditch, flushing system, or another similar man-made device.
- Directly into waters of the United States that originate outside the facility and pass over, across, or through the facility or otherwise come into direct contact with the confined animals.

If the inspector identifies an unpermitted facility that is a medium CAFO, that CAFO is, by definition, discharging to a water of the United States and must either apply for an NPDES permit or permanently eliminate the source of the discharge (40 CFR 122.23(b)(6)).

Table 15-2. Medium CAFOs

Number of Animals	Type of Animal
200–699	Mature dairy cows, whether milked or dry
300–999	Veal calves
300–999	Cattle, other than mature dairy cows or veal calves (Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs.)
7502,499	Swine, each weighing 55 pounds or more

Table 15-2. Medium CAFOs

Number of Animals	Type of Animal
3,000–9,999	Swine, each weighing less than 55 pounds
150–499	Horses
3,000–9,999	Sheep or lambs
16,500–54,999	Turkeys
9,000–29,999	Laying hens or broilers, if the AFO uses a liquid-manure handling system
37,500–124,999	Chickens (other than laying hens), if the AFO uses other than a liquid-manure handling system
25,000–81,999	Laying hens, if the AFO uses other than a liquid-manure handling system
10,000–29,999	Ducks, if the AFO uses other than a liquid-manure handling system
1,500–4,999	Ducks, if the AFO uses a liquid-manure handling system

Source: 40 CFR 122.23(b)(6).

Definition: Man-Made Devices

The term *man-made device* means a conveyance constructed or caused by humans that transports wastes (manure, litter, or process wastewater) to waters of the United States (EPA, 1995). Man-made devices include, for example, pipes, ditches, and channels. If human action was involved in creating the conveyance, it is man-made even if natural materials were used to form it. A man-made channel or ditch that was not created specifically to carry animal wastes but nonetheless does so is considered a man-made device. To be defined as a medium CAFO, there must be an actual discharge of pollutants to waters of the United States. However, it is not necessary for the man-made device to extend the entire distance to waters of the United States. It is sufficient that the wastes being discharged flow through the man-made device. For example, a culvert could simply facilitate the flow of wastewater from one side of a road to another (and subsequently into a water of the United States) and is a man-made device for the purposes of this provision. Also, a flushing system is a man-made device that uses fresh or recycled water to move manure from the point of deposition or collection to another location.

Tile drains in the production area are another example of a man-made device. Tile drains are underground pipes that collect subsurface water for transport away from the site. If tile drains discharge manure to waters of the United States from the production area of a medium-sized AFO, the facility meets the discharge criterion for the medium CAFO definition and is a medium CAFO. An additional example would be the discharge to waters of the United States from a continuous-flow-through water trough system.

The medium CAFO definition addresses discharges directly into a water of the United States, which originate outside the facility and pass over, across, or through the facility or otherwise come into direct contact with the confined animals. The discharge criterion is met if animals in confinement at an AFO can come into direct contact with waters of the United States. Thus, a stream running through the area where animals are confined indicates that there is a direct

discharge of pollutants unless animals are prevented from any direct contact with waters of the United States.

Operations under Common Ownership

Under the CAFO regulations, two or more AFOs under common ownership are considered one operation if, among other things, they adjoin each other (including facilities that are separated only by a right-of-way or a public road) or if they use a common area or system for managing wastes (40 CFR 122.23(b)(2)). For example, operations generally meet the criterion where manure, litter, or process wastewater are commingled (e.g., stored in the same pond, lagoon, or pile) or are applied to the same cropland.

In determining whether two or more AFOs are under common ownership, the number of managers is not important. Two AFOs could be managed by different people but have a common owner (e.g., the same family or business entity owns both). For facilities under common ownership that either adjoin each other or use a common area or system for waste disposal, the cumulative number of animals confined is used to determine if the combined operation is a large CAFO and is used in conjunction with the discharge criteria to determine if the combined operation is a medium CAFO.

Operations with Multiple Animal Types

Under the CAFO regulations, multiple types of animals are not counted together to determine the type and size of a CAFO. However, once an operation is defined as a CAFO based on a single animal type, all the manure generated by all animals confined at the operation is subject to NPDES requirements. If wastestreams from multiple livestock species subject to different regulatory requirements are commingled at a CAFO, any NPDES permit for the facility must include the more stringent ELG requirements (2003 CAFO Rule—68 FR 7176 and 7195). In situations where immature animals (e.g., heifers and swine weighing less than 55 lbs.) are confined along with mature animals, the determination of whether the operation is defined as a CAFO depends on whether the mature or immature animals separately meet the applicable threshold. Operations that specialize in raising only immature animals (heifers, swine weighing less than 55 lbs., and veal calves) have specific thresholds under the regulations. However, once an AFO is defined as a CAFO, manure generated by all the animals in confinement would be addressed by the CAFO's NPDES permit if it is a permitted CAFO.

An operation that confines multiple animal types, where no one type meets the large or medium CAFO threshold, can be designated as a CAFO if it is found to be a significant contributor of pollutants to waters of the United States.

AFOs Designated as CAFOs

The CAFO regulations set the standards for the Director (either the Regional Administrator or the NPDES permitting authority) to designate any AFO as a CAFO if the AFO is a significant contributor of pollutants to waters of the United States (40 CFR 122.23(c)). The Director may designate any AFO as a CAFO on a case-by-case basis if he determines that the AFO is a significant contributor of pollutants to waters of the United States as specified in 40 CFR 122.23(c). AFO operations that may be considered for designation include the following:

- A medium-sized AFO that is not defined as a CAFO and is determined to be a significant contributor of pollutants to waters of the United States.
- A small AFO (i.e., confines fewer than the number of animals defined in Table 15-2) that meets one of the methods of discharge criteria in 40 CFR 122.23(c)(3)(i) and (ii) and is determined to be a significant contributor of pollutants to waters of the United States.
- An AFO that raises animals other than species identified in the regulatory definitions of large and medium CAFOs and is determined to be a significant contributor of pollutants to waters of the United States. Examples of such AFOs include geese, emus, ostriches, llamas, minks, bison, and alligators.

For an AFO to be designated as a CAFO, the Director must determine that the AFO is a significant contributor of pollutants to waters of the United States (40 CFR 122.23(c)). Once an operation is designated as a CAFO, it must seek coverage under an NPDES permit and, among other things, develop and implement an NMP.

Under the regulations at 40 CFR 122.23(c)(3), an AFO may not be designated as a CAFO until the NPDES permitting authority or EPA has determined that the operation should and could be regulated under the permit program and has conducted an inspection of the operation. In addition, a small AFO may not be designated as a CAFO unless it also meets the small AFO discharge criteria (40 CFR 122.23(c)(3)(i) and (ii)) and is determined to be a significant contributor of pollutants to waters of the United States.

CAFO Program as it Applies to Unpermitted CAFOs

When inspecting unpermitted facilities, the inspector should gather information to determine if the facility is a CAFO.¹² For a CAFO with no NPDES permit, any discharge of pollutants from a CAFO's production area to a water of the United States is a violation of the CWA, as is any discharge from the CAFO's land application areas that is not agricultural stormwater.

By definition, medium CAFOs and designated small CAFOs have discharges of pollutants to waters of the United States. These facilities must apply for an NPDES permit or eliminate the cause of the discharge.

Large Unpermitted CAFOs and the Agricultural Stormwater Exemption

Large unpermitted CAFOs may or may not have discharges to waters of the United States. If a large CAFO currently has or had in the past, discharges of pollutants from its production area to a water of the United States, those discharges are in violation of the CWA. Again, the large CAFO will need to apply for a permit or permanently remedy the cause of the discharge.

Section 502(14) of the CWA excludes from the definition of a point source **agricultural stormwater discharges**. A precipitation-related discharge of manure, litter, or process wastewater to waters of the United States from land application areas under the control of a

¹² Note that throughout this chapter, "unpermitted CAFO" refers to a CAFO without a Clean Water Act NPDES permit. This includes CAFOs that have a permit issued pursuant to state law that is not considered to be an NPDES permit.

Large **unpermitted** CAFO is a violation of the CWA **except** under certain conditions. The land application area means all land under the control of the CAFO owner or operator, including where the CAFO owns, rents, or leases the land to which manure from the production area is applied (40 CFR 122.23(e)(3)). It includes situations where a CAFO determines when and how much manure is applied to fields not owned, rented, or leased by the CAFO.

For a Large unpermitted CAFO's discharge to meet the definition of agricultural stormwater, the CAFO must land apply its manure in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater, as specified in Part 122.42(e)(1)(vi) through (ix). See Chapter 4 of EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a) for more information on the agricultural stormwater exemption.

The regulations at 40 CFR 122.42 (e)(1)(vi) through (ix) require the unpermitted large CAFO to:

- Implement appropriate site-specific conservation practices, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the United States.
- Follow protocols for appropriate testing of manure, litter, process wastewater, and soil.
- Follow protocols to land apply manure, litter or process wastewater in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter or process wastewater.
- Maintain specific records that document the implementation and management of the minimum elements described above.

Inspectors should evaluate the protocols and practices implemented by the unpermitted large CAFO against all applicable state technical standards that are part of the authorized state NPDES program pursuant to 40 CFR 123.36. State technical standards may include sampling and analysis methods, prohibitions on land application during certain times of the year, or on frozen or saturated soils, etc. See Chapter 6 of the *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a) for more information on technical standards. Finally, the unpermitted large CAFO must maintain documentation of its manure land application practices either on-site or at a nearby office, and make these records available to the inspector upon request (40 CFR 122.42(e)(1)(ix)).

If a Large unpermitted CAFO does not meet these requirements it is not covered by the agriculture stormwater exemption and discharges to waters of the United States from the land application area are in violation of the Clean Water Act. Discharges occurring during dry weather can never be exempt as agricultural stormwater.

Large unpermitted CAFOs may have additional discharges not specifically addressed in the ELG or CAFO regulations, either from the production area or from outside the production area. They are also subject to industrial stormwater permitting requirements of 40 CFR 122.26. Large CAFOs, as defined in 40 CFR 122.23 and 412 are included in category (i) of facilities considered

to be engaging in industrial activity under 40 CFR 122.26 (b)(14). As a result, large CAFOs are subject to the requirements of 40 CFR 122.26 regardless of whether they are a permitted facility under 40 CFR 122.23. The requirements of 40 CFR 122.26 apply to any stormwater discharge from a large CAFO that is associated with industrial activity at a large CAFO that is not otherwise regulated under 40 CFR 122.23 and 412. CAFOs that are permitted to discharge pursuant to 40 CFR 122.23 and 122.26 may have both sets of requirements included in a single permit or in separate wastewater and stormwater permits. CAFOs subject to industrial stormwater requirements may qualify for the conditional exclusion provided in 40 CFR 122.26(g) for no exposure certifications for stormwater discharges. CAFOs may also be subject to stormwater permitting requirements for construction activity under 40 CFR 122.26(b)(14)(x) or (b)(15).

NPDES CAFO PERMITS

Applications and Notice of Intent

NPDES permitting authorities have two options for issuing NPDES permits to CAFOs: individual permits and general permits. CAFO owners and operators who seek permit coverage must either submit an application for an individual permit or submit a Notice of Intent (NOI) (or permitting authority's comparable form) for coverage under a general permit, if a general permit is available (40 CFR 122.23(d)(1)). EPA requires applicants who seek coverage under either individual or general CAFO permits to provide, at a minimum, the information listed in Table 15-3. The NPDES permitting authority may request additional information from the applicant and use other CWA information-gathering authorities, such as CWA section 308, to obtain such information.

Table 15-3. Information Required on NPDES Application Forms 1 and 2B

Form 1 (all NPDES individual permit applicants) 40 CFR 122.21 (f)
Activities conducted by the applicant that require an NPDES permit
Name, mailing address, and location of facility
Up to four Standard Industrial Classification codes that best reflect the principal products or services provided
Operator's name, address, and telephone number and ownership status
Whether the facility is on Indian lands
List of all other state or federal permits or construction approvals received or applied for under CWA, Resource Conservation and Recovery Act (RCRA), Safe Drinking Water Act (SDWA), etc.
Brief description of the nature of the business
Form 2B (CAFOs) 40 CFR 122.21 (i)
The name, address, and telephone number of the owner or operator
Whether the application is for an existing or proposed facility
Facility name, address, and telephone number
Latitude and longitude of the production area
Name and address of integrator for contract operations
Specific information about the number and type of animals, whether in open confinement or housed under roof
Total number of acres under control of the applicant available for land application of manure, litter, or process wastewater

Table 15-3. Information Required on NPDES Application Forms 1 and 2B

Estimated amounts of manure, litter, and process wastewater generated per year
Estimated amounts of manure, litter, and process wastewater transferred to other persons per year
Topographic map of the geographic area in which the CAFO is located showing the specific location of the production area
Containment and storage type and storage capacity for manure, litter, and process wastewater
A nutrient management plan that satisfies the requirements specified in 40 CFR 122.42(e), including, for all CAFOs subject to 40 CFR Part 412, Subpart C or Subpart B, the requirements of 40 CFR 412.4(c), as applicable
Indication of whether a nutrient management plan is being implemented
Date of last nutrient management plan review or revision
Description of alternative uses of manure, litter, and process wastewater
Identification of land application best management practices implemented

Source: Program Question and Answer Document Volume 1 (EPA, 1992).

Elements of a CAFO Permit

NPDES Effluent Limitations and Standards

Section 301(a) of the CWA prohibits the discharge of pollutants from a point source into waters of the United States unless the discharge complies with other provisions of the CWA, including the requirement for a discharge to be authorized under an NPDES permit. Effluent limitations serve as the primary mechanism in NPDES permits for minimizing discharges of pollutants to receiving waters. Technology-based effluent limits are included in NPDES permits to achieve a level of treatment of pollutants for point source discharges based on the applicable level of control according to technologies specific to that industry. If technology-based limits are insufficient to meet applicable water quality standards, more stringent water quality-based effluent limitations can be included in the permit (CWA section 301(b)(1)(C)).

Overview of Technology-Based Effluent Limitations and Standards

Technology-based effluent limitations and standards for CAFOs must address all discharges from a CAFO (40 CFR 122.42(e)). As discussed below, technology-based standards are established through a national ELG for some CAFO discharges. All other discharges must be addressed through technology-based effluent limitations developed on a case-by-case basis using best professional judgment, or a combination of the two methods (40 CFR 125.3). In general, CAFO permits will include limits for process wastewater discharges from the CAFO's production area and land application area.

The production area at a CAFO includes the animal confinement areas and other parts of the facility, including manure storage areas, raw materials storage areas, and waste containment areas (40 CFR 122.23(b)(8)). The land application area means all land under the control of the CAFO owner or operator, including where the CAFO owns, rents, or leases the land to which manure from the production area is applied (40 CFR 122.23(e)(3)). It includes situations where a CAFO determines when and how much manure is applied to fields not owned, rented, or leased by the CAFO. The regulation at 40 CFR 412 contains the ELG applicable to CAFOs. The CAFO ELG

establishes the technology-based effluent limitations and new source performance standards (NSPS) for those operations that meet the regulatory definition of a large CAFO.

ELG for Animal Sectors

The ELGs for CAFOs are broken into the following subparts addressing specific animal sectors shown in Table 15-4 below.

Table 15-4. Effluent Limitation Summary

Animal Sector	ELG Technology-based Limits
Large CAFOs	40 CFR Part 412
Subpart A—Horses and sheep	40 CFR 412.13
Subpart B—Ducks	40 CFR 412.22
Subpart C—Dairy cows and cattle other than veal calves	40 CFR 412.33, 412.37
Subpart D—Swine, poultry, and veal calves	40 CFR 412.45, 412.47

All four subparts include specific discharge limitations. Subparts A and B contain technology-based requirements for the production area only. Subparts C and D include technology-based requirements for both production areas and land application areas under the control of the CAFO owner or operator.

CAFOs That Are New Sources

The term *new source* is defined in 40 CFR 122.2, and the criteria for determining a new source is identified at 40 CFR 122.29(b). Only large CAFOs can be new sources subject to NSPS requirements promulgated in accordance with CWA section 306 (as provided in 40 CFR Part 412). The new source criteria in 40 CFR 122.29(b) are used to determine which large CAFOs are defined as new sources.

CAFOs That Are New Dischargers

An AFO that is 1) newly constructed; 2) implements changes so that it meets the definition of a CAFO; or 3) that is designated as a CAFO is a *new discharger* if it is not a new source. A new discharger is an AFO that becomes a CAFO either through definition or designation and is not a new source (i.e., subject to NSPS). Such operations could be a CAFO for one of the following reasons: 1) the facility is newly constructed (but not subject to NSPS and therefore not a *new source*); 2) the facility has changed some aspect of its operations such that it becomes defined as a medium CAFO or designated as a small or medium CAFO.

Technology-Based Requirements for the Production Area of Large CAFOs

Operations Covered by Subpart A—Horses and Sheep

The ELG requirements for Subpart A (40 CFR 412.10–15) address the production area only. Any additional technology-based requirements for discharges from the CAFO must be developed using BPJ.

Existing and new large CAFOs that confine horses and sheep may not discharge manure or process wastewater (which includes horse wash-down water) pollutants to waters of the United States from the CAFO (i.e., *no-discharge* standard). The only exception to the no-

discharge standard is an overflow that occurs because of a rainfall event from a permitted facility that is designed, constructed, operated, and maintained to contain all process wastewater plus the runoff from a 25-year, 24-hour rainfall event for the location of the CAFO (40 CFR 412.13 and 412.15).

Operations Covered by Subpart B—Ducks

The ELG requirements for Subpart B (40 CFR 412.20–26) address the production area only. The ELG distinguishes between two types of manure handling systems in the production area of duck operations (*wet lot* and *dry lot*). Any additional technology-based requirements for discharges from the CAFO must be developed on a BPJ basis (40 CFR 125.3(a)).

All duck operations constructed before 1974 subject to the ELG must meet specific discharge limitations established by 40 CFR 412.22. Those are the only numeric limitations in the CAFO ELGs.

OPERATIONS COVERED BY SUBPART C—DAIRY COWS AND CATTLE OTHER THAN VEAL CALVES AND BY SUBPART D—SWINE, POULTRY AND VEAL CALVES

Existing Sources—Subparts C and D

The ELG requirements for subparts C and D (40 CFR 412.30–37 and 412.40–47) address both the production area and the land application area. This section addresses the technology-based requirements associated with the production area. Subpart C includes requirements for large CAFOs that confine dairy cattle and cattle other than veal calves, and Subpart D includes large CAFOs that confine swine, poultry and veal calves. The requirements in Subpart C are identical for existing sources and new sources. The requirements in Subpart D differ for existing and new sources. The new source requirements for Subpart D are addressed below.

Existing sources subject to Subparts C and D and new sources subject to Subpart C are subject to a no-discharge requirement. Those operations may not discharge manure into waters of the United States from the production area (Subpart C—40 CFR 412.31(a), 412.32(a), and 412.33(a); Subpart D—40 CFR 412.43(a), 412.44(a), and 412.45(a)). The only exception to that no-discharge standard is when precipitation causes an overflow, provided that the production area is designed, constructed, operated, and maintained to contain all manure, litter, and process wastewater including the runoff and direct precipitation from a 25-year, 24-hour rainfall event.

To ensure that a facility meets the no-discharge standard, the CAFO must ensure that the production area has adequate storage structures that are designed, constructed, operated, and maintained to contain all manure, litter, and process wastewater including the runoff and direct precipitation from a 25-year, 24-hour rainfall event. An important consideration of whether the CAFO meets the ELG requirements is whether it has adequate storage or treatment structure capable of containing all manure, litter, and process wastewater that accumulate during the critical storage period. To comply with the ELG, the storage volume in the production area must contain all those wastes.

To meet the no-discharge requirement, the CAFO must operate the production area in accordance with additional measures and recordkeeping requirements specified in 40 CFR 412.37(a)–(b) and 412.47(a)–(b). Those include requirements for routine visual inspections of the production area, the use of depth markers for liquid impoundments, corrective action when deficiencies are identified, and mortality handling. Records must be maintained on-site, including records for each of the above measures, and records documenting the design of storage structures and any overflows that occur.

Voluntary Performance Standards

The voluntary alternative performance standards provisions in 40 CFR 412.31(a)(2) apply to existing sources subject to Subpart C and D and new sources subject to Subpart C. This provision applies only to discharges from the production area. The provision for alternative performance standards allows a CAFO owner or operator to request from the Director NPDES permit effluent limitations according to site-specific alternative technologies where the CAFO can establish that the alternative technologies will achieve a quantity of pollutants discharged from the production area equal to or less than the quantity of pollutants that would be discharged under applicable baseline effluent guidelines performance standards.

New Source Performance Standards—Subparts C and D

As discussed in the previous section, Large Subpart C beef and dairy CAFOs that are new sources have the same production area requirements as existing Subpart C operations. Large Subpart D swine, poultry, and veal calf CAFOs that are new sources are subject to the NSPS (40 CFR 412.46).

Like existing sources subject to Subpart D, new sources under Subpart D may not discharge manure, litter, or process wastewater into waters of the United States from the production area and are required to comply with the additional measures and recordkeeping requirements at 40 CFR 412.47(a) and (b).

Unlike the requirements for existing sources, 40 CFR 412.46 does not allow an exception for new sources to the no discharge requirement. Rather, a CAFO subject to the requirements of 40 CFR 412.46 must either 1) have an absolute prohibition of any discharge from its production area as a condition of its permit, or 2) request the permitting authority to “establish NPDES best management practice effluent limitations designed to ensure no discharge...” whereby the facility can satisfy the no discharge effluent limitation (40 CFR 412.46(a)(1)). See Chapter 4 in the *NPDES Permit Writers’ Manual for CAFOs* (EPA, 2012a) for more information.

New sources subject to Subpart D using an open storage structure must have a depth marker to indicate the maximum volume of manure and process wastewater the structure is designed to contain (whereas existing sources and new sources subject to Subpart C must use a depth marker that indicates the 25-year, 24-hour storm event).

An important consideration of whether a CAFO meets the NSPS alternative is if it has an adequate storage or treatment structure capable of containing all manure that accumulates

during the critical storage period. To comply with the NSPS, the storage volume in the production area must contain all wastes.

The definition of a New Source and the requirements for New Sources and their applicability may be complex, depending on the circumstances at an individual facility. Refer to Chapter 4 of the *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a) for more detailed information.

Requirements for the Production Area of Large CAFOs

Even for CAFOs subject to a no-discharge, technology-based standard for the production area, situations could arise where the permit imposes more stringent requirements for allowable discharges. Specifically, more stringent discharge limitations are necessary in instances where CAFOs discharge from a production area to a waterbody listed under CWA section 303(d) as impaired due to nutrients, dissolved oxygen or bacteria, or where an analysis of frequency, duration and magnitude of the anticipated discharge (consisting of potential overflows of manure, litter, or process wastewater) indicates the reasonable potential to violate applicable water quality standards.

Technology-Based Requirements for the Land Application Area of Large CAFOs

Each CAFO subject to the ELG requirements in subparts C and D that land applies manure must do so in accordance with certain practices that constitute the technology-based effluent limitations for the land application area (40 CFR 412.4 and 412.37(c)).

A general description of the practices required by 40 CFR 412.4 follows.

- Develop and implement a field-specific NMP that fully incorporates the other requirements of 40 CFR 412.4 concerning land application.
- Land apply manure at application rates that minimize nitrogen and phosphorus transport from the field to waters of the United States in compliance with the technical standards for nutrient management established by the permitting authority. The technical standard for nutrient management must include a field-specific assessment of the potential for nitrogen and phosphorus transport from the field to waters of the United States and address the form, source, amount, timing, and method of application of nutrients on each field to achieve realistic production goals while minimizing nitrogen and phosphorus movement to waters of the United States. The standard must also include appropriate flexibility for any CAFO to implement nutrient management practices to comply with the standard such as consideration of multiyear phosphorus applications to fields that do not have a high potential for phosphorus runoff to waters of the United States and phased implementation of phosphorus-based nutrient management, as determined appropriate by the Director.
- Analyze manure at least once a year for nitrogen and phosphorus content, and analyze soil at least once every five years for phosphorus content. The results of the analyses are to be used in determining application rates for manure, litter, and other process wastewater.

- Periodically inspect equipment used for land application of manure for leaks (before each application is recommended to ensure the manure is delivered at the proper rate of application).
- Implement a minimum setback for manure application of 100 feet from surface waters and conduits to surface waters; or substitute with a 35-foot vegetated buffer, or other alternatives where the CAFO demonstrates equivalent pollutant reductions.
- Complete on-site records documenting implementation of all required best management practices (BMPs) and any additional records specified by the permitting authority.

Many states have unique requirements for developing an NMP. The EPA regulations establish the minimum requirements for NPDES permitted CAFOs. States may require more stringent requirements, and in many instances states have established additional requirements to address land application. For example, many states require more frequent soil analysis than is required by 40 CFR 412.4(c)(3). In recognition of that, 40 CFR 412.4(c)(2) requires application rates for land application of manure, litter, and process wastewater to be in compliance with technical standards for nutrient management established by the Director. The regulations at 40 CFR 123.36 require that the state's technical standards be a part of every approved state's NPDES program.

EPA has encouraged states to address water quality protection issues when determining appropriate land application practices as part of their technical standards for nutrient management. At a minimum, the permitting authority must include in the technical standard the following components:

- A field-specific assessment of the potential for nitrogen and phosphorus transport from the field to waters of the United States.
- The form, source, amount, timing, and method of application of nutrients on each field to achieve realistic production goals, while minimizing nitrogen and phosphorus movement to waters of the United States.
- Appropriate flexibility for CAFOs to implement the standard (e.g., multiyear phosphorus banking).

The state technical standards will provide additional specificity to key nutrient management provisions in the ELG. The standards should include additional information, such as soil and manure sampling and analysis protocols, application methods, and plan content requirements. The state technical standards are also considered to determine if a facility meets the requirements to be covered by the agriculture stormwater exemption. To meet the exemption requirements, a facility's nutrient management planning must meet all appropriate state technical standards (e.g., use correct sampling and analysis methods). CAFOs that land apply using nutrient management practices based on standards other than the technical standards established by the Director would have to demonstrate that such practices ensure the

appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater as specified in 40 CFR 122.42(e)(1)(viii).

Requirements for the Land Application Area of Large CAFOs

As discussed, all permitted CAFOs are required to develop and implement an NMP. When a permitted CAFO implements an NMP in accordance with its permit requirements, any remaining precipitation related discharges of manure are considered agricultural stormwater. For large CAFOs subject to the ELG, that also means that the NMP must comply with permit requirements that implement the ELG, including technical standards established by the Director for nutrient management. For facilities not subject to the ELG, it means that the NMP must comply with permit requirements that implement 40 CFR 122.42(e) and any additional nutrient management requirements developed by BPJ. As previously mentioned, by definition, the agricultural stormwater exemption applies only to precipitation-related discharges.

BEST PROFESSIONAL JUDGMENT (BPJ)

NPDES permit limitations are based on BPJ when national ELGs have not been issued pertaining to an industrial category or process. Specifically, the NPDES regulations require a permit writer to establish permit limitations on a case-by-case BPJ basis when ELGs are inapplicable, or in combination with the effluent guidelines, where the ELG apply to only certain aspects of the operation or certain pollutants (CWA section 402(a)(1); 40 CFR 122.44(k)). As explained, ELGs have been promulgated for only those operations that meet the regulatory definition of a large CAFO, and apply to the production area for subparts A, B, C, and D, and land application area for subparts C and D. For example, there is no ELG for small or medium CAFOs or for exotic animal species. Exotic animal species are those not specifically identified in the ELG, for example: llamas, geese, or ostriches. Nonetheless, just as for any other permitted facility, the CWA requires that an NPDES permit for small, medium, and exotic animal CAFOs include technology-based effluent limitations.

OTHER TECHNOLOGY-BASED LIMITATIONS THAT APPLY TO DISCHARGES FROM CAFOS

CAFOs may have additional discharges not specifically addressed in the ELG or CAFO regulations, either from the production area or from outside the production area. Those include but are not limited to the following:

- Process wastewater discharges from outside the production area, such as wash-down of equipment that has been in contact with manure, raw materials, products or by-products that occurs outside the production area.
- Discharges that do not meet the definition of process wastewater, such as domestic wastewater discharges; chiller water; discharges associated with feed, fuel, chemical, or oil spills, and equipment repair.
- Discharges of pollutants from poultry, swine, and veal calf animal confinement houses that are not covered by the ELG. Those include removal of animals and cleaning out houses, and runoff associated with fan exhaust deposits outside the houses.

A CAFO permit should address discharges such as those above and establish BAT/BCT limits developed on a BPJ basis. The determination of whether to apply the no-discharge standard to areas other than those that are covered by the ELG (animal confinement area, manure storage area, waste containment area, and so on) is a site-specific determination that must be made by the permitting authority. EPA and states can begin the BPJ analysis with an evaluation based on the no-discharge standard, because that is the applicable standard most closely related to those facilities (see discussion of BPJ-based limits in Chapter 4.1.4. of EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a)).

WATER QUALITY-BASED EFFLUENT LIMITATIONS AND STANDARDS

All NPDES permits must include technology-based effluent limitations. However, a permit must also include more stringent water quality-based limitations when such limitations are necessary to meet water quality standards (CWA sections 402(a) and 301(b)(1)(C)).

REQUIREMENTS FOR THE LAND APPLICATION AREA OF PERMITTED LARGE CAFOS

As discussed, all permitted CAFOs are required to develop and implement an NMP. When a permitted CAFO implements an NMP in accordance with its permit requirements, any remaining precipitation related discharges of manure are considered agricultural stormwater. For large CAFOs subject to the ELG, that also means that the NMP must comply with permit requirements that implement the ELG, including technical standards established by the Director for nutrient management. For facilities not subject to the ELG, it means that the NMP must comply with permit requirements that implement 40 CFR 122.42(e) and any additional nutrient management requirements developed by BPJ. As previously mentioned, by definition, the agricultural stormwater exemption applies only to precipitation-related discharges.

An NMP is a detailed planning document that identifies conservation practices and management activities that, when implemented, help to ensure that both production and natural resource protection goals are achieved. The objective of an NMP is to document those practices and activities that will help achieve the goals of the producer and protect or improve water quality.

Permitted CAFOs must comply with the terms of their NMP. As discussed above, the ELGs establish more specific nutrient management requirements for Large dairy, cattle, swine, poultry, and veal calf CAFOs. One of those requirements is that the manure application rates in those CAFOs' NMPs must minimize phosphorus and nitrogen transport to surface waters in compliance with technical standards for nutrient management established by the Director.

The CAFO regulations at 40 CFR 123.36 require states to establish technical standards for nutrient management that are consistent with 40 CFR 412.4(c)(2). The regulations include basic requirements for elements that each state's technical standards for nutrient management must include.

- The state technical standards will provide additional specificity to key nutrient management provisions in the ELG. The standards should include additional

information, such as soil and manure sampling and analysis protocols, application methods, and plan content requirements.

EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a) provides more detail on EPA's expectations for the content of state technical standards for nutrient management. It is important for inspectors to be familiar with the applicable technical standards for each inspected CAFO. The CAFO's permit will include terms of the NMP, which have been reviewed by the permit writer to ensure the NMP and associated terms are consistent with the state's technical standards for nutrient management. However, inspectors will need to understand the scope and content of the technical standards to adequately evaluate NMP implementation. In addition, for Large unpermitted CAFOs, the inspector needs to understand the state's technical standards to determine if the CAFO's nutrient management practices meet the standards and thus if the CAFO qualifies for the agricultural stormwater exemption.

Soil science and Soil Fertility

To fully understand nutrient management at a CAFO, the CAFO inspector should be aware of the basic principles of soil science and soil fertility. Key concepts include nutrient cycling in soils, the factors that influence plant availability of nutrients and crop uptake, as well as the mechanisms and factors that affect nutrient loss from agricultural soils. These concepts are used to develop and implement an NMP and some familiarity with the concepts will allow the CAFO inspector to understand and evaluate NMP implementation. See Appendix AE, "Management/Soil Science," which describes basic nutrient management and soil science concepts for CAFO inspectors. CAFO inspectors may also refer to Appendix A of EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a), which provides a more thorough introduction to basic soil science and soil fertility.

Minimum Measures that Must Be Terms and Conditions of the NPDES Permit

Certain elements of a permitted CAFO's site-specific NMP are identified as "terms of the permit." Those site-specific terms of the permit are defined as "the information, protocols, [BMPs], and other conditions" identified in a CAFO's NMP and determined by the permitting authority to be necessary to meet the requirements of 40 CFR 122.42(e)(1) (40 CFR 122.42(e)(5)). For CAFOs subject to subparts C and D of the ELG (Large dairy, beef, poultry, swine, and veal calf CAFOs), the terms of the NMP must also include the BMPs necessary to meet the land application requirements identified in 40 CFR 412.4(c). The NMP terms must be included by the permit writer in a CAFO's NPDES permit as enforceable terms and conditions of the permit. CAFO inspectors will assess whether CAFO operations are addressing these conditions and implementing the terms of their NPDES permit.

With respect to protocols for land application of manure, the NPDES regulations identify the specific information that is (and is not) considered to be terms of the NMP. CAFO inspectors should be familiar with the approach (linear or narrative rate) used to develop the terms of a CAFO's NMP as well as the terms that have been identified as enforceable permit conditions.

Many states have unique requirements for developing an NMP. The requirements of EPA regulations establish the minimum requirements for permitted CAFOs. States may require more

stringent requirements, and in many instances states have established additional requirements to address land application.

The NPDES regulations establish minimum requirements—the nine minimum measures—that must be addressed in every CAFO’s NMP. As discussed above, the ELGs and the state technical standards for nutrient management include more specific requirements for some of the minimum measures that apply to certain CAFOs. The nine minimum measures that must be included, as applicable, in each CAFO’s NMP are listed below (40 CFR 122.42(e)(1)(i)–(ix)). The list also identifies the more specific requirements found in the ELG for certain CAFOs.

Minimum Measures:

- Ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the storage facilities.
 - CAFOs subject to the ELG must meet the storage requirements associated with the applicable subpart.
 - CAFOs subject to subparts C and D of the ELG must implement additional measures and recordkeeping for the production area.
- Ensure proper management of mortalities (i.e., dead animals) to ensure that they are not disposed of in a liquid manure, stormwater, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities.
 - CAFOs subject to subparts C and D of the ELG must also handle mortalities to prevent pollutant discharges to surface water.
- Ensure that clean water is diverted, as appropriate, from the production area.
- Prevent direct contact of confined animals with waters of the United States.
- Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or stormwater storage or treatment system unless specifically designed to treat such chemicals and other contaminants.
- Identify appropriate site-specific conservation practices to be implemented, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the United States.
 - CAFOs subject to subparts C and D of the ELG must also implement 100-foot land application setbacks from down gradient surface waters or conduits to surface waters, or 35-foot vegetated buffers, or a compliance alternative.
 - The state technical standards for nutrient management may also require conservation practices to be implemented under certain land application scenarios.
- Identify protocols for appropriate testing of manure, litter, process wastewater, and soil.
 - CAFOs subject to subparts C and D of the ELG must sample soils for phosphorus at least every 5 years and manure for nitrogen and phosphorus annually.

- Establish protocols to land apply manure, litter or process wastewater in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter or process wastewater.
 - The ELG establishes specific requirements for developing land application rates for CAFOs subject to subparts C and D, including the requirement that those CAFOs use the state technical standards for nutrient management when developing land application rates.
- Identify specific records that will be maintained to document the implementation and management of the minimum elements described above and in 40 CFR 122.42 (e)(1)(i)–(viii).
 - The ELG establishes specific recordkeeping requirements for CAFOs subject to subparts C and D.

Information on how to evaluate performance of the nine minimum measures is included in Section C, “The CAFO Inspection—Facility Tour,” and Section D, “The CAFO Inspection—Record Review and the NMP.”

For large CAFOs subject to the land application requirements of the ELG, in addition to the requirements of 40 CFR Part 122, the terms of the NMP must also include the BMPs necessary to meet the requirements of 40 CFR 412.4(c).

Part 412.4 requires that the NMP address the form, source, amount, timing and method of application and include a field-specific assessment of the potential for nitrogen and phosphorus transport from the field to surface waters. The Director may also allow appropriate flexibilities to implement nutrient management practices.

Part 122.42(e)(5) further elaborates on the terms of the NMP associated with protocols for land application. Those must include the fields available for land application, field-specific rates of application, and any timing limitations on when manure can be land applied. The terms for rates of application must follow one of two approaches that the regulation identifies as the linear approach and the narrative rate approach.

Changes to a Permitted CAFO’s NMP

Agricultural operations modify their nutrient management and farming practices during the normal course of their operations. Such alterations might require changes to a permitted CAFO’s NMP during the period of permit coverage.

Because of the way NMPs are developed and the flexibility provided by the two options for developing the terms of the NMP at 40 CFR 122.42(e)(5), most routine changes at a facility should not require changes to the permit itself. To minimize the need for revision, NMPs should account for and accommodate routine variations inherent in agricultural operations such as anticipated changes in crop rotation, and changes in numbers of animals and volume of manure resulting from normal fluctuations or a facility’s planned expansion.

Typically, an NMP is developed to reflect the maximum number of animals confined at the facility; the maximum capacity for manure storage; the total number of fields available for land application and their maximum capacity for nutrient applications. Fluctuations under those maximum amounts would not necessitate changes to NMPs. EPA encourages operators to develop an NMP that includes reasonably predictable alternatives that a CAFO may implement during the period of permit coverage. However, unanticipated changes to an NMP and in some cases, permit terms, might nevertheless be necessary. In the course of the NMP review, an inspector may identify instances where a CAFO may not have complied with a permit requirement to notify the permitting authority of a change to its NMP during the period of permit coverage. The regulations at 40 CFR 122.42(e)(6) identify requirements that should be incorporated into each CAFO's permit regarding providing the permitting authority with the most current version of the NMP.

Agricultural Stormwater Exemption for Permitted CAFOs

Permitted CAFOs that land apply manure must implement practices to ensure that all precipitation-related discharges from land application are composed entirely of agricultural stormwater. Section 502(14) of the CWA excludes from the definition of a point source agricultural stormwater discharges. The CAFO regulations establish when a discharge from a land application area under the control of a CAFO is considered to be exempt agricultural stormwater, as opposed to a point source discharge from the CAFO. A precipitation-related discharge from a CAFO's land application areas is considered agricultural stormwater only when the manure was applied in accordance with site-specific nutrient management practices that "ensure appropriate agricultural utilization of the nutrients" in the manure to be applied (40 CFR 122.23(e)). For CAFOs, the agricultural stormwater exemption applies only to discharges from land application areas. Discharges occurring during dry weather can never be discharges of agricultural stormwater.

Criteria for site-specific nutrient management practices for land application are specified in 40 CFR 122.42(e)(1)(vi)–(ix). For permitted CAFOs, the permit should set forth the, "site-specific nutrient management practices" that will be implemented for each requirement of 40 CFR 122.42(e)(1)(vi)–(ix). Under 40 CFR 122.42(e)(1)(vii), all permitted CAFOs must establish field-specific application rates for manure. The site-specific land application rates must be established as enforceable terms in the facility's NPDES permit following either the linear approach described in 40 CFR 122.42(e)(5)(i), or the narrative rate approach described in 40 CFR 122.42(e)(5)(ii).

In addition to the requirements described above, permitted large CAFOs subject to the requirements of Subpart C and D of Part 412 must also meet the requirement of 40 CFR 412.4(c) to qualify for the agricultural stormwater exemption (40 CFR 122.23(e)(1) and 122.42(e)(1)). The ELG specifies requirements for implementing site-specific application rates, manure and soil sampling, and setback requirements. Additionally, it provides protocols for inspecting the land application equipment.

The site-specific application rates for manure must be developed in accordance with technical standards established by the Director (40 CFR 412.4(c)(2)). The rates must also be identified in

the facility's NPDES permit as enforceable terms following either the linear approach or narrative rate approach (73 FR 70420).

Land Application at Permitted Small and Medium CAFOs

For precipitation-related discharges from the land application area of a medium or small CAFO to qualify for the agricultural stormwater exemption, the owner or operator of the CAFO must implement an NMP that includes the practices and protocols specified in 40 CFR 122.42(e)(1)(vii)–(ix).

Effluent limitations for medium and small CAFOs are based on BPJ and could be the same as, or similar to, the effluent limitations established in the ELG for large CAFOs. Thus, a medium or small CAFO might be required to develop protocols for land application in accordance with the state technical standards for nutrient management and comply with the requirement for a 100-foot setback or a 35-foot vegetated buffer between land application areas and any down gradient surface waters or conduits to surface waters. Because the practices for ensuring appropriate agricultural utilization of the nutrients in land-applied manure at large CAFOs do not differ significantly for medium and small CAFOs, the permit may apply the requirements established in the state technical standards to land application sites at all permitted CAFOs.

MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS OF NPDES PERMITS FOR CAFOs

The NPDES regulations identify recordkeeping, monitoring, and reporting requirements that are applicable to all CAFOs (40 CFR 122.41, 122.42(e)(2)–(4)). The CAFO ELG identify additional recordkeeping and monitoring requirements that are applicable only to large CAFOs. The recordkeeping requirements associated with the off-site transfer of manure are applicable to large CAFOs. For CAFOs not subject to the ELG, additional monitoring and recordkeeping requirements may be established as technology-based limits by the permitting authority on a case-by-case basis using BPJ.

Monitoring Requirements

NPDES permits should include monitoring requirements that address the routine operational characteristics of the facility and the minimum reporting requirements at 40 CFR 122.41(l). The ELG includes specific monitoring requirements for daily and weekly visual inspections of specific aspects of the production area and monitoring requirements associated with land application, including manure and soil analysis and land application equipment inspection (40 CFR 412.37, 412.47).

The permit may also include monitoring requirements that address non-routine activities. For example, discharges at a CAFO can occur because of an overflow during a catastrophic storm event (which may be an allowable discharge under the terms of the permit) or a leak, breach, overflow, or other structural failure of a storage facility because of improper operation, design, or maintenance (which would be an unauthorized discharge). Unauthorized discharges could also occur because of manure releases related to the improper storage or handling of liquid or solid manure, or improper land application. Where there is a discharge from the production

area to an impaired water, a permit may include more restrictive water quality-based effluent limitations and additional monitoring requirements.

Recordkeeping Requirements

Permitted CAFOs must retain copies of all required documentation. In addition, permits should require that the records be organized in a manner that inspectors can easily review during a compliance inspection, such as the use of a dedicated logbook. The required records for large CAFOs are listed in Table 15-5 and for small and medium CAFOs in Table 15-6. Records must be maintained for five years.

Table 15-5. Required Records for Permitted Large CAFOs

Regulatory Requirement for Recordkeeping	Records Required
Requirements to maintain records for the nine minimum terms of the NMP. 40 CFR 122.42(e)(2)	
Adequate storage capacity	Satisfied by requirements of 40 CFR 412.37(b) (below).
Mortality management	Satisfied by requirements of 40 CFR 412.37(b) (below).
Divert clean water	Satisfied by requirements of 40 CFR 412.37(b) (below).
Prevent direct contact with waters of United States	Identify what waters of the United States, if any, exist within the animal confinement areas and the measures, including operation, and maintenance procedures and associated records, that are implemented to prevent animals from contacting waters of the United States.
Chemical disposal	Identify chemicals used or stored (or both) on-site and document appropriate disposal methods.
Conservation practices to control runoff to waters of the United States	Identify the conservation practices used to control pollutant runoff, including location, and the protocols and procedures, including installation, operation, and maintenance, and associated records, that are implemented to ensure the practices function to control pollutant runoff.
Manure and soil testing	Satisfied by requirements of 40 CFR 412.37(c) (below).
Protocols for land application	Satisfied by requirement of 40 CFR 122.42(e)(2)(ii) and 412.37(c) requirement to maintain on-site a site-specific NMP.
Requirements to maintain records for the production area. 40 CFR 412.37(b)	
A complete copy of the information required by 40 CFR 122.21(i)(1)	The name and owner or operator.
	The facility location and mailing address.
	Latitude and longitude of the entrance of the production area.
	A topographic map of the geographic area in which the CAFO is located showing the location of the production area.
	Specific information about the number and type of animals.
	Type of confinement animals are in (open confinement or housed under a roof).
	The type of containment and storage (anaerobic lagoon, roofed storage shed, storage ponds, under floor pits, aboveground storage tanks, belowground storage tanks, concrete pad, impervious soil pad, other).
	The total capacity for manure, litter, and process wastewater storage (tons/gallons).

Table 15-5. Required Records for Permitted Large CAFOs

Regulatory Requirement for Recordkeeping	Records Required
	The total number of acres under control of the applicant available for land application of manure, litter, or process wastewater.
	Estimated amounts of manure, litter, and process wastewater generated per year (tons/gallons).
	Estimated amounts of manure, litter, and process wastewater transferred to other persons per year (tons/gallons).
	The site-specific NMP.
Requirements to maintain records for the production area. 40 CFR 412.37(b)	
Records documenting the inspections 40 CFR 412.37(a)(1)	Necessary documentation for inspections of the production area.
	Records documenting weekly inspections of all stormwater diversion devices, runoff diversion structures, and devices channeling contaminated stormwater to the wastewater and manure storage and containment structure.
	Records documenting daily inspection of water lines, including drinking water or cooling water lines.
	Records documenting weekly inspections of the manure, litter, and process wastewater impoundments.
Wastewater levels 40 CFR 412.37(b)(2)	Weekly records of the manure and wastewater level in liquid impoundments as indicated by the required depth marker.
Corrective actions 40 CFR 412.37(b)(3)	Records of any actions taken to correct deficiencies found in the visual inspections of the production area.
	An explanation of the factors preventing immediate correction of any deficiencies identified in the visual inspections of the production area that are not corrected within 30 days.
Mortality management required 40 CFR 412.37(b)(4), (a)(4)	Records must identify that mortalities were not disposed of in any liquid manure or process wastewater system. They must also identify that mortalities were handled in such a way as to prevent the discharge of pollutants to surface water, unless alternative technologies pursuant to 40 CFR 412.31(a)(2) and approved by the Director are designed to handle mortalities.
Storage structure design 40 CFR 412.37(b)(5)	Current design of any manure or litter storage structures, including volume for solids accumulation, design treatment volume, total design volume, and approximate number of days of storage capacity.
Overflows 40 CFR 412.37(b)(6)	The date, time, and estimated volume of any overflow.
Requirements to maintain records for the land application area. 40 CFR 412.37(c)	
	Expected crop yields.
	Weather conditions 24 hours before application, at time of application, and 24 hours after application.
	Explanation of the basis for determining manure application rates, as provided in the technical standards established by the Director.
	Calculations showing the total nitrogen and phosphorus to be applied to each field, including sources other than manure, litter, or process wastewater.
	Total amount of nitrogen and phosphorus applied to each field, including documentation of calculations for the total amount applied.

Table 15-5. Required Records for Permitted Large CAFOs

Regulatory Requirement for Recordkeeping	Records Required
	The method used to apply the manure, litter, or process wastewater.
	Test methods used to sample and analyze manure, litter, process wastewater, and soil (40 CFR 412.37(c), 47(c)).
	Results from manure, litter, process wastewater, and soil sampling (40 CFR 412.37(c)).
	Date(s) of manure application equipment inspection.
40 CFR Part 412.37(c)	At the discretion of the permitting authority.

Table 15-6. Required Records for Permitted Small and Medium CAFOs

Regulatory Requirement for Recordkeeping	Responsive Records or Documentation
Requirements to maintain records for nine minimum terms of the NMP. 40 CFR 122.42(e)(1)(ix)	
Adequate storage capacity	Documentation of the storage capacity required to meet permit requirements and the storage capacity available.
Mortality management	Records of practices implemented to meet the mortality disposal or management practices (or both) of the permit.
Divert clean water	Document implementation of any operation and maintenance practices used to ensure that clean water is diverted as appropriate.
Prevent direct contact with waters of the United States.	Identify what waters of the United States, if any, exist within the animal confinement areas and the measures, including operation and maintenance procedures and associated records, that are implemented to prevent animals from contacting waters of the United States.
Chemical disposal	Identify chemicals used or stored (or both) on-site and document appropriate disposal methods.
Conservation practices to control runoff to waters of the United States	Identify the conservation practices used to control pollutant runoff, including location, and the protocols and procedures, including installation, operation, and maintenance, and associated records, that are implemented to ensure the practices function to control pollutant runoff.
Manure and soil testing	Results of manure and soil tests taken to meet the requirements of the permit and NMP.
Protocols for land application	Satisfied by requirement of 40 CFR 122.42(e)(2)(ii) requirement to maintain a site-specific NMP on-site.
Additional recordkeeping requirement to satisfy the effluent limitations	
Determined by the permitting authority on a case-by-case basis.	

Reporting Requirements

Reporting requirements are generally linked to monitoring requirements and can include periodic reports, emergency reports for overflow events, and special reports. An NPDES permit will often include monitoring requirements for routine operational characteristics of the facility, including the required annual report, and the minimum reporting requirements at 40 CFR 122.41(l). The permit may also include reporting requirements that address non-routine

activities such as discharge notification (for both authorized and unauthorized discharges). In case of a discharge, the CAFO is required to provide immediate notification of the permitting authority and a follow-up report describing the specific data collection activities required for discharges (40 CFR 122.41(l)(6)). The permittee must provide a description of the discharge, describe the time and duration of the event, identify the cause(s) of the discharge, and provide the result of any required analysis(es) to the permitting authority (40 CFR 122.41(l)(6) and 122.44(g)).

Annual Reports

All NPDES permits for CAFOs must include a requirement that the permittee submit an annual report with specific information defined in the regulation (40 CFR 122.42(e)(4)). In addition to the information required by the NPDES regulations, state permitting authorities can require additional information to be included with the annual report. The 2015 Final NPDES Electronic Reporting Rule requires that NPDES regulated entities, electronically submit certain permit and compliance monitoring information instead of using paper reports. Permitted CAFOs will need to electronically submit any general permit reports (e.g., Notice of Intent (NOI)) and their Annual Reports after December 21, 2020, unless they seek and have obtained an electronic reporting waiver from the NPDES permitting authority (40 CFR 127.15).

The annual report must include the following (40 CFR 122.42(e)(4)):

- The number and type of animals confined at the CAFO.
- Estimated total amount of manure, litter, and process wastewater generated by the CAFO in the previous 12 months (tons/gallons).
- Estimated total amount of manure, litter, and process wastewater transferred to other persons by the CAFO in the previous 12 months (tons/gallons).
- Total number of acres for land application covered by the NMP.
- Total number of acres under control of the CAFO that were used for land application of manure, litter, and process wastewater in the previous 12 months.
- Summary of all manure, litter, and process wastewater discharges from the production area that have occurred in the previous 12 months, including the date, time, and approximate volume of the discharge.
- A statement indicating whether the current version of the CAFO's NMP was developed or approved by a certified nutrient management planner.
- The actual crop(s) planted and actual yield(s) for each field.
- The nitrogen and phosphorus content of the manure, litter, and process wastewater as reported on the laboratory report for the required analyses (lbs./ton, g/Kg, pounds/1,000 gallons, mg/L, ppm).
- The results of calculations conducted in accordance with the approved NMP to determine the amount of manure, litter, or process wastewater to apply.

- The amount of manure, litter, and process wastewater applied to each field during the previous 12 months.
- For any CAFO that implements an NMP that addresses rates of application in accordance with the narrative rate approach:
- The results of any soil testing for nitrogen and phosphorus conducted during the previous 12 months.
- The data used in calculations conducted in accordance with the methodology in the approved NMP to determine rates of nitrogen and phosphorus application from manure, litter, and process wastewater.
- The amount of any supplemental fertilizer applied during the previous 12 months.
- The actual crop(s) planted and actual yield(s) for each field, the actual nitrogen and phosphorus content of the manure, litter, and process wastewater, and the amount of manure, litter, or process wastewater applied to each field during the previous 12 months.

CAFOs that follow the narrative rate approach for describing rates of application in the NMP must also submit as part of their annual report:

- The results of all soil testing and concurrent calculations to account for residual nitrogen and phosphorus in the soil, all recalculations, and the new data from which they are derived.
- The amounts of manure and the amount of chemical fertilizer applied to each field during the preceding 12 months. Together with the total amount of plant-available nitrogen and phosphorus from all sources, the information that is required to be included in the annual report provides the information necessary to determine that the CAFO was adhering to the terms of its permit when calculating amounts of manure to apply.
- The narrative rate approach requires the CAFO to recalculate the projected amount of manure, to be land applied, using the methodology in the NMP, at least once a year, throughout the period of permit coverage. The recalculations and the new data from which they are derived are required to be reported in the CAFO's annual report (40 CFR 122.42(e)(5)(ii)).

The annual report requirements should reflect implementation of existing NMP provisions and changes to the NMP contemplated through flexibilities built into the NMP during the initial planning process or later modifications in accordance with 40 CFR 122.42(e)(6). Because the terms of the NMP are incorporated as enforceable terms and conditions of the permit, any change that results in a change to the terms of the NMP constitutes a change to the permit and therefore must be processed in accordance with 40 CFR 122.42(e)(6).

EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a), Appendix D, "Example Nutrient Management Plan Record Keeping Forms," and Appendix M, "Nutrient Management

Recordkeeping Calendar,” includes some examples of recordkeeping forms. Those forms can help the operation meet some of the recordkeeping requirements specified in the regulations.

B. PREPARING FOR THE CAFO OR AFO INSPECTION

The primary goals of the CAFO inspection are gathering information to identify and document threats to water quality; determine status as a CAFO or AFO, determine compliance status with the statute, regulations, permit conditions and other program requirements; and verifying the accuracy of information submitted by the CAFO. Other goals of a CAFO inspection might include investigating a citizen tip or complaint, gathering evidence to support enforcement actions, collecting information to support NPDES permit development, and assessing compliance with orders or consent decrees. In addition, providing feedback to the producer on where discharge vulnerabilities may exist is important. Some problems can be remedied quickly once identified, and preventing pollutant discharges is the best outcome for water quality. Information collected depends on the type of CAFO inspection being conducted. Information collected and operational aspects evaluated during the inspection will vary by inspection type. A CAFO inspection is often categorized as a Status Determination Inspection, Permit Compliance Inspection, Reconnaissance, Settlement Agreement Inspection, or Complaint Inspection and may include sampling elements.

SELECTION OF FACILITIES FOR INSPECTION

Although specific procedures to select facilities for inspection will vary by EPA Region and by authorized state, the basic approach is similar. Some facilities are selected for inspection based on probable cause, which means that the regulatory agency has obtained specific evidence of a possible existing violation at a facility. Inspections are conducted in response to citizen complaints about a specific facility, emergency situations such as reports of ongoing spills, information about specific water quality problems or fish kills, referrals from a state, to assist a state inspection effort, or as a follow-up to prior inspections indicating violations at the same facility or at other facilities owned or operated by the same entity. Facilities are also selected through the Neutral Administrative Inspection Scheme, in which the regulatory agency does not have any prior information indicating that there are existing violations. These are routine inspections to evaluate compliance. Within the neutral scheme, priority may be given to facilities that meet one or more of the following criteria:

- Are large CAFOs.
- Are in priority watersheds impaired by runoff from AFOs or high water quality watersheds that are priorities for protection.
- Are in watersheds with high AFO or CAFO density.
- Are near surface waters.
- Have the potential for large amounts of animal waste to reach surface water.
- Are near sources of drinking water.

The NPDES Compliance Monitoring Strategy calls for the following inspection frequencies:

- CAFOs with NPDES permits should be inspected by states and regions at least once every five years to determine compliance with the permit.
- Large CAFOs without NPDES permit coverage should be inspected to determine if the facility discharges. After a determination is made, future inspections occur on an as needed basis, (e.g., to see if the facility has made changes to its operation).
- Medium AFOs should be “assessed” one-time initially to determine if the facility is discharging and is a medium CAFO.
- Small AFOs should be inspected as needed based on complaints or other information.

COMPLIANCE DETERMINATION STRATEGY

The primary role of a CAFO inspector is to gather information that can be used to determine if an AFO or CAFO is in violation of NPDES and CWA requirements. If the CAFO has an NPDES permit the inspector will evaluate compliance with permit conditions, applicable regulations, and other requirements. Because most CAFOs do not have NPDES permit coverage, the CAFO inspector will often be collecting information to determine whether an unpermitted AFO or CAFO is discharging pollutants to a water of the United States and has a duty to apply for a permit. The CAFO inspector also plays an important role in enforcement case development and support. To fulfill these roles, a CAFO inspector must know before the inspection how compliance will be evaluated and what documentation will be necessary to make and support compliance determinations. If the CAFO inspector does not know what documentation to collect, the inspection may not provide appropriate and sufficient information. A compliance determination strategy is a formal or informal plan for the information and operational characteristics that an inspector will evaluate at a facility. The compliance determination strategy should reflect the type of inspection being conducted (see the examples in Table 15-7). The inspector should have a clear idea of the purpose of the inspection and the information that will be useful in evaluating compliance. The compliance determination strategy could be a ranking of preference in terms of documents, photographs, statements, and other materials to be evaluated and used to effectively demonstrate that the facility is or is not complying with applicable requirements. The compliance determination strategy will form the basis of the CAFO Inspection Plan, discussed at the end of this section.

Table 15-7. Example Inspection Focus for Compliance Determination Strategy Based on Inspection Type

Inspection Type	Inspection Focus for Compliance Determination Strategy
Status Determination Inspection	Information needed to determine whether the facility is a CAFO; for example: <ul style="list-style-type: none"> • Number of animals confined • Confinement period

Table 15-7. Example Inspection Focus for Compliance Determination Strategy Based on Inspection Type

Inspection Type	Inspection Focus for Compliance Determination Strategy
	Information needed to determine if the facility is discharging or has discharged; for example: <ul style="list-style-type: none"> • Quantity of waste generated • Storage capacity • Potential discharge locations • Records or other evidence of discharges • Proximity to waters of the United States
Permit Compliance Inspection	All information needed to evaluate permit compliance; for example: <ul style="list-style-type: none"> • Evidence of discharges or water quality impacts to the receiving water(s). • Documentation of required visual inspections. • Evaluation of impoundment operation and maintenance. • Documentation of mortality management or disposal. • Land application records. • Animal feed storage and runoff management. • Evaluation of conservation practice operation and maintenance. • Documentation of compliance with all NMP nine minimum measures and associated NMP terms.
Settlement Agreement Inspection	Any information relevant to the terms of the Settlement Agreement
Complaint Inspection	Documentation and evaluation of site conditions related to the complaint

Documentation provides a snapshot in time of the actual conditions existing at the time of inspection so that evidence can be examined objectively by compliance personnel.

Documentation is a general term used here to refer to all printed information and electronic media produced, copied, or created by an inspector to provide evidence of suspected violations. Forms of documentation include the inspector's field notebook or inspection checklist, verbal statements documented by the inspector, photographs, videotapes, drawings, maps, printed matter, electronic recordings, and photocopies or photographs of on-site records. Of these, verbal

statements are the least desirable as they are the easiest to refute. Documentation may also include sampling of manure, litter, and process wastewater as well as soils, surface waters or discharges and the necessary labeling and chain of custody documents associated with the samples.

Documentation Tips

- ✓ Include a distinguishing characteristic like a unique depth marker or buildings in the background of photos.
- ✓ Impermanent items, such as vegetation, do not make good reference points as they can be easily removed.
- ✓ Photos should include an accurate date/time stamp that shows it was taken during the time period of the inspection.
- ✓ Some digital cameras include built-in global positioning system (GPS) tagging that allows an inspector to associate each photo with the geographic location where it was created.

EPA or state attorneys will be able to provide compliance determination strategies and documentation requirements based on prior case law and experience presenting evidence in court. For example, the inspector may want to include an obvious reference point in photographs that clearly ties the image to a specific CAFO. Documents should, ideally, have dated signatures or certification stamps (e.g., professional engineers stamp, where appropriate).

CAFO INSPECTOR RESPONSIBILITIES AND PREPARATION ACTIVITIES

In addition to the responsibilities described in EPA's *NPDES Compliance Inspection Manual* (EPA, 2016), there are a number of other items that the CAFO inspector needs to do or consider before entering the CAFO facility. The CAFO inspector needs to understand his or her role in the inspection process, determine the type of inspection to be performed and become familiar with the facility location and its geographic features. The CAFO inspector should consider his or her responsibilities prior to the CAFO inspection:

1. Professional Attitude
2. Animal Safety and Biosecurity
3. Inspector Safety and Personal Protection Equipment (PPE)
4. General Facility Information
5. Review of Permit and Facility Files
6. Facility Compliance and Enforcement History

Professional Attitude

The CAFO inspector is often the first or only contact a CAFO operator has with the EPA. In dealing with facility representatives and employees, CAFO inspectors should be professional, tactful, courteous, and diplomatic. A firm but responsive attitude will encourage cooperation and initiate professional working relationships. CAFO inspectors should always speak respectfully of any product, manufacturer, or person but not endorse anything.

Many CAFO operators reside on-site, and their office may be in their residence. As a result, portions of a CAFO inspection may take place in a non-neutral location such as the operator's residence or vehicle or in the presence of the operator's family. The CAFO inspector should be polite and respectful of the operator, family members or other facility employees, and the operator's home, vehicle, or office. Inspectors may also encounter the owner's or operator's pets and should resist the urge to touch or pet these animals. To the extent practicable, scrape mud and manure from boots (or remove boots) prior to entering buildings and vehicles, drive and park carefully, and behave in a non-confrontational manner as appropriate to the situation.

Another professional consideration unique to CAFO inspections is timing of the inspection so the operator is available. The CAFO inspector should be aware that some farm operations will take precedence over the inspection, especially animal emergencies. Dairies, for example, have established milking schedules and the operator may not be available to meet if you arrive when cows are being milked. Seasonal considerations, such as planting or harvest time, may also

determine the availability of the CAFO operator or other knowledgeable employee to participate in the inspection. Since inspectors often have to travel long distances to reach remote facilities, it may be beneficial to contact the facility operator ahead of time to schedule the inspection, if allowed by your regional or state policies. Also refer to the “Inspection Notification” section of this chapter.

Animal Safety and Biosecurity

The CAFO inspector should be familiar with all safety obligations and practices regarding basic inspections, including regional and state policies or requirements. Inspectors should ask about and follow any facility-specific safety requirements in place. In addition to the basic health and safety risks associated with inspecting facilities, CAFO inspectors have the added responsibility to avoid transporting livestock diseases between facilities. Livestock animals are susceptible to diseases from other facilities and human carriers are a risk to livestock operations. Failure to follow proper biosecurity precautions could spread livestock illnesses like foot-and-mouth disease (*Aphthae epizooticae*) or avian influenza. Without the proper precautions, CAFO inspectors might unintentionally transport diseases between facilities on contaminated clothing, equipment, or vehicles. To minimize the risk that a CAFO inspector will carry diseases or infections into or between livestock facilities, CAFO inspectors should always follow EPA’s biosecurity procedures (Appendix AF, “Standard Operating Procedure (SOP): Biosecurity Procedures for Visits to Livestock and Poultry Facilities”). CAFO owners or operators may or may not ask visitors to abide by their site-specific biosecurity measures. Regardless of whether the producer makes the request, EPA inspectors should follow the Biosecurity SOP at all livestock and poultry facilities. If the visited operation has additional measures, the inspector is strongly encouraged to follow them, as appropriate, at that specific facility.

Swine and poultry are typically most susceptible to diseases as the animals have limited contact with the natural environment and humans who do not work at the facility. Swine and poultry CAFOs may operate under the authority of an Integrator that oversees numerous facility operations, with different levels of biosecurity. When visiting a facility with various age groups of one species in one day, visit the youngest animal group first. Poultry is an exception. Poultry breeding stock should be visited before other commercial birds. Be aware that most swine facilities do not allow access to any person who has been to another swine operation within the past 72 hours. In addition, many swine operations do not allow access to anyone who has visited another livestock operation of any type within the past 24 hours. Poultry operations often will deny access to anyone who has had contact with other birds, even pet birds, within the past 48 hours.

CAFO inspectors must be aware of each facility’s biosecurity requirements to plan multiple inspections appropriately. Therefore, contacting the Integrator before making swine or poultry farm inspections may be helpful if the inspection plan involves making several different site inspections. The CAFO inspector might need to call in advance so that the biosecurity measures are known before the inspection and the information is accessible along with other pre-inspection information. At a minimum, inspectors should have biosecurity equipment in their vehicle should it be needed. Many CAFOs do provide biosecurity equipment for visitors but inspectors must have their own available to avoid being denied access for a lack of protective

equipment. Consult the Biosecurity SOP for a full list of personal protective equipment and supplies. If inspectors are denied access for biosecurity or any other reason, it should be noted in the inspector logbook/notes, along with the name of the facility contact who denied the access. Equipment and supplies are included in the Biosecurity SOP as well as procedures to follow (see Appendix AF, “Standard Operating Procedure (SOP): Biosecurity Procedures for Visits to Livestock and Poultry Facilities”).

Some highlights of the Biosecurity SOP are included below, but these are NOT a substitute for the procedures in the Biosecurity SOP.

- When EPA personnel are planning to visit a livestock or poultry facility, they should first contact USDA’s Animal and Plant Health Inspection Service (APHIS) or the state veterinarian to identify any areas with outbreaks of animal disease, where travel should be avoided.
- As a general rule, EPA will **not** conduct inspections on livestock or poultry facilities in areas with ongoing emergency foreign animal disease response activities (e.g., vaccination program, depopulation, disposal, or virus elimination).
- Do not make on-site visits to livestock operations if you have visited a foreign country and were exposed to or had contact with farm animals (with or without a known contagious disease) within 5 days before the site visit. Also, clothing and equipment (including shoes) worn or used on foreign farm visits should be cleaned before use on U.S. facilities. If appropriate cleaning is not possible, alternative clothing or equipment should be used.
- Some facilities have an established policy of requiring that their own vehicles be used for transportation purposes within the facility. An Integrator may also want to drive the inspectors from one farm to another, rather than allowing the inspector to take his or her vehicle. Inspectors may accept offers of facility-provided transportation within a facility if the total value of the transportation is \$20 or less. Consult with your ethics counselor if the total value of the transportation exceeds \$20, or you will be transported in non-ground transportation (e.g., aircraft or helicopter) or transported across more than one facility. For other situations, consult with your ethics counselor.
- On entering a facility, acknowledge any and all other livestock facilities visited within the previous 48 hours, including whether EPA entered any animal confinement or waste storage areas.
- EPA should only enter animal production buildings if it is essential to complete the goals of the visit, and should avoid contact with livestock, poultry or other animals (wild or domestic) on any facility.
- Use disinfectants that have been registered (or exempted) by EPA for the intended use. EPA’s pesticide registration program maintains information on EPA registered disinfectants. Information can be found at <https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants>.

- Keep a copy of the label and the Safety Data Sheet (SDS) for any registered disinfectant used and make both available to the facility operator upon request. Follow all label safety precautions and dispose of empty containers, unused disinfectant solution, and used disinfectant in accordance with label instructions.
- In consultation with Health and Safety staff, identify an appropriate location such as an EPA or state laboratory, or office, for disposal of soiled disposable items in case the owner/operator will not allow the waste to remain on-site.

Inspector Safety and Personal Protective Equipment (PPE)

In addition to animal safety and biosecurity, CAFO inspectors must also be aware of specific safety risks that may be encountered during a CAFO inspection. The CAFO inspector should be familiar with all safety obligations and practices, both EPA's and the facility's, to avoid unnecessary risks. Safety equipment and procedures required for a facility will be based on EPA's standard safety procedures or if used, by the CAFO's response to the 308 Letter. See Appendix AG, "Field and Personal Protective Equipment," for additional safety information. Safety requirements must be met, not only for safety reasons, but to ensure that the CAFO inspector is not denied entry to the facility or parts of it. Below are several safety issues that an inspector might encounter at a CAFO.

- **Pesticide spraying and storage.** CAFOs might store pesticides in both concentrated and dilute form. CAFO inspectors should never enter an area where pesticides are being applied. The CAFO inspector should be able to recognize a pesticide sign, and before entering an area where pesticides have been applied the inspector should determine the type of pesticide applied, the time and date of application, and whether the area is safe to enter.
- **Confined spaces.** Gases such as hydrogen sulfide, carbon dioxide, ammonia, and methane are present in all stored manure, and if not properly ventilated, can reach concentrations dangerous to humans. Covered or enclosed tanks present the greatest danger, especially when manure is being agitated or pumped out of the structures. CAFO inspectors should not enter confined spaces used to store manure or silage. If entering a confined space is necessary, the inspector must be certified for confined space entry.
- **Drowning** is a possibility where semisolid, slurry, and liquid manures are stored. Liquid or slurry manure stored in an open impoundment often forms a surface crust. The thickness of the crust depends on the moisture content and consistency of the manure. However, under no conditions is the crust solid enough to support a human being. CAFO inspectors should never step on any crusted surfaces during an inspection. Also, look out for open trenches or sumps in barns or other structures; the drop off may not be immediately visible if the storage is full or the floor is covered with bedding, litter or other wastes.



- **Electrocution.** Some CAFO operators use tractors to power pumps when transferring waste out of storage lagoons. The power sources (takeoffs) present both electrical hazards and physical hazards for CAFO inspectors wearing loose-fitting clothing. Facilities being washed present an electrocution hazard to the CAFO inspector. Wash water might conduct electricity from wiring, connections, or equipment to persons in contact with that water. CAFO inspectors are advised to stay out of facilities during wash down. Electric fencing may be in place to keep animals in designated grazing areas or exercise lots, or to keep animals out of waterways. Inspectors should avoid touching or climbing over or under a “live” wire fence to avoid an electric shock. Facility operators can usually open or disable a live fence so that inspectors can access areas as needed.
- **Equipment used for handling, transporting, and applying manure** can be hazardous to the operator and to others close by. The operator’s manual for the equipment should document the potential hazards for that equipment. Common hazards include getting clothing or limbs caught in moving equipment parts; injury from escaping hydraulic fluid; and slippage of tractors, loaders, and spreaders. CAFO inspectors should exercise appropriate caution (e.g., not wearing loose-fitting clothing) around any machinery encountered during an inspection. Inspectors should also take care to alert truck drivers and equipment to their presence to prevent accidents.
- **Disease and Illness.** Very few animal diseases are of concern to humans. However, persons with low immunity can contract a specific respiratory illness from poultry called histoplasmosis. Livestock can carry bacteria, fungi, and parasites that cause illnesses such as cryptosporidiosis, ringworm, salmonella, giardiasis, leptospirosis, and complications from exposure to *E. coli*. Other illnesses, such as Q fever, anthrax, pseudocowpox, and rabies are less common, but can result from close contact with livestock. Pregnant women are at increased risk from some of these diseases (cryptosporidiosis, listeriosis, and Q fever) (Pelzer and Currin, 2009; Adams, 2012). Fortunately, many of these diseases are rare. Nevertheless, CAFO inspectors should avoid entering animal confinement areas unless necessary to adequately assess compliance. In addition, the inspector should never touch an animal at a CAFO and should follow all the biosecurity precautions in the previous section to minimize risk and exposure.

For any safety- or health-related issues not covered in this manual, CAFO inspectors should consult with their Health and Safety staff.

Health and Safety Tips for CAFO Inspections

- Always wear appropriate PPE; this includes long pants and safety boots (reinforced toe and at least ankle height), sunscreen, and mosquito repellent (containing DEET or Picaridin), as appropriate. A dust mask may be appropriate during windy or excessively dry weather. A safety vest may improve visibility to equipment operators.
- Maintain a safe distance from wastewater lagoon edges and observe from upwind, whenever possible.
- Do not enter confined or enclosed spaces where manure is being stored. Methane released by manure can be lethal. Inspectors must not enter any confined spaces without proper certification.

Health and Safety Tips for CAFO Inspections

- Do not enter fenced-in areas unless you are accompanied by the operator or can observe the entire enclosure to ensure no animals or other hazards exist.
- Be aware of snakes while walking around a CAFO. Avoid walking through areas of heavy brush where you could startle a snake and provoke a strike. Wear boots at all times. If a snake is encountered remain silent, step away slowly, and otherwise remain motionless.
- Be aware of dogs while approaching CAFOs and during your inspection. If a dog is preventing entry to the CAFO, telephone the facility contact and ask that the dog be restrained. As with all animals at a CAFO, do not pet or touch dogs.
- Keep anti-bacterial hand wash or wipes in your vehicle. Clean hands frequently and after each inspection.
- Other types of standard safety equipment may also be warranted, e. g., a hard hat if the facility has active construction underway, or ear protection where exhaust fans may be in use.

General Facility Information

Prior to the inspection, it is good practice to locate the CAFO on a topographic map and the inspector may want to obtain aerial imagery of the facility. A variety of free Internet-based tools can provide topographic maps and aerial imagery for a specific address or GPS coordinates. EPA Regions may have subscriptions to additional mapping resources, such as TerraServer, or have an in-house GIS team or contacts. Note that in rural areas the CAFO's mapped address may not correspond with the production area, for example, it may correspond to the owner's home address. In addition, older imagery may show newer operations. If the facility's production area is not specifically identifiable on aerial imagery, the CAFO inspector should print out several larger scale images that show areas near the address. The facility representative may need to identify the operation's location on these aerial images, in addition to satellite locations such as heifer farms.

The aerial image can be used to locate CAFO production areas, land application areas, and nearby surface waters. A facility diagram or aerial image should be reviewed with the CAFO representative during the inspection to label structures, storage areas, property boundaries, land application fields, and other facility characteristics. The annotated diagrams and aerial image(s) should be attached to the inspection report for reference (See Appendix AH, "Mapping Tool (Region 5)").

Facility Information That Should Be Gathered Before a CAFO Inspection

- ✓ Maps and aerial photographs of the CAFO.
- ✓ Facility's site plan.
- ✓ Names, titles, and telephone numbers of responsible CAFO officials.
- ✓ Description of animal types and agricultural processes.
- ✓ Typical livestock population and maximum capacity.
- ✓ Approximate distance to nearest surface water(s).
- ✓ Water quality/impairment status of the surface water(s).
- ✓ Closest floodplain, if available.
- ✓ Changes in CAFO conditions since previous inspection/permit application.
- ✓ Any known safety and biosecurity requirements.

Facility Information That Should Be Gathered Before a CAFO Inspection

- ✓ Permit, if the facility has permit coverage, or state requirements, including state technical standards, if the facility is unpermitted and land applies manure.
- ✓ Nutrient Management Plan, if the facility has one, or whatever nutrient management planning has been submitted if the facility is unpermitted.
- ✓ Identify any missing or incomplete information.

Locating the target facility on a topographic map is useful for measuring distances and potential flow paths to waters of the United States. The topographic map will show the natural gradient around the facility. This can be used to determine areas where stormwater may flow overland on to the site, areas that may require clean water diversions, and areas where water may drain from the site. Once the names of nearby surface waters are identified, the CAFO inspector should refer to the state's Clean Water Act section 303(d) list of impaired waters to determine if surface water segments adjacent to or downstream of the facility are impaired for nutrients, sediment, or other potential pollutants that could be discharged from the CAFO.

Useful mapping resources include:

- NRCS' Web Soil Survey maps (<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>) can be used to identify soil types expected under the CAFO's production area and their characteristics.
- Federal Emergency Management Agency (FEMA) flood maps (<https://msc.fema.gov/portal/howto>) can be used to estimate if the facility is in a mapped flood zone.
- EPA's Watershed Assessment, Tracking and Environmental Results System (WATERS) (<https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system>) can be used to identify impaired waters, TMDLs, provide maps of surface waters, etc.

Review of Permit and Facility Files

Collection and analysis of available facility background information are essential to the effective planning and overall success of a compliance inspection. Materials from available files and other information sources will enable CAFO inspectors to familiarize themselves with facility operations; conduct a timely, thorough and efficient inspection; clarify technical and legal issues before entry; and develop a sound and factual inspection report. The types of information that may be available for review are listed below and discussed in detail in the following sections. The CAFO inspector is responsible for determining the amount of background information necessary for the inspection and in collecting this information should focus on the characteristics unique to the permittee: site-specific NPDES permit requirements, historical wastewater and manure management practices, nutrient management, proximity to waters of the United States, compliance history, etc.

The CAFO inspector may not have much facility-specific information available prior to the inspection of an unpermitted facility. The CAFO inspector is expected to review the permit and

compliance file in advance of an inspection at a permitted CAFO. If the inspector suspects that an unpermitted CAFO or AFO may meet the criteria for permit coverage, familiarity with an available general permit, or an individual permit for a similar type of facility in that state, will be helpful in assessing conditions at the facility.

Some states may have state-issued CAFO permits that are *not* NPDES permits, though many of the objectives and provisions are similar. In addition, some states issue permits that do fulfill NPDES requirements, but may also include “above and beyond” provisions stipulated by state regulations (e.g., groundwater protection). EPA does not conduct compliance inspections for non-NPDES permits, or the non-NPDES provisions of “dual purpose” permits.

A facility with a non-NPDES state issued permit may still need NPDES coverage; for purposes of the inspection these facilities can be considered unpermitted facilities. If conducting a joint inspection with a state inspector on a “dual purpose” permit, the state inspector should take the lead on questions and discussions about provisions and issues that are not required by the NPDES regulations.

Files Checklist

- ✓ Conditions and requirements of the permit.
- ✓ Nutrient management plans/practices, NMP terms.
- ✓ Inspection notes and issues, along with any previous site entry problems.
- ✓ Prior compliance problems, enforcement actions, and correspondence.
- ✓ Prior complaints.
- ✓ Most recent and any previous annual reports.

Conditions and Requirements of the Permit

Reviewing a CAFO’s NPDES permit and nutrient management plan (NMP) is useful for finding site-specific information such as facility size, number and type of animals, and manure and wastewater management practices. CAFOs covered under a general permit will also have a site-specific nutrient management plan.

While reviewing the permit, the CAFO inspector should pay special attention to the permit requirements, nutrient management plans/practices, NMP terms, including identification of site-specific records to be maintained and annual reports. If a facility has had previous individual permits, it can be useful to review them, if available, to see if there has been any operational changes or changes to the number of animals confined over time.

The inspector should give special consideration to permit requirements that are unique to that operation. CAFO general permits stipulate the same provisions for every operation, perhaps with some sector-specific or region-specific provisions; the nutrient management plans for each facility will be site-specific. Individual permits are tailored for each specific operation and may include compliance schedules that extend deadlines for the CAFO to meet certain requirements. The inspector should determine how he or she will evaluate compliance with both general and site-specific requirements before conducting the inspection.

To become familiar with a CAFO permit and NMP terms, CAFO inspectors should review the example CAFO General Permit provided in Appendix O and the example NMP in Appendix P of EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a).

Requirements, Regulations, and Limitations

In addition to the CAFO permit, the CAFO inspector should review in detail the applicable EPA and state regulations and effluent limitation guidelines (ELGs). If the facility to be inspected is an unpermitted CAFO, state regulations may establish the bulk of the applicable requirements. For unpermitted large CAFOs the federal NPDES regulations prohibit discharges from the production area and establish certain nutrient management requirements for the land application area (See the "Overview of the NPDES Program for CAFOs" in Section A).

For unpermitted large CAFOs, the inspector will review the facility's documentation and implementation of nutrient management practices to determine if the land application areas qualify for the agricultural stormwater exemption (see Section A for information on land application requirements). A large CAFO's nutrient management planning must account for appropriate site-specific best management practices, protocols for appropriate manure and soil testing, appropriate protocols for land application, and maintenance of records to document the implementation of those BMPs.

In these cases, the inspector should gather records and make observations regarding:

- Nutrient recommendations and average yields for prevalent crops.
- Implementation of the permitting authority's technical standards for nutrient management such as requirements for soil and manure testing, development of manure application rates and timing restrictions on land application (e.g., prohibition on applying manure on snow covered or saturated ground).
- Standards or other guidelines for installation, operation, and maintenance of common best management practices, including for the required setbacks or vegetated buffers.

Annual Reports

All NPDES permits for CAFOs must include a requirement that the permittee submit an annual report with specific information defined in the regulation (40 CFR 122.42(e)(4)). Refer to Appendix C of EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a) for an example annual report. The CAFO's annual reports will include the following required information:

Permit Conditions and Requirements Checklist

- ✓ General and site-specific or BPJ effluent limitations.
- ✓ Monitoring and reporting requirements.
- ✓ NMP terms and the NMP.
- ✓ Special exemptions, compliance schedules, and waivers, if any.
- ✓ Changes in site conditions (when compared with previous permits).

Requirements, Regulations, and Limitations Checklist

- ✓ Copies of regulations, requirements, and restrictions placed on CAFO discharges.
- ✓ Monitoring and reporting requirements (if not reflected in a permit).
- ✓ Special exemptions and waivers, if any.

- The number and type of animals confined at the CAFO.
- Estimated total amount of manure, litter, and process wastewater generated by the CAFO in the previous 12 months (tons/gallons).
- Estimated total amount of manure, litter, and process wastewater transferred to other persons by the CAFO in the previous 12 months (tons/gallons).
- Total number of acres for land application covered by the NMP.
- Total number of acres under control of the CAFO that were used for land application of manure, litter, and process wastewater in the previous 12 months.
- Summary of all manure, litter, and process wastewater discharges from the production area that have occurred in the previous 12 months, including the date, time, and approximate volume of the discharge.
- A statement indicating whether the current version of the CAFO's NMP was developed or approved by a certified nutrient management planner. The CAFO inspector should check with the issuing agency on the status of the certification.
- The actual crop(s) planted and actual yield(s) for each field.
- The nitrogen and phosphorus content of the manure, litter, and process wastewater as reported on the laboratory report for the required analyses (lbs./ton, g/Kg, pounds/1,000 gallons, mg/L, ppm).
- The results of calculations conducted in accordance with the approved NMP to determine the amount of manure, litter, or process wastewater to apply.
- The amount of manure, litter, and process wastewater applied to each field during the previous 12 months.
- For any CAFO that implements an NMP that addresses rates of application in accordance with the narrative rate approach:
 - The results of any soil testing for nitrogen and phosphorus conducted during the previous 12 months.
 - The data used in calculations conducted in accordance with the methodology in the approved NMP to determine rates of nitrogen and phosphorus application from manure, litter, and process wastewater.
 - The amount of any supplemental fertilizer applied during the previous 12 months.
- All required records for manure transferred off-site to another entity.

Reviewing consecutive years of annual reports can reveal whether a CAFO is increasing production or changing nutrient management practices.

Discharge and Monitoring Reports

Permitted CAFOs are required to report certain information associated with discharges. CAFO permits might also include ambient stream monitoring, or other special monitoring requirements. State regulations might establish similar discharge reporting and other monitoring requirements for unpermitted CAFOs. The CAFO inspector should review all monitoring and discharge information in the facility file to get an idea of the nature and frequency of facility discharges, if any.

Facility Compliance and Enforcement History

Previous inspection reports will document general CAFO information and site photos, as well as problems or concerns. Inspectors who have visited the CAFO for NPDES or other regulatory programs may also be contacted to provide additional information or answer questions about the facility. The CAFO inspector will find it useful to have a copy of photos from past inspections to see how the CAFO has changed and if photo-documented compliance issues have been resolved.

Other EPA staff and state personnel should be consulted regarding correspondence, inspection reports, permits, and permit applications for individual facilities. They can provide compliance, enforcement, and litigation history; special exemptions and waivers applied for and granted or denied; citizen complaints and action taken; process operational problems and solutions; pollution problems and solutions; and, other proposed or historical remedial actions.

The CAFO's history of enforcement actions and its response to them tell a story about the operator and production practices. For example, inspecting a CAFO with a history of production area discharges will likely involve extensive review of manure management records, depth marker logs, and corrective actions. The CAFO inspector will want to examine manure storage structures, the production area, and flow paths for evidence of discharge. The CAFO inspector

Considerations When Reviewing Annual Reports

- ✓ Are the reports complete? If not what information is missing?
- ✓ Have there been any significant operational changes at the CAFO over time (i.e., new construction at the facility)?
- ✓ Does reported annual manure production seem reasonable for the number of reported animals and does the CAFO use the same manure production factors each year (e.g., weight or volume of manure per animal)?
- ✓ Is the amount of manure land applied or transferred similar to the amount of manure generated?
- ✓ Does the amount of acreage available seem adequate for the amount of manure land applied?
- ✓ Are nutrient calculations consistent with the approved NMP?

Facility Compliance and Enforcement History Checklist

- ✓ Previous inspection reports.
- ✓ Documentation of past compliance violations and the status of requested regulatory corrective action, if any.
- ✓ Enforcement actions such as compliance schedules and consent orders.
- ✓ Status of current and pending litigation against facility.
- ✓ Previous deficiency notices issued to facility.
- ✓ Complaints and reports, follow-up studies, findings, and remedial action.
- ✓ Correspondence between the CAFO and local, state, and federal agencies.

might also consider conducting this inspection during a storm event or at the end of a wet weather period, including snowmelt.

Sampling

If sampling is to be performed, part of the pre-inspection process will involve collecting, organizing, and preparing sampling equipment. The inspector's CAFO Inspection Plan should include whether sampling is expected and, if so, what types of sampling will be performed. The inspector should also prepare a sampling and analysis plan (SAP) or a quality assurance project plan (QAPP).

Sampling equipment will vary according to the media sampled, manure type (liquid, slurry, dry) if manure will be sampled, chemical parameters, and inspection type. Appendix AM, "Sampling Procedures and Equipment," includes a comprehensive list of field sampling equipment; the inspector should evaluate the equipment planned for use against documented sampling protocol. All equipment must be checked, calibrated, tested, logged, and packed for the inspection.

The inspector must plan for the proper preservatives and/or preservation methods (e.g., coolers with cold packs). In addition, if certain types of samples have holding times (i.e., a certain period of time that must not be exceeded before delivering the sample to the laboratory), the inspector should ensure that inspection time plus travel time do not exceed this threshold. For this reason, sampling may need to be scheduled towards the end of the inspection, and a time buffer built into the schedule to account for unanticipated delays. The inspector may have to pre-arrange to have samples delivered and analyzed at a local laboratory (near the facility) if samples cannot be delivered to an EPA laboratory within sample holding times. The inspector should also be prepared to follow the appropriate chain-of-custody procedures and provide the necessary documentation to ensure the results can be used in enforcement or other actions, as necessary. Refer to Basic Inspector Training or NPDES Inspection Manual for more information on chain-of-custody and documentation.

Quality Assurance Project Plan (QAPP)

EPA developed the QAPP as a tool for project managers and planners to document the type and quality of data needed for the agency to make environmental decisions and to describe the methods for collecting and assessing those data. The QAPP is required for all EPA projects resulting in the generation, collection, and use of primary environmental data such as water quality monitoring data. The QAPP ensures that the needed management and technical practices are in place so that environmental data used to support agency decisions are of adequate quality and usability for their intended purpose.

Prior to the start of data collection, a QAPP defining the goals and scope of the project, the need for sample collection, a description of the data quality objectives and quality assurance/quality control (QA/QC) activities to ensure data validity and usability must be developed by the project officer. Thereafter, a review by all parties to the sampling effort, such as a Quality Assurance (QA) Officer, must be conducted. Also, EPA laboratories will require a copy of an approved QAPP prior to conducting any sample analysis. This QAPP requirement

applies to both EPA staff and outside contractors. The process for approval of the QAPP and other documents related to the data collection activity should be outlined in the lead organization's Quality Management Plan (QMP) (see Appendix AN, "Sample Quality Assurance Project Plan (QAPP)").

Inspection Notification

EPA conducts both announced and unannounced inspections. Depending upon the specific circumstances and regional compliance strategies, the CAFO operator may or may not be notified in advance of the inspection. When EPA is leading the inspection, some regions notify the permittee in advance with a letter issued pursuant to Clean Water Act section 308, or "308 Letter," that the CAFO is scheduled for an inspection (see Appendix E, "Sample CWA Section 308 Information Collection Request Letter (308 Letter)"). The 308 Letter notifies the permittee that an inspection is imminent and usually requests information regarding on-site safety and biosecurity requirements. The 308 Letter may specify the exact date of the inspection, if coordination with the permittee is required. The 308 Letter also is used to inform the permittee of the right to assert a claim of confidentiality. The 308 Letter may be issued in conjunction with verbal communication with the CAFO operator to schedule an appropriate meeting time and location and to discuss biosecurity and safety procedures. The 308 Letter can also be used to obtain information prior to the inspection regarding manure storage and handling practices, not otherwise available. The CAFO inspector should consult with regional management regarding the process for developing and issuing these letters.

The CAFO inspector may also notify the appropriate state regulatory agency that an inspection will be conducted, and typically must notify an Indian country regulatory agency in advance of inspections to be conducted in their jurisdictions. The CAFO inspector should be prepared to respond to requests from state or Indian country agency staff to ride-along or participate in the inspection, whether for information exchange or training purposes. EPA policy with respect to Indian country inspections and notifying state agencies is addressed in the *NPDES Inspection Manual*; EPA Regions may have additional guidance with respect to pre-inspection notification.

CAFO INSPECTION PLAN

Developing a CAFO Inspection Plan is the final step of the pre-inspection process and will assist the CAFO inspector in performing the actual CAFO inspection. The CAFO inspector should develop a comprehensive inspection plan to define the inspection type, objectives, tasks and procedures, resources required to fulfill the objectives, tentative inspection schedule, and reporting deadlines. The following items need to be considered relative to the type of inspection (e.g., status determination, permit compliance, follow-up, settlement, or complaint inspection).

- Objectives (depends on inspection type):
 - What is the purpose of the inspection?
 - What is the compliance determination strategy?
 - What is to be accomplished on-site?
 - What is to be accomplished after leaving the site?

- Tasks (depends on purpose of inspection):
 - What specific tasks will be conducted?
 - What records will be reviewed?
 - What information must be collected (photocopies, samples, etc.)?
- Procedures (depends on activities anticipated):
 - What procedures are to be used?
 - Will the inspection require special procedures?
- Resources:
 - What personnel will be required?
 - What equipment will be required?
- Schedule:
 - What will be the time requirements and order of inspection activities?
 - When will the inspection report be sent to the facility?
- Pre-notification/coordination:
 - Will the facility be notified in advance of the inspection? If so, how many days in advance and by what method (phone, mail, email, fax, or some combination of these)?
 - Does the inspection need to be coordinated with EPA attorneys or other EPA compliance staff or regulatory programs?
 - Which other federal and state agencies need advance notice of the inspection?
 - If not done in advance, how and when will the facility be notified of the inspection?

The outline of tentative inspection objectives and records that will be reviewed should be prepared in advance and can be presented to the CAFO representative(s) during the opening conference.

Review Checklists

In addition to the specific items mentioned in this chapter, to facilitate the CAFO inspection process, a detailed National CAFO checklist based on the NPDES CAFO regulations and CAFO ELG requirements has been developed. The checklist is useful in collecting information associated with the NMP and the minimum practices. EPA Regions have developed similar checklists particular to regional issues and some have prepared sector-specific checklists (see Appendix AI, “Inspection Checklist,” and Appendix AJ, “Regional Inspection Checklists”). The CAFO inspector should select or develop a checklist appropriate to the CAFO: permitted, unpermitted, or sector-specific.

The CAFO inspector should photocopy appropriate checklist(s) to be used during the inspection and consider bringing extra copies in case the facility requests a copy during the inspection. The CAFO inspector should also consult this checklist when reviewing the CAFO's facility files.

C. THE CAFO INSPECTION—FACILITY TOUR

This section covers the CAFO site inspection facility tour including entry activities, the opening conference, limited on-site records and document review, the facility tour, and the closing conference. Section 4, "The CAFO Inspection—Records Review and the NMP," will cover how to evaluate the facility's records and implementation of the terms of the NMP.

The information presented in this section is intended to be comprehensive and broadly applicable to the majority of EPA inspections at permitted and unpermitted CAFOs; however, there will always be situations that require inspectors to rely on their best professional judgment, knowledge of the regulations, and familiarity with EPA Region-specific policies. As such, the inspector should recognize that each inspection is different and will generally involve the activities discussed below; the amount of time dedicated to each may vary. In addition, an inspection might only include a subset of the elements below as dictated by the compliance determination strategy and the CAFO Inspection Plan. Nevertheless, all inspections do share common components and the general structure and approach to an inspection will not vary significantly across facilities and inspection types.

ARRIVAL ON-SITE

CAFO inspections may be announced or unannounced; entry procedures are similar for both. However, during an announced inspection the inspector may have an easier time locating the responsible facility representative. As described in Section B, a 308 Letter may be used to notify the CAFO of an upcoming inspection. See an example 308 Letter in Appendix E. A 308 Letter can also be used to gather information important to the inspection prior to the actual announced or unannounced inspection.

The inspector should arrive at the CAFO at the scheduled time, if announced, or during normal working hours if unannounced. The owner, operator, foreman, or other responsible person should be located as soon as the inspector arrives on the premises. The inspector may want to present the CAFO representative with an official inspection introduction letter identifying the purpose of the inspection, inspection authority and contact phone numbers. See Appendix AL, "Inspection Introduction Letter." As previously mentioned, the inspector should recognize that the CAFO may be a small business with a minimal number of employees. The inspection may have to wait until a livestock truck is loaded or unloaded, cows are milked, or other routine activities are finished. In addition, the inspector may have to knock on the door of the on-site residence to locate the responsible individual, especially if the inspection is unannounced.

Credentials

When a knowledgeable CAFO representative(s) has been located, the inspectors must introduce themselves as EPA inspectors and present official EPA credentials. Inspectors should also provide a business card with contact information to the CAFO representative. The

credentials identify the holder as a lawful representative of the regulatory agency and authorized person to perform CAFO inspections. **The inspector's credential must be presented regardless of whether identification is requested.** If any EPA staff members accompanying the inspector do not have credentials, they must have their EPA identification readily available.

If the CAFO representative(s) question the inspector's credentials after the credentials have been reviewed, those individuals should telephone the appropriate state or EPA Regional Office for verification of the inspector's identification. The inspector should keep possession of the credentials at all times; credentials must never leave the sight of the inspector or be photo-copied.

Consent

Consent to inspect the premises must be given by the owner or operator at the time of the inspection. Expressed consent is not necessary; absence of an expressed denial constitutes consent. As long as the inspector is allowed to enter the CAFO, entry is considered voluntary and consensual, unless the inspector is expressly told to leave the premises.

Reluctance to Give Consent

Some CAFO representatives will be agreeable to the inspection, but others will require additional explanation and/or clarification regarding EPA's authority to inspect their operation. Inspectors may want to share EPA's fact sheet with answers to commonly asked questions to help livestock and poultry operation owners and operators understand what to expect from EPA NPDES inspections (EPA, 2014). The factsheet is available at <https://www.epa.gov/compliance/fact-sheet-livestock-and-poultry-operation-inspections>. Examples where entry or consent may require more time and explanation include areas with newly issued NPDES CAFO permits, CAFOs that have not previously been inspected, and inspections following well-publicized compliance settlements. In some cases, representatives may be reluctant to give entry consent because of misunderstood responsibilities, inconvenience, or other reasons that may be overcome by diplomacy and discussion. If consent to enter is denied, the inspector should follow denial of entry procedures detailed in the section below.

Whenever there is a difficulty in gaining consent to enter, inspectors should tactfully probe the reasons and work with the CAFO representative to overcome the problems. Care should be taken, however, to avoid threats of any kind, inflammatory discussions, or deepening of misunderstandings. If the situation is beyond the authority or ability of the inspector to manage, the inspector should follow contingency plans identified before the inspection. Typically, those plans include contacting the inspector's supervisor and/or the Office of Regional Counsel for further direction.

Denial of Entry or Consent

If the CAFO representative considers the inspection to be an adversarial proceeding, the legal authority, techniques, and inspector's competency may be challenged. CAFO representatives may also display antagonism toward EPA personnel. In all cases, the inspector must cordially explain the inspection authorities and the protocols followed. If explanations are not

satisfactory or disagreements cannot be resolved, the inspectors should leave and obtain further direction from their EPA supervisor or EPA's Office of Regional Counsel. Professionalism and politeness must prevail at all times.

Entry Tip

The inspector should maintain a neutral tone throughout the inspection and avoid confrontational subjects, particularly politics, animal welfare, environmental issues and livestock agriculture.

Under no circumstances should the inspector discuss potential penalties or do anything that may be construed by the facility representative as coercive or threatening.

Inspectors should use discretion and avoid potentially threatening or inflammatory situations. If inspectors are threatened or otherwise uncomfortable, they should leave the facility immediately, document the

confrontation, and report it immediately to their EPA supervisor or EPA staff attorney. If feasible, statements from witnesses should be obtained and included in the documentation.

If the facility representative asks the inspector to leave the premises after the inspection has begun, the inspector should leave as quickly as possible following the procedures discussed previously for denial of entry. All activities and evidence obtained before the withdrawal of consent are valid so the inspector should carefully document the time the inspection ended. The inspector is expected to act professionally, adhere to all biosecurity requirements, and collect all personal and government equipment before leaving the facility.

If, during the inspection, the CAFO representative denies or revokes access to parts of the facility integral to evaluating compliance with the regulations, the inspector should record the circumstances surrounding the denial of access and of the portion of the inspection that could not be completed. The inspector should then complete the rest of the inspection. After leaving the CAFO, the inspectors should contact their EPA supervisor or staff attorney to determine whether a warrant should be obtained to complete the entire inspection.

Authority to Conduct Inspections

EPA has the authority to regulate and inspect CAFOs through requirements established in the CWA and its implementing regulations:

- Section 301 of the CWA prohibits the discharge of pollutants to waters of the US unless in compliance with an NPDES permit or other provisions of the CWA.
- Section 502(12) of the CWA defines "discharge of pollutants" to mean the addition of a pollutant to navigable waters from a "point source." The term "point source," in turn, specifically includes CAFOs. Section 502(14).
- Section 308 of the CWA authorizes EPA to enter any premises in which an effluent source is located. This broad authority allows EPA to inspect operations where discharges from point sources such as CAFOs are suspected or located. It also allows EPA to review and copy records and collect discharge samples or other information from effluent sources, as required, to carry out the objectives of the CWA, which includes determining whether NPDES permit conditions are being met or whether an operation is discharging without a permit.

- Section 402 of the CWA requires NPDES permittees to comply with the terms of the permit, including any specific discharge limits and operating requirements.
- The regulations at 40 CFR 122.23 and 122.42 establish the NPDES permitting requirements for CAFOs.
- The regulations at 40 CFR 123.26 establish procedures and objectives for routine inspections of NPDES-permitted facilities by state programs.

Claims of Confidentiality

The inspector should explain the permittee's right to claim material as confidential and that the inspector may examine areas related to waste production or storage even if the permittee has asserted claims of confidentiality. See the *NPDES Compliance Inspection Manual* (EPA 2016) for details on how to handle claims of confidential business information.

Waivers, Releases, and Sign-In Logs

The CAFO operator may provide the inspector with a blank sign-in sheet, log, or visitor register. The inspector should clarify what they can and cannot sign with EPA Regional Counsel prior to the inspection. However, **EPA inspectors or other EPA representatives are prohibited from signing any type of "waiver" or "visitor release" that relieves the CAFO of responsibility for injury or that would limit the rights of EPA to use data obtained from the facility.** If such a waiver or release is presented, the inspectors should politely explain that they cannot sign. They may request and sign a blank sign-in sheet.

Explaining the CAFO operator's right to claim confidentiality for certain types of information may help to alleviate concerns about use of data. If inspectors are refused entry because they do not sign the release, they should leave and immediately report all pertinent facts to the appropriate supervisor and/or legal staff. All events surrounding the refused entry should be fully documented. Problems should be discussed cordially and professionally.

OPENING CONFERENCE

Once credentials have been presented and legal entry established, the inspector can proceed to outline inspection plans with the CAFO representative(s). At the opening conference, the inspector provides names of the inspectors, the purpose of the inspection, authorities under which the inspection is being conducted, provides a copy of the NPDES regulations or other fact sheets concerning the regulation of CAFOs, and procedures to be followed. EPA encourages cooperation between the inspectors and CAFO representative to ensure that the inspection is efficient, professional, and successful.

The inspector will explain the order of activities during the inspection; records review followed by facility tour or vice versa. The inspectors should tell the operator how long they expect to be on-site. This will help to eliminate wasted time by allowing representatives to make records and personnel available. The inspector may have to be flexible to accommodate previously scheduled farm activities like milking, feeding, or unforeseen emergencies.

If not provided in advance, a written list of CAFO records needed for the inspection should be provided to the CAFO representatives. This will help the representatives to gather the records and make them available for the inspector. Commonly required records include, but are not limited to:

- NPDES permit.
- Nutrient management plan.
- Visual inspection logs (e.g., inspection of water lines, wastewater impoundments, lagoon depth recording).
- Manure transfer records.
- Laboratory soil and manure test results.
- Operator identified deficiencies and corrective actions.
- Calibration records for nutrient application equipment.
- Discharge monitoring records.
- Records of inspecting nutrient application equipment for leaks.
- Nutrient application records.
- Mortality management records.

Records Tip

Sending the CAFO a list in advance of records that may be reviewed during the inspection will expedite the on-site records review. Notifying the CAFO officials prior to the inspection will enable them to assemble the appropriate records as well as give them an idea of what to expect from the inspection.

The inspector should also identify structures and activities that need to be evaluated during the facility tour. The inspector should be prepared to answer questions about the relevancy of activities and buildings to regulatory compliance. At this point in the opening conference the inspector should ask about site-specific biosecurity equipment and procedures that need to be followed during the inspection, if the topic has not already been discussed. The biosecurity discussion should include:

- Site specific protocols that must be observed by the inspector (e.g., shower in/shower out, booties or foot wash, gloves).
- Biosecurity concerns that may dictate the order of areas visited, or areas that are accessible to the inspector. See Section B for a more detailed discussion of biosecurity.

Finally, the inspector will provide an overview of general inspection follow-up procedures. This information will be repeated at the end of the inspection. Inspectors should check with their state or EPA Regional contacts for any state or region-specific protocols.

The inspector will then turn the opening conference over to the CAFO representative(s) for an overview of the operation with a focus on manure/nutrient

Ask Basic Facility Information During the Opening Conference

- Verification of the name, address, and telephone number of the facility.
- Who is the authorized representative for the facility?
- Is the facility leased, along with contact information for lessor and lessee?
- Questions concerning the facility's history, including any discharges.

management and any questions the representative(s) may have about the inspection or the inspection process.

Before the record and document review begins, the inspector and CAFO representative(s) may review facility diagrams, maps or aerial images (e.g., Google Earth, TerraServer, or similar) and label significant structures such as the production area, feed and manure storage areas, land application areas, flow paths, property boundaries, drinking water wells, and other facility features. If aerial images are used it may be helpful to provide one close view of the production area and at least one larger scale view of the entire operation. These images can be scanned and attached to the inspection report.

RECORD AND ON-SITE DOCUMENT REVIEW

Federal CAFO regulations require both permitted and unpermitted large CAFOs to maintain records. Unpermitted large CAFOs that land apply manure are required to keep records to demonstrate that they only discharge agricultural stormwater from land application areas. See Chapter 4.1.8. of the *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a) for a detailed discussion of the agricultural stormwater exemption. Permitted CAFOs must maintain records to demonstrate compliance with their NPDES permit.

Regardless of the CAFOs permit status, the inspector should first verify basic information about the facility to identify changes in ownership or operational characteristics.

- ✓ Do EPA records correctly identify the CAFO owner, operator, and contact information?
- ✓ What is the size of the facility, both acreage (production area and non-production area) and number and type of animals?
- ✓ How does the CAFO handle and store manure?
- ✓ What are the current nutrient management practices, cropping, and location of land application sites?

The inspector should review CAFO records to see if recordkeeping requirements are being met. The review of available records and reports should answer the following questions:

- ✓ Is the CAFO collecting the required data?
- ✓ Is all the required information available?
- ✓ Is the information current?
- ✓ Is the information being maintained for the required time period?
- ✓ Do the records reviewed indicate areas needing further investigation?
- ✓ Are the records organized?
- ✓ Do the records demonstrate compliance with the CAFO's NPDES permit status (e.g., if permitted, has the CAFO submitted Annual Reports)?

Records specific to land application requirements are covered in Section D.

FACILITY TOUR

The inspector will ask the facility representative to accompany him or her on a tour of the facility. The purpose of the facility tour is to assess existing conditions, gather information to determine if the CAFO is operating in compliance with the CAFO's NPDES permit, or if the facility needs to submit a permit application or notice of intent (NOI) for NPDES permit coverage. During this phase of the inspection, the inspector will observe and photo document activities, structures and processes used to maintain the compliance with the CWA and/or the CAFO's NPDES permit. During the facility tour, the inspector should visit the following areas of the CAFO:

- Animal housing, feeding, feed storage, mortality management and maintenance areas.
- Manure and process wastewater collection, transport, storage, and treatment areas.
- Manure and process wastewater land application areas.

The inspector needs to carefully document the visual inspection with notes, photographs and/or videos. Occasionally the CAFO representative will take duplicate photos for their records. If the CAFO is discharging

during the inspection or there is evidence that the facility has recently discharged, the inspector might also take samples. See Appendix AM, "Sampling Procedures and Equipment" for more information on sampling. During the facility tour, the inspector might determine that additional records or documents need review. The inspector should inform the facility representative as soon as this has been determined to facilitate the retrieval of the needed information.

CAFO Operational Overview

Many details of how CAFOs are operated are provided in Appendix AD, "Animal Industry Overview." Refer to that section for details on sector-specific confinement facilities, as well as typical manure and mortality management practices.

Identification of Discharges

Basic considerations that can lead to discharges of manure, litter and process wastewater from the production area and land application areas are included here. See additional detail below.

Production Area Discharges

Production area discharges most commonly occur at spillways, man-made ditches or pipes designed to allow overflows during storm events. These overflow features are often located on the berms of a CAFO's wastewater impoundments or in and around animal feed storage areas, such as silage bunkers. Wastewater may also exit the facility at low lying areas where there is

Documentation Tips

- ✓ Make sure photos contain a distinguishing characteristic like a unique depth marker or buildings in the background.
- ✓ Impermanent items, such as vegetation, do not make good reference points as they can be easily removed.
- ✓ Photos should include an accurate date/time stamp that shows it was taken during the time period of the inspection.
- ✓ Some digital cameras include built-in global positioning system (GPS) tagging that allows an inspector to associate each photo with the geographic location where it was created.

no berm. Additional discharge locations may include rodent holes and open tile drains that are designed to carry wastewater away from the production area. Common scenarios that may lead to wastewater discharges from the production area include:

- Undersized or no feed, manure, or mortality storage capacity.
- Poor feed, manure, mortality storage structure operation and maintenance.
- No or undersized diversion structures.
- Poorly located waste and/or material storage areas (i.e., too close to drainage ditches or waterways).
- Insufficient dewatering.
- Clogged and/or broken water lines.

Land Application Area Discharges

Common scenarios that may lead to wastewater discharges from the land application areas include:

- Clogged and/or broken manure transportation lines/hoses.
- Over-application of manure, litter or process wastewater.
- Land applying manure, litter, or process wastewater to saturated, frozen or snow-covered ground (Note: Some states have manure spreading bans in winter months; check state technical standard).
- Type, size, location and maintenance of buffers.

Note that a CAFO's land application discharges that meet the definition of "agricultural stormwater" do not require an NPDES permit.

The following list provides example factors affecting the likelihood or frequency of discharges of manure, litter, and process wastewater:

- Slope of feedlot and surrounding land
- Feedlot surfacing (e.g., concrete or soil)
- Climate (e.g., arid or wet)
- Type and condition of soils (e.g., sand, karst)
- Amount and duration of rainfall
- Volume and quantity of runoff
- High water table

The inspector should look for evidence of actual or past discharges. Moist soil or ponded water located outside of the production area may be indicative of a recent discharge. More obvious evidence that a discharge has occurred may include erosive channels and/or dead vegetation from nitrogen burns leading from the production area and/or land application areas. In addition, wastewater discharges can carry debris and deposit them on the ground. Manure

located in a water or outside the production area and eutrophication in waters adjacent to the CAFO are other signs that might indicate recent or regular discharges.

CAFO Discharges to a Water of the United States

Where evidence of an actual or past overflow or spill is observed, it is important to find out whether it enters a water of the United States. It only becomes an unauthorized discharge if it enters a water of the United States. A water of the United States determination can be a complex process and involves consideration of both facts and legal standards. The inspector should consult with regional or state program and legal experts. The inspector's role is not to make waters of the United States determinations, but to collect the evidence needed for the state or regional experts to make the determinations if point source discharges reach waters of the United States. Inspectors should contact state or EPA experts for additional information or for training opportunities.

A short review of key points relevant to discharges from CAFOs follows.

- **A permit is required for a discharge of pollutants from a CAFO to waters of the United States.** A CAFO may not discharge without an NPDES permit. NPDES permits authorize CAFOs to discharge pollutants to waters of the United States when they are in compliance with permit conditions. Enforcement actions may be taken for any discharge to waters of the United States that occurs without an NPDES permit or for violations of permit conditions.
- **Discharges from CAFOs to waters of the United States are point source discharges subject to NPDES permit requirements.** Any discharge to a water of the United States from a CAFO is a discharge from a point source and must be authorized by an NPDES permit
- **Only CAFOs that discharge pollutants to waters of the United States need NPDES permits.** Coverage under an NPDES permit is not required for a CAFO that does not discharge pollutants to waters of the United States.
- **Unexpected discharges are not exempt from permit requirements.** The CWA does not distinguish between intentional and unintentional discharges in determining whether a permit is required. The fact that an unpermitted discharge was unexpected is not a defense to an enforcement action.
- **Discharges are not limited to manure, litter or process wastewater.** CAFO discharges subject to permitting requirements include discharges of any pollutant, including but not limited to manure, litter and process wastewater, silage/feed and bedding pollutants.
- **Discharges resulting from land application of manure, litter or process wastewater require a permit, unless they qualify as agricultural stormwater.** Discharges from the land application area are exempt from NPDES permitting requirements if they consist only of agricultural stormwater discharges. Section A describes the CWA "agricultural stormwater exemption."

Discharge Pathways at CAFOs

Discharges from a CAFO to waters of the United States may originate in the CAFO's production area, land application area(s), or other parts of the CAFO not specifically included in either of those definitions. For example, discharges of process wastewater could occur when equipment used to spread manure or clean out poultry houses is rinsed at a CAFO's truck wash facility.

To identify discharges, it is necessary to look at the operation as a whole and the variety of ways in which pollutants may be discharged looking at man-made components, operational features of the CAFO, as well as natural characteristics that can cause a CAFO to discharge. Note that a CAFO itself is a point source; a discharge to a water of the United States from a CAFO must be authorized by an NPDES permit regardless of whether the discharge occurs through an additional discrete conveyance (*Waterkeeper Alliance, Inc. v. EPA, 2005*) or if the discharge is to land not owned by the CAFO, and then to a water of the U.S., the CAFO is discharging pollutants to waters of the United States (*Sierra Club v. Abston Constr. Co., 1980*).

Production Area Discharges

This section focuses on the design, construction, operation, and maintenance aspects of CAFO production areas. Characteristics of the facility's production area may significantly influence its likelihood of discharging pollutants to waters of the United States. Examining these features of a CAFO's operation will help in identifying discharge pathways.

As defined by the EPA regulations, a CAFO's production area includes the animal confinement area, the manure storage area, the raw materials storage area, and waste containment areas, as well as areas for egg washing and mortality management (40 CFR 122.23(b)(8)). Because discharges can arise from any of part of the production area, the entire production area should be evaluated when determining whether a CAFO discharges from its production area.

When evaluating whether a CAFO discharges, certain considerations are applicable to many CAFOs in any animal sector, while others may be specific to a certain type of facility. The sections below include both general considerations and those that may not be broadly applicable.

However, the following sections are not intended to be an exhaustive discussion of every possible mechanism for production area discharges. Instead, the sections below highlight the range of potential discharge pathways to consider when evaluating whether an individual CAFO discharges from its production area.

Production area means that part of an AFO (including CAFOs) that includes the *animal confinement area*, the *manure storage area*, the *raw materials storage area*, and the *waste containment areas*.

- The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milk rooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables.
- The manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles.
- The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials.
- The waste containment area includes but is not limited to settling basins, and areas within berms and diversions which separate uncontaminated storm water.

Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of mortalities. 40 CFR 122.23(b)(8).

Discharges from the Production Area: All Animal Sectors

This section describes factors relevant to determining whether a CAFO discharges that apply to all types of livestock, including animal types not specifically discussed in this guidance, such as veal calves, turkeys, ducks, horses, and goats.

The Animal Confinement Area

The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milk rooms, milking centers, cow yards, barnyards, medication pens, walkers, animal walkways and stables (40 CFR 122.23(b)(8)).

A CAFO's animal confinement area should be designed, constructed, operated, and maintained in a way that clean water diversion mechanisms, if any, are fully functional, and all process wastewater is collected and stored. Water that contacts any raw materials, products, or byproducts including manure, litter, feed, milk, eggs or bedding is process wastewater (40 CFR 122.23(b)(7)) and cannot be discharged unless authorized by an NPDES permit. Note that a discharge from animal watering systems is a discharge from the CAFO. Direct contact between confined animals and surface water flowing through the production area, often for drinking or cooling, is a discharge from the CAFO.

Process wastewater means water directly or indirectly used in the operation of the AFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other AFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater also includes any water that contacts any raw materials, products, or byproducts including manure, litter, feed, milk, eggs or bedding (40 CFR 122.23(b)(7)).

The relevant minimum measure is to prevent direct contact of confined animals with waters of the United States (40 CFR 122.42(e)(1)(iv)).

Manure Storage and Handling

During the tour of a CAFO's production area, the inspector should visually check and note any failures to follow Minimum Measure 1: Ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the storage facilities (40 CFR 122.42(e)(1)(i)).

Siting, design, construction, and maintenance of storage structures are important considerations when determining whether a CAFO has an adequate waste storage and handling system in place. In addition, the number of animals and the amount of manure, litter, or process wastewater anticipated to be generated during the critical storage period¹³ should be considered. All process wastewater generated at the site should be considered when determining the adequacy of the CAFO's storage capacity. Operation and maintenance factors include the frequency of regular inspections of all storage structures to ensure integrity of

¹³ This term means the storage period that provides the capacity to store the maximum amount of manure and process wastewater plus precipitation events less evaporation that will be generated until optimal land application or other drawdown of storage (e.g., for transfer off-site). See also Page 2-12 of EPA's *Managing Manure Nutrients at Concentrated Animal Feeding Operations* (EPA, 2004).

berms, valves, and other control devices, and to determine the fill level of liquid impoundments.

Manure storage and handling practices differ depending on whether the CAFO operates a system for handling manure in liquid or dry form, or a combination of the two.

For liquid manure handling systems, it is important to consider whether manure storage structures are designed and constructed to eliminate the possibility of overflow and/or managed in a manner to prevent any overflow from reaching a water of the United States. Proper maintenance includes maintaining capacity for freeboard and direct precipitation and preserving the structural integrity of the pond or lagoon by managing levels of manure, wastewater and sludge appropriately. Photo 17-1 illustrates a lagoon with vegetation growing in it. Growth of vegetation on the manure inside a storage structure decreases the capacity of the system and, may be an indication that manure solids have not been removed at appropriate intervals to maintain adequate storage capacity. Factors that may lead to structural failure include erosion, growth of trees or shrubs on berms, large animals walking on lagoon berms, and burrowing wildlife. A proper maintenance plan should address those factors. Embankments of any manure storage structure should have protective vegetation such as grass, be well compacted, intact, dry, show no signs of erosion, and have sufficient access for equipment such as pumps and agitators. Pooling on the side of the pond or lagoon could be indicative of leaking. Ask the facility representative if the manure structure is lined with any material to prevent leaking such as concrete, clay, plastic, etc.



Photo 17-1. This lagoon at a dairy CAFO is upslope from a water of the United States and overflowing. In addition, cows stand on the embankments of the far side of the lagoon, which may degrade the embankments over time, and vegetation is growing in the lagoon, which indicates poor maintenance. (Source: EPA Region 6.)

Although the design of a liquid manure storage structure is critical in determining the capacity of that structure to contain manure so that a discharge will not occur, the design standard alone does not necessarily guarantee that no discharge will occur. For example, a CAFO with a liquid storage structure designed for the 25-year, 24-hour storm is not categorically excluded

from the requirement to seek permit coverage based on this design standard.¹⁴ Larger storms and chronic rainfall events do occur, and production areas built to the 25-year, 24-hour storm design standard can and do discharge during such precipitation events. A permit is required to authorize a discharge under these circumstances. Proper operation and maintenance of the structure should also be considered as part of the objective assessment, such as steps to ensure there are no leaks or other system failures unrelated to storm events.

For permitted CAFOs, a liquid storage structure designed for the 25-year, 24-hour storm can discharge (because of overflows) during a storm event of any size so long as the facility is designed, constructed, operated, and maintained in compliance with the facility's permit terms and conditions. Further, certain other discharges may be allowed for permitted CAFOs, which are not covered by the CAFO effluent guidelines (ELGs). Such discharges are typically managed by treatment systems or best management practices (BMPs), as determined by the permit writer's best professional judgment (CWA section 402(a)(1); 40 CFR 122.44(a),(k)). For example, a CAFO's permit might allow discharges from equipment washdown facilities, chilling systems, boiler systems, and from other areas not covered by the ELGs, such as areas outside houses at total confinement facilities. For additional details on discharges from areas not covered by the effluent limitation guidelines for CAFOs, see Chapters 4.1.4, 4.1.5, and 4.1.6 of EPA's *NPDES Permit Writers' Manual for CAFOs*

(EPA, 2012a). However, there are no such provisions for unpermitted CAFOs. Therefore, it is important that CAFOs whose owners or operators choose not to have an NPDES permit be designed, constructed, operated, and maintained so they do not discharge during any size precipitation event.

For dry manure handling systems, it is important to consider the practices for moving manure or litter from animal confinement areas to storage areas and whether the CAFO has sufficient capacity to store dry manure or litter in covered buildings or otherwise manage it to keep it dry or contain all runoff.



Photo 17-2. This storage structure might have inadequate capacity for the amount of litter being stored. The area around the storage shed drains to a water of the U.S. and does not have any runoff controls. (Source: EPA Region 3)

¹⁴ In many cases the BMPs implemented by an unpermitted CAFO to ensure that it does not discharge will be more rigorous than those required for permitted CAFOs, because the operator of an unpermitted CAFO is never authorized to discharge under CWA section 301(a). Permitted CAFOs have greater flexibility because, in addition to being authorized to discharge under the circumstances prescribed by the permit, other discharges can be excused when the conditions contained in EPA's upset and/or bypass regulations are met (40 CFR 122.41(m) and (n); 73 FR 70,425).

Stockpiles of dry manure or litter are part of the production area, regardless of where they are located (40 CFR 122.23(b)(8)). Small and medium farms occasionally field-stack manure stockpiles in nearby crop or grazing fields, outside of the main production area. Discharges could occur from such stockpiles of manure or litter, whether solid or semi-solid, depending on the location of the stockpile (i.e., proximity of the stockpile to waters of the United States, and slope of land), exposure to precipitation, and presence of structural controls such as pads, berms or covers, duration of storage, and management of pile removal. Even temporary stockpiles could lead to an unauthorized discharge from an unpermitted CAFO if precipitation that contacts stockpiled manure or litter is subsequently discharged to waters of the United States.¹⁵ Covered storage areas and concrete pads are good management practices that can reduce contact between precipitation and the stockpile, and thus prevent discharges from occurring. It is also important to prevent any discharges associated with spillage of manure or litter. Photos 17-2 and 17-3 illustrate situations where storage practices can lead to discharges to waters of the United States.

Raw Materials Storage Area

The CAFO's raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials (40 CFR 122.23(b)(8)). As indicated above, the definition of process wastewater includes water that contacts raw materials including feed and bedding at the CAFO. Therefore, an evaluation of whether a CAFO discharges must consider whether water from feed, silage and bedding storage areas, if that water has contacted raw materials, will be discharged to a water of the United States. The inspector should note whether raw materials are covered and evaluate storage structures for breaks, leakage and spills. In the case of silage, the evaluation should also include consideration of any leachate resulting from the stored silage.



Photo 17-3. This stockpile is up to 8 feet tall and 60 feet long without cover or containment. A creek runs through the wooded area behind the pile. Any runoff from the stockpile to waters of the U.S. would be a discharge from the CAFO. (Source: EPA Region 7)

¹⁵ EPA has allowed poultry facilities to qualify for the higher numeric thresholds for dry manure handling systems when they have exposed stockpiles for no more than 15 days (the numeric thresholds for poultry with liquid manure handling systems are lower, and thus would cover more facilities). However, this 15 day "grace period" does not apply to whether or not a facility that is defined as a CAFO based on the dry litter numeric thresholds discharges. Regardless of whether an exposed stockpile is maintained for more than or few than 15 days, any discharge from manure or litter stockpiles is a discharge from the production area of a CAFO.

CAFOs should have adequate structures and protocols in place to ensure that any water that has contacted raw materials like feed and bedding will not be discharged to a water of the United States. Structures to prevent discharges from the raw materials storage area could include diversion structures to direct runoff or leachate to the CAFO's wastewater storage structures, or to vegetated treatment areas (VTAs), provided those areas are accounted for in the design, construction, operation, and maintenance of the structures. Where appropriate, the inspection should include evaluating the adequacy of silage leachate runoff collection and treatment. Silage management may be in the form of low flow leachate collection and land application or high flow runoff treatment in a vegetated treatment area. If a VTA system is used, it must be adequately maintained with consistent coverage of vegetation and be free of pooling liquids and kill zones.

Commodity and byproduct feed materials are stored in covered structures at many CAFOs. When handling those materials, CAFO operators should ensure that raw materials are not spilled in uncovered areas where they could be carried in runoff to a water of the United States.

Clean Water Diversion

Diverting clean water away from the production area minimizes the creation of process wastewater making it easier for a CAFO to properly manage manure, litter, and process wastewater. Diversions used to separate uncontaminated stormwater can include berms, swales, channels, ditches, barn roof drains with diversion structures or French drains around barns, or even natural topography. Berms and diversions used to prevent uncontaminated stormwater from entering a waste containment area should be designed and constructed so that they are large enough to ensure separation of clean stormwater.

During the tour of a permitted CAFO's production area, the inspector should visually check and note any failures to follow Minimum Measure 3: Ensure that clean water is diverted, as appropriate, from the production area (40 CFR 122.42(e)(1)(iii)).

Waste Containment

The waste containment area includes but is not limited to settling basins, and areas within berms and diversions which separate uncontaminated stormwater (40 CFR 122.23(b)(8)). For example, waste containment areas include areas where diversion structures are used to prevent clean stormwater from entering the containment area and contacting the waste or to keep contaminated runoff from exiting the containment area. Settling basins are also waste containment areas since they are not designed for long-term storage of manure.

Like manure storage areas, any area that is designed or operated to contain waste must be sized adequately to contain the volume of waste anticipated, thus ensuring waste will not be discharged from that area. For unpermitted CAFOs, such structures must be sized to ensure separation of uncontaminated stormwater to prevent discharge of contaminated stormwater under all conditions.

Some CAFO operators choose to use berms or other containment structures to contain accidental spills or overflows from primary storage structures in other parts of the production

area. For example, some operators may use secondary containment berms around liquid manure storage structures to prevent a discharge to waters of the United States, even in the event of an overflow from the primary storage structure. Such secondary containment areas are waste containment areas since they are not primarily intended for long-term storage of manure. Secondary containment areas help to provide additional protection against discharges to waters of the United States, particularly for unpermitted CAFOs subject to a no discharge standard.

Chemical Storage

During the tour of a permitted CAFO's production area, the inspector should visually check and note any failures to follow Minimum Measure 5: Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or stormwater storage or treatment system unless specifically designed to treat such chemicals and other contaminants (40 CFR 122.42(e)(1)(v)).

- ✓ Verify the description of practices implemented to ensure that chemicals and other contaminants are disposed of properly, as described during the records review portion of the inspection.
- ✓ What types (organic and inorganic) and quantities of chemicals are used and stored at the CAFO, (including pesticides, herbicides, oils, etc.)?
- ✓ Are there floor drains in the milk parlor or other areas that generate process wastewater that could be used for chemical disposal? Is wastewater collected in these drains directed to a manure storage impoundment? Is the storage structure designed to accept these wastes?
- ✓ Are chemical footbaths located by floor drains?
- ✓ Does the CAFO have a designated area for chemical storage and mixing? Are floor drains present in the chemical storage and mixing area?
- ✓ Is there a designated area for accumulating spent chemicals and other like motor oils, hydraulic fluid, etc.?
- ✓ Are chemicals labeled with accumulation dates, disposal methods, and other required information?
- ✓ Are chemical bottles out of place (e.g., around the lagoon instead of in chemical storage area)?

Mortality Management

The CAFO's production area also includes "any area used in the storage, handling, treatment, or disposal of mortalities" (40 CFR 122.23(b)(8)). Relevant factors to consider in assessing whether the CAFO discharges in connection with mortality management include the methods and locations for handling and disposal of animal mortalities, mortality rate, storage capabilities and other site-specific factors. For example, if a CAFO relies on a rendering facility to pick up carcasses, the CAFO should consider whether there is adequate storage to accommodate all

mortalities between pick-ups and whether the storage method ensures that all clean water remains clean, or captures all process wastewater generated from water coming into contact with the carcasses (i.e., nothing reaches waters of the United States). Facilities that dispose of dead animals on-site need to ensure that there are no discharges from the areas where, for example, animals are composted or buried. This may include burying carcasses immediately and making sure runoff from composting areas is contained in a proper storage structure. If composting is used, the inspector should look for any indicators of improper compost management including the presence of black leachate, exposed bones, feathers, carcasses, etc. and to see if the compost area is in an appropriate location to avoid any possible discharges to a water of the United States. Contact the state university agriculture extension office for information on composting methods for the area of the inspection. CAFOs should have a plan for dealing with catastrophic mortality events.

During the tour of a permitted CAFO's production area, the inspector should visually check and note any failures to follow Minimum Measure 2: Ensure proper management of mortalities (i.e., dead animals) to ensure that they are not disposed of in a liquid manure, stormwater, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities (40 CFR 122.42(e)(1)(ii)).

Other Factors Related to the Production Area

Similar considerations apply to other parts of the production area. Key factors that might affect whether a discharge occurs from the production area of any type of CAFO include the following:

- Exposure of animal waste and feed to precipitation or other water that is subsequently discharged to waters of the United States.
- Adequacy of structural controls to divert clean water.
- Sufficiency of inspection and maintenance schedules for clean water diversion controls, such as berms, gutters, and channels.
- Design and maintenance of pumps, pipes, valves, ditches, and drains associated with the collection of manure and wastewater from the animal confinement area.
- Design, operation, and maintenance of secondary containment, if applicable.
- Type of waste storage system, and the capacity, design, construction, and maintenance of the system.
- Implementation of standard operating procedures and quality of maintenance protocols (e.g., for equipment, infrastructure, and practices associated with animal management



Photo 17-4. This CAFO is discharging by disposing of mortalities in a conveyance that drains to a water of the United States (Source: EPA Region 4).

and waste handling), including contingency plans for extreme events (e.g., for equipment loss or failure).

- Drainage of production area and proximity to waters of the United States.
- Whether the animal confinement area prevents direct contact between animals and waters of the United States.

Land Application Area Discharges

All Animal Sectors

Inspectors at both permitted and unpermitted CAFOs with land application should identify the distance and direction from the fields used for land application to the nearest waters of the United States and look for any evidence of manure runoff from application fields towards waters of the United States.

During the tour of a permitted CAFO's land application areas, the inspector should visually check and note the following related to Minimum Measure 6: Identify appropriate site-specific conservation practices to be implemented, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the United States (40 CFR 122.42(e)(1)(vi)). Note Minimum measures 7 and 8 dealing with testing of manure, litter, process wastewater, and soil, and protocols for land application of manure, litter, or process wastewater are covered in Section D, "The CAFO Inspection—Records Review and the NMP."

The inspector should verify that any conservation practices such as NRCS conservation practice codes, buffers, berms, identified during the records review portion of the inspection are properly implemented on-site. The list below contains some factors an inspector might want to evaluate to determine whether a facility is implementing appropriate site-specific conservation practices:

- ✓ Is tail water from flood or furrow irrigation captured and pumped back to the head of the field or otherwise contained?
- ✓ Is wastewater ponding or infiltrating around irrigation sprinklers? Ponding could indicate over-application or leaks.
- ✓ Is manure applied to frozen, snow covered, or saturated ground or is manure land applied during a precipitation event?
- ✓ Is manure incorporated or injected?
- ✓ Is manure mechanically applied within 100 feet of waters of the United States?
- ✓ Is there evidence of manure runoff from application fields towards waters of the United States? Do any land application fields have steep slopes that might cause manure to more easily runoff from the field to waters of the United States?
- ✓ Are there no grassed, vegetated, or forested buffers between land application sites and waters of the United States? Is there evidence of manure application within the 35-foot vegetated buffer?

- ✓ Does land application equipment appear well-maintained? Are there leaks from permanently installed manure application and handling equipment, risers, or pipes?

Sector-Specific Factors Relevant to Production Area and Land Application Areas

See Appendix AD, “Animal Industry Overview,” for information on typical production methods and manure management practices.

Dairy Sector

Dairy operations are complex, with various types of covered and uncovered locations for confining, housing, and milking cows, and have sector-specific design and construction considerations that are relevant to determining whether the CAFO discharges. Inspectors should be aware that dairy operations often include both dry manure handling from calves and heifers, and wet manure handling from the mature milking cows. It is important to determine whether a dairy directs wastestreams to a proper containment structure or if waste is managed in a manner causing it to be discharged from the production area, to a water of the United States. These wastestreams include wastewater from commodity barns, silage bunkers, and milking parlors. Inspectors should also consider the possibility of discharges from portions of the production area that may be uncovered, such as feed storage areas, barnyards, exercise lots, animal walkways and animal pens, including uncovered portions of calf hutches and loafing areas (See Photo 17-5).



Photo 17-5. The dairy CAFO pictured above has had discharges from the confinement area (noted by the red dashed line) to a water of the United States bypassing the waste containment storage structure. (Source: EPA Region 4)

Dairy operations in warm climates might have cooling ponds designed to cool lactating cows. A cooling pond for dairy cattle will have a means for fresh water to enter, unlike a stagnant pond, lagoon, wallow, or mud hole. Any cooling pond that is or has been in use contains process wastewater because of animal contact (40 CFR 122.23(b)(7)).¹⁶ Relevant factors to consider in determining the likelihood of a cooling pond discharging pollutants to waters of the United States include the location of the pond relative to waters of the United States, the design of the pond, and how water removed from the pond is managed (e.g., pumped to a proper containment structure).

¹⁶ As applicable here, process wastewater means water directly or indirectly used in the operation of the AFO for direct contact swimming, washing, or spray cooling of animals. Process wastewater also includes any water which comes into contact with manure.

For other design, construction, operation, and maintenance factors specific to dairy cattle operations, see the table titled “Summary of Sector-Specific Considerations,” below and See Appendix AD, “Animal Industry Overview,” for information on typical production methods and manure management practices.

Beef Cattle Sector

While some cattle are kept in confinement buildings, most beef operations are on outdoor feedlots and might have open sheds, windbreaks, or shades. When evaluating whether a beef cattle operation discharges, an important consideration is whether the feedlot has sufficient containment for all manure, wastewater and direct precipitation for the critical storage period. Because the animals and manure are typically not housed under roof at beef cattle operations, local climate and proximity to waters of the United States should be considered when evaluating whether beef cattle operations discharge, as well as the design of the animal pens. Where operations are sloped for drainage, the inspector should determine if drainage results in a discharge to waters of United States (See Photo 17-6).

Other factors that may be important to consider in this animal sector include the following:

- Management of trough water overflow.
- Management of uncovered feed/silage.
- Manure stockpiling and composting.
- Whether animals have direct contact with waters of the United States.
- Systems to manage process wastewater generated from all uncovered areas to which animals have access.



Photo 17-6. This section of the beef feedlot production area has an outlet for manure and process wastewater to a roadside ditch. If the ditch conveys process wastewater to a water of the United States, the CAFO discharges.

(Source: EPA Region 7)

For other design, construction, operation, and maintenance factors specific to beef cattle operations, see the table titled “Summary of Sector-Specific Considerations,” below and Appendix AD “Animal Industry Overview,” for information on typical production methods and manure management practices.

Swine Sector

In evaluating whether a swine operation discharges, relevant factors include considerations specifically related to manure handling systems that are common at these types of operations.

Some swine operations have in-house manure pits (i.e., where manure is collected in a pit below the animal confinement house) that are designed with sufficient capacity to contain all manure and wastewater generated in the house until it is pumped out to another storage

structure or for land application. This pump-out may occur between groups, when the barns are empty of animals, as swine operations rotate animals by groups until they are sent to another finisher or the processing plant.

Some operations also have pumps to help distribute manure from one section to another, for example, if the operator notices that the solids level is higher in one section. These are commonly referred to as deep-pit systems. Relevant factors to consider for CAFOs with such systems include management of wastewater and manure slurry removal from the pit, including whether the CAFO has appropriate pump-out schedules and maintenance of hoses or underground distribution lines, which can run from the pit to the land application areas. The capacity of a deep-pit system should be evaluated to ensure it can contain all manure and process wastewater between land application events.

Other swine operations have in-house pits that provide only temporary containment before removal of the manure and wastewater to a pond, lagoon, or above-ground storage tank. Operations with these smaller in-house manure pits generally pump out manure more frequently. Therefore, systems at these swine operations typically rely more heavily on pumps and pipes than at other swine operations. Some of the problems associated with these types of operations that can lead to discharges and therefore should be considered when conducting a site-specific evaluation include: pipe or hose ruptures; overflows from open channels or collection pits; and direct discharges from a waste storage structure such as a lagoon.

To prevent discharges from occurring, some swine operations construct a secondary containment system designed to capture any unanticipated pipe or hose ruptures or overflows from deep pit manure storage structures or from the confinement houses themselves. The inspector should consider how the design, operation, and maintenance of such containment systems could contribute to a discharge as the result of accumulated wastes and precipitation.

For other design, construction, operation, and maintenance factors specific to swine operations, see the table titled “Summary of Sector-Specific Considerations,” below, and Appendix AD: “Overview of the Animal Industry,” for information on typical production methods and manure management practices.

Poultry Sector

The definition of a CAFO explicitly includes four different types of poultry operations: chickens (other than laying hens), laying hens, turkeys, and ducks. Most modern CAFOs that raise poultry for meat production use predominantly “dry” manure handling systems. As a result, discharges to waters of the United States from production areas at those poultry operations generally are caused by rainfall coming in contact with dry manure (i.e., poultry litter) in exposed areas, poor housekeeping around the bird houses or litter storage areas, or poor mortality management practices. Egg production facilities typically handle larger volumes of water as a result of egg washing. Some facilities also use bird cooling spray systems and the condensate can co-mingle with manure, litter, and process wastewater. Therefore, in addition to potential discharges from litter handling practices and mortality management, laying hen CAFOs also have the potential to discharge to waters of the United States as the result of overflows from process

wastewater storage and handling structures. Moreover, poultry operations frequently have smaller “footprints,” in comparison to some other livestock sectors, which may lead to large amounts of litter being generated relative to the availability of land for manure spreading. Some poultry facilities may send manure off-site by truck to an outside party for spreading or composting; these manure transfer areas should be evaluated (for example, are there storm drains in these areas?). Therefore, relevant factors to consider in assessing the likelihood of a poultry operation discharging include the following:

- Whether the operation has sufficient storage capacity to accommodate litter removed from houses between flocks and during whole-house cleanouts.
- Whether management of cleanouts, stockpiles, and litter storage sheds is done in such a way that contaminated runoff will not reach waters of the United States.
- For operations with liquid manure handling systems, whether the operation has adequate storage capacity for all egg wash water and cooling spray condensate generated, considering the facility’s maximum egg production, wastewater handling capabilities, and expected dewatering frequency.
- Whether the operation has adequate available acreage for land application to use the nutrients generated at the facility or other arrangements in place (such as third-party haulers).



Photo 17-7. A poultry operation designed to have precipitation drain away from houses would discharge if contaminated runoff enters a water of the United States. (Source: EPA Region 3)

For CAFO operations with ventilated confinement houses inspectors should consider a number of relevant factors, such as the way water is drained from the site and proximity to waters of the United States, when assessing whether they discharge pollutants to waters of the United States. Some poultry facilities are designed to channel precipitation runoff from the houses away from the confinement area in a manner that may result in discharges to waters of the United States (see Photo 17-7). Although such discharges may be allowed for permitted CAFOs subject to conditions specified in the permit, for unpermitted CAFOs, these discharges would violate the CWA. For other design, construction, operation, and maintenance factors specific to poultry operations, see the table titled “Summary of Sector-Specific Considerations,” below and Appendix AD, “Overview of the Animal Industry” for information on typical production methods and manure management practices.

Summary of Sector-Specific Considerations

When evaluating sources of pollutant discharges and pathways for pollutants to reach waters of the United States, EPA recommends considering the following site-specific factors:

ALL ANIMAL SECTORS

- Facility location, such as whether in a floodplain, proximity to waters of the United States, and if the CAFO is upslope from waters of the United States.
- Local climatic conditions, including whether precipitation exceeds evaporation.
- Discharge history.
- Volume of manure, litter, or process wastewater generated.
- Management of manure, litter, and process wastewater.
- Management of storage, treatment, and disposal of mortalities.
- Amount of acreage to land-apply manure, litter, or process wastewater in accordance with appropriate practices or other means of managing nutrients that prevent discharges, such as off-site transfer to other entities.
- Type and collective effect of conservation practices (e.g., setbacks and buffers employed near surface waters, ditches, and other conduits to surface waters to control the runoff of pollutants from land application areas).
- Resources and protocols for proper operation and maintenance of land application equipment (e.g., inspecting hoses and overseeing automatic shutoff valves).
- Management of feed and silage, including management/capture of silage leachate and runoff from feed and silage storage areas.

DAIRY SECTOR

- Whether animals are housed under roofs at all times, and if not, management of manure and wastewater generated in loafing areas and other outdoor areas with animal access.
- The capacity for manure and wastewater storage, including consideration of siting and management of stockpiles to avoid discharges to waters of the United States and capacity of solid settling basins to hold direct precipitation.
- Management of the calving area.
- Management of milk bottle wash water.
- Management of cooling water and footbath water.
- Storage or disposal of waste from milking parlors and milk tank cleaning.
- Management of bedding material.
- Management of manure composting areas.
- Cattle access to surface water.

BEEF CATTLE SECTOR

- The capacity for manure and wastewater storage, including consideration of siting and management of stockpiles to avoid discharges to waters of the United States and capacity of solid settling basins to hold direct precipitation.
- The capacity, siting, and operation and maintenance practices for a vegetated treatment system, where applicable.
- Management of manure composting areas.
- Cattle access to surface water.

SWINE SECTOR

- Management of pollutants from confinement houses, including conveyances designed to drain runoff from confinement areas.

Summary of Sector-Specific Considerations

- How manure and wastewater is collected and stored, such as in a deep pit under the confinement house or by a containment structure like a lagoon.
- Identification of pollutant sources, such as storage facilities, and consideration of whether pollutants from those sources contact precipitation or other water to generate process wastewater.

POULTRY SECTOR

- Identification of sources of pollutants, such as storage facilities, litter handling activities (e.g., cake-outs, crust-outs, whole house clean-outs), poultry handling, and confinement house ventilation systems, and consideration of whether pollutants from those sources contact precipitation or other water to generate process wastewater.
- For layer facilities, management of egg production and egg wash water.
- Management of pollutants generated by confinement areas, including pollutants expelled from the ventilation system and conveyances designed to drain runoff from those areas.

D. THE CAFO INSPECTION—RECORDS REVIEW AND THE NMP

Maintaining complete, current and accurate records is important for permitted CAFOs to show compliance with recordkeeping requirements and for unpermitted large CAFOs that land apply manure to qualify for the stormwater exemption. Inspectors should review relevant records for both permitted CAFOs and unpermitted large CAFOs. Records may be maintained on-site at the CAFO, or may be located off-site at a nearby location.

This section explains what types of records CAFOs must maintain relating to the production area and land application, some key compliance elements that can be reviewed quickly and alerts to possible compliance issues. For more information on crops production, nutrient management and soils, refer to Appendix AE, “Nutrient Management/Soil Science” and Appendix AK, “Growth Stages of Field Crops.”

The approach described in this section does not include a complete, in-depth analysis of NMP implementation. If the CAFO inspector intends to conduct such an analysis, refer to Appendix AO, “Detailed Review of Nutrient Management Plan Implementation,” and Chapter 5 of EPA’s *NPDES Permit Writers’ Manual for CAFOs* (2012a).

UNPERMITTED LARGE CAFOS

Production Area

There are no specific recordkeeping requirements for unpermitted large CAFOs related to the production area. However, the CAFO may want to maintain records to establish and document that there have been no discharges from the production area. Section C describes what the inspector should examine to identify evidence of discharges.

Land Application Areas

As CAFOs are only required to have an NPDES permit if they are discharging to waters of the United States, non-discharging CAFOs may choose not to apply for a permit. **However, precipitation-related discharges of manure, litter or process wastewater from land areas under the control of a CAFO, such as crop fields, are subject to NPDES permitting *unless* the**

CAFOs (including unpermitted CAFOs) maintain records documenting that they have land applied in accordance with appropriate nutrient management practices. If an unpermitted CAFO does not maintain that documentation, discharges from its land application area do not qualify for the agricultural stormwater exemption from NPDES requirements. Unpermitted large CAFOs must have records indicating that they are implementing 40 CFR 122.42(e)(1)(vi)–(ix) on their land application sites to ensure appropriate agricultural utilization of land applied nutrients. These practices ensure that precipitation-related discharges from the land application areas qualify for the agricultural stormwater exemption.

Table 15-8 below, shows the types of records unpermitted large CAFOs must keep to meet the requirements of measures vi through viii dealing with land application (ix is the requirement to keep records for vi through viii).

Table 15-8. Minimum Measures and Associated Records Applying to Unpermitted Large CAFOs

Minimum Measure	Example Records	Potential Compliance Alerts
<ul style="list-style-type: none"> ✓ Identify site-specific conservation practices to be implemented, including buffers or equivalent practices, to control runoff of pollutants to waters of the United States (40 CFR 122.42(e)(1)(vi)). 	<ul style="list-style-type: none"> ✓ NMP or CNMP. ✓ Engineering drawings or as built drawings showing the location and dimension of berms, buffers, setbacks, and other conservation practices between land application fields or production areas and WOUS. ✓ Narrative descriptions of conservation practices implemented to control pollutant runoff, such as NRCS conservation practice standards. 	<ul style="list-style-type: none"> ✓ The CAFO does not have documentation of buffers, setbacks, or other conservation practices to minimize nutrient runoff to nearby WOUS. ✓ Conservation practices are identified but do not include operation and maintenance protocols to ensure long-term effectiveness to control pollutant runoff.
<ul style="list-style-type: none"> ✓ Identify protocols for appropriate testing of manure, litter, process wastewater, and soil (40 CFR 122.42(e)(1)(vii)). 	<ul style="list-style-type: none"> ✓ NMP or CNMP. ✓ A facility sampling plan that identifies sampling locations, sampling frequency, analytical methods, and laboratories for manure, litter, process wastewater, and soil analysis. ✓ Laboratory reports that identify testing procedures and results for manure, litter, process wastewater, and soil. 	<ul style="list-style-type: none"> ✓ The CAFO land applies manure or wastewater without sampling the nutrient content of manure and soil. ✓ Soil and manure analyses are not current. ✓ Manure and process wastewater analysis are not representative of all sources that are land applied. ✓ Soil analyses are not available for all fields used for land application. ✓ Soil or manure analytical results are not consistent with those used to calculate land application rates.
<ul style="list-style-type: none"> ✓ Establish protocols to land apply manure, litter or process wastewater to ensure appropriate agricultural utilization of the nutrients in the 	<ul style="list-style-type: none"> ✓ Site map showing land application fields. ✓ NMP or CNMP. ✓ Manure spreading agreements. 	<ul style="list-style-type: none"> ✓ No documentation of manure application rates, protocols, or schedules. ✓ The CAFO land applies manure and/or wastewater without

**Table 15-8. Minimum Measures and Associated Records
Applying to Unpermitted Large CAFOs**

Minimum Measure	Example Records	Potential Compliance Alerts
manure, litter or process wastewater (40 CFR 122.42(e)(1)(viii)).	<ul style="list-style-type: none"> ✓ Manure application rate calculations in accordance with the methodology in the NMP. ✓ Land application records. ✓ Application equipment inspection logs. 	<ul style="list-style-type: none"> agronomic rate calculations supporting the application. ✓ Manure application at rates higher than the rates calculated in accordance with the NMP. ✓ Manure is applied at a constant rate across all fields and crop types. ✓ Land application records are incomplete (e.g., do not specify manure source, amount, dates, application method). ✓ Actual amount of nutrients applied is calculated at the end of the season rather than tracked for each application event. ✓ Manure is applied to fields that are not identified in the NMP. ✓ Manure is imported to, or exported from, the CAFO for land application, and this is not documented in the NMP, (or the amounts not noted).

Permitted CAFOs

The inspector can visually observe some aspects of the permitted CAFO's implementation of its NMP during the facility tour, as described in Section C, however, the inspector may also need to review calculations, application records, laboratory test results, and other quantitative data after the inspection. To avoid a lengthy post-inspection review, if possible inspectors should familiarize themselves with the CAFO's NMP in advance of the inspection. If the inspection is announced the inspector may want to request a copy from the operator. If the NMP is not available for review prior to visiting the facility, the regulations require that a copy of the site-specific NMP be maintained and available on-site for review.

Generally, these documents do not contain trade secrets but the inspector should reaffirm the CAFO's right to identify documents as confidential business information. Depending on the CAFO staffing level, the inspector may be able to flag particular documents with sticky notes to be copied during the facility tour. The inspector should make copies of any documents that cannot be thoroughly evaluated during the site inspection for later evaluation. The inspector should create a list of documents and materials obtained during the inspection. The inspector should sign and date a copy and give the copy to the CAFO site representative. The inspector can also attach copied documents to the inspection report as reference material. It is highly recommended, regardless of the time allotted to the records review portion of the inspection, that the inspector asks the CAFO representative for copies of the following documents for

detailed review after the on-site inspection. This documentation will aid the inspector in evaluating the CAFO's NMP compliance:

- Phosphorus/Nitrogen risk assessment documentation/calculations
- Soil test results
- Manure/wastewater test results
- Nutrient application rate calculations
- Nutrient application records (organic and commercial)
- Dewatering logs
- Manure transfer records
- Others (specific to NMP terms)
 - Land application dates
 - Precipitation records
 - Timing limitations
 - Soil test P result
 - P Index calculations
 - Description and location of buffers

Substantial Changes to NMP that Require Permit Modification

- Addition of new land application areas **not** previously included in NMP
- Changes to maximum field-specific annual rates of application or to maximum amounts of N and P derived from all sources for each crop
- Addition of any crop not previously included in NMP
- Changes that increase the risk of N and P transport to Waters of the U.S.

On occasion, the CAFO may not have a photocopier, fax machine, or printer that makes useable copies. The inspector can consider taking photographs of the documents; some smartphones have applications for document scanning. Photos should be taken using EPA or state equipment, not personal cell phones. However, the inspector should identify the specific documents they are photographing to the CAFO representative to allow them to claim confidentiality if applicable. Finally, the inspector should leave the CAFO's documents in an organized manner, preferably in the same order provided to the inspector.

RECORDS FOR PERMITTED LARGE CAFOS

Pursuant to the 2008 CAFO Final Rule, all permits issued after December 22, 2008 must require a CAFO to submit its NMP to the permitting authority with its application for permit coverage. This applies to both individual permits and general permits. Since NPDES permits are issued for 5-year permit terms, most CAFO permits should currently reflect the 2008 CAFO rule revisions. In fact, there still exist some permits issued prior to 2008 that have been administratively continued. Pursuant to those 2008 regulation revisions, by the time the CAFO inspector sees the NMP, the permit writer probably will have reviewed the plan to ensure it is consistent with the state technical standards for nutrient management and to identify site-specific terms of the NMP to be incorporated into the permit. For permitted CAFOs, the inspector's job focuses on verifying that the NMP is being updated, implemented, and documented as required. The specific records that a particular CAFO will maintain to document NMP implementation should be identified in the NMP or in the permit, or both.

Permitted CAFOs are required to submit NMP revisions to the permitting authority. The first step in NMP evaluation is to check the NMP found on-site at the CAFO against the most recent version submitted to the permitting authority. Differences could indicate that NMP revisions are not being submitted as required.

If the on-site NMP has been revised from the version that was submitted to the permitting authority, the inspector should ascertain the nature of the non-reported NMP revisions. Certain types of revisions trigger a permit modification. For those revisions, the inspector should notify the permit writer. In any case, the most recent version of the NMP should be included in the permit file. If the inspector did not obtain a copy of the entire NMP, it should be requested from the operator.

Records and documentation associated with the NMP will be referenced throughout the entire inspection. The CAFO's NMP should include documentation and records showing implementation of the nine minimum measures, in addition to any applicable records and practices required by the ELG.

Production Area

Table 15-9 provides examples of the types of records that a CAFO might keep to document implementation of the first six required NMP minimum measures that deal with the production area. Table 15-9 also describes potential compliance alerts that may suggest non-compliance with those minimum measures. Please keep in mind that these are example records and compliance alerts and are not complete lists of all possible records and potential compliance problems for each measure.

The recordkeeping requirements for the nine minimum measures apply to all permitted CAFOs. Some CAFOs also must maintain additional records associated with the production and land application areas: Subpart C CAFOs (dairy and beef cattle other than veal calves) and Subpart D CAFOs (swine, poultry and veal calves) (40 CFR 122.42(e)(2)(B)). As described in Section A, these additional requirements are implemented through the documentation and maintenance of records of the minimum NMP measures. These records must be maintained on-site for a period of five years from the date they are created. The additional production area records for Subpart C and D CAFOs are also included in Table 15-9 below.

If time constraints prevent the inspector from conducting a detailed records analysis of the CAFO's implementation of its NMP, there are some aspects that can often be quickly verified. A complete list of possible documents and compliance alerts is included in Table 15-9 below. If the inspector intends to do an in-depth analysis of NMP implementation, refer to Appendix AO, "Detailed Review of Nutrient Management Plan Implementation," and Chapter 5 of *EPA's NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a).

Table 15-9. Example Records and Potential Compliance Alerts Associated with NMP Minimum Measures i-v

Minimum Measure	Example Records	Potential Compliance Alerts
Ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the storage facilities (40 CFR 122.42(e)(1)(i)).	<ul style="list-style-type: none"> ✓ NMP or CNMP. ✓ Engineering calculations. ✓ Engineering drawings, including as built drawings. ✓ Construction certifications. ✓ Invoices from manure or wastewater haulers. ✓ Wastewater pumping logs. 	<ul style="list-style-type: none"> ✓ No records of dewatering storage structures or protocols to pump down storage structures after a significant precipitation event or before an extended wet weather period (i.e., winter or rainy season). ✓ No drawings, calculations, or other evidence that storage structures were designed and constructed to contain wastewater and stormwater runoff over a design storage period (e.g., 6 months' storage capacity), including normal precipitation; the 25-year, 24-hour storm event; and accumulated solids.
For Subpart C and D CAFOs: Records documenting required visual inspections	<ul style="list-style-type: none"> ✓ Weekly records identifying the impoundments, storage structures, diversion structures, channels, etc. inspected. ✓ Records identifying the water lines that were inspected daily (may be documented weekly). ✓ Description of any problems identified. 	<ul style="list-style-type: none"> ✓ Records do not identify the specific structures, water lines, etc. that are inspected. ✓ Inspections are not documented at least weekly. ✓ Operation and maintenance issues are not documented (e.g., problems identified during site tour are not reflected in records).
For Subpart C and D CAFOs: Weekly records of the depth of manure and wastewater in liquid impoundments	<ul style="list-style-type: none"> ✓ Weekly depth records for every impoundment required to have a depth marker, including: ✓ Name of impoundment. ✓ Units (inches, feet, etc.). ✓ Pumping level (level needed to maintain storage for design storm event (e.g., 25-year, 24-hour storm)). 	<ul style="list-style-type: none"> ✓ Wastewater levels are not recorded weekly for all impoundments. ✓ Records show wastewater levels routinely above pumping level (i.e., storage capacity for design storm event not maintained). ✓ Records indicated impoundments are not dewatered in a timely manner after large storm events. ✓ Operator is not aware of impoundment pumping levels.
For Subpart C and D CAFOs: Records documenting actions taken to correct deficiencies identified during visual inspections	<ul style="list-style-type: none"> ✓ Description and date of corrective actions. ✓ For corrective actions not completed within 30 days, explanation of the factors preventing immediate correction. 	<ul style="list-style-type: none"> ✓ Records do not document corrective actions. ✓ Corrective actions are not timely.
For Subpart C and D CAFOs: Records documenting the current design of any manure or litter storage structures, including volume for solids accumulation,	<ul style="list-style-type: none"> ✓ NMP or CNMP. ✓ Engineering calculations, including estimates for each component of the required storage volume. 	<ul style="list-style-type: none"> ✓ Design documentation does not include both 1) operating volume (e.g., wastewater produced from facility operations and runoff from "normal" precipitation); and 2) emergency storage volume (e.g.,

Table 15-9. Example Records and Potential Compliance Alerts Associated with NMP Minimum Measures i-v

Minimum Measure	Example Records	Potential Compliance Alerts
design treatment volume, total design volume, and approximate number of days of storage capacity	<ul style="list-style-type: none"> ✓ Engineering drawings, including as built drawings. ✓ Construction certifications. 	<ul style="list-style-type: none"> runoff and precipitation from 25-year, 24-hour storm). ✓ Design documentation for new source swine, poultry, or veal calf CAFOs do not identify or account for the design storm to ensure zero discharge.
For Subpart C and D CAFOs: Records of the date, time and estimated volume of any overflow	<ul style="list-style-type: none"> ✓ Records of overflows (not limited to discharges). ✓ Description of the cause of the overflow and corrective actions. ✓ For overflows resulting in a discharge, records of all required sampling and notification. ✓ * It is recommended that the inspector obtain copies of records showing overflows from the production area and any corrective actions. 	<ul style="list-style-type: none"> ✓ Records of discharges that were not sampled or reported. ✓ Frequent overflows. ✓ No records of corrective actions to prevent future overflows.
Ensure proper management of mortalities (i.e., dead animals) to ensure that they are not disposed of in a liquid manure, stormwater, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities (40 CFR 122.42(e)(1)(ii)).	<ul style="list-style-type: none"> ✓ Description of mortality disposal practices, including compost, incineration, or burial locations. ✓ Periodic certification that documented procedures are followed. ✓ Mortality logs. ✓ Invoices from mortality haulers and renderers. 	<ul style="list-style-type: none"> ✓ No written description of mortality disposal procedures. ✓ No records that written procedures are followed. ✓ Facility representative unable to confirm that runoff from mortality disposal area is contained.
For Subpart C and D CAFOs: Records of mortality management	<ul style="list-style-type: none"> ✓ Description of mortality management practices, including storage, handling, and disposal locations and containment of runoff from those locations. ✓ Periodic certifications that documented procedures are followed. 	<ul style="list-style-type: none"> ✓ Facility representative unable to confirm that runoff from on-site mortality handling, storage, or disposal areas is contained.
Ensure that clean water is diverted, as appropriate, from the production area (40 CFR 122.42(e)(1)(iii)).	<ul style="list-style-type: none"> ✓ Description of practices and structures to divert clean water from the production area. ✓ Topographic maps showing the production area to be at a higher elevation than the surrounding land (water drains away rather than toward the production area). ✓ Federal Emergency Management Agency (FEMA) floodplain maps 	<ul style="list-style-type: none"> ✓ The CAFO is unable to produce documentation that roof gutters and downspouts, engineered berms, and/or topography divert clean water around the production area AND wastewater storage structure calculations do not include stormwater runoff from roofs and areas outside the production area. ✓ The production area is constructed inside a delineated FEMA floodplain

Table 15-9. Example Records and Potential Compliance Alerts Associated with NMP Minimum Measures i-v

Minimum Measure	Example Records	Potential Compliance Alerts
	<p>showing that the production area is outside of a delineated floodplain.</p> <ul style="list-style-type: none"> ✓ Engineering plans for constructing adequately sized berms around the production area. ✓ Engineering drawings or NRCS conservation practice agreements to install roof gutters with downspouts draining away from the production area. 	and facility records do not demonstrate that the production areas are protected from flood inundation and washout.
Prevent direct contact of confined animals with WOUS (40 CFR 122.42(e)(1)(iv)).	<ul style="list-style-type: none"> ✓ Topographic maps that show WOUS do flow through the production area. ✓ Descriptions of practices implemented to prevent direct contact. ✓ Engineering drawings of bridges, culverts, or other structures that allow livestock to cross WOUS with coming into direct contact. 	<ul style="list-style-type: none"> ✓ Topographic maps show surface waters flowing through the production area AND the CAFO representatives are unable to discuss or produce documentation of practices to prevent direct contact of confined animals with WOUS.
Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or stormwater storage or treatment system unless specifically designed to treat such chemicals and other contaminants (40 CFR 122.42(e)(1)(v)).	<ul style="list-style-type: none"> ✓ Descriptions of chemical storage areas and handling and disposal practices demonstrating that chemicals and other contaminants are not improperly disposed. ✓ Logs or invoices from chemical recycling and disposal companies. 	<ul style="list-style-type: none"> ✓ No documentation of chemical disposal practices. ✓ Facility might need a need a Spill Prevention, Control, and Countermeasure (SPCC) plan depending on quantities. ✓ Facility should have a Material Safety Data Sheet (MSDS) for all stored chemicals.

Land Application Areas**Fields Available for Land Application**

The NMP will identify each field where land application is planned. The inspector should compare the land application records with the fields identified in the NMP to ensure manure, litter, or process wastewater were not applied to fields that are not covered by the plan. Use of a land application site that is not identified in the NMP constitutes non-compliance with a permit term. Also, addition of a land application site not covered by an approved NMP constitutes a substantial change to the NMP that requires a permit modification with associated permitting authority review and public notice.

Timing Limitations for Land Application

As described in Chapter 6.5.1 of EPA's *NPDES Permit Writers' Manual for CAFOs* (EPA, 2012a), this term refers to limitations described in the technical standards for when manure applications should be prohibited or delayed. The inspector should check land application records to see if the applicable timing limitations are being followed. In some cases, this will be a straightforward evaluation (e.g., prohibition on land application during specific months). Often, however, evaluating compliance will require the inspector and case officer to use professional judgment and diverse resources (e.g., prohibition on land application on "saturated soils"). For additional information and examples, refer to Appendix AO, "Detailed Review of Nutrient Management Plan Implementation."

To determine whether manure or wastewater was applied during rainfall events the inspector can compare land application dates with local precipitation records. CAFOs often maintain daily precipitation logs. Alternatively, Internet resources such as The Weather Underground

(www.weatherunderground.com) and Utah Climate Center

(<http://climate.usurf.usu.edu/products/data.php>)

can be used to determine whether a rainfall event occurred, at least at a nearby weather station, on a specific date. Unless the data document the time of application and precipitation, it might not be possible to positively determine whether the two events were concurrent, but the inspector and case officer can use information such as the magnitude of the rainfall, whether rainfall occurred on the previous and/or subsequent days, the amount of manure or wastewater applied, and other circumstantial data to assess the likelihood that manure or wastewater was applied during a rainfall event.

Evaluating whether wastewater was applied on frozen or saturated ground is more complex.

Many variables such as season, latitude, altitude, proximity of lakes and rivers, and local landscape, can affect when soils freeze and thaw. To predict soil saturation, the inspector and case officer would need information on soil types including antecedent soil moisture, hydraulic conductivity, infiltration rate, and precipitation and irrigation history. Here again, the evaluation is time-consuming and the absence of direct observation may pose challenges to determining non-compliance. If the land application records for a facility suggest the CAFO operator is applying wastewater to frozen or snow-covered ground, it may be more effective for an inspector to visit CAFOs under those conditions to observe whether land application is occurring.

Document Review Tip:

Spot Check Records for a Single Field

- ✓ Did the CAFO apply manure to the correct field identified in the NMP?
- ✓ Was the crop planned for the field actually the crop that was planted?
- ✓ Were the form and source of the manure applied to the field the same as those identified in the NMP (e.g., the plan called for solid manure from the settling basin to be applied)?
- ✓ Did the CAFO follow timing restrictions when applying the manure (e.g., no application between December and March)?
- ✓ Did the CAFO use the method of application identified in the NMP (e.g., injection)?

It is usually easiest and least expensive for a CAFO to apply manure to the field nearest the manure storage structures. The inspector should consider checking records for that field.

Planned Crop or Other Use

The rate calculations in the NMP are based on the crop or crop rotation planned for each field. The inspector should evaluate land application records to ensure the crops grown in the field are the same as the crops that were planned for that field during that year. The only exception would be for the use of alternative crops included in the NMP.

Form and Source of Manure that Is Land Applied

The inspector should compare the form and source of manure to be applied to each field and crop, identified in permit terms, with the land application records to see if the planned form(s) and source(s) were used.

Timing and Method of Land Application

The inspector should compare methods and timing of manure application to the terms of the permit. The specificity of the terms will be guided by the state technical standards for nutrient management and, largely, the nitrogen availability factors that are required. For example, many states provide a single availability factor or mineralization rate for seasonal (i.e., fall or spring) application. In those states, the permit term might simply specify fall or spring application. In some cases, a permit term might be as specific as “within two weeks before planting.” While the CAFO’s NMP may include specific dates for planned applications (most nutrient management planning programs require specific dates) the inspector must make sure the actual nutrient applications identified in the facility records are consistent with the permit term.

The permit term for method of application will specify at least whether the surface or subsurface application is planned and may be as specific as identifying the type of equipment that will be used. The term should also reflect whether the manure is to be incorporated within a certain timeframe. The CAFO inspector should evaluate land application records to see if the actual method of application, including time to incorporation, is consistent with the planned method reflected in the permit term.

Table 15-10 provides examples of the types of records that a CAFO might keep to document implementation of minimum measures vi through viii dealing with land application. The ninth minimum measure is the requirement to keep records documenting the implementation and management of measures one through eight. Some records may be available electronically, for example, it may be possible to obtain a summary table from the CAFO’s NMP planner that includes data for hundreds of fields. Table 15-10 also describes potential compliance alerts that may suggest non-compliance with those minimum measures. Please keep in mind that these are example records and compliance alerts and are not complete lists of all possible records and potential compliance problems for each measure. Inspectors should be well-versed in the common types of nutrient management practices and protocols used in their region to facilitate

Document Review Tip

Keep a notebook with book values for annual manure production by animal type, typical crop nutrient uptake rates, and other information to informally verify numbers used in CAFO nutrient management plans. The CAFO’s input values may be different but would not be expected to differ significantly from land grant university book values. Find information on manure generation and management from the land grant universities at http://articles.extension.org/animal_manure_management or contact your state university extension office.

the evaluation of the adequacy of NMP implementation as applied to the unique circumstances at each individual CAFO.

In addition to the recordkeeping requirements for the nine minimum measures, which apply to all permitted CAFOs, Large beef, dairy, veal calf, swine and poultry CAFOs also must maintain additional records associated with the production and land application areas. As described in Section A, these additional requirements are implemented through the documentation and maintenance of records of the minimum NMP measures. These records must be maintained on-site for a period of five years from the date they are created. The additional land application records for Subpart C and D CAFOs are also included in Table 15-10 below.

Table 15-10. Example Records and Potential Compliance Alerts Associated with NMP Minimum Measures vi–viii

Minimum Measure	Example Records	Potential Compliance Alerts
<p>1. Identify site-specific conservation practices to be implemented, including buffers or equivalent practices, to control runoff of pollutants to waters of the United States (40 CFR 122.42(e)(1)(vi)).</p>	<ul style="list-style-type: none"> ✓ NMP or CNMP. ✓ Engineering drawings or as built drawings showing the location and dimension of berms, buffers, setbacks, and other conservation practices between land application fields or production areas and WOUS. ✓ Narrative descriptions of conservation practices implemented to control pollutant runoff, such as NRCS conservation practice standards. 	<ul style="list-style-type: none"> ✓ Subpart C and D CAFOs cannot document a 100-foot setback from any down-gradient surface waters, open tile intake structures, sinkholes, agricultural well heads, or other conduits to surface waters where manure, litter, and process wastewater are not applied or a 35-foot vegetated buffer where manure, litter or process wastewater is not applied. ✓ The CAFO does not have documentation of buffers, setbacks, or other conservation practices to minimize nutrient runoff to nearby WOUS. ✓ Conservation practices are identified but do not include operation and maintenance protocols to ensure long-term effectiveness to control pollutant runoff.
<p>2. Identify protocols for appropriate testing of manure, litter, process wastewater, and soil (40 CFR 122.42(e)(1)(vii)).</p>	<ul style="list-style-type: none"> ✓ NMP or CNMP. ✓ A facility sampling plan that identifies sampling locations, sampling frequency, analytical methods, and laboratories for manure, litter, process wastewater, and soil analysis. ✓ Laboratory reports that identify testing procedures and results for manure, litter, process wastewater, and soil. Note for large facilities this information may be available electronically from the CAFO’s NMP planner. 	<ul style="list-style-type: none"> ✓ The CAFO land applies manure or wastewater without sampling the nutrient content of manure and soil. ✓ Soil and manure analyses are not current (according to the required testing frequency). ✓ Manure and process wastewater analysis are not representative of all sources that are land applied. ✓ Soil analyses are not available for all fields used for land application. ✓ Soil or manure analytical results are not consistent with those used to calculate land application rates.

Table 15-10. Example Records and Potential Compliance Alerts Associated with NMP Minimum Measures vi–viii

Minimum Measure	Example Records	Potential Compliance Alerts
<p>For Subpart C and D CAFOs: Manure and Soil Testing Protocols</p>	<ul style="list-style-type: none"> ✓ Laboratory reports that indicate manure was analyzed a minimum of once annually for nitrogen and phosphorus. ✓ Laboratory reports that indicate soil was analyzed a minimum of once every five years for phosphorus. ✓ Rate calculations that include results from laboratory. 	<ul style="list-style-type: none"> ✓ Manure not analyzed annually. ✓ Manure not analyzed for both nitrogen and phosphorus. ✓ Soil not analyzed once every five years for phosphorus. ✓ Results not used in determining application rates for manure, litter, and process wastewater.
<p>3. Establish protocols to land apply manure, litter or process wastewater in accordance with site-specific NMP that ensure appropriate agricultural utilization of the nutrients in the manure, litter or process wastewater (40 CFR 122.42(e)(1)(viii)).</p>	<ul style="list-style-type: none"> ✓ Site map showing land application fields. ✓ NMP or CNMP. ✓ Manure spreading agreements. ✓ Manure application rate calculations in accordance with the methodology in the NMP. ✓ Land application records. ✓ Application equipment inspection logs. 	<ul style="list-style-type: none"> ✓ No documentation of manure application rates, protocols, or schedules. ✓ The CAFO land applies manure and/or wastewater AND commercial fertilizer without agronomic rate calculations supporting the application of both types. ✓ Manure application at rates higher than the rates calculated in accordance with the NMP methodology. ✓ Nutrient credits from irrigation water, previous legume crops, and mineralization from previous manure applications are not included in manure application rate calculations. ✓ Manure is applied at a constant rate across all fields and crop types. ✓ Land application records are incomplete (e.g., do not specify manure source, amount, dates, application method). ✓ Actual amount of nutrients applied is calculated at the end of the season rather than tracked for each application event. ✓ Manure is applied to fields that are not identified in the NMP. ✓ Manure is imported to, or exported from, the CAFO for land application, and this is not documented in the NMP, (or the amounts not noted).

Table 15-10. Example Records and Potential Compliance Alerts Associated with NMP Minimum Measures vi–viii

Minimum Measure	Example Records	Potential Compliance Alerts
For Subpart C and D CAFOs: Land application equipment inspections for leaks	<ul style="list-style-type: none"> ✓ Application equipment inspection logs. 	<ul style="list-style-type: none"> ✓ Application equipment inspection logs do not include a section to record leak inspection information. ✓ Facility representative unable to confirm that land application equipment is periodically inspected for leaks.
For Subpart C and D CAFOs: Specific land application area recordkeeping requirements	<ul style="list-style-type: none"> ✓ Expected crop yields. ✓ Date(s) manure, litter, or process wastewater is applied to each field. ✓ Recorded weather conditions starting 24 hours before land application and ending 24 hours after land application is finished. ✓ Test methods used to sample and analyze manure, litter, process wastewater and soil. ✓ Results from manure, litter, process wastewater, and soil sampling. ✓ Explanation of the basis for determining manure application rates, as provided in the technical standards established by the Director. ✓ Calculations showing the total nitrogen and phosphorus to be applied to each field, including sources other than manure, litter, or process wastewater. ✓ Total amount of nitrogen and phosphorus applied to each field, including documentation of calculations for the total amount applied. ✓ Method used to apply the manure, litter, or process wastewater. ✓ Date(s) and results of manure application equipment inspection. 	<ul style="list-style-type: none"> ✓ CAFO does not have records for land application fields and activities.

In addition to the above records, permitted large CAFOs, regardless of animal sector, must keep records of all manure transfers. Prior to transferring manure, litter or process wastewater to other persons, the CAFO must provide the recipient of the manure, litter or process wastewater with the most current nutrient analysis. The CAFO must also retain records of the date of the

transfer, the name and address of the recipient, and the approximate amount of manure, litter, or process wastewater transferred (tons/gallons). These records must be maintained for 5 years from the date the manure, litter, or process wastewater is transferred.

Records for Permitted Medium and Small CAFOs

Permitted medium and small CAFOs are subject to the same requirements as a Large Permitted CAFO, with the exception of the ELG. Permitted medium and small CAFOs must maintain records to document NMP development and implementation, but are not subject to the ELG (40 CFR Part 122.42(e)). Any technology-based requirements and associated records will be specified in the permit for a medium or small CAFO and may be similar to the ELG requirements for large CAFOs.

E. CLOSING CONFERENCE

CAFO representatives are usually anxious to hear and discuss the inspection findings before the inspector departs. The inspector should hold a closing meeting or conference to present and discuss preliminary inspection findings (e.g., CAFO is not recording weekly depth marker readings, impoundments had less than 1 foot of freeboard, inspections not being done, confined livestock not kept out of waters of the United States). The inspector does not make a determination of an operation's CWA compliance or noncompliance status at the time of the inspection. The inspector should characterize the post inspection closing conference feedback as preliminary, acknowledging that the inspector may identify additional issues or concerns while going through records and notes after the inspection and that compliance will be determined by the case review officer with input from the inspector after a review of all information obtained. The inspector may find it helpful to tie inspection feedback to specific regulatory requirements.

The closing conference is also an excellent time to provide the producer with compliance assistance information or refer the producer to sources of additional information. The inspector is often the only contact between EPA and the regulated industries; be aware of opportunities to promote compliance with EPA regulations. During an inspection, the inspector has first-hand knowledge of the inspection site, as well as knowledge of any specific questions or problems the site officials may have. Use this time to answer those questions and/or convey information that will move the site toward improving compliance and acting in an environmentally responsible manner. There are some limitations on the types of compliance assistance that are appropriate. The inspector should follow the guidelines described in EPA's *Final National Policy: Role of the EPA Inspector in Providing Compliance Assistance During Inspections* (EPA, 2003a).

EPA has put together a series of answers to commonly asked questions to help livestock and poultry operation owners and operators understand what to expect from EPA National Pollutant Discharge Elimination System (NPDES) inspections (EPA, 2014), available at <https://www.epa.gov/compliance/fact-sheet-livestock-and-poultry-operation-inspections>. Other examples of appropriate compliance assistance to a facility include:

- Providing copies of statutes, regulations, or fact sheets

- Providing guidance manuals or technical documents
- Distributing the small business information sheet
- Providing facilities with related websites
- Mentioning that state requirements may apply

Inspectors should visit EPA's Ag Center website at <https://www.epa.gov/agriculture> for **compliance assistance** resources that may help the CAFO facilities they inspect. Other CAFO compliance assistance resources include:

- EPA's Compliance Assistance Centers website:
<https://www.epa.gov/compliance/compliance-assistance-centers>
- USDA Cooperative Extension Service's "eXtension" animal manure management site:
http://extension.org/animal_manure_management

During this meeting or conference, the inspector should also answer final questions, prepare necessary document receipts, provide any additional information about the NPDES program, and request the compilation of data that were not available at the time of the inspection.

Inspectors should be prepared to discuss follow-up procedures, such as how results of the inspection will be used and what further communications the region, state, tribe, or locality may have with the facility.

F. AFTER THE CAFO OR AFO INSPECTION

Post-inspection activities begin when the inspector departs the facility. This includes delivering samples to the laboratory in accordance with the protocols outlined in the QAPP (see Appendix AN, "Sample Quality Assurance Project Plan (QAPP)") and any needed post-inspection biosecurity measures. This section may be brief, but the activities covered are critical to ensure that information and data collected during the inspection are accurately documented and presented in the written inspection report. The written report, along with photographs and other evidence collected during the inspection, will be used by EPA attorneys and senior compliance and enforcement managers to make legal decisions pertaining to the facility's compliance status and potential enforcement responses. The report might also document that the facility was in compliance with its NPDES permit at the time of the inspection, which could be an important factor in determining whether any future discharges are allowable, in accordance with the permit conditions (see Appendix AP, "Inspection Report Template (R7)").

Given the importance of the inspection report the inspector is strongly encouraged to begin the inspection report as soon as possible following the inspection. Particular activities that should be accomplished on the day or days following the inspection include:

- Review inspection notes and document any details that were discussed during the inspection but not recorded in the notes, particularly compliance concerns. These items should be annotated to make clear that they were added after the inspection.

- Document or highlight the potential compliance issues identified during the closing conference with the facility representative.
- Identify missing information on the checklist and contact the operator for this information.
- Download, organize and add descriptions to inspection photos, or have inspection film developed. Follow the Digital Camera Guidance for EPA Civil Inspections and Investigations.
- Place documents claimed as confidential business information (CBI) in a secure location (this must occur as soon as the inspector returns to the office).

Generally, the accuracy and quality of the inspection report is highest when the report is completed promptly.

COMMUNICATION WITH THE CAFO OPERATOR

It may be necessary to follow up with an operator after the inspection if additional information is needed or to clarify certain information obtained during the inspection. As it can be difficult to reach an operator who is busy, the inspector should use the closing conference to establish the best times and approach for post-inspection communication (e.g., mobile phone, office phone, email, or fax). Any information obtained from the operator after the inspection should be identified in the inspection notes and report.

Post Inspection NMP Records Evaluation

The records and document review portion of the CAFO inspection should provide the inspector with an opportunity to review required documentation. However, the inspector may not have adequate time to review laboratory reports, rate calculations, and land application records. As a result, the inspector may need to complete the records review back in the office. Refer to Section B for a list of records to photocopy for post inspection evaluation. Appendix AO, “Detailed Review of Nutrient Management Plan Implementation” provides more detail on reviewing NMPs and land application records.

Inspection Report Generation

After the inspector has reviewed all the information obtained during the inspection and contacted the operator, if needed for any clarifying information, an inspection report should be prepared. The inspection report will generally include the inspection checklist, documentation copied during the inspection, an explanation of findings, and supporting photographs. See NPDES Inspection Manual for detailed information on preparation of an NPDES inspection report. The inspector should follow EPA quality control/quality assurance procedures for inspection reports.

Compliance Determination and Follow-Up Action

Senior EPA compliance personnel will review the completed inspection report and evaluate whether the facility is in compliance and what type of follow-up action is appropriate. EPA

responds to noncompliance in several different ways, depending upon the nature and circumstances of the violation(s):

- No follow-up needed
- Letter notifying the facility of violation(s) (e.g., NOVs) or compliance assistance
- Administrative compliance order
- Administrative compliance order plus administrative penalty
- Civil judicial enforcement action (penalties and/or injunctive relief)
- Criminal enforcement investigation

Compliance decisions will be based on observations, data, and other evidence collected during the inspection. Thus, it is the inspector's responsibility to carefully document all aspects of the inspection process so senior compliance personnel can make an informed legal decision about the facility's compliance status and to ensure that any required follow-up action is based on sound, factual evidence.

Once finalized, EPA should send a copy of the report to the inspected facility. If it is not a region's practice to send the report to the facility, there should be some communication with the facility to transmit the results of the inspection. Note that the inspection report may be addressed to a responsible official who is different from the facility representative who participated in the inspection. The responsible official will typically be an individual authorized to make management and financial decisions which govern operation of the facility (40 CFR 122.22(a)(1)).

File Maintenance

It is important once the inspection report is complete to ensure all documents associated with the inspection, including all field notes and photographs, are properly filed in a readily identified location that corresponds with the currently used filing system (e.g., facility name, permit number). The inspector should mark all information claimed to be CBI and place it in a locked filing cabinet or a safe immediately after the inspection is completed. CBI includes information considered to be trade secrets (including chemical identity, processes, or formulation) that could damage a company's competitive position if they became publicly known. The facility representative is responsible for identifying CBI during the inspection; the inspector will have discussed this during the opening conference.

As previously mentioned, the information presented in this chapter is intended to be comprehensive and broadly applicable to the majority of EPA inspections at permitted and unpermitted CAFOs; however, there will always be situations that require the inspector to rely on their best professional judgment, knowledge of the regulations, and familiarity with EPA Region-specific policies. As such, the inspector is encouraged to periodically review the NPDES Compliance Inspection Manual and other resources referenced in this manual to remain up to date on national and regional EPA compliance inspection policies and procedures.

G. REFERENCES

The following is a list of resources providing additional information on CAFOs.

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- U.S. Environmental Protection Agency. (1992). *NPDES Storm Water Program Question and Answer Document, Volume 1*. EPA 833-F-93-002.
- U.S. Environmental Protection Agency. (1995). *Guide Manual on NPDES Regulations for Concentrated Animal Feeding Operations*. EPA-833-B-95-001.
- U.S. Environmental Protection Agency. (2001a). *Final Guidance on the Enforcement Principles Outlined in the 1984 Indian Policy*. Available at: <https://www.epa.gov/enforcement/transmittal-final-guidance-enforcement-principles-outlined-1984-indian-policy-january-17>
- U.S. Environmental Protection Agency. (2002). *Development Document for the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operation*. EPA-821-R-03-001.
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U.S. Environmental Protection Agency. (2003b). *NPDES Permit Writers' Guidance Manual and Example Permit for Concentrated Animal Feeding Operations*. EPA-833-B-04-001

U.S. Environmental Protection Agency. (2004). *Managing Manure Nutrients at Concentrated Animal Feeding Operations*. EPA 821-B-09-009.

U.S. Environmental Protection Agency. (2012a). *NPDES Permit Writers' Manual for Concentrated Animal Feeding Operations*. Office of Water, Office of Wastewater Management. EPA 833-F-12-001.

U.S. Environmental Protection Agency. (2012b). *National Pollutant Discharge Elimination System Permit Regulation for Concentrated Animal Feeding Operations: Removal of Vacated Elements in Response to 2011 Court Decision, Final Rule*. EPA-HQ-OW-2012-0142; FRL-9705-6.

U.S. Environmental Protection Agency. (2014). *Fact Sheet: Livestock and Poultry Operation Inspections*. EPA 305-F-14-0.

U.S. Environmental Protection Agency. (2016). *Biosecurity Procedures for Visits to Livestock and Poultry Facilities*. OECA-PROC-2016-010-R0. Available at:
<https://www.epa.gov/compliance/guidance-biosecurity-procedures-visits-livestock-and-poultry-facilities>

U.S. Environmental Protection Agency. (2016). *NPDES Compliance Inspection Manual*. Office of Enforcement and Compliance Assurance. EPA 305-X-04-001.

Waterkeeper Alliance, Inc. v. EPA. (2d Cir. 2005). 399 F.3d 486, 510-11.

CHAPTER 16– VESSEL GENERAL PERMIT (VGP)

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Related Websites

Vessel General Permit webpage: <https://www.epa.gov/npdes/vessels-incident-discharge-permitting-3>.
 Vessels Notice of Intent (eNOI) webpage: <https://ofmpub.epa.gov/apex/vgpenoi/f?p=102:101>.
 Vessels One-Time Report webpage: https://ofmpub.epa.gov/apex/aps/f?p=VGP_2008:HOME::::.

A. BACKGROUND AND OVERVIEW

BACKGROUND AND HISTORY OF THE VGP

In addition to materials in this chapter, inspectors must be familiar with Chapter 1, “Introduction,” and Chapter 2, “Inspection Procedures.”

In December 2003, a long-standing exclusion of discharges incidental to the normal operation of vessels¹⁷ from the NPDES program became the subject of a lawsuit in the U.S. District Court for the Northern District of California (Northwest Env'tl. Advocates et al. v. United States EPA, 2005). On March 30, 2005, the U.S. District Court for the Northern District of California determined that the exclusion exceeded the Environmental Protection Agency's (EPA's) authority under the Clean Water Act (CWA) and in September 2006 issued a final order stating:

- The blanket exemption for discharges incidental to the normal operation of a vessel, contained in Title 40 of the *Code of Federal Regulations* (CFR) Part 122.3(a), shall be vacated as of September 30, 2008.
- Northwest Env'tl. Advocates et al. v. United States EPA, 2006 U.S. Dist. LEXIS 69476 (N.D. Cal., 2006).

EPA appealed the District Court's decision to the Ninth Circuit, and on July 23, 2008, the Court upheld the decision (Northwest Env'tl. Advocates v. EPA, 2008).

This meant that, effective December 19, 2008, except for those vessels exempted from National Pollutant Discharge Elimination System (NPDES) permitting by Congressional legislation, discharges incidental to the normal operation of vessels which were excluded from NPDES permitting by 40 CFR 122.3(a), were subject to CWA section 301's prohibition against discharging, unless covered under an NPDES permit. The CWA authorizes civil and criminal enforcement for violations of that prohibition and allows for citizen suits against violators.

In response to the court decisions, the EPA issued the first Vessel General Permit (VGP) in December 2008, which expired on December 19, 2013. On April 12, 2013, EPA issued the final 2013 NPDES VGP, which replaces the 2008 NPDES VGP at expiration and extends to December 19, 2018.

VGP OVERVIEW

Eligibility and Limitation on Coverage

The VGP is applicable to discharges incidental to the normal operation of non-recreational, non-military vessels into waters subject to the permit. The permit applies to all vessels operating in a capacity as a means of transportation that have discharges incidental to their normal operations into waters subject to the permit, with some exceptions.

¹⁷ “Vessel” means every description of watercraft or other artificial contrivance being used as a means of transportation on “Waters Subject to this Permit” (modified from CWA section 312(a)).

Operating in a Capacity as a Means of Transportation

Vessels that are NOT being operated in a capacity as a means of transportation as set out in 40 CFR 122.3(a) (and whose discharges are accordingly NOT applicable to the VGP) include vessels being used as energy or mining facilities, storage facilities, seafood processing facilities, or vessels that are secured to a storage facility or a seafood processing facility, or when secured to the bed of the ocean, contiguous zone, or water of the United States for the purpose of mineral or oil exploration or development.

Similarly, vessels in drydock and “floating” craft that are permanently moored to piers (e.g., “floating” casinos, hotels, restaurants, and bars) are not covered by the VGP, as they are not operating in a capacity as a means of transportation.

With respect to vessels under construction, when the vessel is engaged in sea trials that result in operational discharges, because testing is a critical part of vessel operation, such discharges would be incidental to the normal operation of a vessel, and thus eligible for coverage under the VGP; however, any discharges resulting from construction activities are not covered by the VGP as they are incidental to vessel construction, not vessel operation.

Generally, except as provided for above, a vessel is operating in the capacity as a means of transportation while underway (in transit), temporarily moored to a pier or other mooring device, performing cargo loading/off-loading operations, fueling or defueling, during tug or tow operations, or while performing maintenance outside of a drydock while temporarily moored.

Discharges Incidental to the Normal Operation of Vessels

The discharges eligible for coverage under the VGP are those discharges incidental to the normal operation of a vessel covered by the exclusion in 40 CFR 122.3(a) prior to any vacatur of that exclusion. Discharges incidental to normal operation include deck runoff from routine deck cleaning, bilgewater from properly functioning oily water separators, and ballast water. Some potential discharges are not incidental to the normal operation of a vessel. For example, intentionally adding used motor oil to the bilge tank will result in a discharge that is not incidental to the normal operation of a vessel. Furthermore, any discharge that results from a failure to properly maintain the vessel and equipment, even if the discharge is of a type that is otherwise covered by the permit, is not eligible for permit coverage. Discharges that are neither covered by the VGP nor exempt from section 402 of the CWA must be covered under a separate individual or general permit.

The list below identifies each of the 27 effluent streams eligible for coverage under the permit (listed in the same order as Part 2.2 of the permit):

- Deck washdown and runoff and above water line hull cleaning.
- Bilgewater/oily water separator effluent.
- Ballast water.
- Anti-fouling hull coatings/hull coating leachate.
- Aqueous Film Forming Foam (AFFF).
- Boiler/economizer blowdown.

- Cathodic protection.
- Chain locker effluent.
- Controllable pitch propeller and thruster hydraulic fluid and other oil-to-sea interfaces including lubrication discharges from paddle wheel propulsion, stern tubes, thruster bearings, stabilizers, rudder bearings, azimuth thrusters, propulsion pod lubrication, and wire rope and mechanical equipment subject to immersion.
- Distillation and reverse osmosis brine.
- Elevator pit effluent.
- Firemain systems.
- Freshwater layup.
- Gas turbine washwater.
- Graywater (except that graywater from commercial vessels operating in the Great Lakes within the meaning of CWA section 312 is excluded from the requirement to obtain a NPDES permit (see CWA section 502(6)), and thus is not within the scope of the VGP);
- Motor gasoline and compensating discharge.
- Non-oily machinery wastewater.
- Refrigeration and air condensate discharge.
- Seawater cooling overboard discharge (including non-contact engine cooling water, hydraulic system cooling water, refrigeration cooling water).
- Seawater piping biofouling protection.
- Boat engine wet exhaust.
- Sonar dome discharge.
- Underwater ship husbandry and hull fouling discharges.
- Weldeck discharges.
- Graywater mixed with sewage from vessels.
- Exhaust gas scrubber washwater discharge.
- Fish hold effluent.

Waters Subject to the VGP

Waters subject to the VGP are “waters of the United States” as defined in 40 CFR Part 122.2 (extending to the outer reach of the 3-mile territorial sea as defined in section 502(8) of the CWA). This includes all navigable waters of the Great Lakes subject to the jurisdiction of the United States. The permit does not apply to discharges beyond the 3-mile territorial sea.

The general permit covers vessel discharges into the waters of the United States in all states, tribes and territories, regardless of whether a state or territory is authorized to implement other aspects of the NPDES permit program within its jurisdiction, except as otherwise excluded by Part 6 of the permit (Specific Requirements for Individual States or Indian Country Lands).

Vessel Universe Affected by the VGP

Vessels covered under the VGP include, cruise ships, ferries, barges, mobile offshore drilling units, oil tankers or petroleum tankers, bulk carriers, cargo ships, container ships, other cargo freighters, refrigerant ships, research vessels, emergency response vessels, including firefighting and police vessels, and any other non-military, non-recreational vessel that is greater than or equal to 79 feet in length and operating in a capacity of transportation. EPA estimates that there are approximately 61,000 U.S. flagged vessels that may be eligible for coverage under the permit. Additionally, EPA estimates that there are up to 8,000 additional foreign flagged vessels that may need coverage under the permit.

With respect to commercial fishing vessels of any size as defined in Title 46 of the *United States Code* (USC) section 2101, and non-recreational vessels that are less than 79 feet in length, the coverage of the VGP is limited to ballast water discharges only. Public Law (P.L.) 110-299 (July 31, 2008) provided for a temporary two-year moratorium on NPDES permitting of discharges incidental to normal operation of all commercial fishing vessels (except ballast water) and non-recreational vessels less than 79 feet in length. This moratorium was extended multiple times, with the current moratorium lasting until to December 18, 2018 as of this publication. After December 18, 2018, these vessels will be covered by the VGP, unless Congress takes further action.

Recreational vessels as defined in CWA section 502(25) are not subject to the VGP. Recreational vessels are not subject to NPDES permitting under CWA section 402, and are instead subject to regulation under CWA section 312(o).

Vessels of the Armed Forces as defined in CWA section 312(a)(14) are also not subject to the VGP.

B. PERMITS

AUTHORIZATION UNDER THE VGP

To obtain authorization to discharge under the VGP, vessel operators/owners must meet the Part 1.2 eligibility requirements. If the vessel meets the requirements under Part 1.5.1.1, and was authorized to discharge under the 2008 VGP, the vessel operator/owner must submit an NOI to receive permit coverage seven days before the effective date of the VGP to continue uninterrupted coverage.

Vessels authorized to discharge under the 2008 VGP were vessels that had submitted an NOI or were not subject to the NOI requirement by Part 1.5.1.2 of the 2008 VGP. If the vessel was not authorized to discharge under the 2008 VGP and meets the requirements under Part 1.5.1.1, the vessel operator/owner must submit an NOI to receive permit coverage at least 7 days or more than 30 days (as applicable) before discharging into waters subject to the VGP.

Owner/operators of vessels that meet the requirements under Part 1.5.1.2 are not required to submit NOIs. Instead these owner/operators must sign and maintain a copy of the Permit Authorization and Record of Inspection (PARI) form onboard at all times. Vessels in this category are still subject to all applicable VGP requirements.

If the vessel is greater than or equal to 300 gross tons or the vessel has the capacity to hold or discharge more than 8 cubic meters (2,113 gallons) of ballast water, the vessel operator/owner must submit a signed and certified, complete and accurate NOI in accordance with the requirements.

If the vessel is less than 300 gross tons and the vessel does not have the capacity to hold or discharge more than 8 cubic meters (2113 gallons) of ballast water, the vessel owner/operator does not need to submit an NOI; however, they must complete the PARI form.

DISCHARGE TYPES SPECIFICALLY NOT AUTHORIZED BY THE VGP

EPA has identified several discharge types not authorized by the VGP because, among other things, the discharge is not within the scope of the current 40 CFR 122.3(a) exclusion or not within the scope of EPA's NPDES permitting authority (see Part 1.2.3 of the permit). These discharges include:

- Discharges not subject to former NPDES permit exclusion.
- Discharges generated from vessels when they are operated in a capacity other than as a means of transportation.
- Sewage as defined at CWA section 502(6) and 40 CFR 122.2 (sewage is instead regulated under CWA section 312 and 40 CFR Part 140 and 33 CFR Part 159).
- Used or spent oil.
- Garbage or trash (including discharges of bulk dry cargo residues as defined at 33 CFR 151.66(b) and agricultural cargo residues) (discharges of garbage continue to be subject to regulation under 33 CFR Part 151, Subpart A).
- Photo-processing effluent.
- Effluent from dry cleaning operations.
- Discharges of medical waste and related materials.
- Discharges of noxious liquid substance residues.
- Tetrachloroethylene (perchloroethylene) and trichloroethylene degreasers.
- Discharges currently or previously covered by NPDES permits.

TECHNOLOGY-BASED EFFLUENT LIMITS AND RELATED REQUIREMENTS APPLICABLE TO ALL VESSELS

The following effluent limits are required by the VGP, regardless of the type of vessel owned or operated.

Material Storage

For cargoes or other onboard materials that might wash overboard or dissolve because of contact with precipitation or surface water spray, or which may be blown overboard by air currents, minimize the amount of time these items are exposed to such conditions. Locate storage areas on the vessel for such items in covered areas where feasible and consistent with

any applicable regulations promulgated by the Secretary of the Department in which the Coast Guard is operating that establish specifications for safe transportation, handling, carriage, and storage of pollutants (see Part 2.1.5 of the permit). If water draining from storage areas contacts oily materials, vessel owners/operators must:

- Use dry cleanup methods or absorbents to clean up the wastewater.
- Store the water for onshore disposal.
- Run the water through an oily water separator when so required by Coast Guard regulations, or if not subject to such requirement, use other effective methods to comply with Part 2.1.4 of the permit to prevent the discharge into waters subject to the permit of any oils, including oily materials, in quantities which may be harmful as defined in 40 CFR Part 110.

Toxic and Hazardous Materials

Where consistent with vessel design and construction, vessel owners/operators must locate toxic and hazardous materials in protected areas of the vessel unless the master determines this would interfere with essential vessel operations or safety of the vessel, or doing so would violate any applicable regulations promulgated by the Secretary of the Department in which the Coast Guard is operating that establish specifications for safe transportation, handling, carriage, and storage of pollutants (see Part 2.1.5 of the permit). Any discharge that is made for safety reasons must be documented as part of the requirements in Part 4.2 of the permit. This includes ensuring that toxic and hazardous materials are in appropriate sealed containers constructed of a suitable material, labeled, and secured. Containers must not be overfilled and incompatible wastes should not be mixed. Exposure of containers to ocean spray or precipitation must be minimized. Jettisoning of containers holding toxic or hazardous material is not authorized by the VGP.

Fuel Spills/Overflows

Fuel spills or overflows must not result in a discharge of oil in quantities that may be harmful, pursuant to 40 CFR Part 110. Vessel owners/operators must conduct all fueling operations using control measures and practices designed to minimize spills and overflows and ensure prompt containment and cleanup if they occur. Vessel operators must not overfill fuel tanks. For vessels with interconnected fuel tanks, fueling must be conducted in a manner that prevents overfilling and release from the system to the environment.

Vessels with air vents from fuel tanks must use spill containment or other methods to prevent or contain any fuel or oil spills. Large scale fuel spills or overflows are not incidental to the normal operation of the vessel and are not authorized by the VGP.

The following requirements apply to fueling of auxiliary vessels such as lifeboats, tenders or rescue boats deployed from “host” vessels subject to the VGP:

- While fueling, examine the surrounding water for the presence of a visible sheen. If a visible sheen is observed as a result of fueling, it must be cleaned up immediately.

- It is important to know the capacity of the fuel tanks before fueling begins to prevent unintentionally overfilling the tank.
- Prevent overfilling and do not top off fuel tanks.
- When possible, fill fuel tanks while boat is on shore or recovered from the water.
- When possible, fill portable tanks on shore or on the host vessel, not on the auxiliary vessel.
- Use an oil absorbent material or other appropriate device while fueling the auxiliary vessel to catch drips from the vent overflow and fuel intake.
- Regularly inspect the fuel and hydraulic systems for any damage or leaks.

Owner/operators shall ensure that all crew responsible for conducting fueling operations are trained in methods to minimize spills caused by human error and/or the improper use of equipment.

Discharges of Oil Including Oily Mixtures

All discharges of oil, including oily mixtures, from ships subject to Annex I of the International Convention for the Prevention of Pollution from Ships as implemented by the CWA to Prevent Pollution from Ships and U.S. Coast Guard regulations found in 33 CFR 151.09 (hereinafter referred to as “MARPOL vessels”) must have concentrations of oil less than 15 parts per million (ppm) (as measured by EPA Method 1664 or other appropriate method for determination of oil content as accepted by the International Maritime Organization (IMO) (e.g., ISO Method 9377) or U.S. Coast Guard) before discharge. All MARPOL vessels must have a current International Oil Pollution Prevention Certificate (IOPP) issued in accordance with 33 CFR 151.19 or 151.21. All other discharges of oil including oily mixtures must not contain oil in quantities that may be harmful, pursuant to 40 CFR Part 110.

Compliance with Other Statutes and Regulations

As required by 40 CFR 122.44(p), vessel owners/operators must comply with any applicable regulations promulgated by the Secretary of the Department in which the Coast Guard is operating, that establish specifications for safe transportation, handling, carriage, and storage of pollutants.

Any discharge from vessels must comply with: section 311 (40 CFR Part 110) of the CWA; regulations requiring prevention of pollution from ships (40 CFR Part 1043); the National Marine Sanctuaries Act and implementing regulations (15 CFR Part 922 and 50 CFR Part 404); the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 40 CFR Part 152); and, the Oil Pollution Control Act (OPA of 1990, 40 CFR Part 112).

General Training

All owner/operators of vessels must ensure that the master, operator, person-in-charge, and crew members who actively take part in the management of incidental discharges or who may affect those discharges are adequately trained in implementing the terms of the VGP. In addition, all owner/operators of vessels must ensure appropriate vessel personnel be trained in the procedures for responding to fuel spills and overflows, including notification of appropriate

vessel personnel, emergency response agencies, and regulatory agencies. This training need not be formal or accredited courses; however, it is the vessel owners/operators' responsibility to ensure the staff are given the necessary information to conduct shipboard activities in accordance with the terms of the VGP.

Vessel owners/operators must also meet all training-related recordkeeping requirements of Part 4.2 of the VGP.

EFFLUENT LIMITS AND RELATED REQUIREMENTS FOR SPECIFIC DISCHARGE CATEGORIES

EPA's discharge-specific permit requirements applicable to all covered vessels that discharge them are provided in Part 2.2 of the permit by discharge. Below are examples of key permit requirements for several discharge types covered in the permit. The inspector should refer to the full list of permit requirements for all 27 discharge types in Part 2.2 of the permit.

Deck Washdown and Runoff and Above Water Line Hull Cleaning

Vessel owners/operators must minimize deck washdowns while in port. Vessel owner/operators must also minimize the introduction of on-deck debris, garbage, residue, and spill into deck washdown and runoff discharges. Deck washdowns should have minimal presence of floating solids, visible foam, halogenated phenol compounds, and dispersants, or surfactants.

Vessel owners/operators must maintain their topside surface and other above water line portions of the vessel to minimize the discharge of rust (and other corrosion byproducts), cleaning compounds, paint chips, non-skid material fragments, and other materials associated with exterior topside surface preservation.

Measures that may be implemented by the operator/owner to minimize deck washdown or above water line hull cleaning include:

- Using perimeter spill rails and scuppers to collect the runoff for treatment.
- Using coamings and drip pans for machinery on deck to collect and properly dispose of any oily discharge that may leak from machinery and prevent spills.
- Using minimally toxic and phosphate-free cleaners and detergents.
- Avoiding spray applications in windy conditions or avoiding over application.

Bilgewater/Oil Water Separator Effluent

All bilgewater discharges must be in compliance with the regulations in 40 CFR Parts 110 (Discharge of Oil), 116 (Designation of Hazardous Substances), and 117 (Determination of Reportable Quantities for Hazardous Substances) and 33 CFR 151.10 (Control of Oil Discharges). In addition:

- Vessel operators may not use dispersants, detergents, emulsifiers, chemicals, or other substances that remove the appearance of a visible sheen in their bilgewater discharges.

- Vessel operators may not add substances that drain to the bilgewater that are not produced in the normal operation of a vessel (except for additives used to enhance oil/water separation during processing). Routine cleaning and maintenance activities associated with vessel equipment and structures are considered to be normal operation of a vessel if those practices fall within normal marine practice.

Vessels must minimize the discharge of bilgewater into waters subject to the VGP by minimizing production, disposing near adequate treatment facilities, or discharging into waters not subject to the VGP (i.e., more than 3 nautical miles (nm) from shore) for vessels that regularly travel into such waters.

Vessels greater than 400 gross tons shall not:

- Discharge untreated bilgewater into waters subject to the VGP.
- Discharge treated bilgewater into federally protected waters unless the discharge is necessary to maintain the safety and stability of the ship (any discharge of bilgewater must be documented as part of the recordkeeping requirements in Part 4.2 of the VGP).
- Discharge treated bilgewater within 1 nm of shore if technically feasible or discharge into waters subject to the VGP unless the vessel is underway (any discharge that is made for safety reasons must be documented as part of the requirements in Part 4.2 of the VGP and reported in the vessel's annual report).

“New Build” vessels built after December 19, 2013 greater than 400 gross tons that may discharge bilgewater into waters subject to the VGP must monitor (i.e., sample and analyze) their bilgewater effluent at least once a year for oil and grease content. To demonstrate compliance with the permit, the bilgewater sample must be analyzed for oil. Subsequent sampling is not required if oil and grease concentrations are less than 5 ppm and the vessel meets the following conditions:

- Vessel uses an oily water separator capable of meeting a 5-ppm oil and grease limit, or has an alarm that prevents discharge of oil and grease at concentrations above 5 ppm.
- Oil content meter is calibrated at least annually.
- Oil content meter never reads above 5 ppm during discharges into waters subject to the VGP.

Records of monitoring must be retained onboard for at least 3 years in the vessel's recordkeeping documentation.

Ballast Water

All owner/operators of vessels equipped with ballast water tanks must maintain a ballast water management plan developed specifically for the vessel and train the master, operator, person-in-charge, and crew members who actively take part in the management of the discharge, or who may affect the discharge, on the application of ballast water and sediment management and treatment procedures as outlined in Parts 2.2.3.1 and 2.2.3.2 of the permit.

Ballast water management practices must comply with the requirements described in Part 2.2.3.3 of the permit to avoid or minimize uptake and discharge of ballast water and associated sediments during vessel operations. Avoid the discharge of ballast water into waters subject to the VGP that are within or that may directly affect marine sanctuaries, marine preserves, marine parks, shellfish beds, or coral reefs or other waters listed as federally protected waters. Clean ballast tanks to remove sediment in mid-ocean or under controlled arrangements in port or at drydock. As a condition of the VGP, all discharges of ballast water must also comply with applicable U.S. Coast Guard regulations found in 33 CFR Part 151.

Additionally, “Lakers” are subject to mandatory best management practices (BMPs) described in Part 2.2.3.4 of the VGP to reduce ballast water uptake and to implement sediment removal policies, including ballast water exchange and saltwater flushing.

All discharges of ballast water may not contain oil, noxious liquid substances (NLSs), or hazardous substances in a manner prohibited by U.S. laws, including section 311 of the CWA. Vessel operators/owners can meet the numeric limits listed in Part 2.2.3.5 by using any of the following water management measures:¹⁸

- Use a ballast water treatment system
- Send ballast water to onshore treatment facilities
- Use public water supply
- Do not discharge ballast water

If a vessel is subject to ballast water discharge limits and uses a ballast water treatment system (BWTS), then Part 2.2.3.5 of the VGP applies to the vessel and describes the monitoring requirements, in three components. The first component, in Part 2.2.3.5.1.1.2 generally requires monitoring equipment performance to assure the system is fully functional. Vessels conducting this monitoring also must adequately calibrate their equipment as required in Part 2.2.3.5.1.1.3. The second component, in Part 2.2.3.5.1.1.4, requires monitoring from all ballast water systems for selected biological indicators. The third component, in Part 2.2.3.5.1.1.5, requires monitoring of the ballast water discharge itself for biocides and residuals to assure compliance with the effluent limitations established in Part 2.2.3.5 of the permit, as applicable. Records of sampling and testing results required under Part 2.2.3.5.1.1 must be retained onboard for a period of three years in the vessel’s recordkeeping documentation.

Vessels must meet the requirements in Part 2.2.3.5.1 of the permit according to the following schedule, at which point the BWTS will become the Best Available Technology Economically Achievable (BAT):

¹⁸ EPA issued an Enforcement Response Policy on December 27, 2013 for EPA’s 2013 VGP: Ballast Water Dischargers and U.S. Coast Guard Extensions under 33 CFR Part 151. On a case-by-case basis, the U.S. Coast Guard may grant a schedule extension request pursuant to 33 CFR Part 151.2036 to a vessel to implement the required technology to meet the ballast water discharge standard requirements under the U.S. Coast Guard Regulations (33 CFR Part 151). EPA will consider this grant for extension when evaluating the enforcement priority for a vessel that has not complied with the numeric ballast water discharge limits in Part 2.2.3.5 of the 2013 VGP.

- New vessels (constructed after December 1, 2013) must comply on delivery.
- Existing vessels less than 1,500 m³ (constructed prior to December 1, 2013) must be drydocked after January 1, 2016.
- Existing vessels 1,500–5,000 m³ (constructed prior to December 1, 2013) must be drydocked after January 1, 2014.
- Existing vessels greater than 5,000 m³ (constructed prior to December 1, 2013) must be drydocked after January 1, 2016.

Vessel owners not subject to the requirements of Part 2.2.3.5 of the permit must meet the exchange and flushing requirements of Part 2.2.3.6. Ballast water exchange may not be used in lieu of meeting effluent limits in Part 2.2.3.5 of the permit once it becomes required to meet these limits. Part 2.2.3.6 outlines interim requirements for the following vessels:

- Vessels on oceangoing voyages (where ballast water was taken on in areas less than 200 nm from any shore that will subsequently operate beyond the Exclusive Economic Zone (EEZ) and in areas more than 200 nm from any shore).
- Vessels engaged in Pacific Nearshore Voyages (where ballast water was taken on in areas less than 50 nm from any shore) and travels through more than one Captain of the Port (COTP) zone or crosses international boundaries.
- Vessels traveling between more than one COTP zone without ballast water on board (or unpumpable residual ballast water).
- Vessels engaged in Pacific nearshore voyages with unpumpable ballast water and residual sediment.

These vessels are also prohibited from discharging unexchanged or untreated ballast water or sediment in federally protected waters.

Controllable Pitch Propeller and Thruster Hydraulic Fluid and Other Oil-to-Sea Interfaces Including Lubrication Discharges from Paddle Wheel Propulsion, Stern Tubes, Thruster Bearings, Stabilizers, Rudder Bearings, Azimuth Thrusters, Propulsion Pod Lubrication, and Wire Rope and Mechanical Equipment Subject to Immersion

The vessel owner/operator must not discharge oil in quantities that may be harmful as defined in 40 CFR Part 110 from any oil-to-sea interface. If possible, maintenance activities on controllable pitch propellers, thrusters, and other oil-to-sea interfaces should be conducted when a vessel is in drydock.

All vessels must use an environmentally acceptable lubricant (EAL) in all oil to sea interfaces, unless technically infeasible. For purposes of requirements related to EALs, technically infeasible means that no EAL products are approved for use in a given application that meet manufacturer specifications for that equipment, products which come pre-lubricated (e.g., wire ropes) have no available alternatives manufactured with EALs, products meeting a manufacturer's specifications are not available within any port in which the vessel calls, or changeover and use of an EAL must wait until the vessel's next drydocking. If a vessel is unable to use an EAL, the vessel owner/operator must document in their recordkeeping

documentation consistent with Part 4.2 why the vessel operator/owner are unable to do so, and must report the use of a non-environmentally acceptable lubricant to EPA in the Annual Report. Use of an EAL does not authorize the discharge of any lubricant in a quantity that may be harmful as defined in 40 CFR Part 110.

Graywater

All vessels that have the capacity to store graywater shall not discharge that graywater in port or in federally protected waters. For vessels that cannot store graywater, vessel operators must minimize the production of graywater while in port and in federally protected waters.

Vessel owners/operators must use phosphate-free and minimally toxic soaps and detergents, as defined in Appendix A of the permit, for any purpose if graywater will be discharged into waters subject to the VGP. Soaps and detergents must be free from toxic or bioaccumulative compounds and not lead to extreme shifts in receiving water pH.

Graywater for new build vessels and vessels operating in the Great Lakes must meet one of the following requirements for graywater management:

- Vessel must hold all graywater for onshore discharge to an appropriate shore-side facility.
- The graywater discharge must not exceed 200 fecal coliform forming units per 100 milliliters and contain no more than 150 milligrams per liter of suspended solids.

The following monitoring requirements are applicable to vessels that discharge graywater into waters subject to the VGP and meet one of the following conditions:

- The vessel is a new build vessel constructed on or after December 19, 2013, has a maximum crew capacity greater or equal to 15, and provides overnight accommodations to those crew.
- The vessel is subject to Part 2.2.15.1 (Certain VGP Vessels Operating in the Great Lakes) of the VGP.

Vessel owners/operators must collect and analyze two samples per year, collected at least 14 days apart, and report the results of those samples as part of their Annual Report. Samples must be taken for Biochemical Oxygen Demand (BOD), fecal coliform, suspended solids, pH, and total residual chlorine. Vessel owner/operators may choose to conduct monitoring for *e. coli* in lieu of fecal coliform. Fecal Coliform or *E. coli* must only be analyzed once per year if vessels have difficulty analyzing the results within recommended holding times.

Records of the sampling and testing results must be retained onboard for at least 3 years in the vessel's recordkeeping documentation consistent with Part 4.2 of the permit.

Underwater Ship Husbandry and Hull Fouling Discharges

Vessel owners/operators must minimize the transport of attached living organisms when traveling into U.S. waters from outside the U.S. economic zone or between COTP zones. Management measures to minimize the transport of attached living organisms include selecting

an appropriate antifoulant management system and maintaining that system, in water inspection, cleaning, and maintenance of hulls, and thorough hull and other niche area cleaning when a vessel is in drydock.

Rigorous hull-cleaning activities should take place in dry dock where removal of organisms and paint can be contained and disposed of properly. The operator/owner should take measures to treat washwater (if generated) prior to discharging to waters subject to the VGP.

Vessel owners/operators who remove fouling organisms from hulls while the vessel is waterborne must employ methods that minimize the discharge of fouling organisms and antifouling hull coatings. These include:

- Use of appropriate cleaning brush or sponge rigidity to minimize removal of antifouling coatings and biocide releases into the water column.
- Limiting use of hard brushes and surfaces to the removal of hard growth.
- When available and feasible, use of vacuum or other control technologies to minimize the release or dispersion of antifouling hull coatings and fouling organisms into the water column.

Vessel owners/operators must minimize the release of copper-based antifoulant paints during vessel cleaning operations. Vessels that use copper-based anti-fouling paint must not clean the hull in copper-impaired waters (listed at <https://www.epa.gov/vessels-marinas-and-ports/vessel-sewage-discharges-homepage>) within the first 365 days after paint application unless there is a significant visible indication of hull fouling. If the operator/owner cleans the vessel before 365 days after paint application in copper-impaired waters, the operator/owner must document why this early cleaning was necessary.

VESSEL CLASS-SPECIFIC REQUIREMENTS

EPA's vessel class-specific permit requirements applicable to all covered vessels in those vessel classes are provided in Part 5 of the permit by vessel class. Examples of vessel class-specific requirements for large and medium cruise ships are presented below. The inspector should refer to Part 5 of the VGP to get a comprehensive list of permit requirements for all vessel classes.

Large and Medium Cruise Ships

While operating within 3 nm from shore, discharges of graywater are prohibited unless they meet the effluent standards in Parts 5.1.1.1.2 and 5.2.1.1.2¹⁹ of the VGP for large and medium cruise ships, respectively. Parts 5.1.1.1.2 and 5.2.1.1.2 graywater treatment standards are:

- The discharge must satisfy the minimum level of effluent quality specified in 40 CFR 133.102 (secondary treatment requirements).

¹⁹ The effluent standards listed in Parts 5.1.1.1.2 and 5.2.1.1.2 of the VGP are secondary limits set for graywater discharges.

- The geometric mean of the samples from the discharge during any 30-day period may not exceed 20 fecal coliform/100 milliliters (ml) and not more than 10 percent of the samples exceed 40 fecal coliform/100 ml.
- Concentrations of total residual chlorine may not exceed 10.0 micrograms per liter ($\mu\text{g/l}$).

Medium cruise ships are held to the same standards for graywater management as large cruise ships, unless they are a vessel unable to voyage more than 1 nm from shore and were constructed before December 19, 2008. For medium vessels built before December 19, 2008, onshore facilities for graywater discharges must be used if available. If such facilities are not available and the vessel does not have the capacity to treat graywater to meet the standards in Part 5.2.1.1.2 of the VGP, the vessel must hold the graywater unless it is underway and sailing at a speed of at least 6 knots in a water that is not federally protected waters.

When operating in nutrient impaired waters subject to the VGP, large and medium cruise ship vessels must not discharge any graywater unless the length of voyage in that water exceeds the vessel's holding capacity for graywater, and must minimize the discharge of any graywater into nutrient-impaired waters subject to the VGP, which may require minimizing the production of graywater.

Vessel operators must demonstrate through initial and maintenance monitoring (as described in Parts 5.1.2.2 and 5.2.2.2 of the VGP) that an effective treatment system is in place to comply with the discharge standards for treated graywater identified in Parts 5.1.1.1.2 and 5.2.1.1.2 of the VGP. For large cruise ships, monitoring is required if the ship will discharge graywater within 3 nm of shore. For medium cruise ships, monitoring is required if the ship will discharge within 1 nm of shore. The owner/operator must submit data to EPA showing that the graywater standards are achieved by their treatment system.

Cruise ship owners/operators must use soaps and detergents that are phosphate-free, minimally toxic, and biodegradable. Degreasers must be minimally toxic if they will be discharged as part of any wastestream.

Waste from mercury-containing products, dry cleaners or dry cleaner condensate, photo processing labs, medical sinks or floor drains, chemical storage areas, and print shops using traditional or non-soy-based inks and chlorinated solvents must be prevented from entering the ship's graywater, blackwater, or bilgewater systems if water from these systems will be discharged into waters subject to the VGP.

Vessel owners/operators must not discharge any toxic materials, including products containing acetone, benzene, or formaldehyde into salon and day spa sinks or floor drains if those sinks or floor drains lead to any system that will be discharged into waters subject to the VGP.

Vessel owners/operators must monitor chlorine or bromine concentrations (as applicable) in pool or spa water before every discharge event if they will discharge these streams in to waters subject to the permit.

Operators must provide educational and training programs to inform crew members on the appropriate management of ship discharges.

Permit Requirements for Individual States or Indian Country Lands

Part 6 of the VGP identifies provisions provided to EPA by states and tribes in their CWA section 401 certifications that the states and tribes deemed necessary to assure compliance with applicable provisions of the CWA and any other appropriate requirements of state and tribal law. Pursuant to CWA section 401(d), EPA has attached those state and tribal provisions to the VGP.

Permit Requirements for Waters Federally Protected Wholly or in Part for Conservation Purposes

Several of the discharge-specific and vessel class-specific permit requirements prohibit or limit various discharges in “waters federally protected in whole or in part for conservation purposes.” (Refer to Appendix G of the VGP for a complete list of federally protected waters.) These waters include:

- Marine Sanctuaries designated under the National Marine Sanctuaries Act and implementing regulations found at 15 CFR Part 922 and 50 CFR Part 404 or Marine national monuments designated under the Antiquities Act of 1906.
- A unit of the National Park System, including National Preserves and National Monuments.
- A unit of the National Wildlife Refuge System, including Wetland Management Districts, Waterfowl Production Areas, National Game Preserves, Wildlife Management Area, and National Fish and Wildlife Refuges.
- National Wilderness Areas and any component designated under the National Wild and Scenic Rivers System.
- Any waterbody designated as an Outstanding National Resource Water (ONRW) by a state or tribe.

Because it is possible to limit discharges to certain times, but not to limit those discharges indefinitely, EPA developed additional permit requirements for these waters likely to be of high quality and consist of unique ecosystems that may include distinctive species of aquatic animals and plants. Furthermore, as protected areas, these waters are more likely to have a greater abundance of sensitive species of plants and animals that may have trouble surviving in areas with greater anthropogenic impact.

ADDITIONAL WATER QUALITY-BASED EFFLUENT LIMITS

Water Quality-Based Effluent Limitations

The vessel’s discharge must be controlled as necessary to meet applicable water quality standards in the receiving water body or another water body impacted by the vessel’s discharges. EPA may impose additional water quality-based limitations on a site-specific basis, or require the operator/owner to obtain coverage under an individual permit, if information in the NOI (if applicable), required reports, or from other sources indicates that, after meeting the

water quality-based limitations in this part, the vessel's discharges are not controlled as necessary to meet applicable water quality standards, either in the receiving water body or another water body impacted by the vessel's discharges.

Discharges to Water Quality Impaired Waters

Impaired waters or "water quality limited segment[s]" are those which have been identified by a state or EPA pursuant to section 303(d) of the CWA as not meeting applicable state water quality standards. Impaired waters may include either waters with EPA-approved or EPA-established Total Maximum Daily Loads (TMDLs), and those for which EPA has not yet approved or established a TMDL. If the vessel discharges to an impaired water without an EPA-approved or established TMDL, the vessel operator/owner is required to comply with the requirements in Part 2.3.1, including any additional requirements that EPA may impose pursuant to that part.

If the vessel discharges to an impaired water with an EPA-approved or established TMDL and EPA or state TMDL authorities have informed the operator/owner that a Waste Load Allocation (WLA) has been established that applies specifically to the vessel's discharges, to discharges from vessels in the operator/owner's vessel class or type, or to discharges from vessels in general, the vessel's discharge must be consistent with the assumptions and requirements of that WLA.

C. PERMIT INSPECTIONS AND MONITORING

The VGP requires vessel operators to conduct self-inspections and monitoring, comprehensive annual vessel inspections, and drydock inspections.

SELF INSPECTIONS AND MONITORING

Routine Visual Inspections

Conduct routine visual inspections of all areas addressed in the VGP, including, but not limited to cargo holds, boiler areas, machinery storage areas, welldrums, and other deck areas. Ensure these areas are clear of garbage, exposed raw materials, oil, any visible pollutant or constituent of concern that could be discharged in any wastestream, and that pollution prevention mechanisms are in proper working order. At a minimum, the routine inspection must verify that requirements of Part 2.1 of the VGP (Technology-Based Effluent Limits and related requirements Applicable to All Vessels) are being met and document any instances of noncompliance. Routine inspections should be conducted on a schedule that coincides with other routine vessel inspections if feasible. Conduct a visual inspection of safely accessible deck and cargo areas and all accessible areas where chemicals, oils, dry cargo, or other materials are stored, mixed, and used—regardless of whether the areas have been used since the last inspection—at least once per week or per voyage, whichever is more frequent. If operators engage in multiple voyages per day, they need not conduct inspections on every voyage, but must conduct inspections at least once per day. Furthermore, the inspection should verify whether all monitoring, training, and inspections are logged according to permit requirements. A ship's watch must include visual monitoring of the water around and behind the vessel for visible sheens, dust, chemicals, abnormal discoloration or foaming, and other indicators of

pollutants or constituents of concern originating from the vessel. Particular attention should be paid to deck runoff, ballast water, and bilgewater. If vessel owners/operators identify or are made aware that pollutants or constituents of concern are originating from their vessel, they must initiate corrective actions in Part 3 of the VGP. Vessel owner/operators may conduct these inspections as part of meeting their existing (or updated) international safety management code (ISM) safety management system (SMS) plan obligations, if those inspections meet the minimum requirements discussed above.

In situations where multiple voyages occur within a one-week period, the operator/owner may choose to conduct a limited visual inspection addressing only those areas that may have been affected by activities related to the docking and cargo operations conducted during each voyage instead of conducting a full routine visual inspection per voyage (or per day, if there are multiple voyages in one day). If the operator/owner employs such an approach, they must conduct a full visual inspection of the vessel at least once per week.

The findings of each routine vessel inspection must be documented in the official ship logbook or as a component of other recordkeeping documentation referenced in Part 4.2 of the VGP (described below). The date and time of inspection, ship locations inspected, personnel conducting the inspection, location of any visual sampling and observations, and potential problems and sources of contamination must be documented and signed by the person conducting the inspection, if not the Master. The person conducting the inspection must be a signatory under 40 CFR 122.22. A signatory includes the person in charge (e.g., the Master), or his duly authorized representative. The records of routine visual inspections must be made available to EPA or its authorized representative upon request. Vessel operators must initiate corrective actions, as required under Part 3 of the VGP, for problems noted in their inspections.

Extended Unmanned Period (EUP) Inspections

A vessel is considered to be in an extended unmanned period (EUP) if the vessel is temporarily (e.g., for storage or repair) unmanned, fleeted, jacked-up, or otherwise has its navigation systems and main propulsion shut down (e.g., a vessel in drydock or extended lay-up) for 13 days or greater. Immediately before a vessel is placed in an EUP, the vessel operator must conduct a pre-lay-up inspection. During an EUP, a vessel owner/operator may elect to either continue conducting routine inspections of the vessel consistent with Part 4.1.1 of the VGP, or he or she may conduct an EUP Inspection. The EUP inspection is an alternative inspection for fleeted, jacked-up, or similarly situated vessels, which routinely go into temporary or extended periods of lay-up. Vessel owners/operators may conduct EUP inspections in lieu of routine visual inspections if they are up-to-date with all other inspection and reporting requirements found in Part 4 of the permit.

While a vessel is in EUP, the owner/operator or an authorized representative must examine the outside of the vessel and surrounding waters at least once every two weeks for any evidence of leaks, loss of cargo, or any other spills that might result in an unauthorized discharge. If any deficiencies are observed while the vessel is in EUP, the vessel owner/operator must document those deficiencies and the corrective actions taken to resolve those deficiencies. If a visible sheen is noted on the surface of the surrounding water, the source of the oil must be identified

and corrective action must be taken immediately. Furthermore, EPA must be notified of the visible sheen in accordance with Part 4.4 of the VGP.

Analytical Monitoring

Analytical monitoring requirements for specific discharge types are identified in Parts 2.2.2, 2.2.3, 2.2.15, and 2.2.26 of the VGP, and for specific vessel types in Part 5 of the VGP.

Comprehensive Annual Vessel Inspections

Comprehensive vessel inspections must be conducted by qualified personnel at least once every 12 months. Qualified personnel include the master or owner/operator of the vessel, if appropriately trained, or appropriately trained marine or environmental engineers or technicians or an appropriately trained representative of a vessel's class society acting on behalf of the owner/operator.

Comprehensive annual inspections must cover all areas of the vessel affected by the requirements in the VGP that can be inspected without forcing a vessel into drydock. Special attention should be paid to those areas most likely to result in a discharge likely to cause or contribute to exceedances of water quality standards or violate effluent limits established in the VGP. Areas that inspectors must examine include, but are not limited to:

- Vessel hull for attached living organisms, flaking antifoulant paint, exposed TBT or other organotin surfaces.
- Ballast water tanks, as applicable.
- Bilges, pumps, and oily water separator sensors, as applicable.
- Protective seals for lubrication and hydraulic oil leaks.
- Oil and chemical storage areas, cargo areas, and waste storage areas.
- All visible pollution control measures to ensure that they are functioning properly.

If any of these portions of the vessel are not inspectable without the vessel entering drydock, the vessel owner/operator must inspect these areas during their drydock inspection and their results must be documented in their drydock inspection reports. Furthermore, vessel owner/operators must document which portions of the vessel are not inspectable for the annual inspection in their recordkeeping documentation.

The annual inspections must also include a review of monitoring data collected in accordance with Part 5 of the VGP if applicable, and routine maintenance records to ensure that required maintenance is being performed (e.g., annual tune-ups for small boats that have wet exhaust). Inspectors must also consider the results of the past year's visual and analytical monitoring when planning and conducting inspections.

When comprehensive vessel inspection schedules overlap with routine vessel inspections required under Part 4.1.1 of the VGP, the annual comprehensive vessel inspection may also be used as one of the routine inspections, as long as components of both types of inspections are included.

If inspections revealed flaws that would result in a violation of the effluent limits in Parts 2 and 5 of the VGP, or that indicated that control measures are not functioning as anticipated or are in need of repair or upgrade, corrective action must be taken to resolve such flaws in accordance with Part 3 of the VGP. All results from the annual inspection must be recorded in the vessel's recordkeeping documentation or logbook.

Drydock Inspection Reports

Vessel owner/operators must make any drydock reports prepared by the class society or their flag administrations available to EPA or an authorized representative of EPA upon request. If drydock reports are not available from either of these entities, vessels must prepare their own drydock report and it must be made available to EPA or an authorized representative of EPA upon request. The drydock report must note that:

- The chain locker has been cleaned for both sediment and living organisms.
- The vessel hull, propeller, rudder, thruster gratings, sea chest, and other surface areas of the vessel have been inspected for attached living organisms and those organisms have been removed or neutralized.
- Any antifouling hull coatings have been applied, maintained and removed consistent with the FIFRA label if applicable; any exposed existing or any new coating does not contain biocides or toxics that are banned for use in the United States.
- All cathodic protection, anodes or dialectic coatings have been cleaned and/or replaced to reduce flaking.
- All pollution control equipment is properly functioning.

PERMIT RECORDKEEPING

All vessels covered by the VGP permit must keep written records on the vessel or accompanying tug that include the following information:

- Owner/vessel information:
 - Name.
 - International Maritime Organization (IMO) number (official number if IMO number not issued).
 - Vessel type.
 - Owner or operator company name.
 - Owner or operator certifying official's name.
 - Address of owner/operator.
 - Gross tonnage.
 - Call sign.
 - Port of registry (flag).

- Voyage Log. Include the dates and ports of arrival, vessel agent(s), last port and country of call, and next port and country of call (when known).
- Documentation and records of any and all violations of the effluent limit including:
 - A description of the violation.
 - Date of the violation.
 - Name, title and signature of the person who identified the violation.
 - Name, title and signature of the person who is recording the violation (if different from the person who identified the violation).
 - If a Corrective Action Assessment pursuant to Part 3.2 of the VGP is needed, attach a copy or indicate where the corrective action assessment is stored.
 - If a Corrective Action Assessment was previously conducted pursuant to Part 3.2 of the VGP (and revisions are not needed for this violation of the effluent limit), a reference to that previous corrective action assessment.
- Log of deficiencies and problems found during routine inspections, including a discussion of any corrective actions required by Part 3 of the VGP if applicable. Include date, inspector's name, findings, and corrective actions planned or taken. If no deficiencies or problems are found during a routine inspection, record that the inspection was completed with the inspector's name and date. Routine visual inspections must be recorded as completed according to Part 4.1.1 of the VGP.
- Log of findings from drydock inspections conducted under Part 4.1.4 including a discussion of any corrective actions planned or taken as required by Part 3 of the VGP. Include date, inspector's name, findings, and a description of the corrective actions taken.
- Analytical results of all monitoring conducted under Part 4.1.2 of the VGP, including sample documentation, results, and laboratory QA documentation.
- Log of findings from annual inspections conducted under Part 4.1.3 of the VGP, including a discussion of any corrective actions planned or taken required by Part 3 of the VGP. Include date, inspector's name, findings, and corrective actions taken.
- Record of any specific requirements in Part 2.3 of the VGP given to the vessel by EPA, or clearly posted by state agencies and how the vessel has met those requirements.
- Additional maintenance and discharge information to be recorded and kept in a log on the vessel:
 - Deck maintenance. Record dates, materials used, application process, etc. for any significant maintenance of the deck surface(s) (e.g., more than routine, daily cleaning activities, such as sweeping).
 - Bilgewater. Record dates, location, oil concentration (for MARPOL vessels) or visible sheen observation (non-MARPOL vessels), and estimated volume of bilgewater

discharges. Record the same information for bilgewater disposed at onshore locations.

- Paint application. Record dates, materials used, application process, etc. for any antifouling paint applied to the vessel.
- AFFF. Record dates, estimated volumes, and constituents of any discharges of AFFF.
- Chain locker inspections. Dates of inspections and any rinsing conducted within waters subject to the VGP.
- Controllable pitch propeller, stern tube, and other oil-to-sea interface maintenance. Record dates and locations of any maintenance of controllable pitch propellers that occurs while the vessel is in waters subject to the VGP.
- Any emergencies requiring discharges otherwise prohibited to federally protected waters.
- Gas Turbine Water Wash. Record date and estimated volume of any discharge of gas turbine wash water within waters subject to the VGP. If hauled or disposed onshore, record log hauler and volume.
- Estimated volume and location of graywater discharged while in waters subject to the VGP.
- All other documentation requirements stated in the VGP.
- Record of training completed as required by the VGP.

For purposes of the VGP, records may be kept electronically if the records are:

- In a format that can be read in a similar manner as a paper record.
- Legally dependable with no less evidentiary value than their paper equivalent.
- Accessible to the inspector during an inspection to the same extent as a paper copy stored on the vessel would be, if the records were stored in paper form.

ADDITIONAL RECORDKEEPING FOR VESSELS EQUIPPED WITH BALLAST TANKS

Except for vessels operating exclusively within one Captain of the Port Zone (COTP zone), vessels equipped with ballast tanks that are bound for a port or place in the United States must meet the recordkeeping requirements of 33 CFR Part 151.

The master, owner, operator, or person in charge of a vessel bound for a port or place in the United States must keep written records that include the following information:

- Total ballast water information. Include the total ballast water capacity, total volume of ballast water on board, total number of ballast water tanks, and total number of ballast water tanks in ballast. Use units of measurement such as metric tons (MT), cubic meters (m³), long tons (LT), and short tons (ST).
- Ballast water management. Include the total number of ballast tanks/holds that are to be discharged into the waters of the United States or to a reception facility. If an alternative ballast water management method is used, note the number of tanks that

were managed using an alternative method, as well as the type of method used. Indicate whether the vessel has a ballast water management plan and IMO guidelines on board, and whether the ballast water management plan is used.

- Information on ballast water tanks that are to be discharged into waters subject to the VGP or to a reception facility. Include the following:
 - The origin of ballast water. This includes date(s); location(s), including latitude and longitude and port (if relevant); volume(s); and temperature(s). If a tank has been exchanged, list the loading port of the ballast water that was discharged during the exchange.
 - The date(s), location(s) (including latitude and longitude), volume(s), method, thoroughness (percentage exchanged if exchange conducted), sea height at time of exchange if exchange conducted, of any ballast water exchanged or otherwise managed.
 - The expected date, location, volume, and salinity of any ballast water to be discharged into waters of the United States or a reception facility.
- Discharge of sediment. If sediment is to be discharged into a facility within the jurisdiction of the United States include the location of the facility where the disposal will take place.

The ballast water reporting forms must be kept on board the vessel and must be submitted to the National Ballast Information Clearinghouse before arriving to US ports if required by the US Coast Guard. In addition, all vessels which conduct saltwater flushing as required by Part 2.2.3.7 and Part 2.2.3.8 of the VGP, but do not report saltwater flushing to the NBIC, must instead keep a record of saltwater flushing to meet the requirements of the permit.

PERMIT REPORTING

Annual Reports

For each vessel, owners/operators are required to submit an Annual Report for each year that they have active permit coverage. For vessels that must file NOIs, this means for as long as they have an active NOI. For vessels that need not file an NOI, they maintain active coverage as long as they are operating in waters subject to the VGP, provided they have signed and maintain a copy of the PARI form. Annual Reports must be completed each calendar year and submitted by February 28 of the following year (e.g., the 2014 annual report is due by February 28, 2015).

All analytical monitoring results must be submitted to EPA as part of the Annual Report.

The vessel owner/operator shall complete the Annual Report form provided in Appendix H of the permit and submit it to EPA electronically. It can be completed online by accessing EPA's main NPDES vessel webpage (available at <https://www.epa.gov/npdes/vessels-vgp> or through EPA's eNOI system <https://ofmpub.epa.gov/apex/vgpenoi/f?p=102:101>).

The vessel owner/operator shall respond to all questions accurately and completely, and provide the necessary information and/or data to support each response. Unless one of the

exceptions in Part 1.14 of the VGP is met, the vessel owner/operator must submit each Annual Report electronically in accordance with the procedures described in Part 1.14 of the VGP.

If the operator/owner is required to submit a hard copy of the Annual Report, they must send the completed annual report to EPA HQ (Attn: Vessel Annual Report, Mail Code 4203M, 1200 Pennsylvania Ave. NW, Washington, DC 20460). Hard copy reports must be postmarked by February 21 of the following calendar year (i.e., the 2014 annual report must be postmarked by February 21, 2015).

The Annual Report replaces the annual noncompliance report and one-time report requirements found in the 2008 VGP. All instances of noncompliance must be reported as part of the Annual Report.

Combined Annual Reports for Unmanned, Unpowered Barges or Vessels less than 300 Gross Tons

Operators of unmanned, unpowered barges or other vessels less than 300 gross tons (e.g., small tug boats) may submit a single annual report (referred to as the Combined Annual Report) for multiple vessels and/or barges if all of the following conditions are met:

- The answers for each barge or vessel for which the report is to be submitted are the same.
- Each barge or vessel was not required to conduct any analytical monitoring.
- The Combined Annual Report is submitted electronically.
- There were no instances of noncompliance for any barge or vessel and no instances of identified deficiencies by EPA or its authorized representatives during any inspections during the previous 12 months.
- Each barge or vessel has an NOI permit number or, if not required to submit an NOI, a commonly used unique identifier (e.g., registration number) so EPA can identify the vessel. For vessels less than 300 gross tons that have not submitted an NOI, the unique identifier numbers must be entered on the combined annual report.

Vessel owners/operators of unmanned, unpowered barges or vessels less than 300 gross tons may submit a Combined Annual Report for some or most of their fleet, or submit individual Annual Reports if they prefer. Individual Annual Reports are required for any barges or other vessels that are not eligible for the Combined Annual Report, as specified above.

Reporting Quantities of Hazardous Substances or Oil

Although not a requirement of the VGP, if a discharge contains a hazardous substance or oil in an amount equal to or more than a reportable quantity established under 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, during a 24-hour period, the National Response Center (NRC) must be notified (dial 800-424-8802 or 202-426-2675 in the Washington, DC area). Also, within 14 calendar days of knowledge of the release, the date and description of the release, the circumstances leading to the release, responses to be employed for such releases, and measures to prevent reoccurrence of such releases must be recorded in recordkeeping documentation consistent with Part 4.2 of the VGP.

Where a discharge of hazardous substances or oil exceeding reportable quantities occurs, such discharge is not authorized by the VGP and may also be a violation of section 311 of the CWA. Note that these spills must be reported as described above. Also applicable are section 311 of the CWA and certain provisions of sections 301 and 402 of the CWA.

Additional Reporting

Vessels are also subject to the standard permit reporting provisions referenced in Part 1.13 of the VGP (standard permit reporting provisions published at 40 CFR 122.41).

Where applicable, vessels must submit the following reports to the appropriate EPA Regional Office listed in Part 8 of the VGP as applicable:

- 24-hour reporting. Report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the vessel owners/operators becomes aware of the circumstances.
- 5-day follow-up reporting to the 24-hour reporting. A written submission must also be provided within five days of the time the vessel owner/operator becomes aware of the circumstances.

If the operator/owner reports to the NRC as referenced in Part 4.4.3 of the permit, they do not need to complete reporting under this part.

VESSEL INSPECTION OVERVIEW

Purpose of VGP Inspections

On February 11, 2011, EPA and the US Coast Guard (USCG) signed a Memorandum of Understanding (MOU) to establish cooperation and coordination in implementing and enforcing the national VGP. Under the MOU, USCG has agreed to incorporate components of EPA's VGP program into its existing inspection protocols and procedures to help the United States address vessel pollution in U.S. waters. The MOU creates a framework for improving EPA and USCG cooperation on data tracking, training, monitoring, enforcement and industry outreach. The agencies have also agreed to improve existing data requirements so that information on potential violations observed during inspections can be sent to EPA for evaluation and follow-up.

Although the USCG will conduct most inspections, there are some universes of vessels for which they do not have jurisdiction. EPA and/or states that are authorized to enforce the VGP will need to conduct inspections to take enforcement actions against such vessels.

EPA Authority for VGP Inspections

EPA has the authority to regulate and inspect vessels through statutory requirements established in the CWA:

- EPA's long-standing exclusion of discharges incidental to the normal operation of vessels from the NPDES program at 40 CFR 122.3(a) was vacated as of September 30, 2008,

making these discharges subject to CWA section 301 regulation's prohibition against discharges unless covered under an NPDES permit.

- The regulations at 40 CFR 122.28 establish procedures for issuing a general permit to cover categories of point sources having common elements, such as facilities that involve the same or substantially similar types of operations, that discharge the same types of wastes, or that are more appropriately regulated by general permit. 40 CFR 123.25 provides State Programs the legal authority to implement and administer general permits issued under 40 CFR 122.28.
- CWA section 402 states that permittees issued permits for point source discharges of pollutants must meet specific discharge limits and operating conditions.
- CWA section 308 authorizes inspections and monitoring to determine whether NPDES permit conditions are being met.
- Under the CWA, EPA may conduct an inspection wherever there is an existing NPDES permit, where a discharge exists or might exist, and where no permit has been issued. The CWA established enforcement authorities. EPA retains independent authority to take enforcement actions in both authorized and unauthorized states.
- CWA section 309(a) allows EPA to administer administrative compliance orders for persons violating the CWA and to set a reasonable schedule for compliance (violation notice).
- CWA section 309(b), section 309(d), and section 404 provide for injunctive relief and civil penalties of up to \$25,000 per day for each violation of the act.
- CWA section 309(c)(4) provides that falsifying, tampering with, or knowingly rendering inaccurate any monitoring device or method required to be maintained is punishable by a fine of not more than \$10,000, or by imprisonment for not more than 2 years, or both.
- CWA section 309(c) provides for criminal penalties of a fine of \$2,500 to \$25,000 per day, or up to 1 year of imprisonment, or both, for negligent violations of the act (for subsequent convictions, fines of up to \$50,000 per day or 2 years of imprisonment, or both, may be called for).
- CWA section 309(g) allows EPA to assess administrative penalties of two classes.
- Administrative actions may preclude other civil action penalties or citizen suits.
 - Class I, with an informal hearing process, can carry penalties of up to \$25,000.
 - Class II involves formal administrative procedure hearings with penalties of up to \$125,000.

VGP INSPECTION PROCEDURES

Pre-Inspection Activities

The primary role of the inspector is to gather information that can be used to evaluate compliance with permit conditions, applicable regulations, and other requirements. Inspectors should be familiar with the conditions of the specific permit and with all applicable statutes and

regulations. Prior to conducting a VGP inspection, the inspector should complete the following pre-inspection preparation activities listed below. Careful and thorough preparation is critical for conducting a professional and efficient inspection.

- Become familiar with the vessel and the types of discharges associated with the vessel type. Review the “Vessel Discharge Description” subsection below for summary information.
- Review the conditions of the permit.
- Collect as much paperwork as possible regarding the vessel before conducting the inspection (e.g., ballast management plan, discharge paperwork, prior inspection reports). EPA has posted on its website all vessel NOIs submitted by vessel owners. You can use this public EPA webpage to search, sort, and view these NOIs: <https://ofmpub.epa.gov/apex/vgpenoi/f?p=vgp:Search>. Search results reflect real time data. (Note, however, that only vessels greater than or equal to 300 gross tons, or vessels with the capacity to hold or discharge more than 8 cubic meters (2,113 gallons) of ballast water, are required to submit a NOI.) Annual Reports, including any applicable monitoring results submitted as part of a vessel’s reporting requirements, will be publicly available on EPA’s webpage at <https://ofmpub.epa.gov/apex/vgpenoi/f?p=vgp:Search>. The first reports for the 2013 VGP were due to EPA by February 28, 2015. In addition, the One-time reports, submitted as part of the 2008 VGP, are searchable via EPA’s VGP webpage at https://ofmpub.epa.gov/apex/aps/f?p=VOTR_2008:HOME:.....
- To facilitate the VGP inspection process, prepare your inspection procedure in written form and make a form or a checklist for use in documenting the inspection. See the Coast Guard CG-543 Policy Letter 11-01 or numerous trade association checklists for examples of these tools.
- If possible, conduct one or more joint inspections with the USCG to obtain on-the-job training, especially for inspecting deep draft vessels. Inspectors should be familiar with CG-840 inspection books used by the USCG for vessel inspections.

On-site Activities

To conduct the inspection, the inspector should use a notebook for field notes, personal protection equipment (PPE), and a camera to take photographs. Before boarding the vessel, conduct the following visual inspection activities:

- Observe the water line and waters surrounding the vessel for:
 - Traces of oil or an oily sheen, especially the areas of the vessel stern (where the screw and stern tube would be located), locations of thrusters, and other areas of expected oil to sea interfaces.
 - Look for fish kills and any other signs of pollution.
 - Excessive hull fouling.

- Check for evidence of use of prohibited antifoulant coatings containing TBT, and check the condition of any TBT overcoating.

After completing the preliminary visual inspection, board the vessel via the gangway and meet the vessel's Watch Officer. Introduce yourself and ask to meet with the Chief Engineer.²⁰ Inspectors should use a respectful tone when speaking with vessel personnel, as they are, at a minimum, representing the EPA when boarding a U.S. flagged vessel, and, at a maximum, representing the United States when boarding a foreign-flagged vessel.

Vessel security is an important consideration; therefore, inspectors lacking military or other authorized identification should anticipate resistance, and possibly lengthy delays, prior to boarding. Inspectors lacking a Transportation Work Identification Credential (TWIC) may require an escort at all times. Additional authorization may be required to take photos. Foreign-flagged vessels may request that a representative from their class society or other agent be present for the inspection.

After boarding the vessel, you will likely be escorted to a conference room or Captain's quarters. The typical inspection sequence includes:

- Entry interview
- Record and document review
- Visual inspection
- Exit interview
- Inspection report

Entry Interview

The inspector should request the presence of the Chief Engineer as well as the Master to conduct the entry interview. During the entry interview the inspector should:

- Present credentials authorizing the inspection.
- Seek consent for an on-site inspection.
- Inform the vessel owner or operator of the scope and purpose of the inspection.
- Reference the VGP and VGP Fact Sheet concerning the regulation of vessel discharges, and have access to these resources during the inspection, if possible.
- Confirm basic information about the vessel collected during pre-inspection activities:
 - If applicable, verify permit number, vessel owner/operator name, operator IMO number, and vessel information such as vessel name, IMO number, call sign, flag state, vessel type, vessel dimensions, ballast water capacity, etc.
 - Identify the authorized representative of the vessel.

²⁰ Vessels such as large cruise ships may also have an Environmental Officer, while barges may be manned by only a Tanker Man; therefore, avoid boarding during cargo transfer.

- Identify applicable vessel discharges and ask questions regarding discharge-specific permit requirements. For example, ask the Master and Chief Engineer about the following discharges:
 - AFFF.
 - Bilgewater (e.g., How is bilgewater managed? Are bilgewater discharges documented in the oil record logbook?).
 - Ballast water (e.g., How is ballast water managed, where is it discharged?).
 - Graywater (e.g., How is graywater managed while the vessel is pier-side? Is it discharged pier-side? How is graywater minimized while operating in waters subject to the permit?).
- Request copies of specific records that might be required by the permit.
- Ask questions concerning the history of the vessel, including any discharge violations that have occurred.
- Determine vessel conditions as they exist at the time of the inspection.
- If desired, inform the operator what information, if any, will be available after the inspection.

Record and Document Review

The inspector should also ask to see the records required to be kept by the vessel's permit, management plans, and records documenting vessel compliance with the terms and conditions of its permit. Records must be kept onboard or electronically (see EPA's FAQ at <https://www.epa.gov/npdes/vessels-frequent-questions>). Records from the last 3 years are required to be onboard the vessel. The inspector may ask for certification of the accuracy of the data contained in these records. Typical records that the inspector may ask the facility to produce include:

- VGP compliance binder (if available)
- NOI (if applicable)
- One-time report (if applicable)
- Comprehensive annual vessel inspection report (if applicable)
- Drydock inspection report (if applicable)
- Analytical monitoring results (if applicable)
- Voyage log
- Oil record logbook
- Ballast water management plan
- Maintenance and discharge information paperwork
- Emergency discharge logs and associated corrective action forms
- Routine and quarterly inspection logs (or self-inspection forms)
- Annual inspection report

As needed, the inspector should request photocopies of documents that will assist in preparing the inspection report.

Visual Inspection

After reviewing the records and documents, the inspector should ask for an escort to accompany him or her on a tour of the vessel. The purpose of the vessel tour is to assess existing conditions and confirm that the vessel conforms to the description of the permit. During this phase of the inspection, the inspector will want to observe the following portions of the vessel:

- **Deck**. While on deck, ask questions such as what is done with chain locker sediment, and when chain locker cleaning is performed. Visually inspect the deck for cleanliness and for the presence of cargos or materials that might wash overboard, dissolve with precipitation or surface water spray, or blow overboard. Observe the condition of the topside surface and above water line hull (presence of rust, paint chips, etc.). Visually inspect the presence and cleanliness of deck machinery coamings or drip pans to collect any oily water and to prevent spills. Ask questions regarding good housekeeping practices for the deck and above water line hull.
- **Engine room**. Inspect the cleanliness of the bilge and observe the presence of visibly oily bilgewater. Ask questions regarding the bilge good housekeeping practices and about the management and discharge of bilgewater. Observe any evidence of use of dispersants, detergents, or other materials to remove the appearance of visible sheen in bilgewater.
- **Galley and scullery**. While in the galley, ask the chief cook questions such as what is done with used/excess cooking oil, and operation of the garbage grinder or food pulping system. Ask about use of soaps and detergents and consider requesting their Material Safety Data Sheets (MSDS).
- **Toxic and hazardous material storage areas**. Inspect areas such as paint storage area(s), laundry room(s), cleaning supply storage area(s), photography room(s), etc. to ensure materials are appropriately stored, labeled and secured. Consider requesting MSDSs for any soaps and detergents.

To document observations or areas of potential concern during the inspection, the inspector should take photographs. If the vessel is discharging during the inspection, the inspector might also consider collecting samples of the discharge.²¹ During the visual inspection, the inspector might determine that additional records or documents are needed for review. The inspector should ask the Master or Chief Engineer for these additional records as soon as they are identified to facilitate retrieval of the needed information.

²¹ Samples should only be collected if appropriate sampling equipment (e.g., sample bottles, gloves, labels, custody records, etc.) brought aboard by the inspector are appropriate for the specific discharge.

Note that there are areas of vessels that environmental inspectors should not enter for reasons of safety (e.g., cargo pump control room). See Section D, “

Safety,” below.

Exit Interview

Following the visual inspection, the inspector conducts a debriefing or exit interview with the Master or Chief Engineer. This phase of the inspection allows both parties to clarify issues that arose during the inspection. If any records or documents were obtained during the inspection, the inspector prepares a Receipt for Documents and Samples. The inspector also gives the vessel operator/owner the opportunity to claim that some or all the information provided during the inspection is confidential business information (CBI).

The inspector may relay basic observations or areas of concern of the inspection. The inspector does not make the determinations of compliance or noncompliance of the vessel during the inspection; that determination is made when the inspection report is prepared using information obtained during the inspection.

Inspection Report

The inspection report includes the inspection checklist (if used), documentation copied during the inspection, an explanation of findings, and supporting photographs. In some cases, the inspector might need to contact the vessel if additional information is needed or issues require clarification.

Compliance personnel for the regulatory authority review the inspection report and evaluate whether the vessel is in noncompliance. They will determine what type of follow-up action, if any, is appropriate. Copies of the report are sent to the inspected vessel. EPA responds to noncompliance in several different ways, depending on the nature and circumstances of the violation:

- No follow-up needed
- Letter notifying the facility of violations or compliance assistance
- Administrative compliance order
- Administrative compliance order plus administrative penalty
- Civil judicial enforcement action (penalties and/or injunctive relief)
- Criminal enforcement

Vessel Discharge Description

The inspector should understand the types of discharges expected on different vessel types before conducting an inspection. See Table 16-1 for descriptions of the various discharges and the vessel types likely to discharge them. Refer to Section 3.5.1 of the VGP Fact Sheet for more detailed descriptions of the vessel discharges.

Table 16-1. Vessel Discharge Descriptions

Vessel Discharge	Description
Anti-Fouling Hull Coatings	Anti-fouling coatings are applied to the vessel hull and sea water piping systems to limit attachment of aquatic species. Virtually all vessels that are permanently kept in saltwater use antifouling coatings. Biocides such as copper contained in anti-fouling coatings continuously leach into surrounding waters.
Aqueous Film Forming Foam (AFFF)	Firefighting agent added to fire suppression systems on some vessels to create foam. Used infrequently (annually or semi-annually) to test equipment for maintenance, certification, or training. Constituents include fluorosurfactants and/or fluoroproteins.
Ballast Water	Ballast water is water taken onboard in large volumes on large numbers of commercial vessels to assist with vessel draft, buoyancy, and stability. Ballast capacities vary by vessel type, for example more than 20 million gallons for container ships. Ballast water is a known transport vector for aquatic nuisance species and can also contain metals and suspended solids.
Bilgewater	Bilgewater is generated by all vessels and consists of water and other residue that accumulates in a compartment of the vessel's hull. The source of bilgewater is typically drainage from interior machinery, engine rooms, and from deck drainage. Bilgewater typically contains seawater, oil, grease, nutrients, volatile and semi-volatile organic compounds, inorganic salts, and metals.
Boat Engine Wet Exhaust	Engine wet exhaust effluent is generated when engine cooling water (both propulsion engines and generators) is injected into the engine exhaust. The engine cooling water decreases the exhaust temperature, reduces engine noise and reduces exhaust emissions. Engine wet exhaust discharge rates can range from 5 to 10 gallons per minute to more than 100 gallons per minute on larger diesel engines operating at high inputs. Large commercial vessels occasionally operate small auxiliary craft that discharge engine wet exhaust (e.g., life boats on cruise ships); however, discharge volumes for these vessels are negligible as they are typically seldom used. Pollutants in the engine wet exhaust can include oil and grease, metals, volatile organic compounds and semivolatile organic compounds.
Boiler/Economizer Blowdown	Boiler blowdown occurs on vessels with steam propulsion or a steam generator and is used to control the concentration of scaling constituents in boiler systems. Boiler blowdown are infrequent, of short duration (seconds), in small volumes, and at high pressure. The blowdown can contain water and steam or sludge-bearing water at elevated temperatures (above 325°F). The discharge can contain metals or boiler water treatment chemicals.
Cathodic Protection	Nearly all vessels having steel hulls or metal hull appendages use cathodic protection systems to prevent corrosion. Based on underwater hull inspections and maintenance records, one-half of an anode is consumed after three years. The primary pollutant released from cathodic protection is zinc. Average pier-side and underway zinc generation rates are 1.3×10^{-6} and 5.1×10^{-6} (lb. zinc/square foot of underwater surface area)/hr., respectively.

Table 16-1. Vessel Discharge Descriptions

Vessel Discharge	Description
Chain Locker Effluent	Chain locker effluent is water that drips from the anchor chain and anchor during anchor retrieval. Discharge volumes are small and chain locker effluent is expected to contain sediment, some marine organisms, zinc, rust, paint, grease, and any constituents from the fire main water. The small volume of chain locker effluent results in small mass loadings and provides little opportunity for the transfer of non-indigenous species.
Deck Washdown and Runoff and Above the Water Line Hull Cleaning ^a	Deck washdown and runoff occurs from all vessels as a result of deck cleaning and precipitation. Constituents in the discharge can include detergent, soap, deck surface components (e.g., rust, paint chips) and anything dropped, spilled, dripped, or scattered onto the deck surface.
Distillation and Reverse Osmosis Brine	Discharges of brine can occur on vessels that do not bunker potable water but instead use onboard plants to distill seawater or desalinate seawater using reverse osmosis (RO) to generate fresh water. Distillation units generate brine at a rate of 17 gallons of brine for every gallon of fresh water produced. RO units generate approximately 4 gallons of brine for every gallon of fresh water produced. The three sources of the constituents of water purification plant discharge are: 1) influent seawater; 2) anti-scaling treatment chemicals; and 3) the purification plant components, including heat exchangers, casings, pumps, piping and fittings. The primary constituents of the brine discharge are identical to those in seawater; however, they are more concentrated due to volume reduction.
Elevator Pit Effluent	Large vessels with multiple decks are equipped with elevators to facilitate the transportation of maintenance equipment, people, and cargo between decks. A pit at the bottom of the elevator shaft collects small amounts of liquids and debris from elevator operations and deck washdown and runoff depending on the elevator configuration. Water entering the elevator pit can contain materials that were on the deck, including fuel, hydraulic fluid, lubricating oil, residual water, and AFFF. The runoff may also include lubricant applied to the elevator doors, door tracks, and other moving elevator parts. Residue in the elevator car from the transport of materials may also be washed into the elevator pit. The cleaning solvent used during maintenance cleaning operations as well as liquid wastes generated by the cleaning process drain into the elevator pit sump.
Exhaust Gas Scrubber Washwater Discharge	Exhaust gas scrubber washwater discharge occurs as a result of cleaning the exhaust gas system on marine diesel engines. The washwater discharge can be highly acidic, and can also contain traces of oil, polycyclic aromatic hydrocarbons (PAHs), heavy metals and nitrogen. Washwater volumes of 2.8 million gallons per day are estimated from a 10 MWh engine.
Fire main Systems	Fire main systems are found on many vessels and draw in water through the sea chest to supply water for fire hose stations and sprinkler systems. Systems are activated during testing or during an actual fire. Small amounts of metals may be added to the fire water from the vessel piping system.

Table 16-1. Vessel Discharge Descriptions

Vessel Discharge	Description
Freshwater Layup	Freshwater layup is generated when a vessel is pier side or in port for more than a few days, the main steam plant is shut down, and the condensers do not circulate. A freshwater layup includes replacing the seawater in the system with potable or surrounding freshwater (e.g., lake water). Freshwater layup discharges can be as large as 6,000 gallons per evolution and can contain residual saltwater, freshwater, tap water, and possibly metals leached from the pipes or machinery.
Gas Turbine Wash Water	Gas turbines are used for propulsion and electricity generation on some vessels. Occasionally, they must be cleaned to remove byproducts that can accumulate and affect their operation. Large naval vessels can generate up to 244 gallons of washwater per day. Wash water can include salts, lubricants, and combustion residuals.
Graywater and Graywater Mixed with Sewage	Nearly all commercial vessels generate some form of graywater. Graywater is water from showers, baths, sinks, galleys, and laundry facilities. Graywater volumes vary depending on the number of passengers on board and can range from a few gallons per day on tug boats to tens of thousands of gallons per day on large cruise ships. Graywater can contain high levels of pathogens, nutrients, soaps and detergents, and organics.
Graywater Mixed with Sewage	
Motor Gasoline and Compensating Discharge	Motor gasoline is transported on vessels to operate vehicles and other machinery. As the fuel is used, ambient water is added to the fuel tanks to replace the weight. This ambient water is discharged when the vessel refills the tanks with gasoline or when performing maintenance. Most vessels are designed not to have motor gasoline and compensating discharge. The volume of the compensating discharge is expected to range from less than 50 gallons to up a few hundred gallons. The discharge can contain small amounts of fuel and other fuel-related pollutants.
Non-oily Machinery Wastewater	Some larger vessels are expected to have some non-oily machinery discharges, such as distilling plants start-up discharge, chilled water condensate drains, fresh- and saltwater pump drains, and potable water tank overflows. These flows are generally low in volume and are not expected to contain significant amounts of pollutants.
Refrigeration and Air Condensate Discharge	Condensation from cold refrigeration or evaporator coils of air conditioning systems drips from the coils and collects in drip troughs which typically empty to a drainage system. Large numbers of vessels are equipped with refrigeration systems to keep food and other perishable items from spoiling. Air conditioning systems are also found on many vessels for passenger and crew comfort. Condensates may contain very small amounts of pollutants such as metals derived from vessel piping systems.
Seawater Cooling Overboard Discharge ^b	Seawater cooling systems use ambient water to absorb the heat from heat exchangers, propulsion systems, and mechanical auxiliary systems. The water is typically circulated through an enclosed system that does not come in direct contact with machinery, but still may contain sediment from water intake, traces of hydraulic or lubricating oils, and trace metals leached or eroded from the pipes within the system. Additionally, because it is used for cooling, the effluent will have an increased temperature.

Table 16-1. Vessel Discharge Descriptions

Vessel Discharge	Description
Seawater Piping Biofouling Prevention ^c	Some vessels that use seawater cooling systems introduce anti-fouling compounds (e.g., sodium hypochlorite) in their interior piping and component surfaces to inhibit the growth of fouling organisms. These anti-fouling compounds are then typically discharged overboard. Most vessels that have seawater piping systems are expected to use piping materials such as copper to prevent biofouling rather than injecting high concentrations of anti-fouling compounds into their piping systems.
Sonar Dome Discharge	Water is used to maintain the shape and pressure of domes that house sonar detection, navigation, and ranging equipment on large vessels. Discharges occasionally occur when the water must be drained for maintenance or repair or from the exterior of the sonar dome. Sonar dome discharge volumes on Naval vessels can range from 300 gallons per event up to 74,000 gallons per event. Pollutant levels are expected to be low due to the ban on the use of tributyltin.
Stern Tube Packing Gland Effluent and Other Oil to Sea Interfaces	Nearly all commercial vessels with in-board engines have stern tube packing gland surrounding the propeller shaft. The stern tube packing gland is designed to leak a few drops per minute of ambient water (4 to 8 gallons per day) to cool the gland when the vessel is underway. Pollutants in the stern tube packing gland effluent include metals, oil and grease, suspended solids, organics, and phthalates. Oil to sea interfaces include any mechanical or other equipment where seals or surfaces may release small quantities of oil and grease into the sea. Examples include controllable pitch propellers, rudder bearings and wire ropes and cables that have lubricated (greased) surfaces that are submerged in seawater during use.
Underwater Ship Husbandry Discharges	Underwater ship husbandry is grooming, maintenance, and repair activities of hulls or hull appendages performed while the vessel is in the water. Underwater ship husbandry discharges can contain aquatic organisms and residue such as rust and biocide from anti-fouling coating. Underwater ship husbandry is typically performed only when excessive biological growth is causing vessel drag and excessive fuel consumption outside of regular dry dock inspections.
Welldeck Discharges	The welldeck is a floodable platform used for launching or loading small satellite vessels, vehicles, and cargo from select vessels. Welldeck discharges may include water from precipitation, welldeck and storage area washdowns, equipment and engine washdowns, and leaks and spills from stored machinery. Potential constituents of welldeck discharges include fresh water, distilled water, fire main water, graywater, air-conditioning condensate, sea-salt residues, paint chips, wood splinters, dirt, sand, organic debris and marine organisms, oil, grease, fuel, detergents, combustion byproducts, and lumber treatment chemicals.

^a Wet-type fire main systems are commonly used to provide a water source for deck washing.

^b Discharge is for non-contact cooling only and does not include engine wet exhaust.

^c Discharge does not include anti-fouling coatings used to inhibit biogrowth; such discharges are considered anti-fouling leachate.

D. SAFETY HAZARDS

EXPECTED HAZARDS

The following sections list hazards inspectors can expect to encounter during vessel inspections. The hazards fall into the following categories: physical, thermal, chemical and biological.

PHYSICAL HAZARDS

Inspectors should be aware of and alert for all physical hazards. The use of narrow walkways or steep stairs may be necessary to access certain areas. Inspectors should keep one hand free to hold the railing when using narrow stairways.

Inspectors should also be aware of working surface hazards, which may include slippery piers and decks, low doorways, and trip hazards associated with steep narrow stairwells used to enter and exit certain vessel areas. Inspectors should avoid boarding barges or tankers during loading operations, as these operations may be dangerous. Inspectors must be familiar with the location of floatable life rings and other flotation devices.

Noise will be a hazard on certain areas of the ship (e.g., the engine room). Hearing protection should be used by inspectors where required by the ship, when crew members are having trouble hearing or being heard when standing 3 feet or less away from another person.

Extreme caution is required to access certain vessels, particularly barges and tugboats. These vessels may have narrow and dangerous gangways, or may require crossing multiple vessels tied abreast at the pier by climbing over tires used as dock and vessel fenders.

THERMAL HAZARDS

The potential to encounter thermal hazards during inspections are significant as wastewater from dishwashers and laundry is typically between 160°F to 180°F. Also, graywater pipes may become heated when they run next to steam pipes. Inspectors must be aware of potential thermal hazards from indirect contact caused by exposure due to proximity to a ship's equipment (e.g., steam pipes, steam traps). Inspectors should note thermal hazard warning signs from the ship's crew.

Inspectors may be exposed to hot environments for extended periods of time. Appropriate clothing (i.e., clothing allowing free movement of cool dry air over skin) should be worn so as to minimize the heat stress. Inspectors should be aware of abatement procedures for dealing with a heat related illness.

CHEMICAL HAZARDS

MSDSs for each hazardous chemical used or stored onboard should be available for review during an inspection.

Certain areas of the ship may have noxious fumes, such as paint storage and chemical storage areas, or unsafe environments, such as the rope storage and chain lockers. Allow these areas to

air out before entering during an inspection. A gas meter may be required to assure a safe environment for entry.

The inspector should not go into the cargo pump control room during an inspection for safety reasons.

BIOLOGICAL HAZARDS

Graywater mixed with sewage may potentially contain blood or other potentially infectious material defined under OSHA's blood born pathogen regulations (29 CFR 1910.1030). Typically, blood will not be present in domestic sewage unless it comes directly from the infirmary area of the ship. OSHA recognizes that contact with raw sewage poses many health risks, but does not consider contact with diluted raw sewage as an exposure route for blood-borne pathogens. Nonetheless, inspectors who contact the domestic sewage portion of the wastewater treatment system are to be aware of the potential danger and will be outfitted with proper personal protective equipment (PPE) (i.e., nitrile gloves, Tyvek suites, splash goggles) to minimize the chance for exposure. Inspectors are also recommended to have current Tetanus and Hepatitis A and B immunizations to protect themselves against potential biological hazards.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

While conducting vessel inspections, inspectors should wear appropriate protective attire including:

- Non-skid shoes.
- Long sleeve coveralls, or long sleeve cotton shirt and long pants.
- Hearing protection in hearing conservation zones (e.g., the vessel's engine room).
- If visiting the vessel at drydock, additional PPE such as steel-toed shoes and hard hat may be required.

E. VIOLATIONS AND EXAMPLES

COMMON VGP VIOLATIONS AND EXAMPLES OF GOOD AND BAD PRACTICES

Common VGP Violations

The most common violations inspectors can expect to encounter are paperwork-related, including:

- Failure to submit an NOI (approximately half of all violations) or an annual report.
- Failure to perform routine, quarterly, and annual inspections and/or failure to document these inspections (approximately 40 percent of violations).
- Failure to document oily water and ballast discharges (or ballast discharge report submitted to EPA does not match ballast discharge records onboard the vessel).
- Failure to complete and/or maintain a copy of the PARI form onboard (for vessels subject to VGP that are less than 300 gross tons and do not have the capacity to discharge more than 8 cubic meters)

The VGP has many requirements for documentation that must be maintained in the ship's logbook or other recordkeeping tool. However, there is no standardized recordkeeping format. Some owners/operators prepare corporate VGP compliance manuals with inspection forms that are used on all their vessels. Other owner/operators may use existing USCG forms or forms required by their classification society for VGP recordkeeping. Inspectors need to be familiar with permit requirements so they can assess whether the recordkeeping format and content used by individual vessels meet requirements.

Certain types of vessels may be more likely to have permit violations than others. For example, older vessels are more likely to have poor maintenance and poor housekeeping practices compared to newer vessels. Bulk carriers tend to be older. Their engine rooms may have poor housekeeping and are more likely to have oily water compliance issues. Their decks could be disordered as a result of transporting unpackaged bulk cargos.

Most Important Discharges for Most Vessel Types

Certain discharges authorized by the permit are of greater concern than others for several reasons. First, certain discharges generated in small quantities by relatively few vessels (e.g., exhaust gas scrubber washwater effluent, gas turbine water wash, and freshwater layup) are of lesser concern. Second, some discharges contain few pollutants of concern at low concentrations and have correspondingly few permit requirements, even if they are possibly generated in large quantities, (e.g., distillation and reverse osmosis brine, non-oily machinery, refrigeration and air condensate, seawater cooling overboard discharge, and sonar dome discharge). As a result, inspectors are likely to focus most of their time on the following subset of discharges:

- Deck washdown
- Bilgewater
- Ballast water
- Graywater

GOOD AND BAD PRACTICES

Note that many permit requirements include terms such as “minimize” pollutant discharges. The term “minimize” means to reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best marine practice. Unfortunately for inspectors, measures and practices that “minimize” pollutant discharges vary widely by vessel type and individual vessels and are highly dependent on a vessel's purpose, service, and operations. Therefore, what may represent good measures and practices onboard one vessel may not represent good measures and practices onboard another. As mentioned previously, vessels may have VGP compliance guides that specify the measures and practices to be used to comply with the permit. However, it is not a requirement of the permit.

Below are examples of general good and bad practices for the most important discharges on most vessels. Use of the good practices does not ensure compliance with the permit. Similarly, used of bad practice does not necessarily constitute a permit violation.

Deck Washdown

Good practices include use of drip pans under deck machinery such as winches and generators where feasible. Such drip pans should be emptied and cleaned to reduce the risk for pan contents to wash overboard via precipitation, seaspray, or vessel movement. Deck surfaces and above water line hull surfaces should be free from rust, paint chips, spilled cargos and other materials, and debris. Deck washdowns should be performed according to standard industry practices (e.g., broom clean followed by cleaning using hoses and non-toxic, phosphate-free, and biodegradable soaps and detergents, followed by rinsing using hoses). Examples of bad practices include lack of drip pans if it is clearly feasible that drip pans could be placed under machinery to collect oily water; spills on the deck and other evidence of poor housekeeping; peeling deck surfaces and paint; rust; abrasive power cleaning, resulting in stripping of paint chips and then discharging them into receiving waters; and use of prohibited soaps and detergents. Large vessels that regularly sail outside the territorial sea should not need to wash their decks with fire hoses while pier-side.

Bilgewater

Good practices include a clean bilge, which indicates prompt clean-up of any oily drips and spills (drums containing oily rags for proper shore-side disposal are further evidence of these good practices). Other good practices include thorough documentation of bilgewater discharges in the oil record logbook, routine calibration of the oil content meter, physically securing the bilgewater discharge valve or disabling automatic bilge pumps while pier-side. Examples of bad practices include a dirty bilge, use of “magic pipes” to bypass the oily water separator and oil content meter, oil sheen in receiving waters following bilgewater discharge, and evidence of use of dispersants/detergents to remove bilgewater sheen.

Ballast Water





Good practices include a ballast water management plan (if required) and maintenance of a thorough ballast water discharge log. An example of a bad practice is if the ballast discharge report submitted to EPA does not match ballast discharge records onboard the vessel. Additionally, vessels with ballast water treatment systems that discharge into waters subject to the VGP must monitor for biological indicator organisms and biocides or biocide derivatives. Records of the sampling and testing results from the last 3 years must be onboard.

Graywater

Graywater is of most concern on cruise ships. Good practices include limiting graywater generation from activities such as showering, dishwashing and laundry while pier-side, or using a graywater storage tank to hold these wastewaters for later discharge if feasible. Other examples include use of non-toxic, phosphate-free, and biodegradable soaps and detergents for general cleaning, laundry, and dishwashing. Examples of bad practices include obvious disregard of permit requirements to minimize the discharge of graywater while in port. Other examples of bad practices are operating the food grinder while pier-side, and using soaps

and/or detergents that are NOT considered non-toxic, phosphate-free, and biodegradable. These types of soaps should only originate from shower and lavatory use, or it could indicate a permit violation. Medium and large cruise ships are required to maintain records estimating all discharges of treated graywater into waters subject to the VGP and initial and maintenance monitoring as required by the permit.

Photo examples of good and bad management practices:

Good practices	
<p>Photo 19-1. Use of oil-absorbing pads for bilge water.</p> 	<p>Photo 19-2. Properly maintaining equipment.</p> 
Bad practices	
<p>Photo 19-3. Poor storage of hazardous waste.</p> 	<p>Photo 19-4. Continuing to operate without corrective action when there is a visible oily sheen.</p> 

F. REFERENCES

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<https://www.regulations.gov/#!documentDetail;D=EPA-HQ-OW-2011-0141-0950>

CHAPTER 17 – POLLUTION PREVENTION

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Related Websites

Pollution Prevention (P2) home page: <https://www.epa.gov/p2>
Pollution Prevention Information Clearinghouse (PPIC): <https://www.epa.gov/p2/pollution-prevention-resources#ppic>
Pollution Prevention Case Studies: <https://www.epa.gov/p2/pollution-prevention-case-studies>
Pollution Prevention Resource Exchange: <http://www.p2rx.org/programs/>

A. OVERVIEW OF POLLUTION PREVENTION

Pollution prevention is a proactive environmental management approach for minimizing material and resource losses during production. Pollution prevention addresses all aspects of production processes from raw material usage and inventory procedures to waste management and utilities conservation. Management techniques that incorporate pollution prevention reduce or eliminate the generation of pollutants, wastes, and adverse ecological impacts through new approaches, material substitutions, and optimizing processes and operating procedures.

POLLUTION PREVENTION GOALS

The goal of pollution prevention is to reduce pollution by eliminating or reducing waste. Pollution prevention is a multimedia approach that minimizes or eliminates pollutants released to land, air, and/or water without shifting pollutants from one medium to another. The Pollution Prevention Act of 1990 defines source reduction as:

...any practice which reduces the amount of a hazardous substance, pollutant, or contaminant entering any wastestream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and any practice which reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.

Pollution prevention, therefore, represents a fundamental shift in approach away from the conventional reliance on waste treatment/disposal or "end-of-pipe" treatment to the active investigation of prevention techniques. Facilities can implement pollution prevention by:

- Modifying equipment or technology
- Modifying process or procedure
- Reformulating or redesigning products
- Substituting of raw materials
- Improvements in housekeeping, maintenance, training, and/or inventory control

WASTE MANAGEMENT HIERARCHY

A facilities pollution prevention program should eliminate or reduce the generation of pollutants and wastes at the source by carefully considering material usage, production processes, and waste management practices. The facility's pollution prevention program should identify opportunities for reducing the use of hazardous materials and waste generation or releases, as well as opportunities to protect natural resources by conserving and efficiently using energy and water.

The Pollution Prevention Act of 1990 includes a Waste Management Hierarchy that describes a comprehensive waste management program. The hierarchy assigns the highest priority to source reduction and places a decreasing level of preference on recycling, treatment, and disposal. To be most effective, a facility's pollution prevention program should focus on

implementing source reduction. Where source reduction cannot be achieved, reuse and recycling projects should be implemented. If there is no feasible pollution prevention alternative, treatment and disposal should be used as a last resort. Exhibit 17-1 is a graphic representation of the waste management hierarchy. Each level of the hierarchy is described below.

Source Reduction

Source reduction refers to the use of materials, processes, or practices that reduce or eliminate the quantity and toxicity of wastes at the point of generation. By preventing waste, the need for costly treatment and disposal is decreased. Source reduction can be achieved by substituting raw materials improving operating practices and changing processes and equipment.

- **Substituting raw material:** Replacing hazardous materials with less hazardous (or less toxic) alternatives reduces releases to the environment of hazardous materials and wastes resulting from routine production processes and accidental spills. Examples of material substitutions include, but are not limited to, 1) substituting soy-based or water-based ink to replace solvent-based ink for printing, 2) using recycled paper instead of virgin stock, 3) replacing Styrofoam packing materials with re-usable hard-pack plastic materials for shipping products, 4) eliminating trichloroethylene as a cleaning agent by substituting a caustic cleaner such as potassium hydroxide or sodium hydroxide, and 5) eliminating Freon[®] use.
- **Improving operating practices:** Improved operating practices can reduce waste generated from poorly developed standard operating procedures, inadequate training, and inefficient production scheduling. In the past, facilities developed operating practices that maximized production without considering factors such as raw material usage, waste disposal costs, and environmental impacts. Examples of improved operating practices include, but are not limited to, segregating waste, improving housekeeping, and establishing preventive maintenance, training, and outreach programs.
- **Modifying processes and equipment modifications:** In the long run, one of the most effective source reduction techniques may involve process and equipment modifications. Changes to processes and equipment present significant opportunities for source reduction and pollution prevention. Such modifications include using newer or more efficient equipment or redesigning a process so that less raw material is required, yet product quality is maintained.

Recycling

While source reduction prevents wastes from being generated, recycling turns byproducts and wastes into reusable products. Recycling includes such practices as on-site or off-site recycling, materials exchange or reuse, and raw materials recovery.

- **On-site/off-site recycling:** Both on-site and off-site recycling can help reduce dependence on expensive virgin materials by reusing spent materials.

- **Materials exchange or reuse:** A materials exchange system maximizes the use of a facility's excess raw materials and equipment. A system generally consists of a database for tracking the availability of excess materials by department (or whatever organizational unit is appropriate). In addition, a materials exchange system may include a communication link with the facility's supply system to alert stock clerks that excess items are on hand and should be used prior to purchasing new stock.
- **Materials recovery:** Some of the byproducts and wastes generated during production can be recovered and sold as commodities. For example, waste acids that no longer meet the requirements of a final, critical cleaning process can be used in a secondary process that does not require the same level of cleanliness. Other examples of materials recovery as part of waste treatment are discussed below.

Waste Treatment

Unlike source reduction, waste treatment applies to wastes after generation. The goals of waste treatment technologies are to neutralize the waste, to recover energy or material resources, to render the waste nonhazardous, or to reduce the volume. Treatment technologies that enable material to be recovered include ion exchange, reverse osmosis, electrolytic metal recovery, and electro dialysis. Volume reduction through evaporation is an example of treatment. Although volume reduction decreases the amount of wastewater, the absolute quantity of hazardous or toxic waste released to the environment is not reduced. In addition, equipment for volume reduction requires a capital cost and energy costs.

Waste Disposal

Disposal should be considered only when all other options are exhausted. Disposal is considered the least favored waste management method because of the associated costs, liability, and environmental impacts. In addition, a limited number of permitted waste sites are available for disposing hazardous material, and many of these sites are approaching capacity. Also, waste transportation may pose hazards. Finally, recordkeeping and reporting requirements associated with disposing hazardous wastes are an additional burden that can be avoided through preventive measures, such as source reduction.

POLLUTION PREVENTION BENEFITS

Exhibit 17-2 summarizes the direct benefits of pollution prevention practices for facilities. Source reduction improves the potential for environmental compliance. Because penalties for environmental compliance are becoming increasingly severe, compliance is a top priority.

Implementing source reduction measures can also reduce costs associated with waste management. Costs reductions may be experienced in expenditures for raw materials, waste disposal, transportation, handling and storage, training, management overhead, and emergency response. By decreasing the amount of hazardous waste shipped off-site for disposal, the facility may also reduce the costs associated with tracking and filing paperwork required for hazardous waste manifests. Future costs, such as remediation activities, can also be avoided with source reduction activities.

In addition, source reduction will produce positive health and environmental benefits. By maintaining fewer hazardous or toxic materials on-site, facilities reduce occupational hazards, and, therefore, improve worker health and safety. Creating a safer workplace may reduce the need for expensive health and safety protection devices. Also, insurance cost may be lowered. A safer workplace will also improve employee job satisfaction. Reducing hazardous materials usage also decreases the volume of toxic substances released to the environment from spills, leaks, and air emissions.

The indirect benefits of pollution prevention may be equally significant. One indirect benefit is reduced liability. The Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) "cradle-to-grave" provisions stipulate that a generator remains responsible for all environmental damage resulting from its waste including damage that occurs after disposal. A pollution prevention program can generate goodwill in the community and workplace, enhance the facility's public image, and foster environmental awareness among employees.

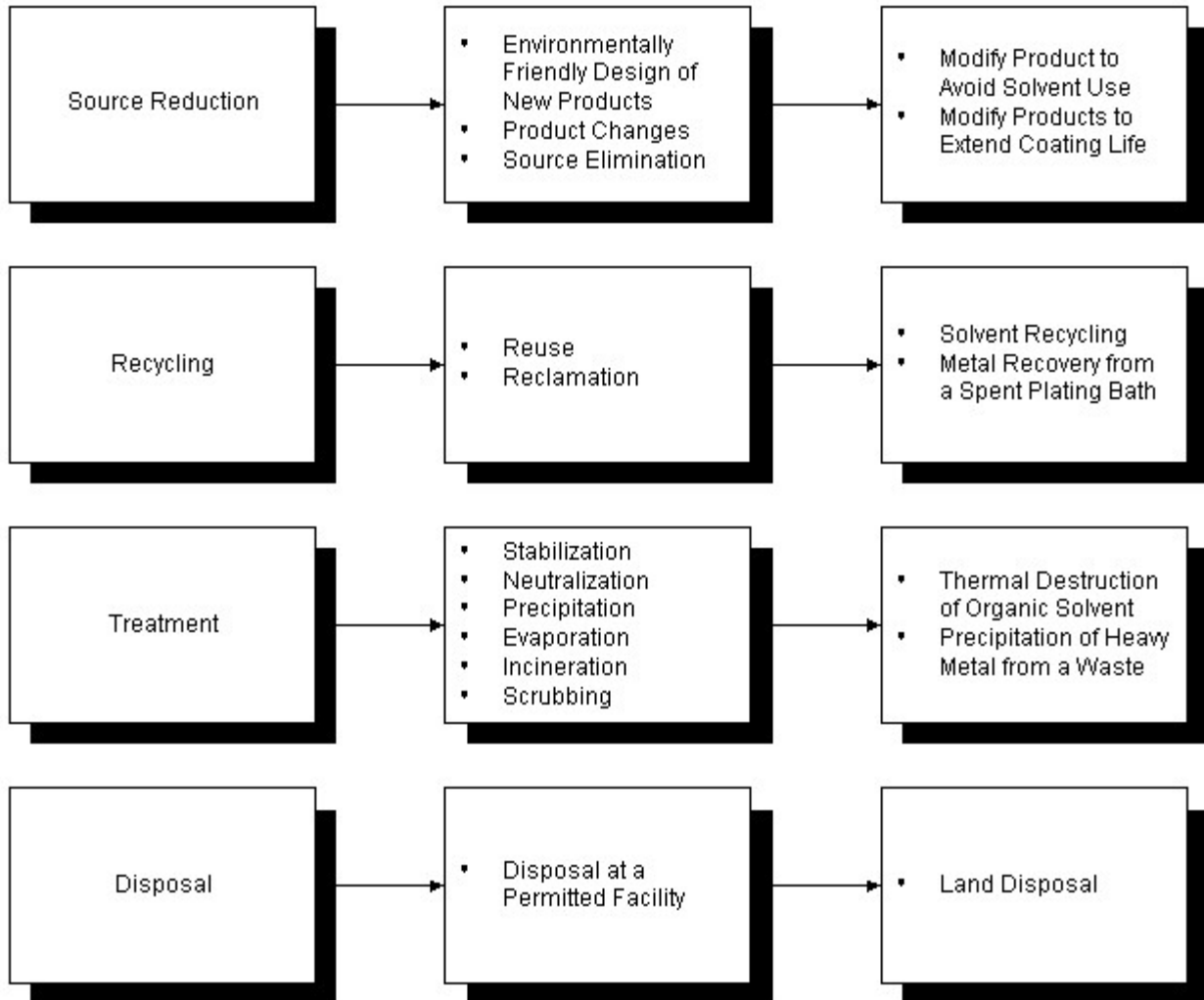


Exhibit 17-1. Waste Management Hierarchy

- Significantly reduces the amount of pollution released to the environment.
- Improves the potential for environmental and safety compliance.
- Improves worker health and safety by reducing occupational hazards.
- Provides the flexibility to choose cost-effective and environmentally sound solutions that will also result in improved efficiency and increased profit margins.
- Provides public recognition of a facility's efforts.
- Saves capital because of reductions in waste sent for costly treatment and disposal and because of decreased raw materials and energy usage.

Exhibit 17-2. Benefits of Pollution Prevention

B. POLLUTION PREVENTION OPPORTUNITY ASSESSMENT PROCEDURES FOR INDUSTRIAL FACILITIES

Because the primary objective of a routine National Pollutant Discharge Elimination System (NPDES) compliance inspection is to evaluate the facility's compliance with its NPDES permit requirements, a pollution prevention assessment incorporated into a compliance assessment may, by necessity, be limited. Nevertheless, the inspector can use these routine NPDES compliance inspections to identify pollution prevention options, particularly those options that would improve compliance. Alternatively, a facility visit may be conducted solely to evaluate the facility. In this instance, the general procedure for a facility visit is the same as that for any inspection (e.g., preparation, entry, opening conference, facility tour), but the specific focus is on identifying pollution prevention opportunities for the facility to investigate. Two reference documents the inspector may find useful are EPA's *Waste Minimization Opportunity Assessment Manual* (EPA, 1998) and EPA's *Facility Pollution Prevention Guide* (EPA, 1992a). These documents contain procedures for conducting a pollution prevention opportunity assessment. Pollution prevention opportunity assessments have four phases: 1) planning and organization, 2) assessment, 3) feasibility analysis, and 4) implementation. The four phases are summarized in Exhibit 17-3.

The inspector cannot perform all the steps in the type of pollution prevention assessment described in the *Waste Minimization Opportunity Assessment Manual* (EPA, 1998) and in the *Facility Pollution Prevention Guide* (EPA, 1992a). These documents were developed as guides for waste generators who want to implement a pollution prevention program. The feasibility analysis and implementation phases require development of criteria to screen and rank the options, conduct an in-depth technical assessment of options that can be successfully applied at that facility, conduct an economic evaluation, and the develop an implementation plan and schedule, which only the facility can determine. However, the inspector can evaluate whether the facility has conducted such an assessment and whether there are obvious pollution prevention opportunities. The inspector may also find useful EPA's *2010-2014 Pollution Prevention Program Strategic Plan* (EPA, 2010), which identifies opportunities for waste reduction.

It will be impossible, and unnecessary, for the inspector to have in-depth knowledge and understanding of all production processes and facility activities. However, as part of the entire pollution prevention assessment, whether during the preparation, interview, or facility site visit, the inspector should strive to become familiar with the facility layout, equipment and processes, points of potential waste generation, types of waste generated, and waste handling and disposal practices. If possible, the inspector should collect sufficient detailed information to develop a general flow diagram or material balance for each process step. The inspector should know the source, type, quantity, and concentration of each identified wastestream to identify data gaps, problem areas, and data conflicts.

As the assessment is conducted, the inspector should keep the pollution prevention principles in mind:

- Multimedia focus looking at all environmental media as a unified whole to avoid transfers from one medium to another; and
- Comprehensive evaluation of the total environmental impacts over the life cycle of the product, from raw materials through manufacturing (including energy use) to use and ultimate disposal.

PREPARATION

The inspector should prepare for the assessment by examining information about the processes, operations, and waste management practices at the facility. Any background material should be reviewed in the facility's file. If the inspection is planned to focus on pollution prevention assessment, the inspector should contact the facility to inform plant officials of this objective. During this initial contact, the inspector should ask for information that will help identify potential pollution prevention options. Table 17-1 provides a list of useful information for this assessment.

As the inspector reviews facility information, he or she should develop a list of questions specific to the facility. The inspector should be seeking, through the facility-specific questions, information to answer the following general questions:

- What significant wastestreams are generated by the plant? How much waste is generated?
- Why are these considered "waste"?
- From which processes or operations do these wastestreams originate?
- What is the production rate of each wastestream?
- Which wastes are hazardous and which are not? What makes them hazardous?
- How are the wastes managed at present?
- What are the input materials used that generate the wastestreams of a process or plant area?
- How efficient is the process? How much input material is:
 - Used in a process?
 - Released to water or air, or disposed of on land?
 - Destroyed or unaccounted for?
- What types of process controls are used to improve process efficiency?
- Are unnecessary wastes generated by mixing otherwise recyclable or recoverable hazardous wastes with other process wastes?
- What types of housekeeping practices are used to limit the quantity of wastes generated?
- Has the plant developed a Pollution Prevention Plan or strategy?

There are numerous resources that identify pollution prevention techniques for specific types of industry, such as the metal finishing industry, the fabricated metal products industry, and the pharmaceutical industry. This pollution prevention information can be obtained from:

- Pollution Prevention Information Clearinghouse (PPIC)
- Pollution Prevention Case Studies
- Pollution Prevention Resource Exchange

INTERVIEW

Just as with a routine NPDES compliance inspection, plant personnel should be interviewed when the inspector first arrives at the facility. The inspector should target personnel from the following areas:

- Management
- Environmental waste management
- Process engineering
- Facility maintenance
- Operation and production
- Safety and health
- Research and development
- Quality control
- Purchasing/inventory
- Shipping/receiving
- Storage

From the interviews, the inspector should develop (or verify) a list of all waste minimization practices already in place. The inspector should also ask plant personnel for the plant's Pollution Prevention Plan or strategy and any suggested pollution prevention opportunities in the operations and processes and discuss with the plant personnel any pollution prevention opportunities that were identified during preparations for the site visit or during the on-site interviews.

FACILITY SITE VISIT

Again, as with a routine compliance inspection, the inspector should conduct a tour of the facility with plant personnel after the interview. The same areas of the manufacturing facility, materials and waste storage, loading and unloading, and treatment system should be reviewed. At each process area, the plant personnel most knowledgeable about the activity should describe the process or should answer any questions the inspector may have.

The inspector should make personal observations, seek confirmation of the interpretation of an activity that is occurring, and investigate any information plant personnel provide that appears to contradict what is being observed. The inspector should focus on:

- Loading and unloading operations
- In-plant transfers (raw materials handling)
- Process operations
- Housekeeping practices
- Maintenance activities
- Waste management operations

The inspector should also check for signs of spills or leaks and assess overall cleanliness of the site. Throughout all the areas visited, the following wastestreams should be evaluated:

- Wastewater
- Air emissions, including stack and fugitive emissions (e.g., detectable odors and fumes)
- Hazardous wastes
- Nonhazardous solid wastes

Each wastestream should be reviewed to:

- Determine whether the wastes are hazardous or nonhazardous
- Determine other physical and chemical characteristics of wastes and emissions
- Determine actual points of generation
- Determine quantities including variations
- Identify all handling, treatment, and storage procedures on-site

Based on activities described above during a facility tour, the inspector should look for pollution prevention opportunities in the general areas listed below.

- Substituting less hazardous materials such as:
 - Using latex or water-based paints, rather than oil-based
 - Eliminating organic solvent cleaners and replacing with aqueous cleaners
- Limiting the amount of hazardous materials disposed of by:
 - Buying only the amount of material the facility needs
 - Using all materials before their expiration date
 - Using only the amount of material needed
 - Sharing materials or donating extra materials to community organizations
- Using and storing products carefully to prevent:
 - Accidents and spills
 - Mixtures of incompatible materials that can react, ignite, or explode
- Recycling wastes, such as:
 - Used oil

- Plastics, glass, paper, and metals
- Spent solvents
- Generating less pollution by:
 - Automating and improving process controls to optimize production operations
 - Allowing products to fully drain process chemicals before rinsing
 - Using less toxic materials (e.g., printing inks, dyes)
 - Adjusting production schedules to minimize cleanup operations
 - Sealing floor drains (permanently or temporarily) to prevent spills
 - Segregating wastes to support recycling (e.g., scrap metals, solvents)
- Turning waste products into new materials by:
 - Treating and recycling rinse waters
 - Recovering metals such as silver from waste materials
 - Recycling waste lubricants and coolants
- Using fewer resources by:
 - Installing flow restrictors on rinse waters
 - Installing high efficiency boilers and furnaces
 - Using heat exchangers to heat process water supplies
- Educating employees on the:
 - Goals of pollution prevention and waste management
 - Procedures to follow for waste disposal and pollution prevention
 - Accomplishments for the pollution prevention program being implemented

Before leaving the facility, the inspector should meet with plant personnel. A list of pollution prevention options identified during the site visit should be prepared and discussed with plant personnel. Inspectors can discuss a pollution prevention technology or refer the facility representatives to EPA or state pollution prevention technical assistance offices. However, the inspector should not recommend specific measures to implement. Nor should the inspector suggest products or imply that a certain pollution prevention measure will enable the facility to achieve compliance.

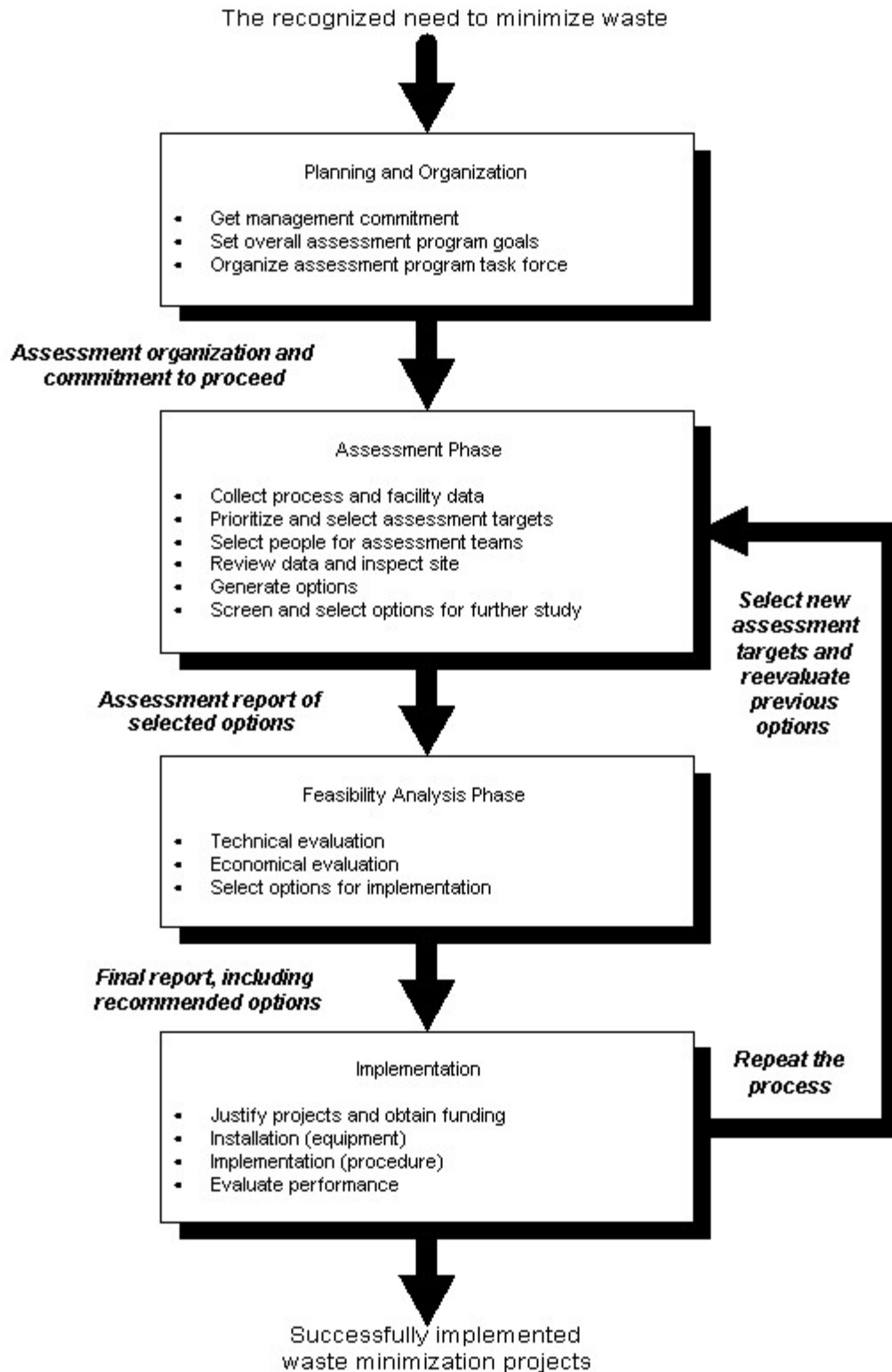


Exhibit 17-3. Pollution Prevention Opportunity Assessment

Table 17-1. Useful Facility Information to Conduct a Pollution Prevention Opportunity Assessment

RAW MATERIALS INFORMATION	• Product composition
	• Material Safety Data Sheets
	• Product and raw material inventory and purchasing records
	• Operator data logs
	• Production schedules and records
MANUFACTURING PROCESS INFORMATION	• Process flow diagrams
	• Material and heat balances for production
	• Manufacturing and pollution control processes
	• Operating manuals and process descriptions
	• Water usage rates
	• Equipment and equipment specifications
	• Piping and instrument diagrams
	• Sewer layout diagrams
	• Facility layout and elevation plans
• Equipment layouts and work flow diagrams	
WASTE GENERATION AND DISPOSAL INFORMATION	• Environmental permits—air emissions, solid waste, hazardous waste, NPDES, pretreatment
	• RCRA information—manifests, annual reports
	• Location of all wastewater, solid and hazardous waste collection, treatment, and storage points
	• Diagram of air, wastewater, and/or hazardous waste treatment units
	• Operating manuals for treatment units
	• Emissions inventories (air, NPDES Discharge Monitoring Reports (DMRs), etc.)
	• SARA Title III—Section 313 release reports
• Previous regulatory violations	

C. POLLUTION PREVENTION OPPORTUNITY ASSESSMENT PROCEDURES FOR MUNICIPAL WASTEWATER TREATMENT PLANTS

The Municipal Water Pollution Prevention (MWPP) program promotes the application of pollution prevention concepts of the Pollution Prevention Act to Publicly Owned Treatment Works (POTWs). Pollution prevention can reduce the need for substantial capital investment in new infrastructure, enhance worker safety, improve the usability of sludge, and reduce operation and maintenance costs. Practices that stress a preventive approach to water pollution abatement include the following:

- Mechanisms for routine assessments of the compliance status of POTWs. This mechanism should include an early warning system based on periodic self-audits and quantitative techniques for assessing the condition of municipal wastewater treatment systems.
- Reporting processes on the capability of POTWs to sustain compliance.
- Processes for identifying, implementing, and tracking corrective actions to prevent pollution and maintain compliance.
- Program that will encourage POTWs to develop pollution prevention projects.

Pollution prevention practices POTWs can adopt could focus in the areas of:

- Improved operation and maintenance.
- Projects that reduce wastewater flows and pollutant loadings.
- Energy and water conservation.
- Timely planning and financing for future needs and economic growth prior to occurrence of wastewater permit violations.
- Toxicity reductions at the source (industrial pretreatment, commercial and residential source reduction programs).
- Recycling.
- Proper treatment of wastes.
- Beneficial uses of sludge.

Specific opportunities for optimizing each unit operation to maximize removal efficiency may include unit modifications to improve performance. For example:

- Clarifiers—Baffle installations and weir modifications to improve hydraulics and limit short circuiting.
- Aeration basins—Baffles to limit short circuiting. Fine bubble diffusers to improve aeration. Use of automatic controls to optimize aeration and limit over-aeration.
- Aerobic digester—Recover energy from gas. Insulate digester.

At any time, but especially during upgrading and expansion, the following pollution prevention projects could be considered:

- Install high efficiency pumps, motors and drives.
- Use biological- rather than chemical-based treatment.
- Install equalization basins to improve efficient operation of downstream units and minimize the need for oversize units.
- Design plant layout to minimize the need for intermediate pumping.
- Consider ultraviolet or ozone disinfection instead of chlorine.
- Digest residuals rather than heat or chemical treat.

- Select dewatering equipment not only to maximize solids but to minimize the need for chemical feeds that increase the volume of residuals.
- Evaluate toxicity of all lubricants, solvents, or cleaners, and replace them with less toxic alternatives such as citrus-based cleaners wherever possible.
- Reduce infiltration/inflow, which will result in several benefits:
 - Reduces plant expansion needs.
 - Improves performance efficiency.
 - Reduces grit (which increases equipment wear and breakage and is a disposal problem).

The Industrial Pretreatment Program is one of the best opportunities to achieve pollution prevention. It represents source control. Pollution prevention programs or projects aimed at residential and commercial users can also reduce loadings. Such pollution prevention programs could:

- Encourage water conservation.
- Provide information on compatible or biodegradable cleaners to replace more toxic cleaners (for example, identify an alternative to chlorine-based "hang-in" type toilet bowl cleaners).
- Encourage composting instead of garbage grinders.
- Enforce a commercial oil and grease ordinance requiring installation, operation, and maintenance of grease traps and recovery and recycle of oil and grease.
- Discourage oil and grease dumping.
- Prohibit disposable diaper flushing.

The POTW could also work with water utilities or agencies involved in establishing plumbing codes to reduce the metals (zinc, copper, and lead) found in drinking water supplies. These metals may be present because the water is corrosive to the pipes and leaches the metals from copper tubing, zinc-coated iron and steel pipes, and lead solder. The water utility may also be using water conditioning chemicals that contain metal salts.

The protocols for conducting a pollution prevention assessment at municipal wastewater treatment plants are similar to those for an industrial facility. The protocols of a Compliance Evaluation Inspection (CEI) are also appropriate, except that the focus during the interview, file review, and site visit is on identifying pollution prevention opportunities.

D. REFERENCES

The following is a list of resources providing additional information on pollution prevention.

U.S. Environmental Protection Agency. (1988). *Waste Minimization Opportunity Assessment Manual*. EPA/625/7-88/003.

U.S. Environmental Protection Agency. (1991). *Municipal Water Pollution Prevention Program*. 21W-7002.

U.S. Environmental Protection Agency. (1992a). *Facility Pollution Prevention Guide*. EPA/600/R92/088.

U.S. Environmental Protection Agency. (1992b). *RCRA Waste Minimization Action Plan*. EPA/530/R92/020.

U.S. Environmental Protection Agency. (2010). *2010-2014 Pollution Prevention (P2) Program Strategic Plan*.

University of Tennessee. (1989). *Waste Reduction Assessment and Technology Transfer (WRATT) Training Manual, 2nd Edition*. Knoxville, Tennessee: The University of Tennessee, Center for Industrial Services.

E. CHECKLISTS

Pollution Prevention Checklist for Industry

Yes	No	N/A	1. Are there designated material storage areas?
Yes	No	N/A	2. Are storage areas clean and organized?
Yes	No	N/A	3. Are containers stored in such a way as to allow for visual inspection for corrosion and/or leaks?
Yes	No	N/A	4. Are containers stacked in a way to minimize the chance of tipping, puncturing, or breaking?
Yes	No	N/A	5. Are there adequate distances from incompatible chemicals and different types of chemicals to prevent cross-contamination?
Yes	No	N/A	6. Is one person responsible for maintaining storage areas?
Yes	No	N/A	7. Does the layout of the facility result in minimizing traffic through material storage areas?
Yes	No	N/A	8. Are stored items protected from damage, contamination, and exposure to weather?
Yes	No	N/A	9. Are all storage tanks routinely monitored for leaks?
Yes	No	N/A	10. Is containment, such as a curb or dike, installed in storage areas to contain leakage and to minimize the area contaminated by a spill?
A. GENERAL			
Yes	No	N/A	1. Is there a written facility policy regarding pollution prevention?
Yes	No	N/A	2. Is there a pollution prevention program currently in place?
Yes	No	N/A	3. Is there a specific person assigned to oversee the success of the program?
Yes	No	N/A	4. Are there management/employee initiatives and incentive programs related to pollution prevention?
Yes	No	N/A	Quality circles (free forums between employees and supervisors) to identify pollution prevention options?
Yes	No	N/A	Opportunities for employee suggestions on pollution prevention options?
Yes	No	N/A	5. Has the facility previously conducted a pollution prevention assessment?
Yes	No	N/A	6. Has the facility used better cost accounting and cost allocation to provide incentives to reduce wastes or resource consumption?
Yes	No	N/A	Is cost accounting performed accurately for all process areas and wastestreams?
Yes	No	N/A	Are utility costs (energy, water) and waste treatment and disposal costs allocated to the operations that generate the waste?
B. STORAGE AREAS			
Yes	No	N/A	11. Are leak detection systems installed for underground storage tanks?
Yes	No	N/A	12. Are floating-roof tanks used for VOC control?
Yes	No	N/A	13. Are conservation vents used on fixed roof tanks?
Yes	No	N/A	14. Does the facility use vapor recovery systems?

Pollution Prevention Checklist for Industry

C. MATERIALS INVENTORY			
Yes	No	N/A	1. Is there an inventory control system designed to prevent materials from deteriorating in storage (first in, first out to prevent expiration)?
Yes	No	N/A	2. Is obsolete raw material returned to the supplier?
Yes	No	N/A	3. Does the facility try to order smaller containers of infrequently used materials to avoid disposing of large quantities of unused obsolete materials?
Yes	No	N/A	4. Has the facility tried to order larger containers of frequently used materials to reduce the number of small containers that must be cleaned and disposed of?
			5. Does the facility use or maintain:
Yes	No	N/A	Hazardous chemicals inventory lists?
Yes	No	N/A	Material safety data sheet files?
			6. Are all in-plant containers of hazardous chemicals labeled, tagged, or marked with:
Yes	No	N/A	Identity of the hazardous chemical(s)?
Yes	No	N/A	Appropriate hazard warnings?
Yes	No	N/A	7. Has the facility reexamined its need for each raw material?
Yes	No	N/A	8. Does the facility have a way to use off-spec material, where possible?
D. MATERIAL HANDLING			
Yes	No	N/A	1. Are raw materials tested for quality before being accepted from suppliers?
Yes	No	N/A	2. Does the facility follow proper procedures when transferring materials?
Yes	No	N/A	3. Are expired materials tested for effectiveness before being disposed of?
Yes	No	N/A	4. Are drums, packages, and containers inspected for damage before being accepted?
Yes	No	N/A	5. Are containers properly resealed after use?
Yes	No	N/A	6. Are containers emptied thoroughly before cleaning or disposal?
			7. Does the facility segregate its wastes as much as possible?
Yes	No	N/A	Solid wastes from aqueous wastes?
Yes	No	N/A	Nonhazardous from hazardous?
Yes	No	N/A	Segregated according to type of contaminant?
Yes	No	N/A	Different types of solid waste to improve recycling/reuse?
Yes	No	N/A	Different types of solvents, cleaner wastes, and lubricants (e.g., organic solvents from mineral oils)?
E. PROCESS OPERATIONS			
Yes	No	N/A	1. Are water conservation measures, recycling, and reuse techniques practiced in processes that use water or generate a wastewater (e.g., cleaning and rinsing operations)?
Yes	No	N/A	2. Has material substitution been tried for any hazardous materials used in process?

Pollution Prevention Checklist for Industry

Yes	No	N/A	3. Have any techniques been used to increase the life of any process baths?
Yes	No	N/A	4. Are any wastes being recycled, reused, or recovered in some manner?
Yes	No	N/A	5. Have any equipment or process modifications been made to increase material use efficiency and thus reduce material waste generation?
Yes	No	N/A	6. Do processes employ any detectors to alert personnel of malfunctions that could produce/generate excessive wastes?
F. SPILLS AND LEAKS			
Yes	No	N/A	1. When a spill occurs, what cleanup methods are employed?
Yes	No	N/A	2. Would different cleaning methods allow for direct reuse or recycling of the water?
Yes	No	N/A	3. Are there preventive maintenance procedures designed to reduce incidents of equipment breakdowns, inefficiency, spills, or leaks?
G. MATERIAL SUBSTITUTION			
Yes	No	N/A	1. Could the facility modify or completely change a given process to use water-based coolants and fluids instead of oil-based fluids?
H. SOLVENT USE			
			1. Can solvent cleaning be replaced with less toxic cleaning, such as:
Yes	No	N/A	A dry process (e.g., bead or sand blasting or other abrasives)?
Yes	No	N/A	Steam cleaning?
Yes	No	N/A	Caustic cleaning?
Yes	No	N/A	2. Are non-chlorinated solvents substituted for chlorinated solvents?
Yes	No	N/A	3. Are parts wiped to remove oil and dirt prior to solvent cleaning?
Yes	No	N/A	4. Is the loss of cleaning ability of the solvent monitored before the solvent is replaced?
Yes	No	N/A	5. Are chemicals reused or recycled?
Yes	No	N/A	6. Is an on-site distillation unit for solvent recovery and reuse installed?
Yes	No	N/A	7. Is solvent use standardized?
I. RINSE WATERS			
Yes	No	N/A	1. Have excessive rinses been evaluated and eliminated?
Yes	No	N/A	2. Is rinse water reclaimed, pretreated, and reused?
Yes	No	N/A	3. Are water softeners used only where necessary?
J. TRAINING			
Yes	No	N/A	1. Are there formal personnel training programs on raw material handling, spill prevention, proper storage techniques, and waste handling procedures?
Yes	No	N/A	2. Are employees trained in pollution prevention techniques?
Yes	No	N/A	3. How often is training given and by whom?

Pollution Prevention Checklist for Industry

K. GOOD OPERATING PRACTICES			
Yes	No	N/A	1. Are plant material balances performed routinely?
Yes	No	N/A	2. Are they performed separately for each material of concern?
Yes	No	N/A	3. Are records kept for each waste, documenting sources of origin and eventual disposal?
Yes	No	N/A	4. Are operators provided with detailed operating manuals or instruction sets?
Yes	No	N/A	5. Are all operator job functions well defined?
Yes	No	N/A	6. Are regularly scheduled training programs offered to operators?
			7. Has the facility integrated pollution prevention into supervision and management by:
Yes	No	N/A	Closer supervision to improve production efficiency and reduce inadvertent waste generation (increased opportunity for early detection of mistakes)?
Yes	No	N/A	Management by Objectives (MBO) with defined and achievable goals for waste minimization (better coordination among the various parts of an overall operation)?
Yes	No	N/A	Scheduling production to minimize cleaning frequency?
			8. Has the facility improved production scheduling and planning to include:
Yes	No	N/A	Maximizing batch sizes?
Yes	No	N/A	Dedicating equipment to a single product?
Yes	No	N/A	Altering batch sequencing to minimize cleaning frequency?
Yes	No	N/A	9. Is corrective maintenance practiced, such as resetting control valves or adjusting process temperatures, to increase efficiency and to prevent raw material loss through wastestreams?
Yes	No	N/A	10. Does the facility forbid operators to bypass interlocks and alarms, or to significantly alter set points without authorization?
Yes	No	N/A	11. Are overflow or malfunction alarms installed on tanks and equipment?
L. HOUSEKEEPING PRACTICES			
			1. Good housekeeping is the maintenance of a clean, orderly work environment. Does the facility:
Yes	No	N/A	Maintain neat and orderly storage of chemicals?
Yes	No	N/A	Promptly remove spillage?
Yes	No	N/A	Maintain dry and clean floors by use of brooms and/or vacuum cleaners?
Yes	No	N/A	Provide proper walkways with no containers protruding into walkways?
Yes	No	N/A	Minimize the accumulation of liquid and solid chemicals on the ground or floor?
Yes	No	N/A	Stimulate employee interest in good housekeeping

Checklist derived from Waste Reduction Assessment and Technology Transfer (WRATT) Training Manual, 2nd Edition, University of Tennessee

Pollution Prevention Checklist for Municipal Wastewater Treatment Plants

A. AGE			
Yes	No	N/A	1. What year was the wastewater treatment plant constructed or the last major expansion to increase the capacity of the plant completed?
Yes	No	N/A	2. What sewer system improvements does the municipality have under consideration for the next 10 years?
Yes	No	N/A	3. What is the expected community and industrial growth?
Yes	No	N/A	4. Is there any major development (industrial, commercial, or residential) anticipated in the next 2 to 3 years, such that either the flow or pollutant loadings could significantly increase?
B. TREATMENT EFFICIENCY			
Yes	No	N/A	1. Compare influent actual flow to influent design flow. When will actual hydraulic loading exceed design?
Yes	No	N/A	Has the plant initiated expansion plans and financing sufficiently in advance to avoid overloading?
Yes	No	N/A	Has the plant investigated measures for reducing flow?
Yes	No	N/A	2. Compare conventional pollutant loadings (BOD, TSS, ammonia, phosphorus) to design loadings. When will actual loadings exceed design?
Yes	No	N/A	Has the plant initiated expansion plans and financing sufficiently in advance to avoid overloading?
Yes	No	N/A	Has the plant investigated measures for reducing loadings?
Yes	No	N/A	3. Review operating records. How many months were the effluent concentrations or loadings above 90 percent of the permit limits?
Mo.	_____		BOD?
Mo.	_____		COD?
Mo.	_____		Fecal coliform?
Mo.	_____		Other conventional pollutants limited by permit (ammonia, phosphorus)?
Mo.	_____		Metals or other toxics?
Yes	No	N/A	4. How many times were permit limits violated (in the last year)?
Yes	No	N/A	5. What types of violations have occurred in the last 5 years?
Yes	No	N/A	Are any of a recurrent nature? What were the causes?
Yes	No	N/A	Have effective solutions been implemented to prevent future recurrence?
Yes	No	N/A	6. How many bypasses have occurred? What were the causes?
Yes	No	N/A	Have effective solutions been implemented to prevent future recurrence?
Yes	No	N/A	7. What are the future regulatory or permit requirements that may require modifications to the plant or its operations?

Pollution Prevention Checklist for Municipal Wastewater Treatment Plants

Yes	No	N/A	Can the facility currently meet any future anticipated water quality standards or effluent discharge limits?
Yes	No	N/A	8. Has the plant investigated ways to maximize operating efficiency?
Yes	No	N/A	9. Has the plant investigated improvements to the chlorination system to decrease chlorine usage?
Yes	No	N/A	10. Does the plant have a written preventive maintenance program on major equipment items and the sewer collection system?
Yes	No	N/A	11. Does the preventive maintenance program depict frequency of intervals, types of lubrication, types of repair and other preventive maintenance tasks necessary for each piece of equipment or each section of the sewer?
C. SLUDGE			
Yes	No	N/A	1. Does the plant have sufficient sludge treatment, storage, and disposal capacity?
Yes	No	N/A	2. What percentage of the methane gas is captured and used? Has the plant investigated ways to increase the amount of gas captured and used?
Yes	No	N/A	3. Has the plant investigated ways to decrease the number of dewatering chemicals used?
D. COLLECTION SYSTEM			
Yes	No	N/A	1. How many overflows within the collection system have occurred?
Yes	No	N/A	2. How many backups at any point in the collection system have occurred for any reason? What were the causes? Have effective solutions been implemented to prevent future recurrence?
Yes	No	N/A	3. Has the plant investigated ways to decrease infiltration/inflow?
E. PREVENTIVE MAINTENANCE PROGRAM			
Yes	No	N/A	3. Are these preventive maintenance tasks, as well as equipment and sewer collection problems being recorded, filed, and reviewed so future maintenance problems can be assessed properly?
F. MATERIALS USAGE			
Yes	No	N/A	1. Has the plant identified all supplies used in the operation and maintenance of the plant?
Yes	No	N/A	2. Has the plant identified materials that could be substituted for less toxic materials?
Yes	No	N/A	3. Does the plant reuse or recycle any materials used?
Yes	No	N/A	4. Has the plant investigated ways to reduce chemical usage without compromising preventive maintenance or treatment?
G. PERSONNEL RESOURCES			
Yes	No	N/A	1. Review personnel resources, training, and certifications.
Yes	No	N/A	Are there sufficient numbers?

Pollution Prevention Checklist for Municipal Wastewater Treatment Plants

Yes	No	N/A	Do all have appropriate certifications and periodic training?
Yes	No	N/A	Do all personnel certifications meet or exceed required levels?
Yes	No	N/A	How many are below the required level?
Yes	No	N/A	Is staffing level equal to or does it exceed O&M Manual recommendations?
Yes	No	N/A	2 What percentage of the wastewater budget is dedicated for training?
H. FINANCIAL			
Yes	No	N/A	1. Are the funds for the plant separate from other municipal funds?
Yes	No	N/A	2. Are funds sufficient for adequate operations?
Yes	No	N/A	3. Are funds sufficient for adequate preventive maintenance?
Yes	No	N/A	4. Are funds available for necessary improvements, expansion?
Yes	No	N/A	5. Is there a capital improvement fund?
Yes	No	N/A	6. Is the equipment replacement fund in a segregated account?
Yes	No	N/A	7. What financial resources are available to pay for improvements/expansion/reconstruction?
I. MUNICIPAL POLLUTION PREVENTION PROJECTS			
Yes	No	N/A	1. Does the plant have a pollution prevention program or strategy?
Yes	No	N/A	2. Has the plant conducted a self-audit on the adequacy of its maintenance, operation, funding, and operator training?
Yes	No	N/A	3. Does the pretreatment program include a pollution prevention component or specific pollution prevention projects?
Yes	No	N/A	4. Does the municipality have any pollution prevention projects aimed at reducing toxic/hazardous waste discharges, conventional loadings, or flow (e.g., water conservation) from:
Yes	No	N/A	Households?
Yes	No	N/A	Commercial businesses?
Yes	No	N/A	Industries?

CHAPTER 18 – MULTIMEDIA CONCERNS

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Associated Appendices

AQ.	Media-Specific Inspection Components
AR.	National Multimedia Screening Inspection Worksheet

A. INTRODUCTION

This chapter is intended as a guide for National Pollutant Discharge Elimination System (NPDES) inspectors who conduct single media and/or multimedia compliance inspections. Inspections help determine a facility's status of compliance with applicable laws, regulations, and permits for one media or multimedia. Specifically, multimedia compliance investigations determine a facility's compliance status in more than one media. NPDES inspectors should be familiar with multiple regulatory programs in order to identify other potential environmental violations during a multimedia inspection. Additionally, the inspector should be able to identify possible media-related concerns on inspections that are not necessarily targeted towards multimedia compliance.

This chapter and Appendix AQ, "Media-Specific Inspection Components," include a significant amount of material drawn directly from the National Enforcement Investigations Center's (NEIC's) *Multimedia Investigation Manual* (EPA, 1992) and EPA's *Process-Based Inspections Guide* (EPA, 1997). NPDES inspectors participating in multimedia inspections should refer to these documents for further guidance.

Additional training available for each media is listed in the EPA Order 3500.1 Program-Specific Training Requirements, which is included as Appendix A.

B. OVERVIEW OF THE MULTIMEDIA APPROACH TO INSPECTIONS

Most inspections can be grouped into four categories of increasing complexity, moving from Category A (program-specific compliance inspections) to Category D (complex multimedia investigations) depending upon the complexity of the facility and the objectives of the investigation. The four general categories of investigations are described below:

- Category A: Program-specific compliance inspections conducted by one or more inspectors. The objective is to determine facility compliance status for regulations specific to a single program, such as NPDES program requirements.
- Category B: Program-specific compliance inspections conducted by one or more inspectors in which the inspector(s) screen for and report on obvious, key indicators of possible noncompliance in multiple program areas. For example, an inspection may be aimed at determining compliance with NPDES program requirements, but screening for indicators of possible noncompliance for both NPDES and FIFRA requirements is performed.
- Category C: Several concurrent and coordinated program-specific compliance investigations conducted by a team of investigators representing two or more environmental and/or statutory program offices. The team, which is headed by a team leader, conducts a detailed compliance evaluation for each of the target programs. Category C inspections entail a more detailed compliance evaluation of each

target program than the general screening-level evaluation performed in a Category B inspection. The objective is to determine compliance for several targeted program-specific areas. Reports on obvious, key indicators of possible noncompliance in other environmental program areas are also made.

Category D: Comprehensive facility multimedia evaluations that not only address compliance in targeted program-specific regulations, but also try to identify environmental problems that might otherwise be overlooked. The initial focus is normally on facility processes to identify potentially regulated activities (e.g., new chemical manufacturing from raw material management through final manufacturing and processing) and byproducts/wastestreams generated, especially those that may not have been accurately reported to the regulators. When potentially regulated activities or wastestreams are identified, a compliance evaluation is made with respect to applicable requirements and subsequent compliance status. Special attention is often given to pollutants that “change media” (such as air pollutants that are scrubbed into wastewaters).

The investigation team, headed by a team leader, comprises staff thoroughly trained in different program areas. The on-site investigation is conducted during one or more site visits and involves intense concurrent program-specific compliance evaluations, often by the same cross-trained personnel.

Category D multimedia investigations are thorough and, consequently, resource intensive. They are appropriate for intermediate-to-large, complex facilities that are subject to a variety of environmental laws. Compliance determinations are made for several program-specific areas, and reports on possible noncompliance are prepared, based on the evaluation of the facility’s activities and wastestreams

Generally, all investigations will include pre-inspection planning, use of a project plan, sampling, inspection procedures, and a final report. The major difference will be in the number of different regulations addressed during Categories C and D investigations.

The multimedia approach to investigations has advantages over program-specific inspections. Multimedia inspections provide:

- A more comprehensive assessment of a facility's compliance status.
- Improved leveraging of compliance monitoring and enforcement resources.
- The ability to respond more effectively to cross-media complaints, issues, or needs and to develop a better understanding of cross-media problems and issues, such as waste minimization.
- The ability to conserve resources and yield more thorough results than numerous single media investigations.

- A higher probability of identifying cross-media issues, such as pollutants that can be “lost” as they change media.
- The opportunity to identify weaknesses in a facility’s Environmental Management Systems.
- Larger facility impact, which may enhance deterrent effect on facility corporate management.

The success of a multimedia investigation program is contingent upon a good managerial system and the support of upper management. Since these investigations will often be conducted at larger facilities, adequate resources (time and personnel) must be provided. Good communication among all team members during the planning phase is essential to define the scope of the inspection, as well as each team member's role. Communications could also include state officials since state inspectors might also participate as team members. Because of the extent of the state's knowledge of the facility and its problems, state involvement is often critical to the success of the investigation. Similarly, coordination with other federal or local agencies needs to be addressed, as necessary.

C. MULTIMEDIA CONCERNS AT NPDES FACILITIES AND THE MULTIMEDIA SCREENING PROGRAM

HAZARDOUS WASTE

Many NPDES-regulated facilities are also subject to requirements of the Resource Conservation and Recovery Act (RCRA). RCRA regulates the generation, transportation, treatment, storage, and disposal of hazardous wastes. NPDES permit writers and inspectors may learn whether the facility conducts RCRA regulated activities, and the nature of those activities, from state or EPA RCRA authorities, data platforms such as EPA’s Enforcement and Compliance History Online (ECHO), or while discussing facility industrial processes during the initial stages of a compliance investigation.

Industrial facilities can use or generate solid, liquid, or gaseous hazardous waste. These wastes may be generated from raw materials, off-specification products, or residuals or emissions from the process operations. In addition, waste oils used by process equipment, solvents used in cleaning operations, or sludges from treatment of process wastewaters can be hazardous wastes.

RCRA defers the control of hazardous wastes to the Clean Water Act (CWA) when those wastes are either directly discharged to surface waters under an NPDES permit (the direct discharge exclusion) or indirectly discharged to a wastewater treatment plant (the domestic sewage exclusion). Industrial facilities may use the direct discharge and domestic sewage exclusions as preferred disposal methods. Since many of the 126 priority pollutants listed in the CWA would be considered hazardous waste constituents under RCRA, the discharge of these pollutants should concern the inspectors and operators of wastewater treatment plants. Potential RCRA issues to consider in a NPDES inspection include:

- Hazardous wastes may pass through to surface waters unless incidentally removed in sludge, degraded, or "lost" through volatilization or exfiltration during the wastewater collection and treatment process.
- The Universal Treatment Standards under the Land Disposal Restrictions help determine when a hazardous waste has been treated sufficiently for land disposal.
- The RCRA waste may inhibit or reduce the effectiveness of the wastewater treatment processes potentially resulting in lower quality effluent discharges.
- RCRA-regulated hazardous wastes introduced into wastewater treatment facilities with surface impoundments could cause groundwater contamination issues.
- Sludges resulting from the treatment of a hazardous waste may become a regulated waste under RCRA.

Publicly Owned Treatment Works (POTWs) receiving hazardous wastes by truck, rail, or dedicated pipeline are subject to RCRA permit by rule requirements. If the material does not pass through a sewer system prior to arriving at a POTW, it is deemed to be a solid waste and, if appropriate, a hazardous waste. Consequently, POTWs that manage wastes that have not passed through the sewer system and mixed with domestic sewage would be subject to all applicable hazardous waste regulations. Included among these requirements is the provision that corrective action must be taken to remedy any contamination that may have resulted from a release of hazardous waste or hazardous constituents from solid waste management units, such as surface impoundments, to the environment. For example, if a POTW that is subject to these RCRA requirements contaminates groundwater through leaching or exfiltration, the permittee might be required to investigate the nature and extent of those releases and, where appropriate, implement corrective measures.

HAZARDOUS WASTE CLEANUP ACTIONS UNDER RCRA/CERCLA

Another source of contaminated wastewater is hazardous waste cleanup actions. Under RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), EPA, states, and private parties remediate contaminated sites. Much of the waste found at these sites is in liquid form, either as leachate or contaminated groundwater. The treatment of contaminated wastewaters from these sources will likely generate complex mixtures, requiring careful examination of their composition to determine appropriate treatment and disposal techniques.

NONHAZARDOUS SLUDGE

Wastewater treatment generates nonhazardous sludges. Several statutes and regulations, including the CWA, are charged with managing these nonhazardous sludges. NPDES and state permits include disposal limitations for municipal sewage sludge as specified in Title 40 of the *Code of Federal Regulations* (CFR) Part 503 (see Chapter 10 for detailed information on the 40 CFR Part 503 requirements). Many states already impose such requirements. NPDES inspectors should become familiar with state sewage sludge requirements and federal sewage sludge management and disposal requirements under the CWA and those imposed by other statutes

and regulations, particularly RCRA and the Clean Air Act (CAA). For example, the CAA controls air emissions from co-incinerating municipal sewage sludge with other wastes. Municipal sewage sludge that is co-disposed with other waste in a municipal solid waste landfill is regulated by 40 CFR Part 258. Industrial sludges are regulated by 40 CFR Part 257 if land applied and by 40 CFR Part 258 if disposed of in a nonhazardous landfill.

AIR

Air emissions from wastewater treatment units may be subject to CAA regulations. For some industries (e.g., synthetic organic chemical manufacturing industry (SOCMI), petroleum refineries), EPA has developed CAA regulations that limit the amount of volatile hazardous air pollutants that can be contained in process wastewaters. The purpose of these regulations is to minimize the amount of pollutants transferred from wastewater to the atmosphere through volatilization. In general, facilities are required to treat wastewater streams that contain volatile hazardous air pollutants before the streams are exposed to the atmosphere. It is important to be aware of what chemical constituents are in the wastewater and what impact this may have on a facility's compliance with CAA regulations. Air emissions from authorized RCRA Treatment, Storage, and Disposal Facilities (TSDFs) are regulated under RCRA. As a result, wastewater treatment facilities at RCRA TSDFs are now being investigated by RCRA program personnel. In addition, EPA's Greenhouse Gas Reporting Program requires certain wastewater treatment plants to submit annual greenhouse gas (GHG) emissions reports. The GHG Reporting Program impacts suppliers of certain products that would result in GHG emissions if released, combusted or oxidized; direct emitting source categories; and facilities that inject CO₂ underground for geologic sequestration or any purpose other than geologic sequestration. Facilities that emit 25,000 metric tons or more per year of GHGs are required to submit annual reports to EPA. Information about the GHG Reporting Program and covered reporters can be found at <https://www.epa.gov/ghgreporting/ghg-reporters>.

Additionally, it is important to investigate use of air pollution control devices or other waste management activities that remove pollutants from one media (such as air) but generate a wastewater stream. These wastewaters may not have been accurately reported in CWA permit applications and may not be properly managed.

MULTIMEDIA SCREENING

Regions and states are encouraged to incorporate multimedia screening into as many single media inspections as possible (i.e., conduct Category B inspections in lieu of Category A inspections). Obtaining multimedia screening information earlier in the process will help leverage inspection resources and ensure that all noncompliance issues are included in any facility-specific compliance status evaluation strategy. The compliance inspector will use a multimedia screening checklist as a guide for making and recording observations and pertinent information.

The Environmental Services Division Field Branch Chiefs and NEIC have led the development and implementation of EPA's multimedia inspection program, including screening inspections. The National Multimedia Screening Inspection Worksheet, dated May 12, 1993, was developed

as a general guideline by a regional work group led by Region 3. A copy of this worksheet is included in Appendix AR, "National Multimedia Screening Inspection Worksheet." Regions and states have adapted and customized checklists such as this for their own use.

D. NPDES INSPECTORS AND MULTIMEDIA INSPECTIONS

DESCRIPTION OF A MULTIMEDIA INSPECTION

The strategy developed for multimedia inspections usually involves prioritizing the processes and waste management activities, followed by systematically moving from the beginning to the end of a process with emphasis on regulated wastestream generation and final wastestream management and disposition. The strategy should be somewhat flexible so that "mid-course corrections" can be made.

The compliance evaluations for each media should be coordinated among all the investigators and scheduled to make the most effective use of the inspector's on-site time and facility contact resources. This schedule should provide an approximate schedule for each media investigator to review documents, interview facility personnel, conduct on-site observations, and conduct sampling as appropriate. This schedule must be flexible and may be modified throughout the on-site investigation to effectively use the limited available time. Daily meetings between team members to discuss progress and needs are recommended to help modify this schedule to meet the team and the facility personnel needs. Personnel availability and other logistical factors may result in a combining of compliance evaluations. RCRA issues may be evaluated concurrently with NPDES requirements because of the close relationship between process evaluations and wastewater generation and disposal requirements. Compliance with regulatory programs that principally involve records reviews, such as the Toxic Substances Control Act (TSCA), Emergency Planning and Community Right to Know Act (EPCRA), and CAA could be scheduled later in the inspection, as time permits.

The strategy for process and compliance evaluations should be developed by the inspection team coordinator and discussed with inspection team members. This will serve as the basis for explaining inspection activities and scheduling to the company during the opening conference.

The strategy should include checklists that address potential process wastestreams to be examined and help identify media-specific compliance issues. Checklists can be a vital component of a compliance investigation to help ensure that an investigator does not overlook anything important. Checklists serve as a reminder of what needs to be asked or examined and provide the basic regulatory requirements. However, checklists should not be a replacement for observations, curiosity, and common sense.

In larger facilities, multiple site visits coordinated by the team leader may be necessary and desirable for completing the inspection and following up on issues identified during earlier site visits. This approach can lead to a better overall site compliance determination inspection because of the opportunity to thoroughly review the information obtained during the inspection upon return to the office, refine the inspection strategy to fill in the gaps and resolve questions, and conduct a subsequent site visit to obtain the required information.

THE NPDES INSPECTOR'S ROLE IN A MULTIMEDIA INSPECTION

Each multimedia investigation team member should bring special program expertise and experience and must be trained in conducting a field investigation, including sampling. Most of the investigators on the team, including the team leader, should be current field investigators who already possess most of the necessary skills and qualifications. EPA Order 3500.1 sets forth specific training requirements for any EPA investigator who is leading a single media investigation. These training requirements include both general inspection procedures and media-specific procedures. While an individual leading a multimedia investigation may not have had the media-specific training for each media covered during that multimedia investigation, the team leader should have completed media-specific training for at least two of the media. At least one team member should be trained in each area that is to be addressed in the multimedia inspection.

The team leader has the overall responsibility for the successful completion of the multimedia investigation. In addition, other investigators may be designated as leads for each of the specific media/programs that will be addressed. These individuals may work alone or have one or more inspectors/samplers as assistants, depending on workload and objectives. However, all investigation team members should report directly to, and be accountable to, the team leader.

The following are some of the more important skills and qualifications that are necessary for team members:

- Ability to work effectively as a member of a diverse team.
- Knowledge of the EPA's policies and procedures regarding inspection authority, entry procedures/problems, enforcement actions, legal issues, and safety.
- Thorough understanding of sampling equipment; quality assurance (QA) requirements for sample collection, identification, and preservation; and chain-of-custody procedures.
- Knowledge of manufacturing/waste producing processes, pollution control technology, principles of waste management, flow measurement theory and procedures, and waste monitoring techniques/equipment.
- Investigation skills including the ability to gather evidence through good interviewing techniques and astute observations.
- Ability to convey information gathered during the inspection into clear, understandable investigation reports.
- Up-to-date experience in conducting compliance inspections.
- Good communication skills.
- Basic understanding of the procedures of obtaining administrative warrants, including preparation of affidavits, technical content of the warrant application, and warrant and procedures for serving a warrant.

- At least one team member should have considerable knowledge of laboratory standard operating procedures (SOPs), analytical test methods, and QA requirements, if a laboratory evaluation is to be conducted.

Investigators should conduct themselves in a professional manner and maintain credibility. A cooperative spirit should be cultivated within the inspection team and with facility representatives, including conducting on-site activities during normal working hours of the facility, as much as possible. Inspection team members should discuss their observations/findings relating to one or more programs with each other. The investigation team should also implement appropriate documentation procedures as described in Chapter 2. Investigators must ensure that important documents (e.g., project plan, safety plan, and logbooks) are not left unattended at the facility and sensitive discussions should not take place in front of facility personnel or on company telephones.

E. REFERENCES

The following is a list of resources providing additional information on multimedia.

- U.S. Environmental Protection Agency. (1992). *Multimedia Investigation Manual*. EPA-330/9-89-003-R. National Enforcement Investigations Center (NEIC).
- U.S. Environmental Protection Agency. (1997). *Process-Based Investigations Guide*. EPA-330/9-97-001.
- U.S. Environmental Protection Agency. (2016). *Best Practices for NPDES Permit Writers and Pretreatment Coordinators to Address Toxic and Hazardous Chemical Discharges to POTWs*. EPA-830-B-16-001.

CHAPTER 19 – APPEARING AS A WITNESS

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A. INTRODUCTION

Inspectors perform a vital role throughout the regulatory enforcement process. An enforcement action begins with the inspector collecting and documenting on-site evidence. This chapter deals with the inspector's responsibility to present evidence in formal legal proceedings.

Due in large part to the high-quality work that inspectors produce, EPA files strong cases. Nearly all these cases result in out-of-court settlements that will not usually require the inspector's testimony. Of the cases that do not settle, a substantial majority of the legal actions take place in the EPA administrative law system rather than in federal courts. Major differences distinguish administrative from federal courts, such as rapid processing and the absence of a jury. Despite the differences between these two legal proceedings, the inspector's role as a witness will remain predominantly the same.

Under most circumstances an inspector will be called as a "fact witness." A fact witness describes personal knowledge obtained through one of the five senses. Throughout the enforcement process, everything an inspector hears, sees, samples, or records may become evidence about which he or she may be questioned. Many cases are tried years after the field and laboratory activities have been conducted. Thus, the inspection report and field notebook should be sufficiently detailed and legible to allow the inspector to reconstruct the inspection "on the record."

B. PRE-TESTIMONY MATTERS

PREPARATION

Preparation is the key to giving accurate and effective testimony. Successful preparation requires a substantial time commitment. Attorneys and witnesses work together in two types of preparation: factual and procedural.

The inspector will complete most of the factual preparation by writing the inspection report as described in this manual. The witness and the attorney will meet to discuss details from this report. Other items should also be discussed, including the field notebook, photographs, and the inspector's qualifications. Qualifications include the inspector's educational degree, professional accreditations, inspector training as required by EPA Order 3500.1, and on the job experience. The inspector's qualifications must never be exaggerated. Even a small exaggeration may cause the inspector's testimony to lack credibility.

The inspector should inform the EPA attorney of any problems, questions, or concerns regarding the case as early as possible. An example of one such concern is the confidential business information (CBI) procedures inspectors must adhere to. CBI procedures that bind inspectors during inspections also have implications for the legal proceeding.

The attorney has primary responsibility over procedural preparation, which includes assembling the facts for presentation in a formal legal setting. In addition to one-on-one preparation, the

attorney may consider whether the inspector should participate in a mock trial or visit a hearing to observe other witnesses' testimony. During one-on-one preparation, the attorney and the inspector should discuss:

- Times and dates that require the inspector's attendance
- Legal etiquette and procedure
- General legal framework of the case
- Significance of the inspector's testimony in this framework
- Probable areas of questioning, including direct and cross-examination
- What documents, if any, will be used by the inspector during testimony

Before giving testimony, the witness should review inspection documents, his or her professional qualifications, and information provided by the attorney. This review should be repeated until the witness has thoroughly refreshed himself of the details of the facts relating to the case. Testimony should appear genuine, not contrived as if a script were being followed. Additionally, the attorney should prepare the witness as if he is testifying in court before the witness testifies in court. The witness may ask the attorney to prepare a mock trial to better understand and be comfortable with the process before the actual trial.

An inspector may be subpoenaed to give testimony by the opposing attorney or even by the EPA attorney. A subpoena is a mandatory Court Order to appear in court if an inspector is subpoenaed, the appropriate EPA attorney should be contacted immediately. Time will be short to prepare to give testimony or to respond to the subpoena.

LEGAL ETIQUETTE, APPEARANCE, AND DEMEANOR

A witness's conduct should reflect the solemn nature of the administrative or judicial proceeding. To act in accordance with required legal etiquette, a witness should:

- Dress conservatively following the advice of the EPA attorney.
- Arrive early and be available immediately when called to testify.
- Address the judge as "your honor."
- Treat an administrative proceeding as seriously as a federal court trial.

A witness should **not**:

- Whisper, talk, or make jokes in the hearing room. If necessary, a note may be passed.
- Bring magazines or newspapers into the hearing room.
- Discuss the case within earshot of anyone but the EPA attorney.

Posture, speech, appearance and attitude influence a witness's credibility. An inspector is a professional who collects, preserves, and presents evidence. To convey a professional demeanor, an inspector should:

- Respectfully respond to questions posed by the opposing attorney on cross-examination.
- Remain natural and animated, but not impatient or overly anxious to testify.
- Minimize nervous tendencies.
- Remain calm.
- Refrain from showing hostility toward the opposing counsel, the specific defendant, or the regulated community as a whole.

C. GIVING TESTIMONY

GENERAL CONSIDERATIONS

A witness gives testimony to create a legal record of the facts. Before giving testimony, a witness will take an oath that he or she will tell the truth. Failure to tell the truth is actionable as perjury. A witness may give pre-trial testimony in a deposition or trial testimony under direct examination or cross-examination.

To give effective testimony, a witness should 1) listen, 2) pause, and then 3) answer if possible. Listening carefully to the wording and implications of an attorney's questions requires significant effort. If the witness does not understand the question, he or she should stop to think, ask to have the question repeated, or ask to have the questions clarified or explained.

A witness should pause before answering. Pausing provides time to think, makes the response more considered and deliberate, and gives the attorney time to object if necessary. When pausing, the witness should not use words such as "um." These types of words may incorrectly indicate hesitation when later read from the written record.

When answering, a witness should:

- Reply with a "Yes" or "No" when appropriate.
- Speak in complete sentences when answering more fully.
- Be as descriptive as possible in referring to exhibits or photographs. For example, "In the upper right hand corner, we see..." rather than "Here, we see..."
- Stop immediately if the judge or either of the lawyers begins to speak.
- Avoid memorizing answers to potential questions.
- Never manipulate an answer to benefit one side.

A witness's credibility is defined as the degree of confidence that the judge or jury gives to the witness's testimony. The opposing attorney will try to "impeach" a witness's credibility by suggesting the following: bias, inaccuracy, inability to recollect, false testimony, or even corruption. To minimize the opposing attorney's efforts to discredit the witness's testimony, the witness should:

- Always tell the truth.
- Answer only the question asked, without volunteering additional information.

- Explain answers fully. If the opposing attorney does not allow a full explanation, the EPA attorney can choose to give the witness an opportunity to explain the answer fully on redirect examination.
- Answer within the limits of the facts.
- Don't hesitate to say, "I don't know," or "I don't remember," if that is the case.
- Correct any mistakes in the testimony as soon as mistakes are identified.
- Carefully identify estimates.
- Never exaggerate.
- Never guess.
- Avoid absolutes, like "I always..." or "I never..."

PRE-TRIAL TESTIMONY: DEPOSITIONS

In a federal court trial, an inspector may be subpoenaed to give a deposition, which is pre-trial questioning under oath by the opposing attorney. Depositions are not often conducted in administrative hearings. Participants include the attorneys for each side, a court reporter, and the witness. Most importantly, a judge will have no role in deposition testimony unless one side abuses the process and the other side seeks relief.

The attorney may use a deposition to "discover" information or to contradict a witness's testimony at trial. In most cases, deposition testimony cannot be used as a substitute for live testimony. To properly prepare for and give deposition testimony, an inspector should:

- Read the notice of deposition.
- Consult with the EPA attorney to determine what preparation and review of documentation will be necessary.
- Realize that he or she is not "off the record" until completely away from the deposition setting.
- Request a break whenever needed.

After the deposition is transcribed, the witness can read it to make any appropriate corrections. Small errors always exist, but some transcripts contain absolute disasters. Errors in technical details, such as numbers and units, can have a large impact. A witness should never waive the right to read and sign the finished deposition.

TRIAL TESTIMONY: DIRECT EXAMINATION

The EPA attorney will question the inspector during direct examination to put the facts known by the inspector on the record in a well-organized and logical manner.

A good direct examination leads the inspector through his or her entire testimony using a dialogue of short questions and answers. The attorney is responsible for asking appropriate questions in the correct order and ensuring that nothing important is omitted. The witness is only responsible for answering the attorney's questions completely and truthfully.

To avoid legally objectionable or tactically unwise remarks, the witness should trust the EPA attorney's final decision concerning what questions to ask at the hearing. The attorney's reasoning behind the questioning may be limited, but the witness should trust that the attorney is asking the questions necessary to convey the story behind the violations. If the inspector has forgotten a fact, the attorney may refresh the inspector's recollection with documents, such as the inspection report. The EPA attorney might also ask, "Is there anything else?" to signal to the inspector that something has been left out.

Redirect examination is a round of questioning only concerning issues raised during cross-examination. Redirect will give the EPA attorney an opportunity to reduce any damage done to the credibility of the inspector's testimony during cross-examination.

TRIAL TESTIMONY: CROSS-EXAMINATION

Cross-examination, questioning by the opposing attorney, will subject the witness to a more difficult interrogation than direct examination. The opposing attorney will try to cast doubt on the credibility of the witness's testimony. Many witnesses fear counsel techniques such as leading questioning and twisting interpretation. The EPA attorney will try to protect the witness from abusive uses of these techniques.

The witness can also protect the credibility of his or her testimony by 1) answering briefly, 2) answering accurately, and 3) remaining calm. Answering briefly consists of being responsive to the question, but not volunteering extra information. Avoid rambling, even if the opposing counsel remains silent.

In addition to the recommendations in the section "Giving Testimony," answering accurately requires listening carefully for the following types of questions:

- Questions that inaccurately paraphrase the witness's previous testimony. The error should be corrected or the previous answer restated in full.
- Hypothetical questions or questions requiring a "Yes" or "No" answer. If these questions may compel a misleading or incomplete answer, the witness should explain the answer fully at that time or later during redirect if cut short by the opposing attorney.
- Two-part questions. The inspector should ask the attorney to restate the question or carefully answer each part separately.

Even when a witness's truthfulness, occupational competence, or professional conclusions are challenged, he or she should remain calm. An angry, sarcastic, or argumentative answer is inconsistent with the inspector's role as a neutral government witness. Remaining calm will add credibility to the inspector's testimony. Becoming familiar with the process, including participation in a mock trial can help reduce the stress of cross-examination.

D. SPECIAL CONSIDERATIONS

TECHNICAL TESTIMONY

An inspector frequently presents technical facts. The inspector must balance the need to be technically accurate with the need to reduce scientific issues to simple terms and concepts.

The first barrier to communicating technical information is the use of jargon. The inspector should prepare carefully to simplify his or her language without over-simplifying the scientific concepts. The inspector should:

- Speak as clearly as possible. The court reporter may have difficulty recognizing numbers and unfamiliar technical terms.
- Ask your attorney to provide a glossary of technical terms, including acronyms, to the court reporter.
- Review the meaning of frequently used acronyms, such as explaining that “OECA” is an acronym for “the Office of Enforcement and Compliance Assurance.”

Even after the witness explains the definitions of the technical language, the underlying concepts may still be difficult to understand. To teach the necessary technical concepts, the inspector and attorney should consider using:

- Short answers in a logical progression of questions
- Well-paced questioning to avoid information overload
- Diagrams and pictures
- Appropriate analogies

Finally, the inspector should not try to outdo the opposing attorney on technical issues. Not only may the inspector confuse the judge or jury in the process, but also a well-prepared attorney will have thoroughly studied the subject before trial and will have a large advantage in legal debate. Inspectors should walk the judge or jury through a technical analysis using plain language and help them understand why EPA needs to take a particular action to protect public health or collect economic benefit to discourage further violations.

To successfully answer questions regarding technical information, an inspector should:

- Examine questions and answers for assumptions and exceptions.
- Look for inaccurate paraphrasing of the inspector’s previous testimony and politely correct them. An opposing attorney may try to restate your testimony with an inaccurate perspective to benefit the defendant.
- Always identify estimates.
- Use references in cases of complicated details. For example, the inspection report could be consulted before testifying about the characteristics of a specific sample.

EXPERT WITNESS

Expert witnesses give opinions on the record. An expert witness has technical or other specialized knowledge that helps the judge or jury better understand the case. To prove a witness' expertise, his or her qualifications are introduced by one side and cross-examined by the other side. Only those opinions that the witness is qualified to express through special training or expertise will be admissible.

An expert is not necessarily someone from outside the agency with particular academic or research credentials. Due to the inspector's professional expertise, he or she might be asked specific questions that require an opinion or might even be called as an expert witness. The EPA attorney will object if the opposing counsel asks inappropriate questions and will decide whether to use the inspector as an expert witness. The inspector should stay carefully within his or her limits of expertise and knowledge whenever asked a question requiring an opinion.