American Petroleum Institute

STEP Strategies for Today Environmental Partnership

UNDERSTANDING AND PREPARING APPLICATIONS FOR PETROLEUM FACILITY NPDES DISCHARGE PERMITS

Regulatory and Scientific Affairs
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American Petroleum Institute

STEP Strategies for Today's Environmental Partnership

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The members of the American Petroleum Institute are dedicated to continuous efforts to improve the compatibility of our operations with the environment while economically developing energy resources and supplying high quality products and services to consumers. We recognize our responsibility to work with the public, the government, and others to develop and to use natural resources in an environmentally sound manner while protecting the health and safety of our employees and the public. To meet these responsibilities, API members pledge to manage our businesses according to the following principles using sound science to prioritize risks and to implement cost-effective management practices:

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- To participate with government and others in creating responsible laws, regulations and standards to safeguard the community, workplace and environment.
- To promote these principles and practices by sharing experiences and offering assistance to others who produce, handle, use, transport or dispose of similar raw materials, petroleum products and wastes.

Understanding and Preparing Applications for Petroleum Facility NPDES Discharge Permits

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FOREWORD

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Preface

The American Petroleum Institute's (API's) Health and Environmental Sciences Department, through the API Water Technology Task Force, has been conducting a multi-year research program to evaluate and identify practical and environmentally sound technologies for petroleum facility wastewater treatment. The Task Force has also been sponsoring research to help petroleum facilities and government agencies to improve efficiencies and to change and comply with regulations. The results of this program are intended to provide industry and regulatory agencies with technical information to make informed decisions on appropriate alternatives for individual petroleum manufacturing and distribution facilities.

The Task Force has sponsored and published a significant amount of work in prior years on handling and treating petroleum waters. A listing of some key published reports is summarized below. This report is aimed at helping individual petroleum facilities understand the NPDES (National Pollutant Discharge Elimination System) permitting process, and how to cost-effectively prepare permit applications under this system, whether done by in-house staff or through a consulting firm or other resource.

This comprehensive report goes beyond explaining how to prepare the NPDES permit application. It provides strategies for improving facility operation as personnel go through the permit application; raises possible issues and resolutions for negotiation and appeals with government regulators; provides example case histories; discusses stormwater permits; and provides a "tool box" to help work through areas such as effluent limit calculations, mixing zones, waste load allocations, sampling/analytical data, and biomonitoring.

The Task Force greatly acknowledges and appreciates the fine work performed by Tischler/Kocurek, Round Rock, Texas in preparing this comprehensive study and for the expert guidance of Mr. David Pierce, Chevron, in overseeing the development of this report.

Studies Sponsored by the Water Technology Task Force

Publ. 1612	Guidance Document for Discharging of Petroleum Distribution Terminal Effluents to Publicly Owned Treatment Works, November 1996.
Publ. 4665	Analysis and Reduction of Toxicity in Biologically Treated Petroleum Product Terminal Tank Bottoms Water, April 1998.

Publ. 4664	Mixing Zone Modeling and Dilution Analysis for Water-Quality-Based NPDES Permit Limits, April 1998.
Publ. 4606	Source Control and Treatment of Contaminants Found in Petroleum Product Terminal Tank Bottoms, August 1994.
Publ. 4602	Minimization, Handling, Treatment, and Disposal of Petroleum Product Terminal Wastewaters, September 1994.
Publ. 4582	Comparative Evaluation of Biological Treatment of Petroleum Product Terminal Wastewater by the Sequencing Batch Reactor Process and the Rotating Biological Contactor Process, June 1993.
Publ. 4581	Evaluation of Technologies for the Treatment of Petroleum Product Marketing Terminal Wastewater, June 1993.

Abstract

A manual is presented by the American Petroleum Institute (API) to assist member companies and others in preparing applications and negotiating with permit authorities for National Pollutant Discharge Elimination System (NPDES) permits for wastewater discharges. The manual is intended to help permittees and permit applicants to understand the permit process from application to final permit, and to provide tools and strategies for assuring that the permit is fair and properly implements the applicable regulations. The manual documents issues that may arise during the preparation of permit applications and the negotiation of permit conditions with permit writers. It also describes administrative and judicial mechanisms that are available to permittees to challenge permit conditions and limits that are technically unsound or do not comport with the applicable regulations. Much of the information in this manual is based on practical experience with many NPDES permits and applications. Examples and case histories are provided to help the user understand the permit application process.

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Section 1

Introduction

This manual has been prepared by the American Petroleum Institute (API) to assist member companies and others in preparating applications and negotiating with permit authorities for National Pollutant Discharge Elimination System (NPDES) permits. The NPDES permit process is often complicated, whether it is administered by the U.S. Environmental Protection Agency (EPA) or by a state that is delegated the authority to administer the program and issue permits. This manual is intended to help permittees and permit applicants to understand the permitting process, from application to final permit issuance, and to provide tools and strategies for assuring that the permit is fair and properly implements the applicable regulations.

The manual documents issues that may arise during the preparation and filing of permit applications and when proposed permits are negotiated with permit writers. It also specifies administrative and judicial mechanisms that are available to permittees to challenge permit conditions and limits that are technically unsound or do not comport with the applicable regulations.

Objective

The principal objective of this manual is to provide permittees and permit applicants with a detailed description of the NPDES permitting process, and the opportunities in this process to provide data, analyses, and information to help assure that the final permit is equitable and has achievable limits and conditions. The importance of building a complete record of the permit action is emphasized, because a complete record provides protection to the permittee from unjustified enforcement actions, whether initiated by the government or citizens.

Scope

This manual covers many aspects of the NPDES permitting process, from the preparation of the permit application through the issuance of the final NPDES permit. The manual describes the development of permit limits and conditions from the permit application, state and federal regulations, and guidance. The manual also describes the procedures for challenging permits through the state or federal administrative processes and the courts.

This manual focuses on NPDES permits issued by states and EPA Regions under the authority of Section 402 of the Clean Water Act (CWA). In many states delegated to administer the NPDES program, the permit may not be

called an NPDES permit. However, such permits in delegated states are NPDES permits regardless of what they are called.

Much of the information in this manual is based on practical experience with many NPDES permits and applications. Examples and case histories are provided to help the user understand the permit application process. A list of reference materials for technical resources is provided in a bibliography.

This manual does not address wastewater discharge permits that may be issued by states to regulate discharges that are not authorized under the CWA, such as discharges to ground water, or permits issued by states that have not been delegated NPDES permitting authority.

Users of this manual should understand that the CWA specifically allows NPDES delegated states to adopt regulations that are more restrictive than the federal regulations. Because each state's program is different, this manual does not attempt to identify specific state provisions that may be different or more restrictive than the federal regulations. Therefore, it is important that users of the manual, if their facility is in a delegated state, also become familiar with the state regulations.

Using This Manual

Information in this manual will allow a permittee to assess the relative complexity of the NPDES permit and to plan a strategy for obtaining it. For relatively simple permits, this manual provides sufficient information, when combined with the permit application instructions and the relevant state and federal regulations, to complete the permit process without resorting to additional technical support. In more complicated situations, the manual presents strategies for obtaining the necessary resources and to address the permit process with the required data and support.

This manual is intended to help the user understand how to prepare a permit application, how to review a proposed permit and fact sheet, how to prepare technical comments to the regulatory agency, and how to negotiate permit conditions and limits. The reference materials in the bibliography are technical resources that may be used in different permitting situations. Although, some permit applicants will not have experience or expertise with certain parts of the NDPES permit process, this manual provides enough information so that the applicant can understand what tools and methods are available, how they can be used, and when it is necessary to obtain technical support to apply them to a specific permitting problem.

What's in This Manual

This manual contains a lot of information about NPDES permits. Users of this manual who need information very quickly about a particular issue should see **Quick Start** at the end of this section. For other users who have less pressing needs, the following outline gives a brief overview of each section in the manual.

Overview of Manual

Section 1, **Introduction**—describes the purpose and use of this manual. Provides overview of manual and **Quick Start** guide.

Section 2, **NPDES Program Basics**—describes the NPDES permit program, which regulates the discharge of pollutants into waters of the United States. This section discusses the general permit process, provisions for the NPDES in the CWA, and federal and state authority for the NPDES program.

Section 3, **Types of Permits**—provides an overview of individual permits and general storm water permits.

Section 4, **NPDES Permit Elements**—describes the common elements of an NPDES permit, including effluent limitations and monitoring and standard conditions.

Section 5, **Permit Applications**—discusses the preparation of individual and general permit applications. This section focuses on items needing special guidance.

Section 6, **The Draft Permit**—describes how a draft NPDES permit is developed by a regulatory agency and what steps the permit applicant may take to obtain a correct and reasonable permit. An overview explains how the permit writer develops a permit. "Fact sheets" that accompany draft permits are explained. Guidance is provided on reviewing and commenting on the prepublication draft permit and the formal public-noticed draft permit.

Section 7, **Hearings and Appeals**—describes public hearings and the permit appeals process. The formal process for both hearings and appeals is described. Guidance is provided on how the permit applicant should approach and prepare for hearings and appeals.

Section 8, **Variances**—describes the variance process for technology-based standards and water-quality-based standards. Descriptions of technology standard variances include those for fundamentally different factors, nonconventional pollutants, economic achievability, and thermal discharges.

Descriptions of water quality standard variances include those for economic/social impacts and temporary periods.

Section 9, **Tool Box**—presents a number of techniques used in the development of NPDES applications and permits. Techniques include effluent limit calculations, seasonally-based effluent limits, sample analyses, biomontoring, mixing zones, total maximum daily loads and wasteload allocations, site-specific water quality criteria, and indicator parameters.

Bibliography—list of references useful in the preparation and understanding of NPDES permits.

Appendices—includes permit application forms and EPA guidance/memos on NPDES permitting issues.

Quick Start

Below is a listing of the more common issues in NPDES permitting and where to find related information in this manual.

Preparing the Permit Application

Where to look in this manual:

- Section 5, **Permit Applications**
- Section 9, **Tool Box** (Sample Analyses, WET Tests)
- Appendix 4, **Individual Permit Applications Forms**
- Appendix 5, **General Storm Water Permit NOI and NOT Forms**

Working with the Permit Writer During the Draft Permit Stage

Where to look in this manual:

- Section 4, **NPDES Permit Elements**
- Section 6, **The Draft Permit**
- Section 8, **Variances**
- Section 9, **Tool Box**

Reviewing the Draft Permit

Where to look in this manual:

- Section 4, **NPDES Permit Elements**
- Section 6, **The Draft Permit**
- Section 8, **Variances**
- Section 9, **Tool Box**

Developing Permit Limits

Where to look in this manual:

- Section 6, **The Draft Permit**
- Section 8, **Variances**
- Section 9, **Tool Box**

Preparing Comments on a Draft Permit

Where to look in this manual:

- Section 6, **The Draft Permit**
- Section 8, **Variances**
- Section 9, **Tool Box**

Preparing for a Public Hearing

Where to look in this manual:

- Section 7, **Hearings and Appeals**
- Section 9, **Tool Box**

Appealing the Permit

Where to look in this manual:

- Section 7, **Hearings and Appeals**
- Section 8, **Variances**
- Section 9, **Tool Box**

Section 2

NPDES Program Basics

This section of the manual is an introduction to the National Pollutant Discharge Elimination System (NPDES), which regulates the discharge of pollutants into waters of the United States. This section discusses the general permit process, provisions for the NPDES in the Clean Water Act (CWA), and federal and state authority for the NPDES program.

Permit Process

With limited exceptions, the NPDES requires a permit for every point source discharge of wastewater to waters of the United States. The NPDES program is designed to be delegated to the states and territories, with the U.S. Environmental Protection Agency (EPA) in an approval and oversight role. If a state or territory has not been delegated NPDES authority, either due to reluctance to operate the program, legal issues, or otherwise, the EPA Region office is the NPDES permitting authority.

The NPDES permitting program consists of the following principal steps:

1) The owner/operator of the point source discharge prepares the permit application and submits it to the permitting authority;

2) The permitting authority drafts a proposed permit and fact sheet which states the regulatory and technical bases for the proposed permit;

3) The proposed permit is noticed for public comment, which may include a public hearing if one is requested by the permit applicant or an interested party, such as members of the general public, or federal, state, or local agencies;

4) The permitting authority responds to public comments on the proposed permit and issues a final permit;

5) The permit becomes effective or all or part of the final NPDES permit is challenged by the permittee, the public, or a federal, state, or local agency; and

6) If the regulatory authority grants the challenge, the specific provisions of the challenged permit are stayed until the administrative and/or judicial appeals process is completed.

A summary of the permitting process is shown in Figure 2-1.

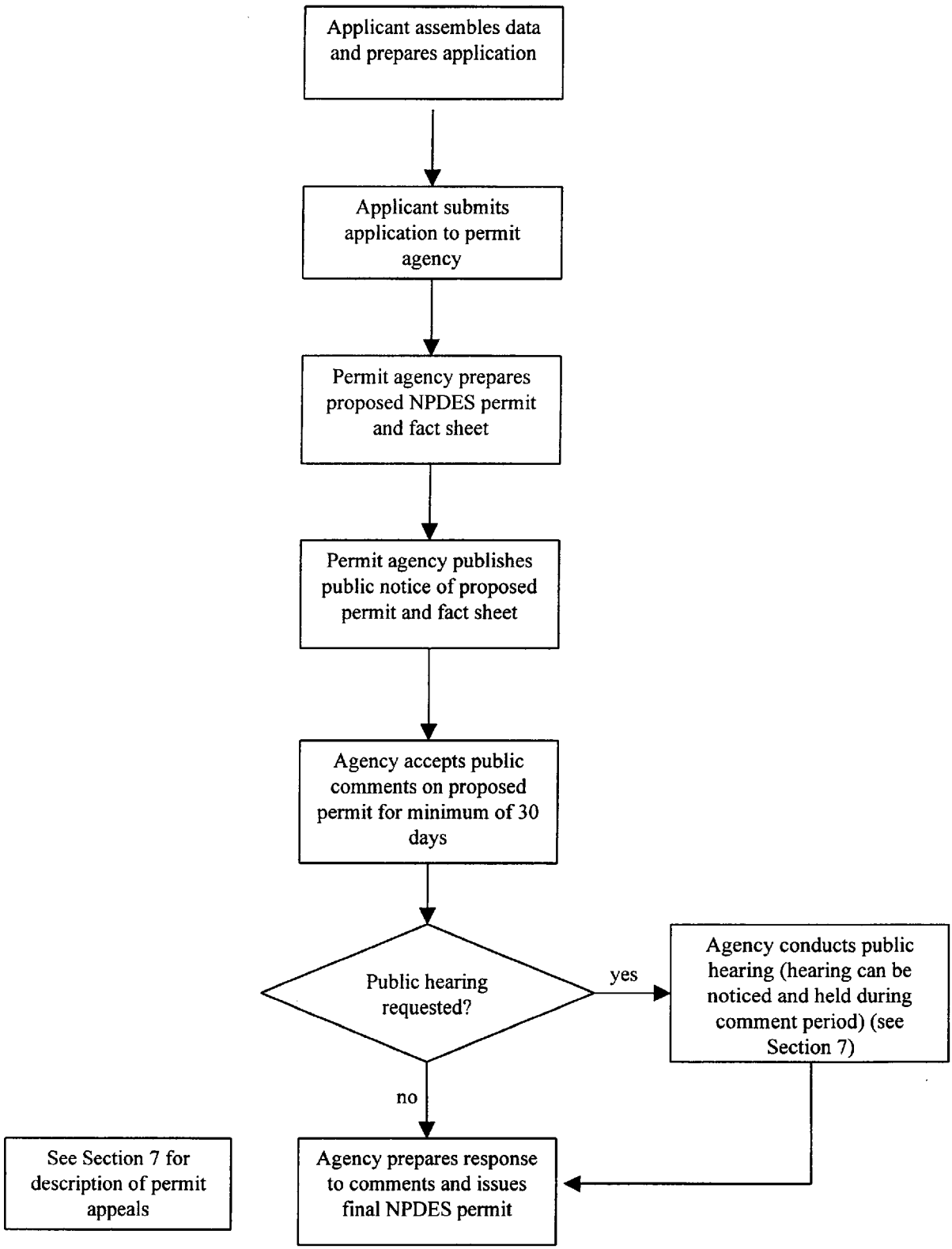

Figure 2-1. Overview of the NPDES Permit Process

Regulatory Authority and Duties

This section of the manual describes the regulatory authorities and duties of the agencies that are involved in the NPDES permit process. The discussion is intended to be a general introduction rather than a legal description of the NPDES program. When an NPDES permit is to be challenged through the regulatory appeals process, permittees must seek the assistance of attorneys that are skilled in the NPDES permitting process.

An overview of the CWA provisions for the NPDES program is given first, followed by a discussion of federal, state, and local program authority.

Overview of Clean Water Act Provisions

The NPDES permit program is authorized under Section 402 of the CWA. The program began in 1972, when the CWA's predecessor, the Federal Water Pollutant Control Act Amendments of 1972, was adopted by Congress over President Nixon's veto. Section 402(a)(1) of the CWA specifies that EPA may "issue a permit for the discharge of any pollutant, or combination of pollutants" if requirements of the CWA are met. NPDES permits are to be issued for discharges to navigable waters of the U.S., unless such discharges are specifically excluded. There are few exclusions, the principal ones being dredge and fill activities (permitted by the U.S. Army Corps of Engineers under the authority of Section 404 of the CWA) and agricultural irrigation return flows. The maximum term of an NPDES permit is five years.

The provisions of the CWA applying to the NPDES program as identified in Section 402(a)(1) are:

- Section 301: "Effluent Limitations," which are technology-based;
- Section 302: "Water-Quality-Related Effluent Limitations," which are implemented to protect water quality when technology-based limitations are insufficient;
- Section 306: "National Standards of Performance," also known as New Source Performance Standards;
- Section 307: "Toxic and Pretreatment Effluent Standards," for industrial discharges to publicly owned treatment works (POTW);
- Section 308: "Records and Reports: Inspections," monitoring of effluents and reporting of information to the regulatory authority; and

- Section 403: "Ocean Discharge Criteria," for discharges to the territorial sea, contiguous zone, or oceans.

The above sections of the CWA reference other sections in the CWA. The most important of these additional sections are Section 303, "Water Quality Standards and Implementation Plans," and Section 304, "Information and Guidelines."

Section 402(b) of the CWA specifies requirements for NPDES program delegation to the states and territories. To receive delegation, a permitting authority must have a program that meets these minimum requirements.

Federal Authority

In states that do not have NPDES program delegation, the EPA regional office will issue the NPDES permits. EPA has promulgated regulations for NPDES program administration at 40 Code of Federal Regulations (CFR), Part 122 (40 CFR 122). These regulations describe the NPDES permitting program as it is administered by EPA. Many of the EPA provisions at 40 CFR 122 also serve as minimum requirements for authorized state programs, and many states have adopted these regulations by reference. The provisions at 40 CFR 122 that are applicable to state NPDES programs are identified explicitly.

Part 125 of 40 CFR contains certain criteria and standards for the NPDES program. These include criteria/standards for technology-based treatment requirements, variances and modifications of national technology-based effluent limitations and standards, ocean discharges, best management practices (BMP), and disposal of sewage sludge. Part 125 also includes EPA Form 2C, "Application for Permit to Discharge Wastewater from Existing Manufacturing, Commercial, Mining, and Silvicultural Operations."

Even when a state has been delegated authority to administer the NPDES program, EPA retains oversight authority for all permits. States must provide the EPA Region with the proposed state permit and fact sheet, and respond to any EPA comments. EPA is required to provide its comments, and any objections to the proposed permit, within 90 days of receiving the proposed permit. If the state does not adopt EPA's comments, EPA may issue the final permit with the disputed provisions. EPA may waive this right of review of state permits for certain classes or categories of discharge, for example, for discharges less than or equal to 500,000 gallons per day.

The coordination between the EPA Region and a delegated state is set out in a Memorandum of Agreement (MOA). The MOA specifies the categories or

classes of permits that EPA will review; provisions specifying documents, reports, and other information that the state must submit to EPA to demonstrate that the program is functioning correctly; and presents procedures to assure coordination of enforcement activities. EPA may waive its review rights for state NPDES permits in the MOA. Typically, the MOA specifies that EPA shall have only 30 to 45 days to review proposed permits rather than the full 90 days allowed by the NPDES regulations. EPA retains the right, however, to object to a permit within the 90-day period if it has provided general comments to the state on a permit within the time period specified in the MOA.

EPA has the authority and responsibility, under the CWA, to establish national technology-based standards for industrial dischargers and POTWs that are required by Sections 301, 306, and 307 of the CWA. The procedures that EPA must follow are set out in Sections 304, 306, and 307 of the CWA.

The technology-based standards for industrial dischargers are known as effluent limitations guidelines and new source performance standards. They are also known as categorical standards because they are promulgated for certain categories of point sources, such as petroleum refineries; oil and gas exploration and production; and organic chemical, plastic, and synthetic fibers manufacturing plants. These categorical standards are promulgated at 40 CFR Parts 404-499. For POTWs, the technology-based standards are known as secondary treatment standards and are found at 40 CFR 133.

The technology-based standards are of particular importance because they set minimum treatment performance. This requirement applies to all NPDES permits, whether they are issued by an EPA Region or by a delegated state. In other words, an NPDES permit limit cannot be less restrictive than that allowed by the categorical standard, unless the discharger can obtain specific variances allowed by the CWA (see Section 8, **Variances** for a detailed discussion).

Section 304 of the CWA specifies procedures and technical requirements EPA must follow to develop the technology-based effluent limitations guidelines for conventional pollutants (biochemical oxygen demand [BOD], total suspended solids [TSS], pH, oil and grease [O&G], and fecal coliforms), toxic pollutants, and nonconventional pollutants such as chemical oxygen demand (COD) and ammonia. The technology-based standards for conventional pollutants are identified as best practicable technology (BPT) and best conventional technology (BCT). The technology-based standards for toxic and nonconventional pollutants are defined as best available technology (BAT). Through Section 304(h) of the CWA, EPA has the authority to establish the analytical and testing methods that must be used to demonstrate compliance with NPDES permit limits. Section 304(l) relates to bodies of water that were

not in compliance with water quality standards for toxic pollutants. States had to prepare "304(l) lists" of such waters and to implement procedures to control point sources that exceeded water quality standards. These procedures were developed as individual control strategies (ICS) in NPDES permits. If states did not prepare appropriate 304(l) lists, then EPA Regions were required to do so.

Section 306 of the CWA requires EPA to establish NSPS for a minimum of 27 industrial point source categories, including petroleum refining. A new source, defined in Section 306(a)(2) and promulgated at 40 CFR 122.29, is a facility that is constructed after NSPS proposal, unless the final NSPS is promulgated more than 180 days after proposal; in which case, the date of promulgation is the effective date for the new source determination. These NSPS are intended to require new sources to achieve effluent standards that are more restrictive than those for existing sources because new sources have more opportunities to use better control and treatment technology.

Section 307 of the CWA requires EPA to develop a list of toxic pollutants, for which technology-based limits (BAT) will be developed under the provisions of Section 304. Section 307 also requires EPA to develop pretreatment standards for industrial dischargers to POTWs (referred to as indirect dischargers) to regulate pollutants that may pass through or interfere with the POTW. These pretreatment standards include both general pretreatment standards applicable to all indirect dischargers and categorical pretreatment standards for existing (PSES) and new sources (PSNS). PSES and PSNS are promulgated at 40 CFR Parts 404-499. EPA pretreatment regulations at 40 CFR 403 include the general pretreatment standards and incorporate PSES and PSNS by reference.

Under Section 303 of the CWA, EPA has the authority to review and approve state water quality standards regulations. The state regulations are the basis for establishing water-quality-based permit limits, pursuant to the requirements of Section 302 of the CWA. States must review and update their regulations every three years (triennial review). If EPA finds that a state's water quality standards do not meet the requirements of the CWA, EPA is authorized to promulgate water quality standards for the state that will meet CWA requirements. EPA has used its authority to promulgate water quality standards for a number of states at 40 CFR 131. In general, these EPA-promulgated standards are for toxic pollutants that states did not address in their water quality standards.

EPA promulgated the Great Lakes Water Quality Guidance (GLWQG) at 40 CFR 132. This regulation establishes minimum water quality standards and implementation procedures for the Great Lakes and their tributaries. For such waters in their jurisdiction, states are required to adopt water quality standards

and implementation procedures that are at least as restrictive as the GLWQG. The objective of the GLWQG is to ensure consistency of water quality standards for these waters among the Great Lakes states.

Section 303(d) of the CWA requires states to prepare lists of water bodies that do not meet water quality standards or designated uses. Total maximum daily load (TMDL) allocations for point and nonpoint sources for these "impaired waters" must be developed by the states to achieve compliance with their water quality standards. EPA has the authority to approve the 303(d) lists and the TMDLs. If a state does not submit an approvable 303(d) list, EPA must prepare and promulgate the list. EPA also must develop and implement TMDLs for impaired waters if a state does not act or does not adopt approvable TMDLs.

Section 308 of the CWA gives EPA authority to collect the information it needs to develop categorical effluent limitations guidelines and standards, water quality data, and other types of information required to implement provisions of the CWA. The EPA can, and has, used its Section 308 authority to require point sources to collect data for sediment quality, water quality, and fish tissue from the waters to which they discharge. Section 308 also authorizes EPA to enter and inspect the site of a point source discharger.

EPA regulations at 40 CFR 124 allow the public to appeal NPDES permits. Appeals occur in two tiers: (1) administrative appeals through EPA, and in the event that administrative appeals fail, (2) judicial appeal of the contested permit conditions to a federal district court. An "affected person" may appeal the limits and conditions in an NPDES permit, which includes the permittee and members of the public that reasonably can demonstrate that they have an interest in the permit action. The rules regarding who has standing to appeal a final NPDES permit are quite generous; most national and state environmental groups have sufficient standing to appeal a permit. Federal and state agencies, such as the U.S. Fish and Wildlife Service, may also appeal final NPDES permits. The appeals process is described in more detail in Section 7, **Hearings and Appeals**.

State and Local Authority

EPA may grant a state authority (delegate) to administer all or part of the NPDES program. Typically, delegated states will have authority for the entire NPDES program, subject to EPA oversight. State authority includes public participation and administrative and judicial procedures specified in the federal regulations.

EPA regulations at 40 CFR 123 specify the minimum requirements of state NPDES programs. These regulations describe the coordination required between states and EPA regions. They also specify what must be included in a state's NPDES program.

Even though states must meet, at a minimum, the applicable requirements of 40 CFR 122, they are allowed to establish regulations that are more restrictive. Many states have specific requirements that are more stringent than EPA's, such as concentration limits in addition to mass limits required by EPA and limits on effluent maximum flows.

Although not a common practice, states may delegate responsibility for state NPDES permits to local or regional authorities. For example, California and Pennsylvania have delegated authority to regional agencies, although these regional agencies are arms of the state agencies that have overall NPDES permitting authority.

Section 303 of the CWA gives states the primary responsibility of developing water quality standards for all surface waters within their jurisdiction. States must review and revise their water quality standards, as necessary, every three years. Water quality standards consist of several parts: (1) numeric criteria for specified water quality constituents; (2) narrative criteria to protect a number of water quality characteristics that cannot be expressed by numeric criteria; and (3) designated uses. Most state water quality standards also include provisions such as for mixing zones, averaging periods for numeric criteria compliance, and procedures for developing site-specific numeric criteria and designated uses. States have considerable latitude in the development of their water quality standards; therefore, their standards and implementation procedures are very state-specific. EPA issues national water quality criteria and guidance, but with the exception of the GLWQG described earlier, EPA allows considerable opportunity for states to deviate from the national guidance if such deviations can be scientifically justified.

Even if a state does not have NPDES authority, a state does have the authority and responsibility under Section 401(a) of the CWA to certify whether an EPA-proposed NPDES permit will comply with the state's water quality standards. EPA must include any conditions of the state water quality certification in the NPDES permit. Some states and territories without NPDES delegation use the state certification provision to incorporate many state-specific provisions into NPDES permits.

Delegated states must have regulations that allow appeal of permit decisions. State regulations must specifically provide the opportunity for affected persons to challenge an NPDES permit in state district courts, and standing requirements must be consistent with those of the EPA rules. These appeals

are typically provided for under the state administrative procedures act. States are not required to have an evidentiary hearing process similar to that provided by EPA regulations at 40 CFR 124, although many states do provide for such hearings.

Section 3

Types of Permits

Two types of NPDES permits are discussed in this manual, general permits and individual permits. This section briefly describes each of these permit types. Detailed discussions of NPDES permit applications and permit requirements are presented in Section 4, **Elements of a Permit** and Section 5, **Permit Applications**. Because requirements among states vary so much, details of state NPDES permits that are unique to a particular state are not specifically discussed in this manual.

General permits contain "generalized" permit conditions; they cannot be tailored to a specific site—they are a "one size fits all" type of permit. Individual permits are meant to be tailored to specific site conditions. These two types of permits are discussed in more detail here.

Individual Permits

Individual NPDES permits are tailored to each specific facility. They require detailed permit applications and significantly more time and effort to obtain than general permits. Individual permits can apply to any type of surface water discharge—including process wastewater, utility wastewaters, storm water, and sanitary wastewater.

Like the individual NPDES permit, an individual state permit also applies to all types of discharges. If a state has the authority from EPA to run the NPDES program, a facility will receive only a state permit. On the other hand, if a state does not have NPDES authority, the facility will receive an EPA permit and in some cases, a state permit as well.

Because an individual permit process has so many steps and can be quite complicated, it is the main focus of this guidance manual.

General Permits

A general permit may be issued by EPA or NPDES-delegated states to cover a group of discharges that have similar characteristics. A general permit can be issued when there are a number of dischargers that:

- Involve the same or substantially similar types of operations;
- Discharge the same types of wastes;
- Require the same effluent limitations or operating conditions;

- Require the same or similar monitoring requirements; and
- Are considered more appropriately controlled under a general permit than under an individual permit.

There are many types of discharges covered by general permits. Examples of general permits for discharges related to the petroleum industry and petroleum products are listed in Table 3-1. The availability of these and other general permits vary by state. Those interested in knowing which general permits are available in their states should contact their state permitting authority.

Table 3-1. Examples of Types of Discharges Covered by General Permits*

Permit Category	Discharge Description
Aquifer restoration	Contaminated ground water, which contains or is being treated for only petroleum-related contaminants with a maximum discharge rate of 50 gallons per minute.
Fuel spill cleanup	Discharges resulting from corrective actions of ground and/or surface water that has been exposed to gasoline and/or petroleum-related products from point sources, including discharges through municipal separate storm sewer systems.
	Treated ground water polluted by fuel leaks from service stations and similar sites.
	Extracted and treated ground water resulting from the cleanup of ground water polluted by fuel and other related waste leaks in fuel storage and dispensing facilities.
Ground water cleanup	Contamination by fuel oil and gasoline.
	Petroleum-contaminated ground water.
Hydrostatic oil and gas lines	Discharges of waste from structural integrity testing of new tanks and pipelines used to hold drinking water, sewage, or natural gas.
Offshore oil and gas exploration, development, and production facilities	Discharges of sanitary and domestic wastewater from mobile, exploration, development, and production camps; gravel pit dewatering; use of water from gravel pits for construction of ice structures and road watering; and construction dewatering.
	Produced water.
Onshore oil and gas extraction	Ground water cleanup of gasoline.
	Water produced from oil-producing facilities.

Petroleum bulk stations and terminals	Storm water, tank bottoms, water draws, hydrostatic test water, and ground water resulting from storage, handling, transportation, cleanup of contaminated ground water, cleanup of contaminated soils, investigations of potential contaminations, or other operations involving petroleum and its derivatives.
Storm water	Industrial activities.
	Construction activities.
Underground storage tanks	Discharges of contaminated ground water/storm water from construction-related excavation projects.
	Discharges of ground water contaminated with gasoline or petroleum related products, which have been treated using multi-stage granular activated carbon treatment systems.
	Uncontaminated ground water from petroleum pits.

* The availability of these and other general permits vary by state. Those interested in knowing which general permits are available in their states should contact their state permitting authority.

One of the most commonly implemented types of general permit is the storm water general permit. The relationship between a general storm water permit and an individual NPDES permit is shown in Figure 3-1.

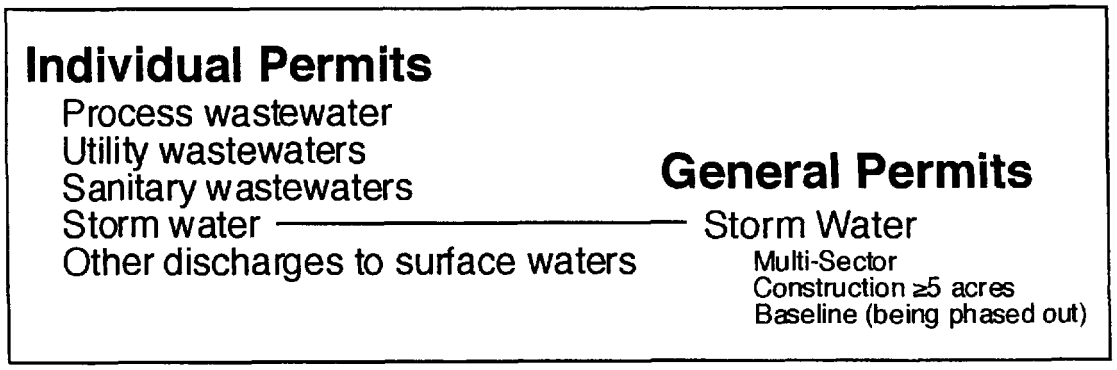

Figure 3-1. Relationship Between General Storm Water and Individual NPDES Permits

Note from Figure 3-1 that storm water discharges may be regulated by either an individual NPDES permit or general permit. Whether a storm water discharge is covered under a general or individual permit depends on the type of discharge and the preferences of both the permittee and the regulatory

agency. For example, a facility may choose a general rather than an individual permit because the general permit is easier and faster to obtain. On the other hand, the facility may choose the individual permit because the general permit is not applicable to its type of storm water discharges, because permit requirements can be tailored to its specific discharge, or because a single permit is preferred for both process and storm water outfalls.

As shown in Figure 3-1, there are three types of general NPDES permits for storm water—multi-sector, construction, and baseline (industrial general). EPA is phasing out the baseline industrial general permit in preference for the multi-sector permit. However, because the baseline permit was still in use by some facilities at the time this manual was written, it is included in the discussion here. The baseline industrial general permit was issued by EPA in 1992 for a five-year term until September 9, 1997. It has general applicability for most storm water discharges, but does not cover certain types. Most importantly, it cannot be used for storm water discharges that are covered by national effluent limitation guidelines, including those from petroleum refining and asphalt emulsion facilities.

EPA is replacing the baseline industrial general permit with the multi-sector general permit (see EPA correspondence in **Appendix 1**), which tailors requirements to 29 different industrial and facility sectors. Table 3-2 lists the petroleum industry sectors in the multi-sector permit. The original multi-sector storm water permit issued by EPA in 1995 has been revised several times since then. One of the most important revisions was to include petroleum refining facilities, which were added to the original oil and gas extraction sector. However, contaminated storm water subject to national effluent guidelines, at either extraction or refining facilities, may not be permitted through the multi-sector permit, instead requiring an individual permit. Areas at refineries which may be eligible for coverage include vehicle and equipment storage and maintenance and refueling areas. Gasoline service stations are not included in any of the specific sectors of the multi-sector permit; however, other state general permits may be issued to cover certain discharges from stations such as contaminated ground water.

The general permit for construction activities originally was issued by EPA in 1992 for a five-year period, and in 1998, EPA reissued the permit with modifications. The general construction permit applies to construction areas of 5 or more acres, including activities such as clearing, grading, and excavation. The multi-sector permit does not cover industrial activity from construction that disturbs 5 or more acres; however, storm water from smaller construction areas may be combined with storm water that is discharged under a multi-sector or baseline general permit. In 1998, EPA proposed storm water regulations for construction sites less than 5 acres separate from the multi-sector permit; at the time of this writing, EPA had not issued final regulations.

States that do not have EPA-authorized NPDES programs cannot develop state-specific general permits under the NPDES program. However, most states do have NPDES authority, and can either develop their own type of general permit or adopt EPA's. For example, when Louisiana obtained authority for the NPDES program in 1996, it took over EPA's general permits, with the exception of those in Indian lands—these general permits remained unchanged with the same expiration date as originally set by EPA. Texas, which received NPDES delegation in 1998, is taking over EPA's general storm water permits in phases. In Oklahoma, EPA has NPDES permitting authority for oil and gas exploration- and production-related industries and pipeline operations. Because states have limited authority, and because different states handle the transfer of EPA general permits to their delegated programs differently, applicants should check with their individual states to determine who is the permitting authority for the particular discharge, and which application forms should be used.

Table 3-2. Petroleum Industry Sectors in the NPDES Multi-Sector Storm Water Permit

Sector	Comment
Oil and Gas Extraction Facilities and Petroleum Refineries	Covers extraction facilities that have had a reportable quantity of oil or hazardous substance released in storm water. Covers storm water not commingled with "contaminated runoff" (that which is subject to national effluent guidelines).
Asphalt Paving and Roofing Materials Manufacturers and Lubricant Manufacturers	Lubricant manufacturers include re-refining facilities, but do *not* include petroleum refining facilities or oil recycling facilities.
Vehicle Maintenance or Equipment Cleaning Areas at Petroleum Bulk Oil Stations and Terminals	Also includes activities not related to petroleum industry—motor freight transportation facilities, passenger transportation facilities, rail transportation facilities, and United States Postal Service.
Vehicle Maintenance Areas and/or Equipment Cleaning Operations at Water Transportation Facilities	Includes deep sea foreign and domestic, Great Lakes, and other water freight transport.
Hazardous Waste Treatment, Storage, or Disposal Facilities	Includes those operating under interim status or permit under Subtitle C of RCRA.
Landfills and Land Application Sites	Includes sites under Subtitle D of RCRA.
Scrap and Waste Recycling Facilities	Liquid waste recycling facilities, typically identified under SIC 5093, include used oil recycling facilities. Liquid waste recycling facilities are typically classified as service centers including those that accumulate spent solvent, used oil, and antifreeze. Re-refining facilities are covered under the multi-sector permit for lubricant manufacturers.

Section 4

NPDES Permit Elements

This section of the guidance manual describes the common elements of an NPDES permit. The minimum content of an NPDES permit is specified at 40 CFR 122 and all NPDES permits have the same general format. However, because permitting agencies develop their own specific formats, the look and content of a permit will differ among agencies. Therefore, the description of the NPDES permit given here is only a general one and will not reflect a specific permit exactly.

Cover Page

The cover page of the NPDES permit identifies the discharger's legal name, address, and physical location. It also identifies the discharge outfalls (usually by number) and the name and state segment number of the receiving water. The latitude and longitude of each outfall usually is included, although sometimes the outfall location is shown on the first page of the "effluent limitations and monitoring requirements section" instead. The cover page includes the effective date of the permit and the expiration date or duration. The cover page is signed by a designated representative of the permit agency.

Effluent Limitations and Monitoring Requirements

The first major section of an NPDES permit contains effluent limitations and monitoring requirements. These requirements are often identified as Part 1 of the permit. The effluent limitations and monitoring section is usually, but not always, where enforceable, numerical permit limits are found.

Usually, there are separate pages for each outfall. If several outfalls have identical limits (such as for cooling water or storm water), the requirements may be listed only once for the set. It is unusual for process outfalls at the same facility to have identical numerical permit limits and monitoring conditions; each process outfall usually has a separate page. There also may be separate pages for internal outfalls. The purpose and regulatory authority for internal outfalls are discussed later in this section.

The first page of the "effluent limitations section" identifies the particular outfall and describes the discharge from this outfall in detail. For example, a typical description is:

The permittee is authorized to discharge from Outfall 001: the continuous discharge of treated process wastewater, utility wastewater, process area storm water runoff, and hydrostatic test water.

Numerical limits usually are of two types: the daily average and the daily maximum. The daily average limit represents the maximum allowable average of all individual daily samples collected in a calendar month (i.e., it is a maximum monthly average). The daily maximum limit is the maximum for any one day (or 24-hour period). If only one sample is analyzed during a month, it must be compared to both the daily average and daily maximum limit. In this case, because the daily average is never higher than the daily maximum, the average limit controls, and the maximum limit is essentially irrelevant.

Some states also include grab sample limits in NPDES permits. A grab sample typically is defined as one collected within 15 minutes or less. Grab sample limits usually are set for concentrations rather than mass loadings.

EPA regulations at 40 CFR 122.45(f) specify that numerical pollutant limits should be expressed as mass discharged per unit of time (kilograms/day or pounds/day) whenever possible. Obviously, parameters such as temperature, fecal coliform, pH, and whole effluent toxicity (WET) (see Section 9, **Tool Box**) cannot be expressed as mass limits, but almost every other wastewater constituent can.

Effluent limits sometimes are expressed as concentrations. Most often, this is done by states as a matter of policy, and the concentration-based limits are included in permits along with mass limits. However, for effluents with highly variable flow rates (such as storm water), it is common for permit limits to be expressed as concentrations because monitoring for compliance with mass limits for such discharges is impractical. The NPDES regulations 40 CFR 122.45(f)(1)(ii)-(iii) allow concentration limits when mass limits are infeasible or when an effluent limitations guideline is expressed as a concentration.

The "effluent limitations section" of the permit lists every pollutant regulated in each internal and final outfall. There are numerical limits for each pollutant, unless the permit specifies "only monitoring and reporting" for a pollutant (see **Monitoring** later in this section). The numerical limits are developed as either technology-based or water-quality-based limits, which are described below. The calculation methods for these two types of limits are described in Section 9, **Tool Box**.

Technology-Based Limits

As discussed in Section 2, **NPDES Program Basics**, technology-based permit limits are required by Section 301 of the CWA. These numerical limits are established using national categorical effluent limitations guidelines at 40 CFR 401-499. These guidelines apply to specific industrial categories in manufacturing or service operations. Technology-based limits for industrial dischargers are defined by EPA for different treatment levels and pollutants. The technology-based limits are defined as follows:

- Best practicable technology (BPT)—The level of treatment required to be achieved by industrial dischargers by 1977. This technology is now directed toward pollutants that EPA defines as conventional pollutants (BOD, TSS, pH, oil and grease, and fecal coliforms). BPT effluent guidelines that were first promulgated before 1977 may also include limits on nonconventional and toxic pollutants.

- Best conventional technology (BCT)—A level of treatment for conventional pollutants that is more stringent than BPT. BCT limits are only established for an industrial category when a specialized cost test demonstrates that the limits are cost-effective as compared to the costs to upgrade a publicly-owned treatment works (POTW) to advanced treatment. For most industrial categories, BCT and BPT limits are the same.

- Best available technology (BAT)—The level of treatment required for toxic pollutants and nonconventional pollutants. Toxic pollutants are typically individual organic chemicals (e.g., benzene, phenol, benzo(a)pyrene) and metals (e.g., copper, mercury, chromium). Nonconventional pollutants are a catch-all category for pollutants that are not conventional or toxic. For example, ammonia, total phenols, chemical oxygen demand (COD), and total organic carbon (TOC) are nonconventional pollutants.

- New source performance standards (NSPS)—This is the level of treatment required for new sources in a point source category. A new source is any independently functional manufacturing process, even if it is at an existing plant site, that is constructed after NSPS is proposed or more often, after promulgation of NSPS. The concept of NSPS is that a new manufacturing process or processes, with its associated treatment, can cost-effectively achieve a higher treatment level than an existing source, which must retrofit its operations and treatment to achieve the effluent guidelines. The idea is that a the new source can incorporate pollution prevention at the design stage, thus reducing

pollutant generation at the source, as well as include more efficient end-of-pipe treatment processes. NSPS are established for conventional, nonconventional, and toxic pollutants. A facility that has to meet NSPS is exempted from any more restrictive effluent limits on conventional and nonconventional pollutants for 10 years (2 permit terms) from the date of startup. This exemption does not apply to standards for toxic pollutants.

Effluent guidelines specify both the pollutants that must be regulated in an industrial discharge and the numerical limits that must apply to each pollutant. In most guidelines, the numerical limits are calculated on the basis of manufacturing production rate (per unit of raw material or product). For example, the limits for COD may be specified in the guidelines as kg/1000 kg of product manufactured. The manufacturing rate would be expressed on a daily operation basis (1000 kg/day). Therefore, multiplying the manufacturing rate by the limit would give the allowable daily mass of COD (kg/day) that could be discharged. A few effluent guidelines are expressed in concentration terms, and must be multiplied by the regulated process wastewater flow rate to calculate the mass-based permit limits. The calculation of technology-based limits from effluent limitations guidelines is described in more detail in Section 9, **Tool Box**.

There are many industrial services and operations for which there are no national categorical effluent limitations guidelines. For those wastewaters, permit writers must establish case-by-case technology-based effluent limits. These limits often are referred to as best professional judgment (BPJ) permit limits. BPJ limits are based on agency policy, effluent limits established for discharges with similar characteristics, treatment technology assessments by the permit writer, data submitted by the permit applicant, and technology transfer from effluent guidelines for wastewaters considered similar to the discharge. In addition to establishing BPJ limits for process wastewater not regulated by categorical effluent limitations guidelines, the permit writer will establish BPJ limits for other, nonprocess wastewaters such as cooling water (both once-through and recycle/blowdown streams), demineralizer water, steam condensates, scrubber blowdown, and if not regulated as process wastewater, storm water from process areas.

In many cases, because discharges often are mixtures of process wastewater regulated by effluent limitations guidelines and other wastewaters not covered by a guideline ("unregulated" with respect to a guideline), permit limits for these discharges will be based on both guidelines and BPJ. In such cases, the technology-based permit limits are created by a "building-block approach" using the technology-based limits for each waste stream.

Pollutants assigned technology-based permit limits include those in the applicable effluent limitations guidelines and any pollutants identified in the permit application that the permit writer believes is a concern and requires regulation. Every pollutant regulated by a guideline must be included in the permit, even if the pollutant is not discharged, unless the guideline specifically allows it to be excluded. As discussed in Section 5, **Permit Applications**, it is important to provide a comprehensive listing of all pollutants known or believed to be present in a discharge in order to use the permit as a shield from enforcement action for unauthorized discharges of a pollutant (see Appendix 2, **EPA Memo on Permit as Shield**). A permit writer is not obligated to regulate every pollutant identified in the permit application, because many of the pollutants so identified are considered to be controlled effectively when other pollutants regulated by the effluent guidelines are controlled (see Section 9, **Indicator Parameters**).

Water-Quality-Based Limits

Water-quality-based permit limits are required by Section 302 of the CWA when they are determined to be necessary to meet state water quality standards and protect designated uses of the receiving water. Water-quality-based effluent limits (WQBEL) and technology-based limits establish a hierarchy of permit limits. Technology-based limits establish the minimum acceptable level of treatment for regulated pollutants. If there is a numerical state water quality criterion for a pollutant, the permit agency must calculate an allowable discharge level that will not cause or contribute to the exceedance of the criterion. This allowable discharge level is the WQBEL. If the WQBEL is more restrictive than the technology-based limit, or if there is no technology-based limit, then the WQBEL becomes the permit limit. If the technology-based limit is more restrictive than the WQBEL, then the technology-based limit becomes the permit limit.

WQBELs for those pollutants with numerical water quality criteria are calculated using the state's implementation procedures for water quality standards. Example WQBEL calculations are included in Section 9, **Effluent Limit Calculations**.

WQBELs also will be included in NPDES permits for pollutants which have a TMDL or waste load allocation (WLA) for the receiving water. TMDLs and WLAs are established when discharges cause or contribute to a water quality standards excursion, even though all the dischargers are in compliance with technology-based limits. The derivation and application of TMDLs and WLAs are discussed in Section 9, **TMDLs and Waste Load Allocations**.

In addition to numerical water quality criteria, there are narrative criteria that also must be achieved. Every state has a narrative criterion that prohibits the discharge of toxic substances in toxic amounts. Usually, this narrative criterion is implemented by including whole effluent toxicity (WET) test requirements in the NPDES permit (see Section 9, **Biomonitoring**). Most permit agencies do not establish permit limits for WET unless the discharger has a history of effluent toxicity. However, some states do include WET limits in NPDES permits for every industrial discharger determined to have the potential to cause or contribute to aquatic toxicity in the receiving water.

Internal Outfalls

In some cases, NPDES permits will contain effluent limits and monitoring requirements for discharges before they combine in a final outfall. Such discharges are called "internal outfalls." Internal outfall limits are authorized by NPDES regulations at 40 CFR 122.45(h) when establishing limits at the final outfall is impractical or infeasible. Internal outfall limits are to be established only when there are exceptional reasons for doing so.

In general, internal outfall limits are established only when compliance with an effluent limitations guideline or BPJ limit for a process wastewater cannot be determined at the final outfall because of dilution by another wastewater stream. An example is a process effluent covered by an effluent guideline mixed with once-through cooling water before the final outfall. The flow rate of the cooling water may be much higher than the process wastewater, diluting the latter such that the pollutant limit in the combined discharge would be lower than the analytical detection limit. Therefore, an internal outfall can be established to monitor compliance with effluent limits before mixing with the cooling water. This is the principal reason for establishing internal outfalls in NPDES permits.

Similarly, an internal outfall may be assigned when a regulated process wastewater stream is a small fraction of the total process wastewater. An example is the effluent limitations guidelines for organic chemicals manufacturing facilities at 40 CFR 414. These guidelines include BAT limits on cyanide and metals, which apply only to process wastewaters identified as cyanide-bearing or metals-bearing. In some cases, internal outfalls are specified solely for the cyanide or metals treatment unit effluent. Usually, however, the limits are set on the combined process wastewater.

Narrative Permit Limits

NPDES permits also may include narrative limits. Narrative limits are unusual, and are usually expressed as prohibitions on certain wastewater

discharges. For example, a permit may prohibit discharges from a storm water outfall during dry weather ("dry weather flow"). The permit also may prohibit certain chemicals in cooling water systems; such limits usually are included in the "other requirements" section of permits. A common narrative limit is prohibiting the discharge of excessive floating solids or visible foam.

Flow Limits

NPDES regulations do not require limits on discharge flow rate. However, some state regulations do require flow limits in the NPDES permit. If flow limits are included, usually they will be for the same duration as specified for pollutant limits – usually a maximum monthly average (daily average) and a daily maximum.

Monitoring

The required monitoring frequency and sample type are specified in the NPDES permit for each pollutant regulated with a numerical limit. In addition, monitoring requirements may be specified for pollutants even when no numerical limit has been set. In this case, the only requirement is to report the monitoring results ("report only").

The monitoring frequency may be continuous (e.g., for flow, pH, and temperature) or in terms of the number of samples to be collected in a given time period. Typical frequencies are daily, one or more times per week, monthly, quarterly, or yearly. In general, monitoring frequencies less than once per year are not used in NPDES permits.

Sample types specified in permits include continuous, grab, and 24-hour-composite samples. A continuous sample is one collected with a direct-reading instrument, such as a pH meter. In most cases, recording is also continuous, although EPA and states generally will allow use of data systems that record at intervals, such as once a minute. In this case, the sample frequency usually is negotiable with the permit writer. A grab sample typically means a sample collected within 15 minutes. A 24-hour composite sample can be a continuously collected, flow-weighted sample or a sample prepared by combining, on a flow-weighted basis, grab samples that are collected at equal intervals over a 24-hour period. In some cases, equal volume subsamples can be used to prepare composite samples. The permit will specify the composite sampling requirements, which may be different for specific pollutants. For example, compositing requirements for volatile organic pollutants often will be different from those for nonvolatile organic pollutants.

Although NPDES permits do not have to contain limits on flow rates, all permits must require some type of flow monitoring. The monitoring provisions will specify the type of flow measurements that must be collected and reported. For large industrial facilities with continuous discharges (e.g., greater than 1 million gallons per day), NPDES permits will typically require continuous monitoring and recording of effluent flow rates. Small continuous discharges and intermittent discharges (including storm water) will typically require monitoring on a periodic basis, but not continuously.

Except in special cases, the permit does not specify the exact analytical methods for monitoring; however, the permit will include in the "general conditions" section a provision requiring methods approved at 40 CFR 136. These methods must be used unless there is no method at 40 CFR 136 for the pollutant. In this case, the analytical method will be specified in the "other requirements" section.

The permit also will specify the sample location for outfalls. A typical description of a sampling location would be:

> Samples taken in compliance with the monitoring requirements specified in this permit shall be collected at the following location: Outfall 001 at the final weir box prior to discharge to the Blue River.

The permit contains other requirements and instructions relating to the monitoring and effluent limits. A typical example is reporting pH excursions when continuous monitoring is required by the permit. EPA regulations at 40 CFR 401.17 allow for short-term, infrequent excursions outside pH limits. This provision may be included as a footnote or other provision in the permit.

Footnotes are used to note when a particular permit limit or monitoring condition becomes effective, if it is not effective for the entire permit duration. For example, when a permit contains a compliance schedule, a footnote on the numerical limit specifies the time, within the permit term, when the limit becomes effective. Footnotes also may be used to require notification of the permit agency when a certain manufacturing or treatment process that is under construction, or is temporarily shut down, is brought into service.

Compliance Schedule

When limits cannot be met at the same time the permit becomes effective, the permit may include a compliance schedule for achieving limits later within the permit period. The compliance schedule usually requires periodic progress reports.

Reporting of Monitoring Results

The permit specifies how often and when monitoring results are submitted to the permit agency. The permit specifies the discharge monitoring report (DMR) form to be used for submittals. Usually, monitoring results must be reported monthly. The due date for each month's DMR usually is 15 days to 25 days after the end of the month.

Standard Conditions

Standard conditions of NPDES permits often are referred to as "boilerplate." Appendix 3 contains a copy of the standard conditions from an NPDES permit from EPA Region VI. The standard conditions required in all NPDES permits are defined at 40 CFR 122.41. Table 4-1 is an outline of these conditions. Several of the standard conditions identified in Table 4-1 deserve additional discussion and explanation, namely, the upset provision, the bypass provision, and notification of changes in discharges.

Table 4-1. Outline of Standard Conditions of NPDES Permit

General Conditions

- Duty to comply—permittee must comply with all conditions of permit.
- Toxic pollutants—permit will be modified to conform to new more stringent toxic limits; permittee must comply with regulatory deadlines for toxic pollutants despite conditions in permit.
- Duty to reapply—permittee must reapply to continue permit; application must be submitted 180 days before permit expiration date.
- Permit flexibility—permit may be modified, revoked and reissued, or terminated for cause.
- Property rights—permit does not convey property rights or exclusive privilege.
- Duty to provide information—permittee must provide information and copies of records.
- Criminal and civil liability—except for bypasses and upsets, permit provisions do not relieve permittee from civil or criminal penalties for noncompliances.
- Oil and hazardous substance liability—permittee remains subject to liability under Section 311 of CWA.
- State laws—permittee remains subject to state law and regulation.
- Severability—permit provisions are severable, invalidation of individual provision does not invalidate remaining provisions.

Proper Operation and Maintenance

- Need to halt or reduce not a defense—permittee cannot use as a defense for a permit excursion that it would have had to halt or reduce a facility operation to prevent the excursion.
- Duty to mitigate—all reasonable steps must be taken to prevent discharges in violation of the permit.
- Proper operation and maintenance—all treatment equipment must be properly operated and maintained, adequate staffing is required, and sufficient operating data must be collected.

Table 4-1.*Continued*

Bypass of treatment facilities—bypasses are allowed if they do not cause permit violations, but only for essential maintenance. Notification of anticipated bypass is required. Bypasses that are not for essential maintenance are prohibited except to prevent loss of life, personal injury, or severe property damage.

Upset conditions—upset conditions are an affirmative defense for permit violations of technology-based permit limits; causes of upset must be demonstrated.

Removed substances—sludges, oils, and other pollutants removed from wastewater by treatment must be properly disposed.

Monitoring and Records

Inspection and entry—representatives of the permit agency must be allowed access to the facility for review of records and treatment facilities, and collection of samples.

Representative sampling—samples must be representative of the effluent discharge.

Retention of records—all monitoring records and records used in preparation of the permit application must be maintained for 3 years.

Record contents—records must include sampling dates, times, person collecting the sample, date and time of analysis, analyst name, analytical method used, results of analysis

Monitoring procedures—monitoring must be in accordance with 40 CFR 136. All monitoring and analytical instruments must be calibrated and maintained. Adequate QA/QC is required.

Flow measurements—flow measuring devices must be properly maintained and calibrated; flow measurements must be accurate within ± 10%.

Reporting Requirements

Planned changes—notification is required if any planned changes will cause the facility to be subject to new source requirements and/or there will be a significant change in the quantity or types of pollutants discharged.

Anticipated noncompliance—advance notice is required of any planned changes that may result in noncompliance with permit requirements.

Transfers—permit is non-transferrable except after notice to and approval from permit agency.

Discharge monitoring reports and other reports—DMRs must be filed on appropriate form and with authorized signature. Address of DMR recipient is listed.

Additional monitoring by the permittee—if a permittee monitors any limited pollutant more frequently than required by the permit, and uses approved analytical methods, these data must be reported on the DMR.

Averaging of measurements—an arithmetic average is to be used unless otherwise specified.

Twenty-four hour reporting—any noncompliance that may endanger health or the environment must be reported orally within 24 hours.

Other noncompliance—all other noncompliance with permit conditions shall be reported with the DMR.

Other information—when a permittee becomes aware of any relevant facts not included in the permit application, such information shall be reported to the permitting agency.

Changes in discharges of toxic substances—any discharge of a toxic pollutant on a frequent or routine basis that is not limited in the permit must be reported if defined notification levels are exceeded.

Table 4-1.*Continued*

	Signatory requirements—all required reports shall be signed and certified; signatory requirements are specified.
	Availability of reports—any information other than applications, effluent data, permits, and DMRs may be declared as business confidential if permit authority is notified at the time of submission.
Penalties for Violations of Permit Conditions	
	Criminal penalties—for negligent violations, knowing violations, knowing endangerment, and false statements.
	Civil penalties—up to $25,000 per day for each permit violation.
	Administrative penalties—Class I is $10,000 per day per violation up to $25,000; Class II is $10,000 per day per violation to $125,000 maximum.
Definitions	
	Terms such as daily average, daily maximum, etc., as used in the permit.

Upset Provision

The upset provision at 40 CFR 122.41(n) is a valuable permit condition for the discharger. It offers a defense from enforcement action on a permit violation if certain criteria are met. This provision is only available for violation of a technology-based permit limit. The upset provision is not a defense from enforcement action for a violation of a water-quality-based permit limit.

In order to use the upset defense, the permittee must establish, through properly signed operating logs for the period in question, or other relevant data, that:

- An upset occurred and that the permittee can identify the cause(s) of the upset;
- The permitted facility was being properly operated at the time of the upset;
- The permittee submitted notice of the upset within 24 hours of when the permittee became aware of the permit violation; and
- The permittee took all reasonable steps to mitigate the permit violation.

Because of the restrictive notification requirements, a discharger must be aware of the upset defense whenever monitoring data are received and reviewed. Whenever the exceedance of a permit limit is identified in the

monitoring data, the discharger must determine quickly if the violation was due to an upset and if the upset provisions (notification, mitigation, identification) can be met.

Bypass

The definition of a bypass in the NPDES regulations at 40 CFR 122.41(m) is broad. It is any intentional diversion of waste streams from any portion of a treatment facility. Thus, if a secondary clarifier is taken out of service for repair, it is technically a bypass, even if another clarifier is in operation and all permit limits are consistently achieved. Bypass of treatment that does not result in a permit violation is acceptable provided that the bypass is for essential maintenance to assure efficient operation. The example of the secondary clarifier would be this type of bypass. This form of bypass does not require notification of the permit agency, but records should be maintained showing when the unit was out of service and the type of maintenance required.

Bypasses of treatment equipment that result in violations of permit limits are prohibited and may result in enforcement action. The only defense against enforcement for a bypass that results in the violation of a permit limit is if the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. To demonstrate that a bypass was unavoidable, the discharger must show that there was no feasible alternative to the bypass. A bypass is not unavoidable if adequate backup equipment could have been installed by the discharger to prevent a bypass which occurs during normal equipment downtime or preventive maintenance.

If a bypass that may cause a permit violation is anticipated in advance, the permit agency is required to be notified, at least 10 days in advance, if possible. For unanticipated bypasses, the permit agency must be notified within 24 hours of the bypass.

If a treatment process is used for effluent polishing, but does not need to be in continuous operation, diversion of treated effluent around the treatment process would be considered to be a bypass, *unless the permit application clearly shows that the treatment process is contingent treatment and that effluent can be diverted around the unit if the treatment is not needed.* An example is end-of-pipe carbon columns used only when testing indicates the presence of elevated organic constituents in a biotreatment effluent. It is very important that treatment units and their operation are clearly identified and described in the permit application.

Notifications of Changes in Discharge

There are two types of standard notification requirements that are of particular importance to industrial dischargers. The first deals with planned changes in the permitted facility; the second deals with discharges of toxic pollutants.

Industrial facilities often make planned changes in their manufacturing processes, utilities, and treatment systems during the duration of an NPDES permit. Notification to the permit agency is required at 40 CFR 122.41(l)(1) under two conditions:

1) If the alteration or addition to the permitted facility meets the criteria at 40 CFR 122.29(b) for a new source; or

2) If the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification requirement applies only to pollutants that are not specifically limited in the permit and that are not toxic pollutants.

Although notification of planned changes that do not meet the above conditions is not required by the permit, it is always good practice to notify the permit authority of any significant changes at the facility in order to ensure that the permit file for the facility is complete.

The notification requirement for toxic pollutants at 40 CFR 122.42(a) applies to those not specifically identified and regulated in the permit. Notification is required if the discharge exceeds the highest of the following levels:

- One hundred micrograms per liter (100 µg/L);
- Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; 500 µg/L for 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol (4,6-dinitro-o-cresol); and 1 mg/L for antimony;
- Five times the maximum concentration reported for that pollutant in the permit application; or
- A specific notification level established in the permit.

Tables II and III at 40 CFR 122, Appendix D, list some of the more common toxic pollutants that are subject to this notification requirement. (Note that

"total phenols" listed in Table III is a method-defined parameter and not a toxic pollutant per se.)

Other Conditions

All NPDES permits have an "other conditions" section (sometimes called "other requirements") which is used by the permit agency to incorporate agency policies and special monitoring or study requirements into the permit, to specify analytical methods to be used for monitoring (if different from those in 40 CFR 136), to specify analytical reporting requirements such as detection or quantification limits, and to describe the methods to be used and reporting requirements for WET testing. Mixing zone requirements and dimensions may also be included in the "other conditions" section of the NPDES permit.

Because the "other conditions" sections of permits may contain a variety of conditions, which are based on the permit writer's evaluation of the application and permit agency policies and procedures, it is impossible to generalize the contents of this section. In some permits, the other conditions section may consist of only one or two provisions; in others, there may be 20 or more special provisions. The permittee must understand that this section of the permit has equal importance with the other more standard sections and every provision must be carefully read and met.

Section 5

Permit Applications

This section of the manual discusses the preparation of individual and general permit applications. Because most of the information in the application is straightforward and covered by the application instructions, this section covers only certain items needing additional guidance.

Application Forms

Application forms are available from permitting agencies or can be found in the NPDES regulations. Permitting agencies may have the forms available electronically and downloadable through the internet. Because the application forms can be lengthy, printed forms that are not available as word processing files can be scanned into the computer to make typing and editing easier.

Individual Permits

This subsection discusses deadlines, preparation time, various application forms, and application content.

Deadlines

For new discharges, individual permit applications must be submitted 180 days before the discharge starts. For new storm water discharges from construction activities, applications must be submitted 90 days before construction starts (180 days for other storm water discharges). For renewal of individual permits, applications must be submitted 180 days before the existing permit expires. Applications to request changes to the permit before the renewal deadline may be submitted at any time. The general rule is to submit any permit application at least 180 days before the requested change is to take place.

The above deadlines are regulatory drop-dead times. Applications should be submitted earlier if timing is critical for a project, the wastewater system is particularly complex, special issues need to be addressed, a lengthy public hearing is likely, the permitting agency is slow in processing applications, or for any other reason that may require extra time. The amount of extra time that will be needed depends on individual circumstances; however, two to six months ahead of the 180-day deadline is typical.

Preparation Time

Preparing a permit application is straightforward; however, a significant amount of time is required to collect the necessary data and put them together in a well-organized and complete package. Permit writers appreciate applications that are well prepared. Some of the more time consuming tasks are outlining and scheduling laboratory analyses of discharges, preparing maps and drawings, and writing technical reports. Generally, preparation requires a minimum of two months for simple applications or permit renewals with minor changes. This is not two man-months of continuous work, but includes the time waiting for laboratory analyses, company approval of the application, and other milestones. Depending on the amount of work involved, some companies start on the application as much as a year before it's due. **Individual Permit Application Contents** in this section gives an overview of the information that is included in individual permit applications, and can be used to estimate preparation time and schedules for a particular facility.

Individual Permit Application Forms

Table 5-1 lists EPA NPDES application forms applicable to individual permits for the petroleum industry. Copies of these forms are in Appendix 4 of this manual. Originals may be obtained from EPA regional offices or from printed copies in the regulations as indicated in Table 5-1. Tables 5-2 through 5-6 summarize the contents of each of these forms for easy review. The actual forms and their instructions in Appendix 4 should be consulted for the exact information required in the application.

Form 1 contains general facility information and must be submitted with every application along with other forms, listed in Table 5-1, applicable to the facility. Form 2C is the form that is most familiar to applicants. It is for existing facilities that discharge process wastewater and is used for permit renewals and modifications. Form 2D is for proposed facilities that will discharge process wastewater or existing sites that have not previously permitted a process wastewater outfall. Form 2E is for both new and existing facilities that discharge only nonprocess wastewater such as noncontact cooling water. Form 2F is for storm water discharges from industrial activity. Form 2F must be submitted for all discharges containing storm water—those that are composed entirely of storm water as well as those that are mixed with process or nonprocess wastewater. For example, an existing facility with both a process and storm water outfall would submit Forms 1, 2C, and 2F.

Table 5-1. EPA Application Forms for Individual Permits

Form ID	Description	Location in EPA Regulations
1	General Information	40 CFR 122
2C	Existing Manufacturing, Commercial, Mining, and Silvicultural Operations	40 CFR 125
2D	New Sources and New Dischargers of Process Wastewater	40 CFR 122
2E	Facilities That Do Not Discharge Process Wastewater	40 CFR 122
2F	Storm Water Discharges Associated with Industrial Activity	40 CFR 124

Table 5-2. Contents of Form 1, General Information

Facility name, address, location, EPA identification number (RCRA hazardous waste identification number), and contact person
Listing of types of permits (air, UIC, hazardous waste, NPDES) required for facility
SIC codes for facility and narrative description of nature of business
Operator information including name, address, and operator status
Listing of existing environmental permits and their permit numbers
Topographic map showing the facility site and neighboring areas at least one mile beyond property lines, with specific information included such as location of water intakes and wastewater outfalls, hazardous waste treatment, storage and disposal facilities, and injection wells
Certification statement and signature by authorized individual

Table 5-3. Contents of Form 2C, Existing Facilities with Process Wastewater

Outfall numbers, latitude, longitude, and receiving stream
Water and wastewater balance diagram
List of operations contributing wastewater with flow rates and treatment processes
List of intermittent or seasonal flows with flow rates and frequencies
Manufacturing production information for wastewaters subject to production-based national effluent guidelines
Description of projects required by federal, state, or local authorities affecting wastewater discharges
List of specific pollutants in wastewater discharges
Biological toxicity testing information
Identification of contract laboratories used
Certification statement and signature by authorized individual
Detailed wastewater effluent characteristics for specific pollutants including conventional (BOD, TSS, etc.) and toxic pollutants

Table 5-4. Contents of Form 2D, New Facilities with Process Wastewater

Outfall numbers, latitude, longitude, and receiving stream
Date discharge will start
List of operations contributing wastewater with flow rates and treatment processes
Water and wastewater balance diagram
List of intermittent or seasonal flows with flow rates and frequencies
Manufacturing production information for wastewaters subject to production-based national effluent guidelines
Detailed wastewater effluent characteristics for specific pollutants including conventional (BOD, TSS, etc.) and toxic pollutants
Identification of engineering reports on wastewater treatment
Certification statement and signature by authorized individual

Table 5-5. Contents of Form 2E, Facilities with Only Nonprocess Wastewater

Outfall numbers, latitude, longitude, and receiving stream
Date discharge will start (if new)
Type of wastewater discharged (sanitary, noncontact cooling water, other)
Wastewater effluent characteristics for common pollutants/parameters (BOD, TSS, pH, etc.)
List of intermittent or seasonal flows with flow rates and frequencies
Brief description of treatment system
Certification statement and signature by authorized individual

Table 5-6. Contents of Form 2F, Storm Water from Industrial Activity

Outfall numbers, latitude, longitude, and receiving stream
Description of projects required by federal, state, or local authorities affecting wastewater discharges
Site drainage map
Total and impervious areas draining through each outfall
Description of materials handling in storm water drainage areas during last three years
Description of storm water controls and treatment
Certification for nonstormwater discharges and description of related testing
Description of spills and leaks during last three years
List of specific pollutants in wastewater discharges
Biological toxicity testing information
Identification of contract laboratories used
Certification statement and signature by authorized individual
Detailed wastewater effluent characteristics for specific pollutants including conventional (BOD, TSS, etc.) and toxic pollutants

Table 5-6. ***Continued***

Description of storm events when samples taken, including duration, total rainfall, and storm water flow rates
Description of flow measurement or estimate

Individual Permit Application Contents

All of the individual permit forms listed in Table 5-1 come with instructions, so there is no need here to repeat these instructions word for word; however, some parts of the application forms are not clear and there are other parts where some guidance based on practical experience is useful. This manual provides that guidance, which is based on experience with completing many permit applications for the petroleum industry and others. Guidance is given specifically for Forms 1, 2C, and 2F because these forms are used most frequently and contain essentially all the elements of the other forms listed in Table 5-1.

Form 1

Most of Form 1 is self-explanatory. Guidance given here covers pollutant characteristics, SIC codes, and the facility topographic map.

Pollutant Characteristics

The title of this part of Form 1 would be better named "Application Type." The instructions say that application forms must be submitted for each regulatory category that is applicable to the facility. Actually, only those activities for which a permit action is being requested require application forms. For example, if a facility is submitting an application for renewal of an existing NPDES permit, only the forms applicable to the NPDES permit should be submitted. If the facility manages hazardous wastes, it would mark "yes" for item II.E on Form 1, indicating Form 3 to be completed; however, Form 3 does not need to be submitted for an NPDES permit application.

SIC Codes

SIC stands for Standard Industrial Classification. SICs are 4-digit codes by industry type or classification; a complete listing is published in *Standard Industrial Classification Manual* by the Executive Office of the President, Office of Management and Budget, available from the National Technical Information Service (NTIS). Usually, corporate personnel for a company can supply this information if the facility does not know or is not certain of the code(s) that apply to the site. In many cases, only one SIC code is required for the site.

It is important to list the correct SIC code(s) for the facility because the SIC code(s) determine, in part, which national effluent guidelines, if any, will be used to calculate permit limits. For example, the SIC code for petroleum refining is 2911 and effluent guidelines for this industry are at 40 CFR 419. There also may be other manufacturing areas onsite that have different SIC codes and effluent guidelines, but discharge to the same wastewater treatment system. It is important to identify all SIC codes so that a facility receives the permit allocation allowed by each guideline.

Facility Map

Most environmental permit applications require a topographic facility map. Although not required by Form 1, United States Geological Survey (USGS) 7.5-minute topographic maps are normally used as base maps because they show the natural physical features required in applications. Because the USGS does not update these maps frequently (some have not been updated in more than 20 years), the applicant should check the base map to be sure that all required features are adequately shown. Normally, physical features will be current on the map, but land uses may have changed significantly since the last update.

Some agencies require an original USGS map while others will accept a photocopy or print of a scanned image. Black and white copies are adequate, but map features are easier to see in color copies. Scanned images are helpful because other features required on the map (property boundary, outfall location, etc.) can be drawn in using graphics software. Scanned maps can be easily updated or modified for different application forms or uses.

The map must include drinking water wells within one-quarter mile of the facility boundary. The locations of these wells can be identified by the state agency that regulates such wells. There are information retrieval services that can collect this information and even prepare a map showing the location and identifying code for each well. An applicant can find out which local services are available by asking the regulatory agency or checking the telephone directory.

The Form 1 instructions state that the map should show the direction of river current and for tidal waters, the ebb and flow tides. This information, however, does not appear to be critical inasmuch as permit applications are routinely processed without it. One would assume that river flow direction is indicated by topography and the branching of tributaries and that tidal direction would be discussed/requested if applicable to the permitting process.

Form 2C

Form 2C itself is relatively simple to complete; however, a significant amount of time may be required to prepare supplemental information in attachments. Elements of Form 2C discussed here include the water/wastewater balance diagram, flows and treatment description, manufacturing production, identification of effluent pollutants, and effluent characteristics (concentration, mass loads).

Water Balance

The water balance diagram can be a simple line drawing with boxes identifying water/wastewater sources and treatment processes and arrows showing the routing of wastewater from the different sources through treatment to the discharge outfalls. Average flow rates should be shown on each flow line. Average flows should normally be reported as *30-day averages*, which is the flow basis for most permit limits. It is important that the water balance diagram actually *balance;* otherwise, the permit writer may ask the applicant to correct the discrepancies, or worse, the permit writer may calculate permit limits with the incorrect data. It also is important that the water balance diagram match the description of wastewater sources and treatment system processes provided elsewhere in the application. This information is discussed in the following subsection.

Flows and Treatment Description

Section II.B of Form 2C requires the following information for each discharge outfall: outfall number, source of individual wastewater types or streams, average wastewater flow for each source, and listing of individual treatment processes by name and EPA code. It is important that all wastewater sources and treatment processes be represented correctly and fully. Wastewater sources may be grouped to simplify the description; however, there should be enough detail in the description to ensure that all flows are adequately represented. If there are wastewater streams from nonroutine activities, for example, ground water remediation, these should be clearly shown. Figure 5-1 shows a completed example from Form 2C. As noted in this example, additional detail on the wastewater sources and treatment system often is provided in a technical report that is attached to the application.

An important part of the treatment description is that any treatment processes that are operated as contingent treatment (used only when needed, such as an effluent activated carbon polishing unit) be clearly identified and shown as such. The alternative flow routing around a contingent treatment unit must be clearly identified in the application, and described to make it clear that the treatment is applied only on an as-needed basis. These steps will prevent the

Please print or type in the unshaded areas only.

EPA I.D. NUMBER (copy from Item 1 of Form 1): TXD 000 000 001

OMB No. 2040-0086
Approval expires 5-31-92

FORM 2C NPDES — EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS
Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. deg.	2. min.	3. sec.	1. deg.	2. min.	3. sec.	
001	33	29	30	97	50	31	North Creek

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures. See Attachment 2.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT	
	a. OPERATION (list)	b. AVERAGE FLOW (include units)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1
001	Refinery process wastewaters	1,500,000 gpd	Treatment codes: 2K, 1H, 3A, 1G, 1U, 5A, 5L, 5R, 4A	
	Ammonia plant process wastewater	175,000 gpd		
	Ammonia plant cooling water, condensates	40,000 gpd		
	Cooling tower blowdowns			
	Refinery	200,000 gpd	3A, 1G, 1U, 5A, 5L, 4A	
	Gas plant	100,000 gpd		
	Ammonia plant	15,000 gpd		
	Sanitary wastewater and storm water from process areas included in above flows.		Neutralization	2K
			Oil/Water Separation	
			Equalization	
			DGF Flotation	1H
	Also see Attachment 2, Wastewater Treatment Technical Report.		Activated Sludge	3A
			Flocculation	1G
			Sedimentation	1U
			Aerobic Digestion	5A
			Gravity Thickening	5L
			Pressure Filtration	5R
			Discharge to surface water	4A

OFFICIAL USE ONLY (effluent guidelines sub-categories)

EPA Form 3510-2C (8-90) PAGE 1 OF 4 CONTINUE ON REVERSE

[FORM 2c]

Figure 5-1. Example of Flows, Sources of Pollution, and Treatment Technologies Information for Section II.B, EPA Form 2C

issue of bypassing the contingent treatment unit from arising during an inspection.

Manufacturing Production

When a facility such as a petroleum refinery is regulated by a national effluent guideline that is based on manufacturing production, the applicant must provide production data in the form required by the guideline. Some facilities may have various manufacturing processes subject to different guidelines. Because these guidelines determine the permit discharge levels, it is important to make sure that all production subject to guidelines is included. In addition, to make sure that permit limits are adequate, it is important that production data represent the maximum levels that are expected during the five years the permit will be effective.

Effluent guidelines for petroleum refining are divided into the five subcategories shown in Table 5-7. These guidelines are found at 40 CFR 419. The applicant must report production data according to the list of petroleum refining processes in the guidelines. These processes are listed in Table 5-8. Production capacity is reported in thousands of barrels per stream day (1,000 bsd). Table 5-9 is an example of production data for a petroleum refinery with petrochemical production, which is subject to Subcategory C effluent guidelines.

Table 5-7. Subcategories of Petroleum Refining in National Effluent Guidelines

Subcategory	Description	Applicability
A	Topping	Topping and catalytic reforming, whether or not facility includes other process in addition. Does not include facilities with thermal processes (coking, vis-breaking, etc.) or catalytic cracking.
B	Cracking	Topping and cracking, whether or not facility includes any other process in addition. Does not include facilities with processes under subcategories C, D, or E.
C	Petrochemical	Topping, cracking, and petrochemical operations, whether or not facility includes any other process in addition. Does not include facilities with processes under subcategories D or E.
D	Lube	Topping, cracking, and lube oil manufacturing, whether or not facility includes any other process in addition. Does not include facilities with processes under subcategories C or E.
E	Integrated	Topping, cracking, lube oil manufacturing, and petrochemical operations, whether or not facility includes any other process in addition.

Table 5-8. Petroleum Refining Processes Listed in National Effluent Guidelines

Crude Processes

- Atmospheric crude distillation
- Crude desalting
- Vacuum crude distillation

Cracking and Coking Processes

- Visbreaking
- Thermal cracking
- Fluid catalytic cracking
- Moving bed catalytic cracking
- Hydrocracking
- Delayed coking
- Fluid coking
- Hydrotreating

Asphalt Processes

- Asphalt production
- 200G6F softening point unfluxed asphalt
- Asphalt oxidizing
- Asphalt emulsifying

Lube Processes

- Hydrofining, hydrofinishing, lube hydrofining
- White oil manufacture
- Propane dewaxing, propane deasphalting, propane fractioning, propane deresining
- Duo Sol, solvent treating, solvent extraction, duotreating, solvent dewaxing, solvent deasphalting
- Centrifuge and chilling
- MEK dewaxing, ketone dewaxing, MEK-toluene dewaxing
- Deoiling (wax)
- Naphthenic lubes production
- SO_2 extraction
- Wax pressing
- Wax plant (with neutral separation)
- Furfural extraction
- Clay contacting-percolation
- Wax sweating
- Acid treating
- Phenol extraction

Table 5-8. *Continued*

Reforming and Alkylation Processes
H_2SO_4 alkylation
Catalytic reforming

Table 5-9. Example of Production Data for Petroleum Refinery with Petrochemical Operations

Process	Capacity (1,000 barrels per stream day)
Crude processes	
Vacuum crude distillation	100
Crude desalting	200
Atmospheric crude distillation	200
Cracking and coking processes	
Fluid catalytic cracking	90
Hydrocracking	30
Delayed coking	20

Pollutant Identification

Sections V and VI of Form 2C require the applicant to identify pollutants that may be in the discharge and those that are associated with manufacturing processes, respectively. Proper identification of these pollutants allows the permit to be a "shield" against legal allegations of unauthorized discharges of specific pollutants. EPA's policy for individual permits (see copy of EPA memo in Appendix 2) is that the permit provides authorization, and therefore a shield, for the following categories of pollutants from facility processes, waste streams, and operations:

- Pollutants specifically limited in the permit or pollutants which the permit, fact sheet, or administrative record explicitly identify as controlled through indicator parameters;
- Pollutants for which the permit authority has not established limits or other permit conditions, but which are specifically identified as present in facility discharges during the permit application process; and
- Pollutants not identified as present, but which are constituents of waste streams, operations, or processes that were clearly identified during the permit application process.

Priority pollutant analyses which are submitted with Form 2C are not sufficient for identifying potential pollutants. The applicant should give special attention to checking the list of other possible pollutants in Form 2C, Table 2C-3 and listing those pollutants associated with manufacturing as raw materials, intermediates, final products, byproducts, and wastes. Examples of pollutants in Table 2C-3 that may be present in trace amounts in petroleum refinery effluents are cyclohexane, cresol, naphthenic acid, and xylene. To be conservative and get the fullest permit "shield" protection, the applicant should list all *potential* pollutants and mark them as "believed present" in Form 2C. If a pollutant has never been detected by analysis, the applicant may mark it as "believed absent" if it is not contained in materials handled at the facility, not formed during the manufacturing or wastewater treatment processes, or is not present in the facility's water supply.

Arranging for wastewater analyses is one of the most important tasks in preparing a wastewater discharge application. There are many details to consider, for example—a long list of pollutants (analytes), grab or composite samples, additional analytes required in the state application in non-NPDES states, and detection limits.

It is wise to prepare a list of analytes, showing the type of sample needed (grab/composite), the type of sample bottle and preservation to be used, and the required detection limit. The analyte list should be sent to the laboratory before any samples are collected and reviewed in detail with the laboratory project manager to make sure that the analyses will be complete and adequate for the permit application. Contract laboratories can provide sample bottles and chemical preservatives based on the analyte list and deliver these items in their own shipping container. After collection, the samples are shipped back to the laboratory in the same container. As an additional service, many laboratories also will collect wastewater samples.

Laboratories provide professional services, but they are not infallible. Ultimately the applicant has the responsibility for obtaining wastewater analyses that meet the permit application requirements. The applicant should check all laboratory reports carefully to make sure that all requested analyses were performed, that required detection limits were achieved, and any laboratory problems with the analyses were resolved. The two most common problems with laboratory analyses are missing analytes and detection limits that are too high. These items should be checked immediately when the laboratory report arrives. If any analysis needs to be added or rerun, the laboratory should be contacted to see if there is any sample remaining and if the holding time for the particular analyte has not been exceeded. Additional samples, if needed, should be collected as soon as possible so that their analytical data can be submitted with the permit application by its due date. When the additional data cannot be obtained by the due date, the applicant

should provide an explanation with the permit application and include an expected submittal date. Although unexpected problems can happen, the applicant should plan ahead and make every effort to submit all analytical data by the application due date.

One item to note about the priority pollutant list in Section V of Form 2C—since the form was originally developed, two chemicals have been removed from the priority pollutant list. These are bis(chloromethyl) ether and dichlorodifluoromethane. Because they are no longer on the list, they may not be included in the laboratory's NPDES analyte list. The applicant should contact the permitting agency to verify that these two chemicals do not have to be analyzed. If no analysis is required, the applicant should indicate the reason why in Section V. If analysis is required, the laboratory will need to be instructed to add the chemicals to the analyte list.

Section 9, **Sample Analyses** provides additional guidance on sample analyses, including detection limits, method selection, QA/QC, and laboratory audits. It should be read and understood before any effluent samples are collected and analyzed for the permit application.

General Permits

This section discusses general permits for storm water, including the difference between baseline industrial general and multi-sector permits, application deadlines, the Notice of Intent, and the Notice of Termination. For an overview of the general permits for storm water and other discharges, see Section 3, **Types of Permits**.

Baseline or Multi-Sector Permit

The baseline industrial general permit for storm water was issued by EPA in 1992 for a five-year term until September 9, 1997. EPA is replacing the baseline industrial general permit with the multi-sector general permit for storm water (see EPA correspondence in Appendix 1), which tailors requirements to 29 different industrial and facility sectors. When originally issued in 1995, the multi-sector permit could not be used by petroleum refineries; however, later revisions extended coverage to refinery storm water which was not already covered by national effluent guidelines.

Deadlines

Applications for general permits for storm water discharges for all facilities except oil and gas facilities must be submitted at least two days before the

discharge starts. Storm water pollution prevention plans (SWPPP) must be prepared and *implemented* before the application is submitted.

Application deadlines are different for operators of oil and gas exploration, production, processing, or treatment operations or transmission facilities. Oil and gas operators must submit an application within 14 days of knowledge of a reportable quantity (RQ) release of oil or a hazardous substance. The application, however, requires that the applicant certify that an SWPPP has been prepared in accordance with the general permit. These two requirements are inconsistent with another provision of the general permit that allows oil and gas operators up to 60 days to prepare an SWPPP. If an oil and gas operator is planning to obtain a general permit, the applicant should contact the permitting agency to determine the deadline for the SWPPP.

Notice of Intent

The application form for EPA general storm water permits is called a Notice of Intent (NOI). In 1995, when EPA issued the multi-sector permit, it revised the NOI form originally created for the baseline/construction permits to cover all three types of general permits (see Appendix 5). A separate, revised NOI for storm water from construction sites was issued in 1998.

The NOI is a one-page form that is very simple to complete. Information on the form includes facility identification and location, types of activities onsite, and applicant certification and signature. Applicants also have a few special requirements concerning historic preservation and endangered species.

The multi-sector permit requires that storm water discharges do not affect property listed or eligible for listing on the National Register of Historic Places, or that the applicant has obtained and is in compliance with a written agreement between the applicant and the State Historic Preservation Officer (SHPO). An applicant must certify on the NOI that it has met these conditions.

In addition, a facility may be covered by the multi-sector permit only if the storm water discharges and best management practices to be constructed are not likely to adversely affect endangered species; the applicant has received previous authorization under the Endangered Species Act (ESA) and established an environmental baseline that is unchanged; or the applicant is implementing other appropriate measures to address adverse effects. The applicant also must certify that its storm water discharges and BMP construction activities are not likely to adversely affect endangered species. EPA has stated that most applicants will be able to meet the ESA certification requirement by either determining that no listed species are found in the

county of the discharge or by determining that listed species found in the county are not in proximity to the discharge.

The 1998 NOI for construction activities includes requirements for protection of endangered species also; however, the NOI does not address historic preservation, although EPA may do so at a later date.

Notice of Termination

If a facility no longer needs or wants to be covered under a general permit, the facility submits a Notice of Termination (NOT) (see Appendix 5). The NOT is a one-page form that contains general information such as permit number, facility identification and address, and a certification statement.

Application Submittal

General permits are self-implementing—two days after the NOI is submitted, the facility is automatically authorized to begin discharging. The process for individual permit applications is much more complex and takes several months.

After an individual permit application is submitted, it is reviewed by the agency to make sure it is complete. If there are any deficiencies, the applicant will be sent a Notice of Deficiency (NOD). The applicant will be required to take care of any deficiencies before the permit can be drafted.

A good working relationship with the permit writer is important. After the application is submitted, it will be assigned to a specific permit writer. The applicant should contact the permitting agency soon after the permit application is submitted to find out who the permit writer will be. The applicant may then contact the permit writer to introduce himself or herself, ask if there are any questions, let the permit writer know he or she is available to answer any questions or information requests, and ask what the expected time table is for drafting the permit. The applicant may check-in with the permit writer from time to time to ask how things are going and if there are any questions. Regular contact with the permit writer makes for a better draft permit because any questions or problems can be addressed as they arise. How often the permit writer should be contacted depends on the complexity of the permit, when the draft permit is expected to be issued, and if there are any problems or issues that develop. If needed, the applicant can meet at any time with the permit writer and others in the agency involved with the permit process to discuss particular issues.

Section 6

The Draft Permit

This section describes how a draft NPDES permit is developed by a regulatory agency and what steps the permit applicant may take to obtain a correct and reasonable permit. The section begins with an overview of how the permit writer at a regulatory agency develops a permit. Following the overview is a description of the "fact sheets" that accompany draft permits to explain the legal and technical bases for the permit. Next, guidance is provided on reviewing and commenting on the prepublication draft permit and the formal public-noticed draft permit.

How the Permit Writer Develops a Permit

Reference materials commonly used by a permit writer to develop NPDES permit limits and conditions are listed in Table 6-1. The permit writer must identify any applicable national categorical effluent limitations and guidelines that apply to the discharge, using information supplied in the permit application and information from previous permits for existing dischargers. Based on the data supplied in the permit, the permit writer calculates technology-based effluent limitations for all wastewater streams that are subject to categorical effluent limitations guidelines. For wastewater streams that are not subject to an effluent guideline, the permit writer uses agency policies and procedures and BPJ to calculate case-by-case permit limits for all pollutants of concern.

Table 6-1. Reference Materials Commonly Used to Develop NPDES Permits

Permit application
Any supplemental data or information provided by the discharger after the permit application is filed
Information from phone calls or meetings with the discharger's representatives
The current permit and permit file (for an existing permitted discharge)
Discharge monitoring reports (for existing dischargers)
Data obtained from CWA Section 308 orders for information
Applicable EPA categorical effluent limitations guidelines and standards
State water quality standards and implementation procedures
State regulations, policies, and procedures for preparing NPDES permits (delegated states)
The NPDES regulations at 40 CFR 122 and 125 (EPA-issued permits)
EPA guidance documents pertaining to permit limits and conditions

The permit writer must review the pollutant data in the permit application to identify every substance for which there is a numeric state water quality criterion (see Box, **The Meaning of Standards and Criteria**). For each pollutant regulated by a water quality criterion, the permit writer determines if the discharge has the reasonable potential to cause or contribute to the exceedance of the criterion. This "reasonable potential" analysis is performed with very conservative assumptions on effluent dilution to assure that the water quality standards are protected.

If the discharge of a pollutant is determined to have a reasonable potential for exceeding a water quality criterion, a WQBEL is calculated using the state's implementation procedures. The dilution allowance in the WQBEL calculation, if provided by state regulations, is based on either the state's default dilution factors or on site-specific dilution factors supplied by the permit applicant. If there is a more restrictive technology-based limit for a pollutant, then the technology-based limit becomes the permit limit. If the WQBEL is more restrictive, or if there is no technology-based limit, then the WQBEL becomes the permit limit.

If there is a TMDL or WLA for the receiving water, the permit writer will use the allowable loading to calculate appropriate WQBELs. These WQBELs will be compared to the technology-based limits for the pollutants, as described above, and the more stringent of the WQBEL or technology-based limits become permit limits.

The permit writer reviews any whole effluent toxicity (WET) test data in the permit application. Based on these data, on previous toxicity data supplied

The Meaning of Standards and Criteria

The terms "water quality standard" and "water quality criterion" are often used interchangeably, although they do not mean exactly the same thing. In the past, criteria were viewed only as guidelines, and standards were what were adopted in regulations and enforced. Over the years, the meaning and distinction of these two terms have changed. Presently, in most state regulations, water quality standards include both designated uses and narrative and numeric criteria designed to protect those uses. As such, water quality criteria are a subset of water quality standards. For example, Texas defines "standards" as "the designation of water bodies for desirable uses and the narrative and numerical criteria deemed necessary to protect those uses" and "criteria" as "water quality conditions which are to be met in order to support and protect desired uses." Other states may define standards and criteria differently, which makes it difficult to be precise when using these terms. Therefore, this guidance manual will not make this distinction and will refer to criteria and standards as the same.

with the permit, and the nature and quality of the discharge as described in the permit application, the permit writer will determine if the discharge has a reasonable potential to exceed the state's narrative water quality criterion for toxicity. If a reasonable potential is found, the permit writer includes WET test requirements in the permit. These may be in the form of monitoring and reporting requirements, or WET limits. The type of WET conditions included in a permit is based on the state's implementation procedures for the narrative water quality criteria.

Monitoring requirements for effluent limitations and reporting are based on effluent limitations guidelines, NPDES regulations, and state permit policies. Typically, permit writers have considerable discretion in setting the monitoring frequency for each pollutant.

The permit writer also uses the permit application and other discharge data to determine special conditions to include in the NPDES permit. Many of these conditions will be required by state regulations, policies, and procedures. However, permit writers often add permit-specific special conditions to clarify or complement other permit conditions and limits.

When permit limits are developed, it is not uncommon for the permit writer to contact the applicant with questions about the discharge or the permit application. Permit writers may also contact the applicant to discuss permit limits or conditions that they are considering.

Other agency staff usually performs certain analyses in conjunction with the permit writer, such as evaluating compliance with water quality standards and performing water quality modeling. The permit writer is always the primary point of contact for the permit applicant; however, in some cases, other agency staff may be directly involved with the permit applicant to obtain more information or discuss proposed permit limits and conditions.

Once the permit writer has completed the data and regulatory analysis, he/she prepares the proposed permit and fact sheet. Some permit agencies and permit writers have a policy of sending a prepublication draft of the proposed permit and fact sheet to the applicant to obtain informal comments and correct any errors. The proposed permit and fact sheet are officially noticed for public comment.

After the public comment period, the permit writer and other agency staff evaluate the comments, including any data submitted with them. Usually, they make changes in the permit limits and conditions they believe are supported by the comments. After any changes are made, the permit agency issues the final NPDES permit and a response to comments. In some cases, if the comments require extensive revisions in the proposed permit, the public

comment period may be reopened for review of the revised proposed NPDES permit.

The permit process, from receipt of the application to issuance of a final permit, usually takes six months or more for a complicated permit. Even for simple permits, it is rare for the process to take less than four months because of the required administrative steps and public participation.

It is to the advantage of the permit applicant to establish communication and rapport with the permit writer at the beginning of the permit process, and the applicant should take the initiative. The permit writer should be comfortable with contacting the applicant at any time to ask questions or request additional information. Meetings with the permit writer are not necessary, but can be very helpful if the permit application is complicated. Meetings are helpful, and can be essential, if the application involves a new source or major modifications of an existing source. However, applicants should use good judgment in requesting meetings and communicating with the permit writer. A meeting should not be requested unless it is truly necessary to explain the discharge and application; otherwise, the permit writer may feel that the time is wasted. Similarly, if the permit writer does not feel the need for extensive communication during the permit drafting period, the applicant should not press the issue.

Fact Sheets

The fact sheet accompanies the proposed permit when it is published for public comment. The fact sheet is supposed to set forth the principal facts and the significant factual, legal, methodological, and policy questions that are the basis for the limits and conditions in the proposed NPDES permit. The fact sheet is an essential document for the permit applicant's review of the proposed permit limits and conditions.

The format of the fact sheet is set by the permit agency, and therefore may differ among states and among EPA regions. However, regardless of the permit agency preparing it, the minimum information included in the fact sheet is the same. The fact sheet should include the items listed in Table 6-2. Fact sheets often contain appendices that present, in detail, the calculation of the technology-based limits and WQBELs. Because most permit agencies now use computers to perform many of the calculations, these calculations are appearing more often in fact sheets. These calculations allow the discharger and public to understand how the proposed permit limits and conditions were developed.

Reviewing Prepublication Draft Permits

As noted earlier, many permit writers provide prepublication draft permits to the applicant for comments before the proposed permit and fact sheet are published for public notice. In some cases, this is a permit agency policy. From the permit writer's and agency's standpoints, allowing the applicant to review the proposed permit reduces the potential for errors and allows more time for clarifying and negotiating permit requirements.

Permit applicants should encourage permit writers to communicate with them during the permit drafting period and to provide a prepublication draft permit and fact sheet for review. Typically, the review period is short (2 to 3 weeks) unless a time extension is requested. Usually, a permit agency will allow additional time if the permit applicant is developing additional information to assist in the permit drafting process.

Table 6-2. Information Typically Included in Fact Sheets

Brief description of the type of facility
Type and quantity of pollutants to be discharged
Brief summary of basis for permit conditions, including references to statutory or regulatory provisions and supporting references
Calculations or explanation of derivation of effluent limitations and sewage sludge use or disposal standards, including citations to effluent limitations guidelines, reasons why they are applicable, or explanation of how alternate effluent limitations were developed
Explanation of why any effluent limitations for toxic pollutants, internal outfalls, indicator pollutants, or BPJ limits are applicable
Sketch or map of discharge location, when appropriate
For EPA-issued permits, state certification requirements for water quality standards compliance
Reasons why requested variances or alternatives to required standards do or do not appear to be justified
Description of procedures for reaching final decision on draft permit
Beginning and ending dates of the comment period and address where to submit comments
Procedures for requesting public hearing and nature of hearing
Any other procedures by which public may participate in final decision
Name and telephone number of contact for additional information

Comments during the prepublication review period can be either written or verbal. If the issues are complicated, then written comments should be filed. In general, it is wise to follow up on any significant verbal comments with written comments. In many cases, the applicant needs to provide additional

data or evaluations to allow the permit writer to establish appropriate permit limits. For example, analytical data submitted with the application may have detection/quantitation limits that are too high to allow the permit writer to assess the potential for exceeding a water quality standard (see Section 9, **Quantitation and Detection Limits**). In such cases, the typical permit agency policy is to include an effluent limit or reporting condition in the permit for such pollutants. If this analytical problem is discovered while the permit is being drafted, the applicant can try to collect additional samples, analyze them using a method with adequate sensitivity to address the water quality standards, and submit these analyses as a supplement to the application.

When provided, the informal review period is the appropriate time to identify and correct any errors in the permit. Error may occur in the discharge description, effluent limits calculations, WQBELs, or virtually any other part of the permit other than the standard conditions. The NPDES permit is a complicated legal document and there is considerable potential for minor, or even major, errors to occur during the drafting process. Sometimes the permit application is not sufficiently descriptive to provide the information required by the permit writer. The prepublication comment period provides the opportunity to correct such deficiencies. Because the comments on the prepublication draft permit will become part of the public record for the permit, it is important that they be clear and complete. Written comments on the prepublication draft permit generally should follow the format described for the formal public comment period (see next subsection).

If there are major issues with the prepublication draft permit, the applicant should request a meeting with the permit writer to discuss them. Such a meeting gives both the applicant and the permit writer a better understanding of the concerns with the draft permit and potentially resolve such issues before the proposed permit is noticed for public comment.

Submitting Comments on Draft Permit

Submitting comments during the public comment period is one of the most important parts of the NPDES permit process. The written comments and supporting information submitted during the public comment period, along with the permit record compiled by the permit agency during the permit preparation process, become the complete record upon which any challenges to permit conditions must be based (see Section 7, **The Appeal Process**). In general, state and federal administrative procedures do not allow for the record to be supplemented with data, information, and comments after the public comment period. Therefore, it is essential that the permit applicant thoroughly review the proposed permit and fact sheet, and before the comment period expires, submit written comments, with any required supporting data, on any permit limit or condition that is incorrect or otherwise problematic.

The following subsections provide some suggestions on what to review in the draft permit and how to go about it. Most of these suggestions are common sense, and they do not cover every aspect of the permit. The most important fact to remember when reviewing the proposed permit is that it is a legal document that establishes controls on discharges and operations by a facility, and failure to comply with all the limits and conditions in the permit can result in criminal and administrative penalties. Therefore, a discharger should devote the time and resources merited by the potential impact of the proposed permit and fact sheet. Section 9, **Tool Box** also provides detailed guidance on some important aspects of permits, including effluent limit calculations, seasonally-based limits, sample analyses, biomonitoring, mixing zones, TMDLs and WLAs, site-specific water quality criteria, and indicator parameters.

Reviewing the Discharge Description

The name and address of the permittee, the location of the discharge, the identification of each outfall, and the name of the receiving water should be reviewed. For each permitted outfall, the description of the nature of the discharge should be carefully reviewed. It should identify all significant sources of wastewater in the discharge, for example, process wastewater, utility waters, process area storm water, and ground water from remediation activities. Permittees have encountered difficulties with inspectors when the outfall description does not clearly include all of the sources of wastewater, so this is a very important provision in the permit. The permit application must clearly identify all of the wastewater sources to an outfall. If this is done properly, the permittee typically will be able to defend wastewater sources even if not specifically identified in the permit.

Reviewing Effluent Limitations

Each numeric limit for each regulated pollutant in the draft permit should be reviewed and checked for error. The calculations for each effluent limit should be described in the fact sheet (or its appendices) and should be reproduced by the discharger to verify that the limit is correctly calculated.

Technology-Based Limits

The review of permit limits based on categorical effluent limitations guidelines is relatively simple because the methods for calculating them are standardized. The permit applicant should verify that production information, if used to calculate technology-based limits, is both correct and represents any planned changes during the permit period, such as a production increase. If wastewater flow is used in the guidelines calculation, it also should be

verified. After verifying production and flow information, calculations and data entry should be reviewed for possible errors.

One mistake that can occur in permit limits calculated from effluent limitations guidelines is not providing an allowance (load) for a pollutant in what is sometimes called a "nonregulated" wastewater. In this particular case, "nonregulated" means the pollutant is not regulated by an effluent limitations guideline. When a mixture of wastewater streams is to be permitted, this mixture may contain some wastewaters regulated by effluent limitations guidelines and others that are not. It is important that a permit limit allocation be given to the nonregulated portion of the wastewater mixture. For example, a regulated wastewater may have a BOD allocation provided by its effluent limitations guideline. If the regulated wastewater is mixed with a nonregulated wastewater and the commingled wastewaters will be permitted as a single outfall, the nonregulated wastewater should also receive a BOD allocation. The same idea holds true for any pollutant that is regulated by an effluent limitations guideline and is present in a nonregulated wastewater. The same type of problem can occur with wastewater mixtures whose individual streams are regulated by different effluent limitations guidelines. The different guidelines may not regulate the same list of pollutants, so it is important that each stream receive its correct allocation. Permit applicants should review all permit limits to ensure that allocations have been correctly given to the different types of streams in wastewater mixtures. If allocations have not been provided for each waste stream, then the permit limits will be lower and may be difficult to meet.

If an existing permit simply is being renewed with no changes to the facility's discharge, then the limits in the existing permit can be compared to the proposed permit limits to simplify the checking of the effluent limits. However, it is not unusual for there to be changes in a renewed permit, particularly because states revise their water quality standards and implementation procedures every three years. In the case of technology-based limits, states may have adopted new procedures for identifying and limiting pollutants by BPJ limits. In such instances, the new or changed permit limits can be the focus of more in-depth analysis.

BPJ-based permit limits are often the most contentious technology-based effluent limits. Because the permit writer has considerable discretion in establishing these limits, they are the permit limits most likely to be an issue. In some cases, it is necessary to collect additional pollutant data to convince the permit writer to adjust proposed BPJ limits. For example, if the permit writer establishes low allowable TSS limits for a cooling tower blowdown stream, it may be necessary to collect such data for the applicable blowdown, or a comparable stream. Permit applicants should not hesitate to collect and submit wastewater data to support their positions with regard to BPJ-based permit limits.

Water-Quality-Based Limits

Reviewing the calculated permit limits for pollutants that are controlled to protect water quality requires an understanding of the state's implementation procedures for water quality standards. These are usually well-documented in the fact sheet, but if they are not, then the discharger should obtain a copy of the procedures from the state agency.

The first item that should be reviewed is the reasonable potential analysis, which identifies those pollutants for which WQBELs may be necessary. If the reasonable potential analysis has identified any pollutants from the application that were reported as less than the analytical detection or quantitation limit, this usually means that the analytical method was insufficiently sensitive. If the state is proposing to establish a WQBEL for such pollutants in the permit, or alternatively, proposing a significant monitoring and reporting requirement with a permit reopener clause, the permit applicant may decide to collect additional data for the pollutant using a more sensitive analytical method. This usually requires extra time and the applicant may have to request an extension of the comment period to allow submittal of the data. To give more time for resampling, it is better to identify this problem when the permit is being drafted or during the prepublication review of the draft permit. In any case, however, additional time may be needed and the permitting agency usually grants extensions if the request is justified.

The applicant should determine if the appropriate dilution factor was used in the WQBEL calculations. This will typically be the default dilution factor used by the state (see Section 9, **Mixing Zones**). The applicant can provide data to establish site-specific dilution factors, such as that based on modeling or trace studies of the outfall diffuser. WQBEL calculations should be checked. Many states will provide an applicant with the software they use to calculate WQBELs, which makes it easier to check calculations. The critical dilution used for any WET test requirement (limit or monitoring) should be the same as the critical dilution used to calculate any numeric WQBELs. WQBELs and technology-based limit calculations should be compared. When both types of limits apply to a pollutant, the permit limit should be based on the most stringent.

Monitoring Requirements

The permit will have monitoring requirements for each pollutant with effluent limits. It also may include monitoring requirements for pollutants without effluent limits—these are "report only" requirements.

The types of required samples should be reviewed. For most pollutants and parameters, 24-hour composite samples are required because they are more representative of the "average" level for that day. However, for some

pollutants and parameters, 24-hour composite samples are unsuitable because either the parameter is unstable and must be analyzed quickly or sampling equipment prevents proper compositing. Grab samples should be used for the following pollutants: cyanide (total and amenable to chlorination), oil and grease, total phenols, sulfides, and fecal coliform bacteria. Continuous, *in situ* monitors or grab samples must be used for pH and temperature. Grab samples or special compositing methods must be used for volatile organic compounds. Special compositing methods for volatiles should be described in the "other conditions" section of the permit.

The mass limits for pollutants in the draft permit should be converted to concentration limits using the average and maximum flows expected for an outfall (see Section 9, **Permit Compliance Analysis**). These concentrations should then be compared to the detection and quantitation limits of the approved analytical methods to determine which methods must be used for compliance analysis.

For some mass limits, the concentrations that will occur at average or maximum flow may not be measurable with any of the approved analytical methods. Most often, this occurs with WQBELs, but it may also occur with technology-based limits. In this event, the permit should contain a special provision in either the "monitoring requirements" section or "other conditions" section describing how concentrations reported as less than the analytical quantitation limit should be reported in DMRs and used in calculations of averages. The recommended language for dealing with this situation, which is used by several states and EPA regions, is as follows:

> If any individual analytical test result is less than the minimum level (or practical quantitation limit) listed in this permit for the pollutant, a value of zero (0) may be used for that individual result for the discharge monitoring report (DMR) calculations and reporting requirements.

The permit should also include a list of the minimum levels for each regulated pollutant that may be expected to have reporting results that are less than the minimum level. Generally, this will include all specific organic pollutants (including the priority pollutants), trace metals, cyanide, sulfide, and chlorine residual. These minimum levels typically are established in state water quality standards or, more commonly, are the minimum levels reported for each method in 40 CFR 136. When an analytical method has a reported method detection limit, but no minimum level, EPA recommends that a factor of 3.18 can be multiplied times the method detection limit to arrive at the minimum level. This clause is necessary to prevent having to calculate and report average values that are based on "less than" values.

The permit should also include a provision to allow the permittee to determine matrix-specific (effluent) minimum levels for regulated pollutants; this provision usually is placed in the "other conditions" section of the permit. Permit language used by EPA Region VI and the states within the region is:

> The permittee may develop an effluent-specific method detection limit (MDL) in accordance with Appendix B of 40 CFR Part 136. For any pollutant for which the permittee determines an effluent-specific MDL, the permittee shall send to the permitting authority a report containing quality assurance/quality control (QA/QC) documentation, analytical results, and calculations necessary to demonstrate that the effluent-specific MDL was correctly calculated. EPA has provisionally defined an effluent-specific minimum level (ML), determined in accordance with the following calculation:
>
> $$ML = 3.18 \times MDL$$
>
> Upon written approval of the permitting authority, the effluent-specific ML may be utilized by the permittee for all future discharge monitoring report (DMR) calculations and reporting requirements.

Monitoring frequency is generally discretionary on the part of the permit writer, subject to general guidelines and policies of the permitting agency and any specific requirements in effluent guidelines. Therefore, monitoring frequencies should be reviewed, and if deemed by the permittee to be excessive, subject to commenting and negotiation. Typically, a permittee can argue for reduced monitoring frequency for a pollutant if historic monitoring data have shown consistent compliance with existing and proposed permit limits, and the historic reported pollutant loads are usually significantly lower than the limits. The permittee may need to submit additional effluent data and data analyses to demonstrate to the permit writer that a reduced monitoring frequency is justified for a pollutant.

EPA's Office of Water issued a policy in 1996 that encourages permit writers to reduce monitoring frequencies for permittees that have proven good compliance records (see **Bibliography**). This policy can be helpful in requesting reduced monitoring frequencies for selected pollutants.

Compliance Schedules

When permit limits cannot be met at the same time the permit becomes effective, the permit may include a compliance schedule for achieving limits later within the permit period. If the permittee requests one, a compliance schedule is usually provided the first time a WQBEL is added to an NPDES permit. State regulations generally specify the compliance period. The typical maximum period allow for compliance with a WQBEL is three years; however, the GLWQG allows compliance schedules of up to five years.

Compliance schedules also are usually available for BPJ-based limits. Generally, they are not available for technology limits based on categorical effluent limitations guidelines, unless the guideline is recently promulgated and specifically allows compliance schedules.

Permit applicants should determine their ability to comply with the proposed permit limits, and if they cannot meet the limit when the permit becomes effective, request a compliance schedule in their comments on the draft permit. The request must include justification for the compliance schedule (study, planning, design, construction of treatment equipment), given in sufficient detail to convince the permitting agency to grant a compliance schedule.

If a compliance schedule is granted in the permit, it will include required progress reports. The timing and content of these compliance reports should be reviewed.

Reviewing Standard Conditions

Permittees should review and understand the standard conditions included with the permit. However, because these conditions are standard and are essentially a restatement of state and federal regulations, commenting on them is generally futile.

Reviewing Other Conditions

Because the "other conditions" section of permits may contain a wide variety of conditions, including permit limits, it is impossible to list specific items that should be reviewed. In any case, every special condition should be reviewed carefully in terms of ability to comply, the legal and factual bases for the condition, and its reasonableness. If the permit writer has included any special studies in the "other conditions" section (such as receiving water quality sampling, sediment sampling, fish tissue testing), the legal and factual bases for such studies should be clearly stated in the fact sheet.

Preparing the Comments

The comments on the proposed permit and fact sheet must be thorough and comprehensive. The public comments become part of the permit record and may be used in any appeals of the final permit. *Thus, all data, information, and references that a permittee may wish to use in an appeal of a permit condition or limit must be included in the comments.* Each comment should reference the specific page number and provision number being addressed. If data are needed to support a specific comment, these data should be included as attachments or appendices to the comments. Comments should include copies of the relevant pages of all reference material used to support them, unless the reference is a federal or state agency regulation or guidance document, in which case only the citations need be given.

Comments should include any recommended changes to permit limits, monitoring conditions, or special conditions. These recommended changes should be specific, and include, as necessary, redrafting of permit conditions and language or inclusion of new permit language. Even though there may be good understanding and agreement between the permit applicant and permit writer with respect to these changes, the changes should be included in the written comments because this will help to make a complete public record for the final permit.

The permit agency does not issue a final fact sheet when it issues the final permit, nor does it address errors in the fact sheet when it prepares the response to comments. However, errors in the fact sheet should still be commented on, because these corrections will then be part of the public record.

Errors in Permit

Many times the permit applicant will review a proposed permit and find errors, and sometimes these errors are in the applicant's favor. An example would be a permit limit based on a technology-based limit when the WQBEL is more restrictive and should be the permit limit. Permit errors should always be identified in the comments. Because the permit is a legal document like a contract, the applicant is obligated to identify any errors in calculations, typographical errors, and transcription errors.

It is important to distinguish errors in permit limits and conditions from decisions and assumptions made at the permit writer's discretion. Permit writers have considerable latitude in the preparation of permit limits and conditions, particularly when setting BPJ limits. Such decisions are not errors and do not have to be "corrected," as long as the permit application is clear and the permit writer has made a BPJ decision.

Comments by Environmental Groups

During public comment, there may be significant comment from the general public or organized environmental groups. Many times, public comment comes from individuals that are located adjacent to or downstream of the discharge site. Often, these people are simply concerned citizens who do not understand the permit process completely or the nature of the discharge. In other cases, they are individual environmental activists or organized environmental groups opposed to the proposed permit. They can request a public hearing, can file written comments on the proposed permit, and can appeal a final permit decision. Therefore, their opposition cannot be taken lightly.

It is difficult to predict when there will be significant opposition to a permit. However, there are certain permit actions that are more likely to generate opposition. These include:

- A permit for a new source or new discharge;
- A permit amendment for an increase in the amount of pollutants discharged;
- Discharge to a receiving water body with actual or perceived water quality problems;
- An active neighborhood group that is in conflict with the facility requesting the permit, even if that conflict has nothing to do with water quality; and
- An active neighborhood group that has an environmental conflict with a neighboring discharger.

Opposition to a permit can be reduced or eliminated by an active public affairs program. Many plants now have community affairs panels consisting of a broad cross-section of neighbors and community representatives, including environmental activists. It is prudent to inform such people when a significant NPDES permit action is being planned. An active and open community affairs program will often defuse major opposition to a permit.

Sometimes permit opposition can be eliminated by meeting with the concerned citizens to explain the permit. States and EPA regions will encourage such meetings because they prefer disagreements to be settled by negotiation rather than permit hearings and appeals.

The best defense to permit opposition is a solid permit record, from the permit application to the draft permit. If the proposed permit is based on a strong factual and legal foundation, it will withstand adverse public comment. Thus, this is another reason for preparing a complete permit application and thorough comments on the draft permit, including submission of supporting data and references.

It should be noted that when the draft permit is issued, it is the permit agency's responsibility to defend the permit conditions. It is responsible for preparing a permit that meets all applicable federal and state regulations and is protective of human health and the environment and therefore, it must justify the limits and conditions. The permit applicant's role is explaining the reason for the proposed discharge and the types and performance of pollution controls that will be used to meet the permit limits and conditions.

Section 7

Hearings and Appeals

Public participation and the right to appeal permit decisions are essential components of the NPDES permits program. The right to public notice and a public hearing on a permit action is provided at Section 401(a)(1) of the CWA. Final NPDES permits may be appealed through administrative appeals processes established in federal regulations (for EPA-issued permits) or state regulations in delegated states. Both EPA-issued and state NPDES permits also may be appealed to the federal or state courts, respectively, for judicial review.

The hearings and appeals processes offer an important avenue to permit applicants to challenge permit limits or conditions that are not based on sound technical information and analysis or are not authorized by the applicable state and federal regulations. However, hearings and permit appeals should be the last resort for permit applicants who have reached an impasse with the permit agency over a final NPDES permit. Hearings and appeals are time-consuming and expensive, and their outcome cannot always be predicted with confidence. Therefore, applicants should make every effort to resolve all permit issues during the development of the proposed permit by the regulatory agency, using the approaches discussed in other sections of this guidance manual.

Hearings

Public hearings may occur at two points in the permit process: (1) when a proposed permit has been prepared and is made available for public comment; and (2) following a final permit decision as part of the permit appeals process. The second type of hearing is discussed later in this section under **Appeals**. Figure 2-1 in Section 2, **NPDES Program Basics**, shows where the first type of public hearing occurs in the permit process.

EPA Regulatory Requirements

The NPDES regulations at 40 CFR 124.12 require that a public hearing be held on a proposed NPDES permit, if the EPA Regional Administrator determines that there is sufficient public interest. Delegated states also must provide the opportunity for public hearings on proposed NPDES permits. These public hearings may be held during the public comment period specified for proposed permits (40 CFR 124.10), or they may be held after the public comment period would normally be closed if, during the comment period, the permit agency determines that there is sufficient public interest to justify a hearing.

The public hearing required for proposed NPDES permits is not a judicial-format hearing like the evidentiary hearing under the EPA appeals process. This hearing is actually part of the public comment process on the proposed NPDES permit. The objective of the hearing is to assure that the public has an opportunity to present comments on the proposed permit. A hearings officer presides over the public hearing and is responsible for the conduct of the meeting. In a public hearing, the permit agency's representatives describe the conditions and limits in the proposed permit and summarize the legal and technical bases. Any member of the public, including the permit applicant, may offer oral or written comments on the proposed fact sheet and permit during the public hearing. A tape recording or written transcript of the hearing is prepared and is made available to the public. The regulatory agency considers the comments offered at the public hearing in the same way that it considers written comments provided during the public comment period. The agency prepares written responses to the comments made at the public hearing, as appropriate, and includes them in the final permit decision.

Public Hearings in Delegated States

Delegated states are required to hold public hearings on proposed fact sheets, NPDES permits, and the supporting administrative record. These public hearings may follow the procedures described in the EPA regulations, or they may follow specific provisions of the state regulatory agency or the state administrative procedures act. In some states, the hearings may be administrative proceedings conducted by an administrative law judge similar to judicial proceedings with discovery, depositions, and sworn testimony. It is impossible to generalize the exact format of the public hearings that delegated states conduct for proposed NPDES permits. Therefore, applicants should contact the state permitting agency to determine the details of the public hearing procedures in their state.

The Applicant's Approach to Public Hearings

Usually, it is not in the permit applicant's best interest to request a public hearing on a proposed permit. Because any member of the public can attend the public hearing on a proposed NPDES permit, and some people usually attend such hearings simply because they are open to the public, the hearing is not a suitable venue for discussing complicated technical and legal issues with the permit writer and agency staff. Normally, the permit applicant has ample opportunity to meet with the permit writer and other regulatory staff while the permit is being drafted and during the public comment period. Because it is important to have a complete written administrative record on a permit application and decision (see Section 6, **The Draft Permit**), a public hearing cannot substitute for complete written comments, with supporting data, on all

permit conditions and limits for which the applicant takes exception. Thus, usually there is not any reason for a permit applicant to request a public hearing on a proposed NPDES permit.

The applicant also should consider how it will participate in a public hearing requested by members of the public. Typically, such hearings are requested by opponents of the proposed permit. These opponents may be organized environmental groups, landowners of property bordering the receiving waters, individuals that use the receiving waters for recreation, or virtually anyone with a real or perceived interest in the proposed permit (EPA's provisions for standing to request a public hearing are very broad). The best strategy for the permit applicant in the public hearing is to present a brief oral summary of the permit application request (if desired, a written summary also can be distributed) and a statement of support for the proposed permit limits and conditions. The permit applicant should also consider having a representative available to answer questions about the project, but not the proposed permit because the applicant should rely on the permit writer and other agency representatives to explain the proposed NPDES permit and fact sheet.

Appeals

The appeals procedures for final NPDES permits are available to both the permit applicant and to the public. Appeals of an NPDES permit can be made on issues of material fact or law. Delegated states are not required to use EPA's appeal process at 40 CFR 124. The following sections discuss the EPA decisionmaking procedures first, followed by a summary of the appeals process in delegated states.

EPA Appeals Process

A member of the public, including the NPDES permit applicant and state and federal agencies, can challenge a final NPDES permit. This challenge must be filed with the EPA Region that issued the final permit no later than 30 days after the final permit decision. This challenge is in the form of a request for an evidentiary hearing to adjudicate the contested conditions in the final NPDES permit as described. Only the key aspects of the evidentiary hearing process are discussed in this guidance manual; for additional details, the reader should refer to EPA regulations at 40 CFR 124, Subpart E.

The request for an evidentiary hearing on a final NPDES permit must state each legal and factual issue in the final permit that is being challenged, the relevance of the challenge, and the hearing time that is estimated to be required for adjudication of each issue. Although evidentiary hearing requests can be challenged on legal issues only, they will be denied automatically and

have to be appealed to EPA's Environmental Appeals Board (EAB) for review of the legal and policy aspects of the permit decision. Typically, EPA does not allow challenges to the state water quality certification required by Section 401(a)(1) of the CWA. Such challenges must be pursued at the state level, either in an administrative procedure, if available, or in the state courts.

The evidentiary hearing request must be granted or denied, all or in part, by the EPA Region within 30 days following the deadline for filing the request. Until the request is approved or denied, the entire NPDES permit is stayed and the permit applicant cannot rely on the limits and conditions of the stayed permit as authorization to discharge. If the NPDES permit is a renewal, then the conditions and limits in the existing NPDES permit are in effect until action on the evidentiary hearing request is completed. If the permit is for a new source, new discharge, a recommencement of a discharge, or an amendment to allow increased discharges of pollutants, then the permit applicant cannot commence any of these activities until EPA decides on the evidentiary hearing request.

An important fact of the appeals process is that EPA Regions often do not meet the 30-day requirement to grant or deny the evidentiary hearing request. When the permit applicant appeals the limits and conditions in a renewed NPDES permit, EPA's failure to act on the request for an evidentiary hearing may be of no consequence if the permittee can continue to operate normally under its existing NPDES permit. In fact, it is often in the permittee's best interest to keep limits and conditions of the renewed NPDES permit stayed indefinitely until the contested issues can be resolved with the permit writer. However, if the appeal of the permit is by a member of the public or a government agency, and the NPDES permit is needed either to commence discharge for a new source or new discharger, or to increase a discharge to accommodate new production at the permittee's facility, then EPA's failure to promptly render a decision can be very problematic. The only recourse a permit applicant has is filing suit on the EPA Region under the citizen's suit provisions in Section 505 of the CWA.

When the EPA Region renders its decision on the evidentiary hearing request, it may grant or deny a hearing on any or all of the material issues of fact that are raised in the request. After this action, only the provisions of the NPDES permit for which the hearing was granted are stayed. All of the uncontested provisions of the NPDES permit, and contested provisions for which the evidentiary hearing was denied, become effective upon the date of the EPA decision.

An administrative law judge (referred to in EPA regulations as the presiding officer) presides over the evidentiary hearing. The judge is assigned from the pool of EPA judges. The evidentiary hearing is conducted in a judicial format.

This includes providing for discovery, taking of depositions, and presentation of sworn testimony by experts from EPA and parties involved in the permit appeal. A record of the hearing is kept by a court reporter. Parties to the appeal may file with the administrative law judge proposed findings of fact and conclusions and a supporting brief. At any time during the evidentiary hearing process EPA may "recycle" the permit back into the permit preparation process to the draft permit stage. Then EPA may issue a new draft NPDES permit addressing the withdrawn portions of the originally proposed permit. This new draft NPDES permit goes through the public notice and comment periods prescribed by the regulations. The EPA Region can effectively end the evidentiary hearing process in the originally proposed NPDES permit with this action. It may choose this course if it believes that it can remedy the contested conditions with changes to the proposed permit.

At the end of the evidentiary hearing, the administrative law judge will issue an initial decision on all issues. The parties to the hearing have 30 days after notice of the initial decision to file a petition for review of the decision by the EAB. If such a petition is not made, then the decision automatically becomes final and the permit becomes effective, revised as appropriate based upon the outcome of the decision.

The administrative record used in the evidentiary hearing is the record developed by the permit application, the records of the permit writer, and any comments submitted during the public comment period. The regulations on evidentiary hearings at 40 CFR 124.76 explicitly require that the record be limited to data, analyses, and other information developed during the permit preparation and public comment period, unless good cause can be shown by the appellant for its failure to submit such data. Good cause in this case can be demonstrated if: (1) the party shows that it could not have reasonably ascertained the issues or made the information available in the time allowed for public comment; (2) it could not have reasonably anticipated the relevance or materiality of the information it seeks to introduce; or (3) operating data (discharge data) are available that were not available during the permit preparation and comment period. These limitations show why it is important that the permit applicant submit thorough comments on the proposed NPDES permit, including any technical and scientific data that support an applicant's position with regard to permit limits and conditions that it may wish to contest after the final permit is issued.

The decision by the presiding officer in an evidentiary hearing can be appealed to the EAB. The EAB is the final level for administrative appeals of NPDES permits issued by EPA Regions. Also, as mentioned earlier, the EAB will review denials of evidentiary hearing requests. The procedures followed by the EAB in reviewing appealed initial decisions from the presiding officer

of an evidentiary hearing or appeals of denials of evidentiary hearing requests are described at 40 CFR 124.91.

The EAB determines whether to accept an appeal for review subject to a showing that the initial decision contains: (1) a finding of fact or conclusion of law that is clearly erroneous; or (2) an exercise of discretion or policy which is important and that the EAB should review. A petition to the EAB for review of an initial decision from an evidentiary hearing or the denial of a request for an evidentiary hearing is a prerequisite to the seeking of judicial review of an EPA action on an NPDES permit.

Once the EAB accepts a petition, it will accept briefs from the petitioner and any other parties on the contested issues that it has agreed to review. The petitioner has the opportunity to file a reply brief. At any time the EAB may issue a summary decision to affirm the initial decision or denial of hearing request, in which case the initial decision or denial becomes a final Agency action. In this event, the NPDES permit becomes a final permit, with any changes required by the conclusions of the evidentiary hearing.

If the EAB accepts the appeal and reviews the initial decision or denial request, it will make a decision whether to: (1) affirm the decision or denial request without opinion, in which case the permit becomes final; (2) make a decision without remanding the proceeding, in which case the NPDES permit, incorporating any changes recommended by the EAB, becomes final; or (3) remand the proceeding to the presiding officer of the evidentiary hearing, in which case the permit becomes final after completion of the remanded proceeding, including any subsequent appeals to the EAB. Most parts of the appeals process do not have any time limits set by regulation or law, and therefore, these proceedings can take several years to complete.

If the EAB denies an appeal, the last resort that a protestant to a permit has is the judicial route. Challenges to decisions made by EPA in its administrative appeals process must be made in the appropriate federal circuit court of appeals, not in a federal district court. The provisions of the federal Administrative Procedures Act establish the procedures and requirements for federal judicial review of EPA NPDES permit actions.

State Appeals Processes

The NPDES permit regulations for delegated states do not require the administrative appeals process described above for EPA-issued permits. State NPDES regulations must allow for judicial appeal of their permit actions, in state district courts. Typically, state administrative procedures acts will establish the requirements for seeking judicial review of permit actions.

Because states have considerable latitude with regard to administrative appeals of their NPDES permit decisions, it is difficult to generalize beyond the basic requirement for the availability of judicial review. Some states have evidentiary hearing procedures similar to those of EPA. Such procedures can occur at the proposed permit stage, rather than after the final permit decision by the state agency. A number of states have appointed commissions or boards that make the final decisions on NPDES permits. Typically, there is an opportunity for the permit applicant and the public to appeal permit limits and conditions before such commissions and boards. In delegated states, permit applicants should obtain the necessary information on permit appeals from the state agency responsible for issuing permits. This is the only certain method for understanding specific rights of appeal for an NPDES permit.

The Applicant's Approach to Permit Appeals

As stated earlier, administrative or judicial appeals of NPDES permits by the permit applicant are a last resort because the permit applicant usually has ample opportunity to negotiate conditions with the permit writer and other agency staff during the permit draft stage. One major reason for avoiding the appeals process is that it often drags out over several years, which is often a problem if the contested permit conditions impact the facility operation (such as restricting production). However, there are a few cases where the permit applicant and regulatory agency staff differ over technical issues, policies, or decisions and a permit appeal is the only possible way to resolve the issues.

Permit appeals are judicial or quasi-judicial procedures and thus, a permit applicant must involve its attorneys when appeal of a permit is being considered. Typically, a permit applicant knows at the beginning of the public comment period, whether any contested permit issues are likely to remain when the final NPDES permit is issued and if they are important enough to appeal. It is prudent to involve company or outside attorneys at this point, before the final permit decision is issued, so that planning of the appeal can be initiated. Because there is only a short time period allowed between notice of the final permit decision and the deadline for filing an appeal (typically 30 days), any advanced planning of the appeal is valuable. Also, it is important to consider the need to appeal certain permit conditions when the comments on the proposed permit are prepared, because this is when the administrative record that will be the basis for the appeal must be completed. Again, having an attorney assist in preparing the comments in order to establish a complete administrative record to support a possible appeal is valuable, should an appeal go forward.

An appeal is granted only if the petitioner can demonstrate that there is an issue of material fact in the NPDES permit. Thus, the permit applicant must

make a complete administrative record with the permit application and comments submitted during the public comment period to support its position with regard to the factual issues. This will usually require inclusion in the record of data, technical analyses, and references that will support the applicant's position on contested issues. The more complete the administrative record, the better is the chance that an appeal will be granted and will be successful.

The following example of a successful appeal will help the user of this guidance understand the types of issues and the degree of technical support required, to successfully challenge the conditions and limits in an NPDES permit.

EXAMPLE - Example of NPDES Permit Appeal

A plant that manufactures synthetic rubber, purifies a feedstock for the synthetic rubber manufacturing process, and manufactures certain rubber additive chemicals (antioxidants) was issued a proposed renewal NPDES permit that regulated the rubber additive chemical processes and the feedstock purification process using the effluent guidelines for organic chemicals, plastics, and synthetic fibers (OCPSF) at40 CFR 414. The plant's existing NPDES permit regulated all of the manufacturing processes at the site under the synthetic rubber effluent limitations guidelines at 40 CFR 428. In fact, this plant served as one of several plants that were used by EPA to establish the BPT and BAT effluent limitations guidelines for the synthetic rubber manufacturing point source category. The EPA permit writer insisted that the OCPSF guidelines applied to the chemical processes at this plant, even though the permittee supplied data and information during the application process and public comment period that demonstrated that the plant had always been considered to be covered by the synthetic rubber guidelines and was used by EPA to develop those guidelines.

When the final permit was issued, the permittee requested an evidentiary hearing on the specific permit limits that were based on the OCPSF effluent limitations guidelines. The EPA Region's position with respect to the applicability of the OCPSF guidelines was supported by the Engineering and Analysis Division in EPA Headquarters, which is the group responsible for developing the effluent limitations guidelines. On the basis of this support, the EPA Region denied the request for an evidentiary hearing. The permittee appealed the denial of the evidentiary hearing to the EAB. After review of the petition filed by the permittee and the administrative record, the EAB issued its decision that the Region had erred and that the OCPSF effluent limitations did not apply to the chemical processes at the synthetic rubber plant. The EPA Region was directed by the EAB decision to revise the NPDES permit and eliminate all provisions and permit limits that relied on the erroneous decision that the OCPSF guidelines applied to processes at the synthetic rubber plant. The entire appeals process, including the issue of a final NPDES permit without the OCPSF limits, took more than seven years to complete. During this time, the permit conditions that were based on the OCPSF limits were stayed.

The above example illustrates the difficulties of the appeals process, but also demonstrates that if a permit applicant has a strong technical basis, it can prevail over EPA by preparing an adequate administrative record and persevering in the appeals process. Because of the time and resources involved in the appeals process, permit applicants should only appeal those issues they believe have a high probability of being resolved in their favor. Permittees should avoid filing appeals of permit limits and conditions that cannot be supported by the administrative record or that clearly are actions authorized by the federal or state regulations. For example, it is fruitless to challenge state water quality standards or water quality standards implementation procedures through the NPDES appeals process, although the permit agency's interpretation of such standards and procedures in the development of water-quality-based permit limits may be justifiably challenged. Similarly, the categorical effluent limitations guidelines that are applicable to a source cannot be challenged successfully (assuming that their applicability is not disputed), but their interpretation and implementation may be subject to a challenge. The bottom line on a permit appeal is that the permit applicant should understand thoroughly the foundation used by the permit writer to develop the permit limit or condition being challenged, and determine whether to file an appeal based on the technical and factual strength of the argument that can be made to support the challenge.

Settlement of Contested Issues

Many appeals of contested permits are settled outside of the formal appeals process. Often, the filing of an appeal, which stays the contested permit conditions, provides additional time to resolve issues with the permit agency. In fact, a common strategy is to file a permit appeal with the ultimate objective being to negotiate a settlement with the regulatory agency. This strategy assumes that the permit agency will recognize that its position with respect to the contested permit conditions is not so strong that it is certain of victory in the appeal. Thus, as stated previously, only permit issues that can be contested with a high probability of success should be appealed.

Settlement discussions with the permit agency usually begin before the schedule for the evidentiary or administrative hearing is set. The appeal process may be suspended until the negotiation is either completed or it is determined that a settlement is impossible. If a settlement is possible, the appeals process continues to be suspended until the permit is revised to reflect the settlement, and then the appeal is withdrawn when the revised final permit is issued.

Appeals by the Public or Government Agencies

If an NPDES permit is appealed by a member of the public or by a government agency, it is the responsibility of the permitting agency to defend its permit decision. In theory, the permit applicant could be viewed as an interested spectator in this process, although the applicant will be a party to any appeal of its permit. From a practical standpoint, however, a considerable amount of the burden of proof that the NPDES permit meets all regulations and protects human health and the environment falls on the permit applicant. Permit applicants are well advised to participate fully in the appeals process as an advocate for the NPDES permit that was issued by the regulatory agency. This includes having representation in the appeals process by an experienced attorney and having expert witnesses available to provide supporting testimony. The potential for public challenge of permit conditions is another reason why permit applicants should make every effort to assure that their applications are complete and that the administrative record prepared by the permit authority supports the permit.

In some cases, protestants use the appeals process to delay the issuance of a permit in order to gain some form of settlement with the applicant. In this case, the best defense is to assure that the NPDES permit is fully supported by the technical and legal record, so that the regulatory agency is able to deny appeals that are not based on material fact.

Section 8

Variances

There are relatively few opportunities for variances from the two types of standards used by permit agencies to set NPDES permit limits. The applicable standards for setting permit limits are: (1) the national categorical technology-based standards; and (2) water quality standards established by the states, or EPA when the state fails to issue such standards. These standards and how they are used to calculate permit limits are discussed in Section 4, **NPDES Permit Elements** and Section 6, **The Draft Permit**.

This section of the manual describes the variance process for technology-based standards and water-quality-based standards.

Variances from Technology Standards

NPDES permits are required to have limits based on any applicable national categorical effluent limitations guidelines. These technology-based standards for direct dischargers, introduced in Section 4, **Technology-Based Limits** are:

- BPT, which applies to the conventional pollutants BOD_5, TSS, oil and grease, pH, and fecal coliform;
- BCT, which applies to the same conventional pollutants as BPT;
- BAT, which applies to nonconventional pollutants such as ammonia, total phenols, COD, and TOC; and toxic pollutants identified pursuant to Section 307(a)(1) of the CWA; and
- NSPS, which apply to new sources, as they are identified under Section 306 of the CWA.

Sections 301(n), 301(c), 301(g), and 301(k) of the CWA allow variances from these technology-based standards under limited conditions. *None of these variances is available for NSPS, however, based on the assumption that a new plant can be designed and operated to achieve the standards because the designers know what the limits are in advance.* These variances, and the requirements for obtaining them, are discussed in the following subsections. It should be noted that these variances are provided for the federally-promulgated categorical effluent limitations guidelines and pretreatment standards for existing sources. They are not applicable to technology-based permit limits established by permit writers using BPJ, under the provisions at

40 CFR 122.44(a) (case-by-case effluent limits as identified in Section 401(a)(1) of the CWA). However, variances from BPJ technology-based limits are available pursuant to 40 CFR 122.21(m)(2)(B)(ii).

It is important to understand that, except for thermal discharge limits, EPA is the only regulatory authority which may grant the variances provided for the national categorical standards. States, including delegated states, may deny variance requests, or may forward such requests to EPA with recommendations for approval or with no comment, but they cannot grant any of these variances except for thermal discharges.

Fundamentally Different Factors Variance

The fundamentally different factors (FDF) variance provided by Section 301(n) of the CWA is potentially the broadest opportunity for a variance from the categorical technology-based limits. The requirements for filing for an FDF variance are at 40 CFR 122.21(m)(1). The required elements of an FDF variance petition are at 40 CFR 125, Subpart D.

The concept of the FDF variance is that EPA may not have available, or may not consider, data representative of every particular facility in an industrial point source category when it develops the categorical effluent limitations guidelines under the authority of Sections 304(b) and 304(g) of the CWA. Although EPA solicits data under the authority of Section 308 of the CWA, and during the public comment period, from a broad cross-section of the industry that will be regulated by an effluent limitations guideline, it may not be able to obtain all of the data required to assure that the guidelines are applicable to every facility in the point source category. As a result, the effluent limitations guidelines may have to be adjusted, on a case-by-case basis, to make them less stringent than those required for the category or subcategory. It should be noted that the regulations at 40 CFR 125, Subpart D also state that an FDF may be needed to make the effluent limits more stringent than the effluent limitations guidelines that are applicable to a discharger. It is hard to imagine that any discharger would apply for an FDF variance to lower its discharge limits, so this aspect of the variance is unlikely to ever apply.

Factors which may be considered fundamentally different between the applicant's facility and those used to establish the effluent limitations guidelines are listed at 40 CFR 125.31(d) and are summarized in Table 8.1. Although these factors seem to be reasonable bases for variances from the categorical effluent limitations guidelines, EPA establishes a very high standard for granting an FDF variance. The application for a variance will be approved only if:

- The alternative effluent limitation provided by the FDF variance is no less stringent than is justified by the fundamental difference;
- The alternative effluent limitation will ensure compliance with Sections 208(e) (areawide plans) and 301(b)(1)(C) (compliance with any water-quality-based permit limits) of the CWA;
- The removal cost required for the facility to comply with the effluent limitations guidelines is "wholly out of proportion to the removal cost considered during the development of the national limits;" and
- Compliance with the national standards would result in non-water quality environmental impacts (including energy requirements) fundamentally more adverse than the impacts considered during the development of the national limits.

The cost criterion for an FDF variance is a particularly high hurdle. In the few FDF variances that EPA has granted, EPA has considered the costs to be "wholly out of proportion" with the effluent guidelines estimates if the facility's annual compliance costs are greater than three times those estimated to be required for a similar plant to achieve the guidelines.

Table 8-1. Factors Which May be Considered Fundamentally Different for an FDF Variance

Nature or quality of pollutants in the raw waste load of the process wastewater
Volume of the discharger's process wastewater and effluent discharged
Non-water-quality environmental impact of control and treatment of the discharger's raw waste load
Energy requirements of the application of the control and treatment technology
Age, size, land availability, and configuration as they relate to the discharger's equipment or facilities; processes employed; process changes; and engineering aspects of the application of control technology
Cost of compliance using required control technology

A FDF variance will not be granted under any of the following conditions:

- The infeasibility of installing the necessary equipment to meet the time deadline for attaining an effluent limitations guideline. (This only applies when an effluent limitations guideline is newly promulgated or revised and establishes time schedules for compliance);
- The assertion that the standard cannot be achieved with the appropriate waste treatment equipment installed, except as demonstrated by one of the fundamentally different factors described above;
- The discharger's ability to pay for the equipment; or
- The impact of the discharge on local water quality (i.e., it cannot be argued that the technology-based limits are more stringent than required to protect water quality).

The FDF variance petition is filed with the permit agency. In a delegated state, the state may deny the FDF variance (which is subject to appeal under state regulations), or it may forward the petition to EPA with a recommendation to approve, or with no recommendation. States may not approve FDF variances. (They may approve variances for thermal discharges, which is not an FDF variance.) FDF variances can be processed at the EPA Region level, but only if they are not determined by EPA Headquarters to be of national significance. Generally, all FDF petitions are processed at EPA Headquarters. Once EPA makes the initial determination to approve or deny the FDF variance, it has the EPA Region or delegated state publish a public notice of tentative approval or denial of the variance. The public notice of the tentative approval or denial of an FDF variance is subject to the same hearing and appeals procedures as NPDES permits (see Section 7, **Hearings and Appeals**).

The requirements for application for an FDF variance are different for each of the technology-based effluent guidelines. As set out at 40 CFR 122.21(m)(1), they are:

- A request for a variance from the BPT standards must be filed by the close of the public comment period on a proposed NPDES permit.
- A request for a variance from the BAT and/or BCT standards must be filed, for any guideline promulgated after February 4, 1987, no later than 180 days from the date on which a new or revised BAT or BCT effluent limitations guideline is published in the Federal Register.

The 180-day deadline for BAT/BCT standards is a problem for dischargers that may not follow rulemaking closely. In December 1996, EPA proposed NPDES streamlining regulations to change the filing requirements for FDF variances from BAT and BCT guidelines to be consistent with the BPT variance requirements. If promulgated as a final rule, this revision would allow a discharger to apply for an FDF variance at any time before the close of the comment period on its proposed NPDES permit.

When a permittee files an application for an FDF variance, the permit authority typically stays the entire NPDES permit, including the guidelines-based limits that are the subject of the application. Thus, the permittee operates under the existing NPDES permit until final action is taken on the FDF variance. This approach is required because, by regulation, a valid NPDES permit must contain any applicable effluent limitations guideline-based limits. EPA could, and has in some instances, issued a renewed NPDES permit containing challenged effluent guidelines-based limits, and then simultaneously issued an administrative order (AO) acknowledging that the pollutant limits subject to the FDF variance application cannot be achieved by the discharger, and providing interim limits for those pollutants. This approach is unusual, however, and may not be acceptable to many dischargers who are placed in the position of exceeding the guidelines-based permit limits, even though the AO may provide achievable interim limits.

Although on the surface, the FDF variance procedure appears to offer a discharger a reasonable opportunity to change overly stringent categorical effluent limitations guidelines, in practice, EPA Headquarters has always taken a very aggressive stance, and has required an almost impossible burden of proof to justify the variance. Furthermore, EPA has no statutory deadline for acting on FDF variance applications, and historically, has taken years to issue the tentative approval or denial of an application. Thus, EPA often waits out the FDF variance applicant who typically will need a revised NPDES permit to allow changes and increases in production at its facility and who may ultimately decide to install the required equipment, or modify processes, to achieve the disputed guidelines limits. There have only been a handful of approved FDF variance applications over the entire life of the effluent limitations guidelines program.

Nevertheless, dischargers should not be discouraged by the FDF variance track record if they truly have a situation that has one or more of the factors necessary for filing an FDF variance application. If a facility is confident that it can prove that EPA did not consider the unique characteristics of its process wastewater when it developed the effluent limitations guidelines, it should at least explore what would be required to pursue an FDF variance. To be successful, the discharger must be able to assemble an application with hard facts and site-specific data. Before pursuing the variance, the discharger must

understand thoroughly the data and procedures used to develop the guideline. This means not just reviewing the guideline as it is promulgated in the CFR, but collecting and studying the guideline administrative and technical record. A starting point is the preamble to the proposed and final effluent limitations guidelines regulations. The EPA development document, economic analysis document, and environmental effects documents that are prepared to support the final rule also are essential to understanding the type of demonstration that must be made in the FDF variance application.

Because of the complexity of an FDF variance application, any discharger considering applying for such a variance probably should obtain expert assistance. This assistance should include a technical expert that is very knowledgeable with respect to the development of effluent guidelines by EPA, preferably of the specific guidelines for the point source in question, and a legal expert on the administrative procedures that must be followed to file the application and obtain approval.

Variance for Nonconventional Pollutants

Section 301(b)(2)(A) of the CWA requires dischargers to achieve BAT levels for all nonconventional pollutants identified in applicable effluent limitations guidelines. Section 301(g) of the CWA provides for granting a variance from BAT limits for the following nonconventional pollutants: ammonia, chlorine, color, iron, and total phenols (4AAP). This section of the CWA also allows the EPA to add nonconventional pollutants to this list. The objective of the section 301(g) is to prevent dischargers from having to expend resources to achieve a BAT limit for these pollutants when the limit is not necessary to protect water quality.

The requirements for granting a Section 301(g) variance from BAT limits for nonconventional pollutants are:

- The modified effluent limits will achieve any applicable BPT regulation and any water-quality-based permit limit, whichever is more restrictive;
- The modified treatment requirements will not result in additional treatment requirements for any point or nonpoint sources; and
- The modified effluent limits will not interfere with the maintenance of water quality that is required to protect human health and the environment (i.e., will not interfere with any water quality standard or designated use).

Deadlines for nonconventional pollutant variances are given at 40 CFR 122.21(m)(2). Initial requests for variance from BAT limitations guidelines must be filed within 270 days of the date of promulgation of the guideline. The complete request for variance must be filed no later than the close of the public comment period for the proposed NPDES permit and at least 180 days before EPA must make a decision on the variance. Typically, this latter requirement will be more restrictive. The complete request must demonstrate that any applicable requirements of 40 CFR 125 are met; however, the section at 40 CFR 125 dealing with Section 301(g) variances is reserved currently and thus, there are no specific requirements.

The Section 301(g) variance from BAT limits for nonconventional pollutants is much easier to obtain from EPA than an FDF variance. It does not require any demonstration of fundamental difference from the plants used to develop the guidelines and no economic demonstration is required. The burden of proof required to obtain this type of variance is relatively light. It consists primarily of a water quality effects analysis of the discharge of the nonconventional pollutant(s) to demonstrate: (1) that water quality and water uses will not be adversely affected if the variance is granted; and (2) that no point sources or nonpoint sources will be required to install additional treatment if the variance is granted.

From a practical standpoint, because of the time deadlines, a nonconventional pollutant variance is only available to dischargers that will be subject to new guidelines or future revisions that establish BAT limits for any of the five nonconventional pollutants specified above. EPA has shown no interest in expanding the list of nonconventional pollutants subject to this variance.

Therefore, dischargers should keep informed of any new or revised effluent limitations guidelines applicable to their facilities. This is relatively easy to do because EPA generally proposes new or revised guidelines at least one year before they become final. If a new or revised BAT guideline for any of these nonconventional pollutants becomes applicable to the discharge and a variance is needed, then the discharger should remember to file an initial variance request within the 270-day deadline.

Section 301(g) variances are also available from BPJ-based BAT limits for these nonconventional pollutants. These variances must meet the same requirements as described for approval of the categorical BAT limits; however, no initial request for variance is required. Deadlines for the complete variance request are the same (filed no later than the close of the public comment period for the proposed NPDES permit and at least 180 days before EPA must make a decision on the variance).

Economic Achievability Variance from BAT

Section 301(c) of the CWA provides for economic-based variances from any of the categorical BAT effluent limitations guidelines. To grant such a variance, EPA must find that:

- The modified requirements requested by the variance will represent the maximum use of technology within the economic capability of the discharger; and
- The modified requirements will result in reasonable further progress toward the elimination of the pollutant discharge.

Although this variance provision appears to apply to all pollutants regulated by categorical BAT limitations, Section 301(l) of the CWA specifically excludes toxic pollutants listed under Section 307(a)(1) from any variance provision except the FDF variance. Because all of the 126 priority pollutants are toxic pollutants as identified under Section 301(a)(1), this economic achievability variance is not available for any of them. It is, however, available for any nonconventional pollutant for which EPA has established categorical standards. However, it should be noted that the Section 301(c) variance is not available for modifications of BPT or BCT effluent limitations guidelines.

The application requirements for Section 301(c) variance are the same as those for a Section 301(g) variance (40 CFR 122.21(m)(2)). There are no regulations at 40 CFR 125 describing the required contents of a request for a Section 301(c) variance. However, it is clear from the required findings that EPA must make to grant such a variance that the applicant must demonstrate that it is economically unable to construct and operate the treatment technology required to meet the BAT limits. This standard requires the applicant estimate treatment capital and operating costs required to achieve the BAT effluent limitations guidelines. The applicant also has to provide sufficient financial information to demonstrate that it cannot afford to install and operate the treatment equipment required to achieve the BAT standard.

Large companies are unlikely to be able to make the necessary demonstrations to obtain an economic variance. The economic variance is structured primarily to provide relief to small businesses.

Alternative Effluent Limitations for Thermal Discharges

Section 316(a) of the CWA provides that a discharger may be granted alternative effluent limitations from any thermal discharge standard promulgated under the provisions of Sections 301 and 306, provided that the alternative thermal limitations assure the protection of a balanced, indigenous population of fish, shellfish, and wildlife in and on the receiving water for the discharge. The requirements for the variance application are at 40 CFR 125, Subpart H. The Section 316(a) variance can be approved by a delegated state.

The discharger first must file an initial application with screening information to support the request. The screening information must include:

- A description of the alternative limitation requested;
- A general description of the method by which the discharger proposes to demonstrate that the limit is more stringent than necessary to protect aquatic life and wildlife;
- A general description of the type of data studies and experiments that the discharger proposes to conduct to demonstrate that the alternative limitations are suitable and protective; and
- Data and information to assist the permit agency in selecting appropriate representative important species for the required studies.

Within 30 days of filing the initial application, the discharger must arrange to meet with the permit agency to discuss the application and proposed studies. Within 60 days of the filing of the application, the discharger must submit a detailed plan of study to support the Section 316(a) demonstration. The study must include:

- Collection of hydrographic, meteorologic, and physical data on the water body;
- Collection of physical monitoring data;
- Use of engineering or diffusion models and/or laboratory studies; and
- Evaluation of effects of the discharge on representative important species.

The permit agency must review and approve the study plan and provide any required changes to the discharger before the study is performed. The discharger can add additional information to the approved study plan to provide additional support to the variance request.

Existing dischargers may base their demonstration on the evidence of the absence of any appreciable harm in lieu of predictive studies required of new dischargers. The demonstration must consider the interaction of the thermal discharge with other pollutants and the additive effect of the thermal components of any other thermal discharge.

The request for alternative limits must be filed with the NPDES permit application for a new source or the application for renewal of the permit for an existing source. If the thermal standards are based on Section 401(a) of the CWA (case-by-case BPJ limits), or are water-quality-based limits, the discharger may submit the application within the public comment period on the proposed NPDES permit. If a Section 316(a) variance (alternative limit) is being renewed, the applicant only needs to submit applicable information as requested by the permit agency. In this case, the agency must request the information within 60 days after receiving the application.

The Section 316(a) alternative thermal limit variance is most commonly used by the electric power industry. However, any industrial discharger with a thermal discharge can take advantage of this variance, which is widely used when the required demonstrations can be made. The studies that are necessary to secure alternative thermal limits are extensive and costly, however, and only a relatively few dischargers outside of the electric power industry apply for such variances. In general, this variance is most appropriate for large volume thermal discharges, where providing cooling for the discharge is more expensive than the studies required to demonstrate that the variance is justified. The required studies for a Section 316(a) demonstration typically cost hundreds of thousands of dollars, and may cost millions of dollars for a large volume discharge. They also usually require at least two years to complete.

A discharger considering a Section 316(a) variance should secure the services of a consulting firm experienced in these specialized studies. Because the studies require field and modeling studies involving physical, hydrologic, thermal, and biological characteristics of the discharge and receiving water, including identification of representative important aquatic species, a project team with specialized knowledge and experience in these studies is both necessary and cost-effective.

Variances from Water Quality Standards

Variances from water-quality-based effluent limits are authorized by the CWA. Water-quality-based effluent limits are required by Section 302(a) of the CWA for any point source, or group of point sources, that may interfere with the attainment of water quality standards and designated uses of the receiving water body. Section 301(b)(1)(C) of the CWA requires permit agencies to establish permit limits that are more stringent than those required by technology-based standards, if more stringent limits are required to protect water quality and water uses.

Variances from water quality standards and water-quality-based permit limits must be approved by the state, regardless of whether the state has been delegated the NPDES permit program, because states have the authority under the CWA to adopt and implement their water quality standards. EPA has review and approval authority for any variances from water quality standards that are approved by the state.

Section 302(b)(2) Economic and Social Variance

Section 302(b)(2)(A) of the CWA allows modification of water-quality-based permit limits for any conventional or nonconventional pollutant, but not for toxic pollutants identified under Section 307(a)(1). Section 302(a) requires EPA and states to establish water-quality-based permit limits for any point source or group of point sources that discharge to a common receiving water, if there is reason to believe that application of the technology-based effluent limitations prescribed by Section 301(b)(2) would be insufficient to protect the water quality and designated water uses of the receiving water. States have typically used this provision to adopt waste load allocations for pollutants such as BOD and ammonia to assure that a dissolved oxygen standard is achieved. This provision, however, is applicable to all water uses, and to pollutants for which there are water quality criteria.

The Section 302(b)(2)(A) variance provision allows EPA and/or a delegated state to issue an NPDES permit that modifies the water-quality-based limitations required by Section 302(a) if the applicant demonstrates at a public hearing on the proposed water-quality-based limit that there is no reasonable relationship between the economic and social costs and the benefits to be obtained from achieving the limit (including the attainment of the water quality standard and/or designated use). This economic and social costs variance can be requested even if technology or alternative control technologies exist for achieving the water-quality-based permit limit. For the variance to be available in a particular state, the state must adopt such a provision in its water quality standards. States are not obligated to include provision for Section 302(b)(2)(A) variances in their water quality standards.

The applicant must demonstrate that attaining the designated use would cause widespread adverse economic and social impacts. The economic impacts that are considered in this analysis are those resulting from treatment beyond that required to comply with technology-based effluent standards. To be granted a variance, the analysis of economic impacts provided by the applicant must demonstrate that:

- It would face substantial financial impacts due to the costs of the necessary pollution controls to achieve the water-quality-based permit limit (substantial impacts on profitability or would interfere with desirable development), and

- The affected community would bear significant adverse impacts if the discharger is required to meet existing or proposed water-quality-based permit limits (widespread impacts such as job loss, or interference with important development).

In some cases, states may perform the economic and social impact analysis, if multiple point sources on a receiving water are likely to be affected by water-quality-based permit limits. Typically, a state would perform such an analysis when it determines waste load allocations for the receiving water.

A discharger must submit its variance request before the end of the public comment period for its proposed NPDES permit. The request must document the costs that the discharger would incur to install pollution controls needed to meet the water-quality-based permit limit, and demonstrate that the cost of these controls would represent a significant adverse financial impact on the facility, for example, significant decreases in profitability or the possibility of product line or plant closure. The request also must demonstrate that if these financial impacts were to occur, there would be significant adverse social and economic impacts on the community where the facility is located. These impacts could include employment reductions, decreased expenditures by the discharger for goods and services, and the related secondary impacts on the local economy.

The variance must be renewed whenever the NPDES permit is renewed (every five years). The economic/social analysis must be updated as necessary to demonstrate that the conditions that justified the variance still exist.

Section 302(b)(2)(B) of the CWA allows a variance from a water-quality-based permit limit for a toxic pollutant for a maximum of five years. The discharger must demonstrate that: (1) the modified limits are the maximum

degree of control within its economic capability; and (2) the modified limits will result in reasonable further progress toward achieving the objectives of Section 302(b)(2) (the water-quality-based permit limits). The economic demonstration requires both an estimate of the capital and operating costs to achieve the proposed limits and documentation that the financial condition of the discharger does not allow it to install any more effective pollution control technology.

Both of these Section 302(b)(2) variances from water-quality-based permit limits are most likely to be useful for small businesses, and especially those with a single facility. Large companies with multiple plants may find it difficult to demonstrate that the costs of installing the treatment required to achieve water-quality-based permit limits would not be financially acceptable. However, with increasingly restrictive water quality standards, cases may arise in the future where a major company may elect to use these variance provisions. For example, if an old plant would be forced to shut down if it had to meet a water quality standard, and the plant was a significant employer in a community, then a company might wish to pursue the economic variance approach for modified effluent limits.

These variance provisions are not widely used, but obtaining such a variance is not impossible. For example, some small cities have used the economic and social variance provisions of Section 302(b)(2)(A) to obtain relief from dissolved oxygen criteria for low flow streams.

Temporary Variances from Water Quality Standards

States are authorized at 40 CFR 131 to include temporary variances from water quality criteria in their water quality standards. Such variances, which have 3-year durations, but can be renewed, relieve the discharger from achieving water quality criteria during the variance period. These variances are available for all categories of pollutants. This type of variance is allowed if the state determines that:

- A site-specific water quality criterion may be applicable and is likely to be less restrictive than the existing criterion;
- The existing use may need to be downgraded because one or more of the conditions that justify such a downgrade, as listed at 40 CFR 131.10(g), are likely to be satisfied; or
- The water quality criterion is likely to be achieved at some time in the future without requiring the point source discharger to achieve

restrictive water-quality-based permit limits (such as remediation of sediments or control of nonpoint sources).

An applicant for a temporary variance from a water quality standard usually is required to commit to a study to develop a site-specific water quality standard or to demonstrate that the existing use designation should be downgraded. Such studies include the indicator species approach (water effects ratio), the recalculation procedure, and the resident species procedure (see Section 9, **Site-Specific Water Quality Criteria**).

To downgrade a designated water use, a study must be conducted by the discharger or state to demonstrate that attaining the existing designated use is infeasible for at least one of the reasons specified at 40 CFR 131.10(g):

- Naturally-occurring pollutant concentrations prevent attainment;
- Natural, ephemeral, intermittent or low flow conditions or water levels prevent use attainment, unless it can be demonstrated that effluent discharges can compensate for these low flow conditions without violating state water conservation requirements;
- Human-caused conditions or causes of pollution prevent attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave as is;
- Dams, diversions, or other hydrologic modifications preclude attainment of the use, and it is not feasible to restore the water body to its original state or to operate the modification to attain the use;
- Physical conditions related to the natural features of the water body preclude attainment of aquatic life protection uses; or
- Controls more stringent than those required by Section 301(b) of the CWA (technology-based effluent limits) would result in widespread social and economic impact.

Although in many cases it would seem that the state should conduct these studies, especially those required for downgrading an existing use, in practice, states do not have the resources or budget to perform the studies except in the case where a large number of point sources, and especially POTWs, are affected by the water-quality-based limits.

The studies required to justify downgrading include field studies of hydrology, water chemistry, and biology. The studies required for the economic justification for a downgraded use are identical to those described for a Section 302(b)(2)(A) variance.

These temporary variances must be renewed every three years to coincide with the required triennial review of a state's water quality standards, so that any necessary changes in a state's standards to accommodate site-specific water quality criteria or revised designated uses can be made.

There are no federal regulations for the filing of an application for a water quality variance because these variances are found only in state regulations. Most states require that the variance be filed no later than the end of the public comment period on the proposed NPDES permit. They usually prefer, however, that the application be made at the same time that the application for the permit is filed. In order for an applicant to file its variance request with the permit application, it will have to perform its own analysis to determine if a variance is likely to be necessary.

If such a variance is granted, typically states include conditions for any required studies in the NPDES permit or in an order issued at the same time that the final permit is issued. These permit or order conditions typically require submittal of periodic progress reports to the permit agency.

The water quality standards variance approach is a valuable tool for dischargers. It is notable that no demonstration of adverse economic or social impacts is required to obtain a variance that is based on demonstrating that a site-specific water quality criterion is appropriate. Because many, if not most, of the state water quality criteria for protection of aquatic life are based on the EPA national criteria, which are intentionally very conservative, there is a high probability that a site-specific water quality criteria study will demonstrate that less restrictive criteria are protective of aquatic life. This is especially true for the water quality criteria for metals. Such studies (see Section 9, **Site-Specific Water Quality Criteria**) are not difficult or expensive and usually can be completed in two years, which is ample time to allow for modification of a state water quality standard.

Developing site-specific criteria for protection of human health or wildlife is more difficult and expensive than for aquatic life, but still may be of value. EPA and the states use very conservative assumptions with respect to the bioavailability of pollutants and potential exposure to humans and wildlife, and more realistic site-specific information may demonstrate that less restrictive criteria are protective.

The studies required to justify downgrading a designated water use also are straight-forward and can be performed within a reasonable amount of time, typically less than two years. With the exception of the downgrading of a use based on widespread social and economic impacts, the use attainability analysis requires a study of the hydrology, physical/chemical characteristics, and biology of the receiving water.

If a discharger elects to pursue a temporary variance for development of a site-specific water quality criterion or for conducting a use attainability study, it will need to contract with experienced consultants unless it has the capabilities to conduct these multi-disciplinary studies in-house. There are a number of consultants and laboratories with the expertise to conduct these studies. However, it is recommended that consultants or in-house experts with experience in conducting these water quality studies be retained to prepare the study plan and manage the study.

Section 9

Tool Box

This section presents a number of techniques used in the development of NPDES applications and permits. These techniques include effluent limit calculations, seasonally-based effluent limits, sample analyses, biomontoring, mixing zones, TMDLs and wasteload allocations, site-specific water quality criteria, and indicator parameters.

Effluent Limit Calculations

This section explains how effluent permit limits are calculated. Often there are many steps involved in the calculation and many factors to be considered. Consequently, permit calculations can be very complex. To keep things simple, this portion of the manual describes these calculations primarily by example. References to more detailed explanations in EPA manuals and elsewhere are provided for the interested reader.

Types of Limits

Permit limits may be based on technology or water quality standards. Technology-based limits are like those found in national effluent guidelines and those developed by permit writers using BPJ. Water-quality-based effluent limits, or WQBELs, are derived from state and federal water quality standards for toxic pollutants, dissolved oxygen, dissolved solids, and other pollutants. Permit limits must be based on the more restrictive of the two standards. Therefore, permit limits may be a combination of limits that are technology-based for certain pollutants and water-quality-based for others. Both types of limits are calculated during the drafting of the permit, and the final limit is then based on the most stringent value.

Data Distributions

Permit limits often are based on statistics. For example, a permit usually has monthly average and daily maximum limits for a pollutant. These limits are normally developed from statistical parameters that define the data distribution. Environmental data related to permit limits typically follow either normal or lognormal distributions. Data following a normal distribution fall in a fairly straight line in a probability plot as shown in Figure 9-1. Data following a lognormal distribution also plot in a straight line when the vertical axis in the probability plot is log-scale as shown in Figure 9-2. Choosing the best distribution for a set of data is important because it affects the calculation of the permit limit.

Most spreadsheet programs have the statistical functions needed to fit normal and lognormal distributions to effluent data. It is recommended that probability plots of effluent data always be prepared and examined to confirm that a specific distribution fits a data set. Although there are methods for determining the goodness of fit of a particular statistical distribution, graphs make it is easier to identify any peculiarities in the data.

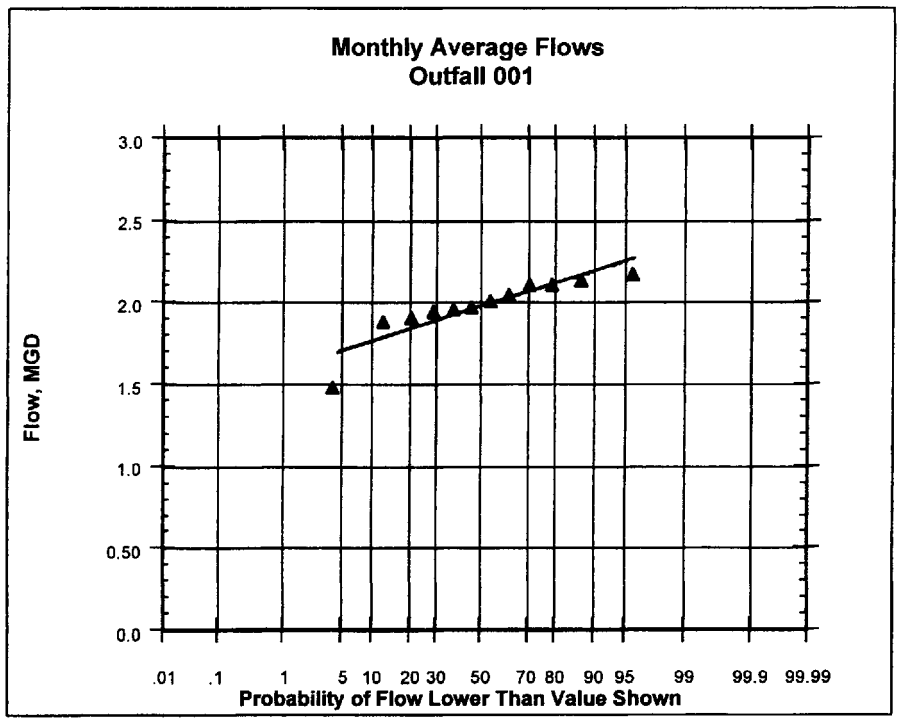

Figure 9-1. Normal Probability Plot of Effluent Flows

It should be noted that the data plots in Figures 9-1 and 9-2 are not perfectly straight lines. There are data points at both the high and low ends that do not fall on the best fit line representing the probability distributions. This is common with effluent data and the amount of deviation in these plots usually is acceptable for effluent calculations. Typically, as long as there are only a few points "off" the line or the data are not severely "curved" at either end, the normal or lognormal distribution, as the case may be, can be used. However, if the data fit is particularly poor in the upper part of the distributions, it may be necessary to use other statistical distributions. These distributions include extreme value statistics and nonparametric statistics, and are outside of the normal scope of effluent data analysis. The statistical references included in **Bibliography** describe how to use these more advanced methods.

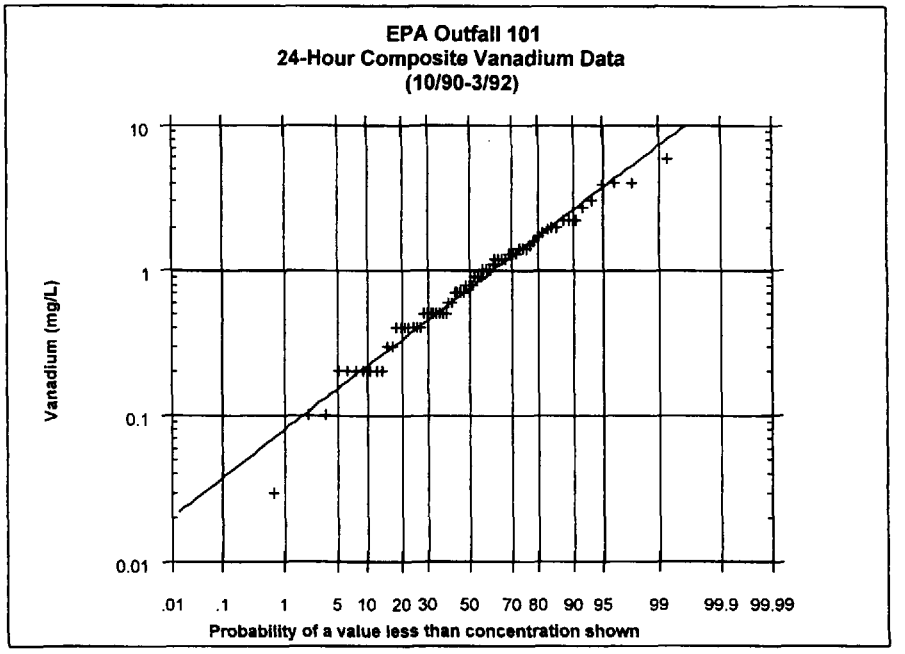

Figure 9-2. Lognormal Plot of Effluent Vanadium Data

The best description of the statistical methods that EPA uses to characterize wastewater data is presented in Appendix E of the "Technical Support Document for Water-Quality-Based Toxics Limits (TSD)," EPA/505/2-90-001. Chapter 5 of the TSD describes how these statistical methods are used to calculate permit limits. Most states use the statistical methods developed by EPA for calculating BPJ technology-based permit limits and WQBELs. EPA's categorical effluent limitations guidelines are calculated using these statistical methods.

Outliers

Environmental data should always be evaluated for values that stand out from the rest of the data, hence, the term "outliers." Outliers can occur from mistakes in data entry (decimal points, transposing numbers), in laboratory analysis, in sample collection, and so on. There will also be values that are valid, but are not considered typical. Their effect on the data distribution should be considered in the calculation of permit limits. If an outlying value is the result of a mistake and cannot be corrected, it should be removed from the data set when calculating permit limits. Reference sources for outlier tests and discussion are listed in **Bibliography**.

Nondetects (Censored Data)

Analyses of environmental data for materials that are present in very low or trace concentrations often result in *nondetectable* or *less than* values because the analytical method can only determine quantities reliably down to a certain level. Nondetects are called *censored* values because the true values are not known. Censored data sets have to be handled differently when statistical parameters are calculated for data distributions. There are a variety of techniques for handling censored data sets in calculations. References for some of the most common techniques are listed in **Bibliography**. Two of the better techniques are the modified delta-lognormal distribution and Cohen's method, both of which have been described in EPA documents. The modified delta-lognormal method is most typically used by EPA for wastewater data analysis, but Cohen's method has actually been shown to give the least biased estimates of the statistical parameters of censored data distributions. The TSD describes how the modified delta-lognormal distribution is used to analyze censored wastewater data. An example of a censored lognormal data distribution is shown in Figure 9-3. In this particular case, the censor level is the analytical quantification limit of 0.1 mg/L.

Spreadsheet-based programs can be developed to use for fitting Cohen's method and the modified delta-lognormal distribution to effluent data. These can be used to analyze censored effluent data to develop effluent limits from treatment performance data.

Confidence Intervals

A confidence interval is the range in which a mean value is expected to lie. A confidence interval defines the uncertainty in the mean value. For example, for a set of effluent flow data, a 95% confidence interval is interpreted as the range within which one can be 95% confident that the true mean flow lies. The confidence interval must not be confused with the probability estimate of individual flow values from the underlying distribution, i.e., the probability that any individual flow value will lie above or below a given flow value.

Confidence intervals are useful in effluent statistical analysis because technology-based effluent limits (including effluent limitations guidelines) and WQBELs are sometimes based on average flow rates. However, the statistical variability that is built into effluent guidelines and WQBELs typically is based on effluent concentrations, not on mass discharges, which are concentrations multiplied by flows. Because permit limits are established most commonly on mass discharges, failure to include the potential uncertainty in average effluent flows in the permit limit calculation will result in overly restrictive permit limits. In some cases, state regulations or EPA effluent limitations guidelines will allow the use of the maximum 30-day

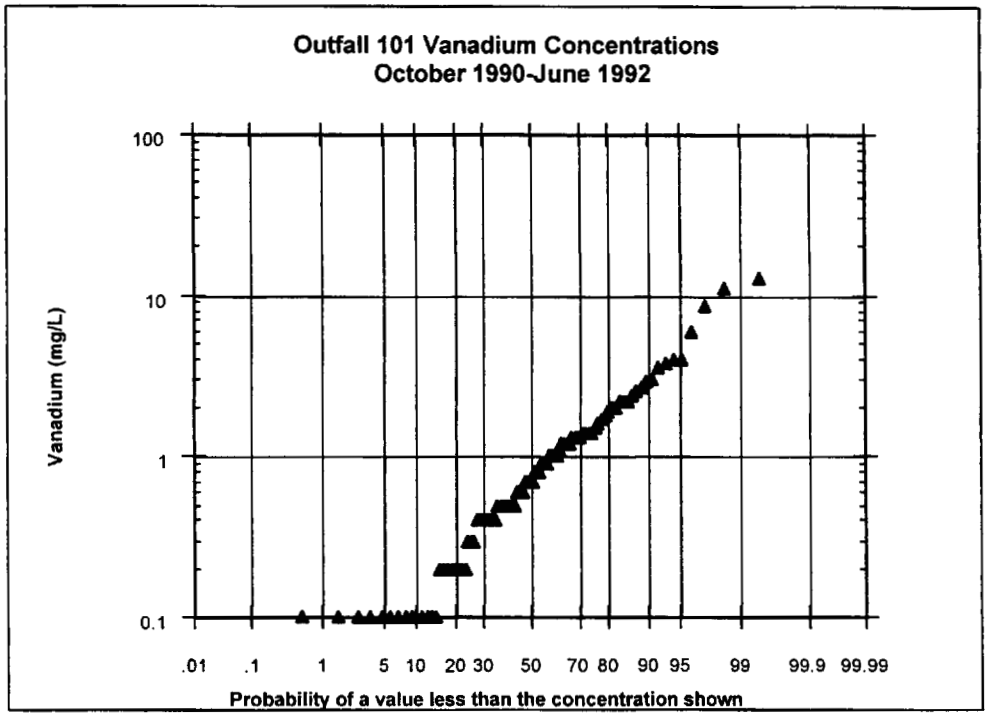

Figure 9-3. Censored Lognormal Distribution of Effluent Vanadium Data

average flow for calculating mass limits. If this approach is allowed, then the confidence interval approach to flow estimating is not necessary. However, if the permitting agency or the effluent guidelines calls for use of an averaging period of more than 30 days for mean flows (recalling that the daily average permit limit is, in effect, a 30-day average), then the use of the upper bound of the confidence interval on the mean flow is an appropriate value to use for calculation of permit mass limits.

The following example shows how to calculate the upper bound of the 95% confidence interval on an average effluent flow.

EXAMPLE - Upper Confidence Limit on Effluent Flow

The WQBELs for the plant with the flow data in Figure 9-1 must be calculated with the annual average effluent flow, based on the state's water quality standards implementation procedures. The facility proposes, and the state agrees, that the upper bound of the 95% confidence interval on the annual average flow will be used to calculate the mass WQBELs for the NPDES permit. The monthly average flow data submitted with the permit application are:

Month	Flow, million gallons per day (MGD)
Jan 93	1.9079
Feb 93	2.1114
Mar 93	1.8741
Apr 93	1.4819
May 93	1.9438
Jun 93	2.0015
Jul 93	2.1062
Aug 93	1.9502
Sep 93	2.1296
Oct 93	2.1717
Nov 93	1.9697
Dec 93	2.0432

Mean	1.9743
Standard Deviation	0.1817

The 95% confidence interval on the mean is calculated with the following equation:

$$\text{Confidence interval} = \bar{x} \pm z\frac{\sigma_{n-1}}{\sqrt{n}}$$

where:

$\bar{x}$ = mean

z = z - *factor from the one - side normal distribution*

σ_{n-1} = sample standard deviation with n - 1 degrees of freedom

n = number of samples

It should be noted that the above equation, which is commonly used by regulatory agencies, is a simplification (and for a statistician, not a correct one). The correct factor in the above equation is Student's t, not the z-factor. The value of Student's t changes with the number of samples (degrees of freedom). For a given confidence level, Student's t is always larger than the z-factor. As the number of samples increases, Student's t approaches the z-factor. To avoid having to use a variable Student's t, regulatory agencies often use the z-factor. As stated before, this is not entirely correct, but produces a lower permit limit, which is conservative from a regulatory standpoint.

To continue, the z-factor for 95% is 1.65, and the upper bound of the confidence interval is calculated using the mean and sample standard deviation of the flow data:

$$95\%\ \text{upper bound} = 1.9743 + 1.65\frac{0.1817}{\sqrt{12}}$$

$$= 2.0608\ \text{MGD}$$

The 95% upper bound on the annual average flow is 4.4% greater than the arithmetic mean flow, which reflects the uncertainty in the mean flow estimate.

Effluent Guideline Limits

Effluent limitations guidelines developed by EPA for different industry categories incorporate statistically-derived monthly averages and daily maximum limits. The EPA effluent limitations guidelines all use the same probability levels for the development of these limits. The daily maximum limits are based on the 99th percentile of individual daily (24-hour) effluent measurements. The monthly average limits (called daily average limits in permits) are based on the 95th percentile of the monthly averages of individual daily values, usually assumed to be 4 to 30 samples per month. These same probability levels have been adopted by most states for developing BPJ-based technology limits and WQBELs. The description of the methodology for developing these statistical methods is presented in the TSD.

Many permittees express concern about using a statistical percentile to set the permit limit and then requiring 100% compliance because there are always values in the data set or distribution greater than the selected percentile. For example, with a 99th percentile, 1% of the values will be greater than this value. Even a well-operated facility can expect a small number of samples to exceed such limits (on average, 1 out of 100 individual samples and 1 of 20 monthly averages). However, EPA and the states expect 100% compliance with the limits. The merits of the permittee's concern are apparent, but both state and federal courts have upheld EPA's statistical approach to setting limits and enforcing them. Thus, the permittee must operate at performance levels that are better than EPA and the state use to set the permit limits, which is actually their intention.

Most categorical effluent limitations guidelines are based on production at a facility. An example of the application of a production-based guideline follows.

EXAMPLE - Effluent Guidelines Calculation of Permit Limits for a Petroleum Refinery

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An existing lube oil petroleum refinery has a crude feedstock capacity of 233.7 thousand barrels per day (kbbl/day). The refinery is subject to the effluent limitations guidelines at 40 CFR 419 Subpart D (lube oils). The refinery submitted the following production capacity data, which are based on the highest monthly average production in the two years preceding the permit application:

		Production Rate	Ratio to Feedstock
Crude Processes			
Vacuum crude distillation	=	162.1 kbbl/day	0.694
Crude desalting	=	233.7 kbbl/day	1.0
Atmospheric crude distillation	=	233.7 kbbl/day	1.0
Total crude processes	=	629.5 kbbl/day	2.6936

Cracking and Coking Processes			
Visbreaking	=	15.1 kbbl/day	0.0646
Fluid catalytic cracking	=	52.7 kbbl/day	0.2255
Hydrocracking	=	31.1 kbbl/day	0.1331
Fluid coking	=	73.0 kbbl/day	0.3124
Total cracking and coking processes	=	171.9 kbbl/day	0.7356
Lube Processes			
Hydrofining, lube hydrofinishing	=	23.5 kbbl/day	0.1005

As shown above, the throughput for each refinery process is divided by the crude feedstock capacity. The refinery guidelines use these ratios to calculate an overall refinery "process configuration." Unit process configurations are calculated by multiplying the ratio by a weighting factor for that particular type of process. The weighting factors are found at 40 CFR 419.42(b)(3). Then all of the unit process configuration factors are added to obtain the total refinery process configuration. In this example, the total process configuration factor is 8.41, shown in the following calculations.

Process	Ratio to Feedstock	Weighting Factor	Unit Process Configuration Factor
Crude Processes	2.6936	1	2.6936
Cracking and Coking	0.7356	6	4.4136
Lube Processes	0.1005	13	1.3065
Refinery total process configuration			8.41

The next step is to find the "process factor" and "size factor" related to this total process configuration value. Size factors (sf) and process factors (pf) for the Lube Subcategory are found at 40 CFR 419.42(b)(1) and (2), respectively. The size factor is based on the total crude throughput. For a total throughput of 233.7 kbbl/day, the size factor for this refinery is 1.19. For a process configuration value of 8.41, the process factor is 1.09.

The refinery size factor, process factor, and total production (tp) are multiplied by the applicable standards in 40 CFR 419, Subpart C for the Lube Subcategory. For example, the applicable standard for BOD is BCT at 40 CFR 419.44(a). The BOD limits are calculated below. Units for the standards are in pounds per kbbl (lb/kbbl).

Daily average BOD limit = (9.1 lb/kbbl) x (pf)(sf)(tp)
= (9.1)(1.09)(1.19)(233.7 kbbl/day)=2,758 lb/day

Daily maximum BOD limit = (17.9 lb/kbbl) x (pf)(sf)(tp)
=(17.9)(1.09)(1.19)(233.7)=5,426 lb/day

BAT limits for COD, ammonia, and sulfide are calculated in a like manner using the effluent standards at 40 CFR 419.43(a).

BAT limits for total phenols (4AAP), total chromium, and hexavalent chromium are calculated using a different method. The total throughput capacity of each of the above process groups, plus the total throughput capacity of reforming and alkylation processes, are used in this calculation. At this refinery, the total capacity of reforming

and alkylation processes is 74 kbbl/day. The calculations of the daily average BAT limits for total phenols (4AAP), using the BAT limits for these pollutants from 40 CFR 419.43(c), are:

Process Group	Total Rate (kbbl/day)	Daily Average BAT Limit (lb/kkbl)	Permit Limit (lb/day)
Crude Processes	629.5	0.003	1.885
Cracking and Coking	171.9	0.036	6.188
Lube Processes	23.5	0.090	2.115
Reforming and Alkylation	74.0	0.032	2.368
Daily average BAT mass limit for total phenols (4AAP)			12.556

The petroleum refinery guidelines are somewhat unusual because they also have BPT limits for total phenolics, total chromium, and hexavalent chromium. These are calculated as shown above for BOD. Because the refinery guidelines are very specific to the configuration of each individual refinery, there are some refineries where the BPT limits for total phenolics, total chromium, and hexavalent chromium are more restrictive than the BAT limits calculated for these pollutants. Therefore, the permit writer must calculate both the BPT and BAT limits for these pollutants, and use the more restrictive in the NPDES permit.

The above calculations are for the process wastewater flow component of the refinery discharge. There are a separate set of effluent limitations guidelines, which are concentration-based, for contaminated storm water that is combined and treated with the process wastewater. These permit limit allocations are calculated using the treated storm water flow, and are added to the process wastewater allocations. An example calculation follows.

EXAMPLE - Effluent Guidelines Calculation of Permit Limits for Storm Water at a Petroleum Refinery

The refinery in the previous example has calculated that its maximum 30-day average flow of storm water that is treated and discharged is 1,051,000 gallons per day (1,051 kgal/day). The effluent guidelines for storm water from lube oil refineries are at 40 CFR 419.44(e) (BCT for BOD, TSS, oil and grease, pH) and 419.43(f) (BAT for total phenols (4AAP), total chromium, hexavalent chromium, and COD). The calculations for the storm water permit allocations for BOD are as follows:

	Flow Rate (kgal/day)	BCT Limit (lb/kgal)	Permit Limit (lb/day)
Daily average BOD	1,051	0.22	231.2
Daily maximum BOD	1,051	0.40	420.4

The permit limit for BOD is the sum of the process wastewater allocation and the storm water allocation. Thus, for this refinery, the daily average permit limit for BOD would be 2,989.2 lb/day (2,758 + 231.2). Other limits are calculated similarly.

The petroleum refining effluent limitations guidelines are much more complicated than most other production-based guidelines. In most guidelines, the permit limits are calculated directly from the manufacturing production rate (as per the previous example of BAT limits for total phenolics). Permit limits from concentration-based effluent limitations guidelines are calculated as shown above for the refinery storm water limits.

Water-Quality-Based Effluent Limits

The methods that most states use for calculating WQBELs are based on the methodology presented in EPA's TSD. This method combines the statistical methods used for the development of technology-based limits with numeric water quality criteria and the allowable dilution in the mixing zone (if mixing zones are allowed). As with the effluent guidelines calculations, an example is provided to show how WQBELs are calculated.

EXAMPLE - Example of WQBEL Calculations

The same refinery described in the previous examples discharges to a tidal river. The effluent flow rate (highest 30-day average) is 2.88 MGD (4.456 cubic feet per second [cfs]). The average tidal flow in the river is 1,181 cfs. The 15th percentile TSS in the river is 8.5 milligrams per liter (mg/L), which is used in the calculation of metals partitioning coefficients (see **Site-Specific Water Quality Criteria** later in this section). The state's default dilution factors for tidal rivers are 1/3 of the average flow for the chronic aquatic life standards and 1/30 of the average tidal flow for the acute criterion. The refinery has constructed a diffuser to increase effluent mixing and the state has approved a dilution of 5.11% effluent at the edge of the zone of initial dilution (ZID), which is used to apply the acute aquatic life criterion.

Based on the effluent data in the NPDES permit application, the state has determined that the discharge has a reasonable potential to cause or contribute to an exceedance of the numeric aquatic life criteria for copper. Therefore, WQBELs for copper must be calculated and added to the permit. The state's acute and chronic criteria for dissolved copper are the same, 4.37 µg/L.

Step 1
Adjust the dissolved copper criteria to total recoverable copper criteria using the default partitioning coefficient. The partitioning coefficient is calculated from the 15th percentile TSS concentration, using an equation in the state's standards. The ratio of total to dissolved copper at this TSS concentration is 1.132, so the acute and chronic criteria on a total copper basis are 4.95 µg/L.

Step 2
Calculate WLAs for the acute and chronic copper criteria, using the respective dilution factors.

Fraction effluent for chronic criterion = (4.456 cfs)/(4.456 cfs + (1,181cfs)/3)
= 0.00112

WLA for chronic criterion, WLAc = 4.95 µg/L÷(0.00112) = 442.0 µg/L

Fraction effluent for acute criterion = 0.0511 (based on diffuser)

WLA for acute criterion, WLAa = 4.95 µg/L÷(0.0511) = 96.9 µg/L

Step 3
Because the acute and chronic water quality criteria are based on different exposure periods (24 hours and 7 days, respectively), the WLAs must be converted to long-term averages so that they can be compared and the more restrictive can be used to set the WQBELs. This conversion is made with statistical conversion factors that adjust the acute and chronic criteria to a common long-term average basis. These statistical factors are default values taken from EPA's TSD at specified probability levels. The conversion factor for the acute criterion is 0.32 and the factor for the chronic criterion is 0.53. The long-term averages are calculated as follows:

Long-term average for chronic criterion, LTAc = 442.0 µg/L (0.53) = 234.3 µg/L
Long-term average for acute criterion, LTAa = 96.9 µg/L (0.32) = 31.0 µg/L

Step 4
Because LTAc is greater than LTAa, the LTAa of 31 µg/L becomes the basis for the WQBELs. The WQBELs are calculated using variability factors, which convert the long-term average concentration to the daily average and daily maximum permit limits. These default variability factors are calculated from the methodology presented in EPA's TSD, and represent the 95th percentile for the daily (monthly) average and 99th percentile for the daily maximum limit. The variability factors are 1.31 and 3.11, respectively. The calculated WQBELs for copper are:

Daily average limit = (31 µg/L) (1.31) = 40.6 µg/L
Daily maximum limit = (31 µg/L) (3.11) = 96.4 µg/L

These concentration limits are multiplied by the 30-day average effluent flow rate to obtain the mass permit limits for copper.

Seasonally-Based Limits

When permit limits are controlled by water quality standards for dissolved oxygen (DO), seasonally-based limits can provide higher limits by taking advantage of naturally varying conditions in the receiving water. Impacts on receiving water DO are routinely evaluated by regulatory agencies using computer water quality modeling. Dissolved oxygen concentration in the receiving water typically is used to measure the impacts of wastewater discharges containing DO-demanding substances. Microorganisms in the

water use oxygen while consuming the organics in wastewater discharges. Organic loads of wastewaters are typically measured in terms of oxygen demand from carbon and nitrogen containing compounds (BOD and ammonia). When a wastewater is discharged into a stream, DO is used by microorganisms to degrade organic matter. Biodegradation occurs, followed by reaeration as DO is added back into the stream from the air. If the load from a wastewater discharge is large enough, the DO in the stream decreases for some distance downstream of the discharge because DO is being used faster than reaeration can supply it. Eventually, when enough of the organic load is biodegraded, the biodegradation rate slows, and through reaeration, the DO in the stream begins to increase. The lowest DO that occurs is called the sag point in water quality modeling. The concentration at the sag point must meet the water quality standard.

Biodegradation processes are sensitive to temperature. During the summer when water temperatures are high, biodegradation is fast and DO is consumed rapidly. During the cooler times of the year, biodegradation is slower and thus, DO is consumed at a slower rate. There may still be a sag point, but it will not be as low. In addition, DO saturation levels are higher at cooler water temperatures, so that the upstream water mixing with the discharge carries more DO to offset removals by biodegradation. There are other factors affecting DO, but this is a simple description of some of the most significant.

During the permit drafting stage, if it appears that permit limits will be controlled by the DO water quality standard, the applicant can request seasonally-based limits. Normally, two seasons are defined. Which months are included in each season depends on the monthly water temperatures in the receiving water and the efficiency of the facility's wastewater treatment system. For example, the "summer" season may run from May to October and the "winter" season from November to April. During the summer season, the month with the highest water temperature will dictate the permit limits. The summer limits will be the same as those that would have been determined for year-round limits. An applicant gets relief with higher winter limits, which are helpful because the facility's wastewater treatment system, being biological, is less efficient at cooler temperatures. Winter permit limits, however, are likely to be controlled by higher DO standards set during the spring when spawning occurs. The DO standard is usually 1 mg/L higher during spawning months.

Other items to consider during the development of DO-controlled permit limits (seasonally-based or year-round) are carbonaceous BOD (CBOD) limits and trading between BOD and ammonia limits. If requested by the applicant, the regulatory agency may set a CBOD limit instead of a BOD limit because water quality modeling is based on CBOD. Ammonia, which is a component of BOD, is a separate parameter in water quality models. If ammonia is a significant portion of a facility's effluent BOD, it can be double-counted in water quality modeling—once as BOD and again as ammonia itself. Under

aerobic conditions, ammonia is nitrified in a two-step process, first to nitrite, which subsequently is oxidized to nitrate. Ammonia has a large effect on DO; 1 milligram (mg) of NH_3-N uses 4.57 mg of O_2 for complete oxidation to nitrate. Therefore, it is important that its effects on DO not be double-counted. Modeling will determine what combination of CBOD and ammonia will comply with the DO standard. The applicant can then request that the permit limit be written explicitly as CBOD. The applicant can also request the agency to model the effect of trading between CBOD and ammonia. Because each part of ammonia is equal to about 4.57 parts of CBOD, an applicant typically will request a reduction in an ammonia limit in order to obtain a high CBOD (or BOD) limit.

Sample Analyses

Wastewater sample analyses are a key requirement of the NPDES permits program. Accurate and precise analyses are essential for completing permit applications, and the analytical requirements included in NPDES permits for compliance monitoring are obviously of great importance. While on the surface it might seem that obtaining reliable analytical data on a wastewater sample is as easy as selecting a qualified laboratory, in fact, the permit applicant must have a good understanding of the analytical requirements of the NPDES program in order to assure that the laboratory is properly instructed on the chemical and physical constituents of the sample, the types of analytical methods used for these measurements, and the sensitivity of the analytical method (detection limits). This guidance manual deals with the following topics:

- Choosing the appropriate analytical methods for permit applications and compliance monitoring;
- Identifying the required analytical detection and quantification limits for each chemical that will be measured in the wastewater samples;
- The importance of QA/QC for validating analytical method results;
- Auditing the performance of the laboratory; and
- Petitioning EPA or the state for an alternate analytical method to improve method sensitivity, precision, or eliminate matrix interferences.

Choosing an Analytical Method

The starting point for choosing an analytical method for wastewater analysis is to determine the constituents to be measured for the application or for

demonstration of compliance with NPDES permit limits. The approaches that should be used for method selection differ somewhat for permit applications and permit compliance monitoring. Therefore, these two topics are discussed separately.

Permit Applications

The NPDES permit application forms specifically identify the wastewater constituents that must be analyzed. The permit application form and instructions must be read carefully to identify those pollutants for which actual analytical measurements are required, as opposed to those that simply have to be identified as potentially present in the effluent.

The type of discharge (domestic sewage, industrial waste category) is an important factor in determining the specific wastewater analyses required for the permit application. For example, all point source dischargers for which EPA has promulgated national categorical effluent limitations guidelines must collect, as a minimum, the analytical data that are specified for these categories in Appendix D at 40 CFR 122.

States also may have lists of chemicals that must be analyzed to assess the need for water-quality-based permit limits. Texas, as an example, has numeric water quality criteria for more than 30 chemicals that are not on EPA's priority pollutant list and are, therefore, not specified for analysis in the NPDES permit application forms and instructions. If an NPDES application were to be completed for a point source discharging in Texas, and no data were provided for chemicals with water quality criteria, then the discharger's permit application might be deemed incomplete, the discharger may be given a permit condition requiring such chemicals to be routinely monitored in its effluent, or, worse, the discharger could be given permit limits for the chemicals for which no application data were provided. Because this situation is not unique, before beginning any analyses of wastewater for a permit application, the permit applicant should determine from the permit authority if there are any specific chemical constituents that must be analyzed to address state water quality standards requirements.

The permit applicant should prepare a complete list of all wastewater constituents that must be analyzed to complete the application. This list of analytes (a term used by chemists for substances or parameters that are to be measured in a sample) should be given to the laboratory in the request for analysis.

Once the list of analytes has been prepared, the analytical methods must be specified. All analyses for NPDES permits (applications and compliance) must use approved analytical methods that are listed in EPA regulations at 40 CFR 136. This requirement is true for state NPDES programs as well as for permits issued by EPA.

The only exception to the use of the 40 CFR 136 methods is when it is necessary to analyze a sample for a constituent for which there is no 40 CFR 136 method. This situation may occur when a state has water quality standards for chemicals that have no EPA-approved NPDES analytical method, when an applicant has identified a chemical in its permit that raises concern with the permitting agency and for which the agency then requests an analysis, or when the applicant, for its own reasons, has analyzed the wastewater for chemicals that have no 40 CFR 136 approved methods.

In some cases, the permit application form or instructions will identify the analytical methods that are to be used; in others, the permit application or instructions may identify either an analytical detection or quantification limit that must be achieved for each pollutant. States with water quality criteria for chemicals that do not have approved 40 CFR 136 analytical methods will often provide a list of acceptable analytical methods and required detection or quantification limits, if this information is not already included in the permit application instructions or application forms.

The determination of any special state or EPA requirements for achievable analytical detection or quantification limits is essential before a request for wastewater analysis is given to the laboratory. In most cases, special detection or quantification limits will be required for those wastewater constituents with numeric water quality criteria, which can require water-quality-based permit limits that are lower than the technology-based limits. It may be necessary for the permit applicant to contact the state permitting agency or the EPA Region that issues the NPDES permit to determine if there are any special requirements related to analytical methods for specific pollutants, or if there are required detection or quantification limits for these analyses. Failure to do so may cause the permitting agency to reject the analytical data, requiring reanalysis of the wastewater. In a worst case, NPDES permit limits may be set merely because the analytical detection or quantification limits are higher than concentrations deemed allowable for discharge.

Table 9-1 lists the types of information and instructions that should be given to the laboratory when requesting NPDES analyses:

Table 9-1. Example Information and Instructions That Should be Given to a Laboratory When Requesting NPDES Analyses

Physical and chemical constituents that must be measured in the water sample.
Wastewater analyses must be performed using approved 40 CFR 136 methods and the results must be identified as being measured with these methods.
Any required analytical detection or quantification limits specified in the permit application, the application instructions, or any state or EPA guidance.

If any constituents to be analyzed in the wastewater sample do not have 40 CFR 136 methods, the laboratory should be instructed to use, if possible, an analytical method that is approved under another EPA program such as the methods published in SW-846 ("Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, EPA Office of Solid Waste, Washington, D.C.) or the drinking water methods approved at 40 CFR 141. The required analytical detection or quantification limits should be specified, if available.

Laboratories should be instructed to perform and provide reports on all QA/QC requirements specified in each analytical method used.

A list of any special QA/QC requirements, such as analysis of certified standards for selected constituents or analysis of duplicate samples.

The instructions to the laboratory, and the contract or purchase order, should specify that all QA/QC requirements for the analytical methods and the detection/quantification limits must be met. Many permit applicants have had the unfortunate experience of requesting analyses of wastewater and receiving unusable results for some wastewater constituents because their instructions to the laboratory were not sufficiently detailed and explicit. This is a problem that should never occur if complete and precise instructions are given to the laboratory.

Permit Compliance Analysis

Once a proposed or final NPDES permit has been issued, the applicant must determine which analytical methods will be used to conduct the regular permit compliance monitoring. As a rule, only analytical methods that are approved at 40 CFR 136 may be used for NPDES permit compliance monitoring. The exception to this is when the NPDES permit explicitly allows or requires use of an analytical method that is not a 40 CFR 136 method. Alternate methods may be specified in an NPDES permit for a number of reasons:

- monitoring for an analyte for which there is no 40 CFR 136 method
- avoiding an analytical interference unique to the permittee's effluent
- attaining a lower detection limit or improved method sensitivity
- attaining improved resolution or selectivity for the analyte of interest
- improving method precision and accuracy
- reducing analytical costs
- simplifying analytical procedures

An important principle of analyses for NPDES permit compliance is that only approved 40 CFR 136 methods may be used unless the permit explicitly requires or allows an alternate method. It is important for the permittee to inquire about and fully understand why an alternate method has been specified in his/her permit, and to include discussion of analytical methods as part of the permit negotiation process. In this discussion, the permittee should consider the following concerns:

- 40 CFR 136 is intended to provide the permit writer with a complete compendium of EPA-approved and fully validated methods for analysis of pollutants under the Clean Water Act. The permit writer must provide a technically sound justification, beyond application of "professional judgment," for selecting a method outside of this compendium, and this justification should clearly indicate why the permit writer believes that 40 CFR 136 methods are not appropriate for the particular permit.

- In many cases in effluent guidelines development, the use of specific analytical methods was assumed. Use of a different analytical method for compliance monitoring could invalidate the effluent guideline. For example, EPA has specified in the refinery effluent guidelines the analytical procedure for phenolic compounds given in the 14th edition of *Standard Methods*. To ensure consistency and accuracy in compliance determinations, refineries should be required to use this same analytical method for compliance monitoring. In particular, refineries should not be required to use phenolics methods specified in later editions of *Standard Methods*.

- The appropriate 40 CFR method may have a method detection limit above the concentration in the effluent. It is quite acceptable and consistent with EPA policy to use the 40 CFR 136 method and report zero concentration in this case. If a permit writer insisted upon an alternate method, perhaps unvalidated but with a lower method detection limit, and then specified a stringent water-quality-based permit limit near or at this detection limit, the permittee might be unable to comply with the permit limit. The permittee should insist that inasmuch as 40 CFR 136 methods are fully validated (see below), no unvalidated or improperly validated methods can or should be substituted for them.

- Section 304(h) of the Clean Water Act and 40 CFR 136.3 require all analytical methods used for compliance monitoring be subjected to a rigorous method validation process, including round robin testing to establish interlaboratory performance and variability. The permit writer is obligated to specify in permits only analytical methods which have undergone this rigorous method validation process. The permittee should insist that all methods specified in the permit be properly validated as per 40 CFR 136.3 and section 304(h) of the Clean Water Act.

An important aspect of compliance analysis for NPDES permit limits is selection of an analytical method that is sufficiently sensitive to measure the presence or absence of a constituent at the permit limits, where this is possible. This requires selecting an approved analytical method with a quantification limit that is lower than the concentration corresponding to the lowest permit limit. To do this, the permittee should calculate the

concentration that would correspond to each mass limit for each regulated constituent, if the facility were discharging at the maximum daily effluent flow anticipated during normal operations (e.g., as identified in the permit application). This calculation will identify the minimum concentration that would have to be measured and reported to demonstrate compliance with the mass limit. If the permit has concentration limits rather than, or in addition to, the mass limits, then the concentration can be used directly. These minimum required concentrations can then be compared to the analytical sensitivity of the approved 40 CFR 136 analytical methods and the appropriate analytical method can be selected. The selection of the method does not have to be performed by the permittee. The list of required chemicals for analysis, and the associated minimum concentrations to be achieved, can be provided to the laboratory, and the laboratory can then select the appropriate method.

It is important to understand that for water-quality-based permit limits, the numeric permit limit may be lower than can be achieved by any available, approved analytical method. This may occur because for some chemicals, numeric water quality criteria are set below analytical quantification limits. EPA and state policy is to place the actual numeric limits calculated from such water quality criteria in NPDES permits, even though the limits are set at concentrations below the minimum levels that can be quantified, or even detected, with available analytical methods. In such cases, during permit negotiation and/or the comment period, the permittee should request that the permit specify the required analytical method and quantification limit (as discussed in the next subsection). Furthermore, the permit should explicitly address how compliance is to be determined and results are to be reported when the analytical quantification limit exceeds the concentration upon which the permit limit is based.

Typically, most permit limits are established at levels where the lower level of quantification is not a problem. The chemicals that are most frequently of concern with respect to analytical quantification are: (1) certain metals, including mercury, silver, copper, lead, and cadmium; (2) oil and grease and/or total petroleum hydrocarbons; (3) polychlorinated biphenyls (PCB); (3) polychlorinated dibenzo-p-dioxins and dibenzofurans (dioxins and furans); (4) cyanide; and (5) certain pesticides. These chemicals, with the exception of oil and grease, often have very low numeric water quality criteria, which lead to low water-quality-based permit limits.

Oil and grease and the related group of substances, total petroleum hydrocarbons, are a special case because some states or permit writers will establish very low concentrations, which are not measurable with the available analytical methods. These pollutants are also special cases, because they are actually defined by their analytical methods. The best approach for dealing with this problem is in the drafting and public comment stage of permit development. Applicants should either insist upon permit limits that are at

analytically quantifiable concentrations, or the permit must contain language that addresses compliance with the permit limit when the analysis is reported as below the quantification limit.

Quantification and Detection Limits

A entire report could be written on analytical method detection limits, quantification limits, and related terms. These terms are used to define the lowest concentrations that are practically measurable for a specific pollutant, using a particular analytical method. The starting point for this discussion in this guidance is the distinction between a detection limit and a quantification limit. These two key concepts can be defined as follows:

- Detection limit—the concentration of a substance at which the analytical method can determine that the amount present in a sample is different from zero, at a defined level of statistical confidence.

- Quantification limit—the concentration of a substance at which the analytical method can determine the amount which is present in a sample, at a defined level of statistical confidence.

In simpler terms, the detection limit tells the data user if the substance is present in the sample, but the actual amount present is not known with good precision. At or above the quantification limit, the amount present in the sample can be stated, within a known confidence range.

Several different types of quantification and detection limits are used in the NPDES program, depending upon which state or EPA region is responsible for issuing the NPDES permits. The specification of a common definition for detection limits and quantification limits that would be used in all NPDES programs (including state water quality standards) is a controversial topic and will not be discussed in this guidance.

The most common forms of detection and quantification limits in the NPDES program are as follows:

- Method detection limit (MDL)—the MDL is used by EPA to define the detection limits for many of the approved analytical methods at 40 CFR 136. The MDL methodology is defined in Appendix B at 40 CFR 136. EPA defines the MDL as the concentration at which a chemical can be identified as present in a water sample at a 99% probability level. The MDL can be measured in reagent water (water with no impurities) or in any wastewater matrix (matrix-specific MDL). All of EPA's published MDLs for approved analytical methods were

determined in reagent water. A matrix-specific MDL typically will be greater than the published MDL.

- Minimum level (ML)—the ML is a form of quantification limit that EPA's Engineering and Analysis Division is using for some of its analytical methods for water and wastewater samples, and is promoting as a unified quantification limit for NPDES and water quality programs. Historically, the MLs for EPA methods have been specified using different approaches, some of which are not statistical. Currently, EPA is defining the ML as 3.18 times the MDL. It is intended to represent a concentration at which there is a 99% probability that a measurement is within ±30% of the true concentration of the analyte in the sample. An ML can be based on reagent water or on a matrix-specific analysis. Obviously, a matrix-specific ML typically is greater than a reagent water ML.

- Practical quantification level (PQL)—the PQL originally was defined by EPA's Office of Drinking Water and is used in the drinking water program. It is also used by EPA's solid waste program. It is supposed to represent a concentration at which 80% of qualified laboratories can measure within ±40% of the true concentration in a sample. In practice, the Office of Drinking Water estimated PQLs as 5 to 10 times the reagent water MDLs produced by a method for a specific analyte. The PQL is supposed to account for interlaboratory variability and matrix effects on quantification.

- Limit of detection (LOD)—the LOD is the analytical detection limit defined by the American Chemical Society (ACS). It is defined as three standard deviations of the signal/noise ratio measured in a blank sample (containing none of the target analyte).

- Limit of quantification (LOQ)—the LOQ is defined by the ACS as 10 standard deviations of the signal/noise ratio measured in a blank sample. The 3.18 factor used by EPA to convert its MDL to its ML (quantification level) is derived from the ratio of the LOQ to the LOD.

From the standpoint of the permittee, the most important distinction is between a quantification limit and a detection limit, and compliance with permit limits should always be based on quantification limits. Permit limits that are stated as "no detectable amount or quantity" should also be based on a quantification limit. At the quantification level, the chance of a false positive result (i.e., a chemical is reported as present in a sample when actually it is not) is minimal. At the detection level, the opportunities for false positives (and permit noncompliances) are much greater. This is especially true when

the detection limit is based on concentrations in reagent water. Therefore, a permit applicant should strive to avoid permit limits based on detection limits.

An important option for NPDES permts is the matrix-specific quantification limit and detection limit. It is an advantage to a permittee if the permit includes specific language allowing development of a quantification or detection limit specific to the permittee's effluent matrix. This type of permit condition is becoming more common as low water-quality-based limits are included in NPDES permits. Typically, this type of permit condition allows the permittee to perform its own detection limit/quantification limit study, using its actual effluent. The permittee will have to develop an approved or approvable study protocol, and then submit the results of the study to the permitting agency. If the permitting authority approves the matrix-specific quantification or detection limit, then the permittee can use the matrix-specific limit for all compliance determinations. This approach is desirable regardless of whether permit limits are based on detection limits or quantification limits.

"Less-than" analytical data (e.g., <5 μg/L) should be handled properly in discharge monitoring reports. For the permittee, the best approach is to report such a result a as zero (0) concentration and use a value of zero in any compliance calculations. EPA's Region 6 has used this reporting method, following a procedure adopted by Texas. EPA has proposed this approach as national guidance for permit limit reporting when water-quality-based limits are lower than the applicable quantification level. The permittee is required to achieve the quantification limit established for the constituent in the NPDES permit, and is required to maintain the laboratory records to document that these quantification limits were achieved.

An alternate reporting method is to use less-than quantification level values in the discharge monitoring report. This approach is acceptable for reporting concentrations, but should be strongly resisted for reporting mass discharges for comparison to mass permit limits. It is inappropriate to calculate numbers by multiplying a known value (the effluent flow) by a less-than value, even though this is widely practiced. Multiplying a flow by a less-than concentration value implies that the less-than value is a measured value, which it is not.

Also to be avoided is using one-half of the quantification limit to calculate mass loadings, or to report less-than concentration values. Again, a value stated as below the quantification level is not a measured value, and should not be treated as such in calculations or reports.

Alternate Analytical Methods

As discussed previously in **Choosing an Analytical Method**, the only analytical methods that can be used for the NPDES program are at 40 CFR 136, unless no approved method is available for the constituent and a state or EPA Region specifically identifies, in an NPDES permit, an alternate analytical method. The EPA regulations provide a mechanism to obtain approval of an alternate analytical method for any specific wastewater constituent, either on a discharger-specific basis or on a nationwide basis. The method of application for approval of an alternate analytical method is described at 40 CFR 136.4, and the contents and approval of such applications are described at 40 CFR 136.5.

An applicant for an alternate method must submit to EPA a complete description of the proposed method, a demonstration of method performance including precision and bias using both reagent water samples and effluent matrices, and QA/QC procedures. Applications for site-specific alternate analytical procedures are submitted to the EPA Administrator in the EPA Region where the discharge occurs. If the discharger is in a state that has been delegated authority for NPDES permits, the application is made to the EPA Regional Administrator through the Director of the state permitting agency. If the applicant seeks nationwide approval of an alternate method, the application must be made to the EPA Director of the Analytical Methods Staff, Office of Science and Technology, in Washington, D.C.

EPA proposed regulations in 1997 to streamline the approval of alternate analytical methods for the NPDES program. These streamlining initiatives, which EPA is already implementing, are based on the concept of performance-based measurement system (PBMS) rather than on detailed and specific analytical procedures. Approved analytical methods at 40 CFR 136 may be modified to a significant extent without prior EPA approval, provided that certain required demonstrations of acceptable method performance can be achieved. This information must be documented and held at the laboratory that is performing the analyses.

For new methods under the streamlining approach, there are three tiers of approval. At Tier 1, a single laboratory will be allowed to use a new method that has been demonstrated to perform acceptably on a single wastewater matrix. At Tier 2, a single laboratory can use a new method on multiple effluent matrices if it submits performance data demonstrating that the method is acceptable for multiple types of effluent matrices. The Tier 3 approval is for nationwide use of a new method, and the performance demonstration must include multiple laboratories as well as multiple effluent matrices. The streamlining methodology includes detailed guidance describing how existing, approved methods can be modified and how new methods must be documented and demonstrated to meet performance requirements. Because of

the standard format, EPA expects approvals to be granted expeditiously, especially for Tier 1 alternative method requests.

EPA's new methodology for approval of alternate analytical methods, if adopted, will allow dischargers to use this option much more easily than has been possible in the past. Because matrix interferences are a common problem, particularly when measuring chemical constituents in low concentrations as required by water-quality-based permit limits, the option of modifying an analytical method or developing a new method is a viable approach for permittees.

The following case history is a good example of how an alternate analytical method can help a permittee. Although this approach is not easy or inexpensive, it offers a valuable alternative to approved analytical methods.

EXAMPLE - Alternative Analytical Method Case History

A chemical plant in Texas was required to achieve technology-based limits for total cyanide. The total cyanide test is notorious for having positive interferences by a number of chemicals including reduced sulfur compounds and aldehydes.

The wastewater from this plant contained a number of interferences that could not be corrected with the approaches provided in the approved test method. These interferences resulted in false positive cyanide concentrations that caused frequent exceedances of the technology-based limits for total cyanide.

The plant developed a new total cyanide method, which substituted ion chromatography (IC)/electrochemical detection for the colorimetric determination in the approved analytical method. This was the only change in the approved procedure. The IC method, which is specific to the cyanide anion, eliminated all of the matrix interferences from the test.

To document the performance of the IC method, it was used to analyze spiked samples of the effluent matrix, spiked reagent water samples, and certified standards to develop the bias and precision of the new method. QA/QC requirements were also developed for the new method.

The new method, along with the performance data, were submitted to the Texas Natural Resource Conservation Commission and EPA Region 6 for approval. Because this was a site-specific alternate analytical method, Region 6 incorporated the IC method for cyanide in the plant's NPDES permit.

Quality Assurance/Quality Control

All of the approved analytical methods for the NPDES program have QA/QC requirements. The importance of adequate QA/QC for environmental analyses

cannot be overemphasized. Ultimately, the permittee is responsible for the quality of analytical data submitted in permit applications and discharge monitoring reports. Therefore, it is important for the permittee to understand the QA/QC requirements and reports prepared by the laboratories that generate its data.

Laboratory reports should include adequate QA/QC data, or alternatively, QA/QC reports should be available on request. It is recommended that adequate QA/QC data accompany every laboratory report. Applicants and permittees should familiarize themselves with the QA/QC requirements and reports, and these data should be given at least a cursory review each time they are received. It is important to be able to identify when a particular analysis is out of control (does not meet QA/QC requirements), because this means that the analytical result may be questionable. In some cases, it is necessary to use QA/QC data to support invalidation of a specific analytical result (although this must be done with careful consideration, because it could result in a permit noncompliance for not taking the required number of samples). This review of QA/QC data should be a standard procedure before any analytical data are entered into a discharge monitoring report.

When preparing a permit application, an analysis that does not meet the required QA/QC is usually considered invalid and may be rejected by the permitting agency, resulting in an incomplete application. Typically, another analysis is performed and the original result is invalidated. In some cases, it is acceptable to report analyses that do not meet the QA/QC criteria by properly flagging them in the application (e.g., a measurement of methylene chloride in a sample when that compound was found in a field blank).

Auditing the Laboratory

Even if a laboratory is internal to the discharger's company, periodic laboratory audits are a recommended practice. Periodic auditing of commercial laboratories that perform analyses also is recommended. Because the permit application is a legal document, just the same as the discharge monitoring report required by the NPDES permit, the discharger is obligated to assure that the analytical data used in both documents are collected under conditions that meet all regulatory requirements. Furthermore, because the NPDES permit will be based on the analytical data in the application, the discharger must assure that the data are accurate and representative of the discharge. Auditing the laboratory is a prudent practice.

A comprehensive laboratory audit requires an experienced auditor or audit team, and few dischargers have this capability themselves. However, many

large companies have laboratory audit teams that they send to every commercial laboratory they use. It is a good idea to use these teams where available.

Audits are useful, whether or not the discharger performs the audit himself. Outside of the technical complexities of analysis, a lot can be learned about a laboratory's quality of work by looking around the laboratory and checking simple practices. Upon request, the laboratory should show how it maintains records, and should provide a walk-through to see if the facilities are clean and well-organized. The laboratory's sample control and storage procedures are particularly important, because lost samples and sample holding time exceedances can indicate poor procedures or work overload. Discussions with the laboratory's chemists can provide information on the experience of the staff with particular methods.

To assist it in conducting a laboratory audit, a permit applicant can obtain a copy of EPA's "NPDES Compliance Inspection Manual," EPA 300-B-94-014, September 1994. This manual, which is used by EPA and state inspectors, describes and presents checklists for laboratory inspections.

Biomonitoring

The term, biomonitoring, can apply to a number of different types of procedures; however, in the NPDES program, generally it is used to refer to the testing EPA identifies as whole effluent toxicity (WET) tests. Thus, the following discussion focuses primarily on the WET test. Other types of biomonitoring that could appear in permit application requirements or as permit conditions are also discussed briefly.

WET Tests

The WET test has become a standard component of NPDES applications and permits. A WET test determines the effects of the effluent on the survival, growth, and/or reproduction of test organisms. The WET test involves putting aquatic organisms in 100% effluent, or in a mixture of effluent and receiving water (or synthetic dilution water), under controlled conditions for a specified exposure time, and observing any effects.

The WET test is used to protect receiving water quality and thus, WET conditions and limits in an NPDES permit can be considered as water-quality-based limits. EPA's NPDES regulations at 40 CFR 122.44(d)(iv) and (v) require a state or EPA region to include WET limits in an NPDES permit if the permitting agency determines that a reasonable potential exists for a discharge to cause or contribute to an excursion of a numeric WET standard or narrative toxicity standard. Because EPA regulations on water quality

standards require all states to include narrative toxicity provisions in their water quality standards, the WET test is a universal requirement for the NPDES program. The NPDES regulations also require permit agencies to make a determination as to whether a discharge has the reasonable potential to cause or contribute to an exceedance of the narrative toxicity standards. Therefore, most permit authorities require some WET data in the permit application.

The WET tests have been standardized by EPA and are promulgated as approved NPDES methods at 40 CFR 136. There are two general types of WET tests that are widely used in NPDES permits and applications: (1) the static acute toxicity test for 24 to 96 hours, for which the observed effect is organism survival; and (2) the short-term static renewal chronic test for 7 days, for which the observed effect may be survival, growth, and/or reproductive success. These tests are termed static because the test organisms are exposed to an effluent:dilution water mixture in a chamber which is manually filled with both the test organisms and the water sample. The static renewal test involves replacing the water in the test chambers several times during the exposure period.

The aquatic organisms used in the standard WET test have been selected for their sensitivity and ease of cultivation in the laboratory. There are standard test organisms for both fresh water and marine waters. EPA recommends in its TSD that an effluent be evaluated with test species in each of three biological families: invertebrates, vertebrates, and plants. In practice, most permit agencies require testing with organisms from two families: invertebrates and vertebrates. The aquatic organisms used in the standard WET tests are shown in Table 9-2 and Table 9-3.

Table 9-2. Aquatic Species Used in Standardized Acute WET Tests

Freshwater Species	Marine Species
Ceriodaphnia dubia (cladoceran)	*Mysidopsis bahia* (mysid shrimp)
Daphnia magna, Daphnia pulex (daphnids)	*Artemia salina* (brine shrimp)
Pimephales promelas (Fathead minnow)	*Cyprinodon variegatus* (Sheepshead minnow)
Oncorhynchus mykiss (Rainbow trout)	*Menidia beryllina* (Inland silverside)
Savelinus fontinalis (Brook trout)	*Menidia menidia* (Atlantic silverside)
	Menidia peninsulae (Tidewater silverside)

Table 9-3. Aquatic Species Used in Standardized Chronic WET Tests

Freshwater Species	Marine Species
Ceriodaphnia dubia (cladoceran)	*Mysidopsis bahia* (mysid shrimp)
Pimephales promelas (Fathead minnow)	*Cyprinodon variegatus* (Sheepshead minnow)
Selenastrum capricornutum (algae)	*Menidia beryllina* (Inland silverside)
	Arbacia punctulata (Sea urchin)
	Champia parvula (Red macroalgae)

A few states require use of different, indigenous test organisms in WET tests. Therefore, before conducting any WET tests for a permit application, the applicant should determine the appropriate test species from the permitting agency.

Most WET tests are run using what are known as serial dilutions of effluent and dilution water, for example, 10%, 20%, 30%, and so on. The serial dilutions are designed to estimate statistically the effluent dilutions which are lethal to or will inhibit growth or reproduction of the test organisms. When lethality is tested, the term "lethal concentration" or LC is used. An LC_{50} is the concentration (dilution) of effluent that results in death of 50% or the organisms. When inhibition of biological processes such as growth or reproduction is tested, the term "inhibition threshold" or IT is used. For example, an IT_{25} for reproduction is the effluent concentration that causes a 25% decrease in reproduction.

A control consisting of 100% receiving water or synthetic dilution water is run with every dilution series. The dilution of effluent and receiving water (or synthetic dilution water) used in the WET tests is typically established based on the allowable mixing zone dilution, which is the critical dilution. Receiving water usually is the dilution water; typically, synthetic dilution water is used only when the receiving water exhibits toxicity to the test organisms and cannot be used as a test control.

The WET test procedures, including sample collection and preservation requirements, are described in several EPA manuals that are referenced in 40 CFR 136. These manuals are:

- "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms," 4th edition, EPA/600/4/90/027F, Office of Research and Development, Washington, D.C., 1993.

- "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms," 3rd edition, EPA-600-4-91-002, Office of Research and Development, Washington, D.C., 1994.

- "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Marine Organisms," 3rd edition, EPA-600-4-91-003, Office of Research and Development, Washington, D.C., 1994.

These manuals contain laboratory procedures for the WET tests as well as the sample collection and preservation methods. EPA has indicated that the manuals allow laboratories flexibility in WET test conditions, as long as the conditions are within the acceptable ranges specified in the methods. For example, the salinity used in the marine species tests may be set anywhere in the acceptable range of salinity given in the test manual. For example, in a particular case study, a discharger with a high salinity effluent found it necessary to culture the mysid shrimp at the maximum salinity allowed by the test method in order to obtain reproducible and accurate WET test results.

In addition to static and static renewal WET tests, protocols have been established for continuous flow-through aquatic toxicity tests, which can also be used to determine effluent toxicity. These continuous flow-through tests mix effluent and dilution water at a series of dilutions in multiple test chambers containing the test species. Because the flow-through tests are more representative of a flowing water body, and reflect variations in effluent and receiving water quality, they provide more accurate measurements of effluent toxicity potential. However, they are very labor-intensive and expensive compared to static and static renewal tests, and are not conducive to large-scale testing of multiple effluents such as is required for the NPDES program. Therefore, this type of WET test is not routinely conducted for permit applications or permit compliance monitoring, although some states do require such testing for certain effluents and discharge locations. Such testing is more likely if the receiving water is considered to be very sensitive.

WET Test Data for Applications

The WET test procedures described above have become a standard component of NPDES permits and are usually required data for permit applications. The permit application or instructions from delegated states typically will specify WET test data requirements. EPA's Form 2C application asks for WET test data, but does not require such data if they are not available. Thus, when an EPA Region is the permitting agency, WET test data do not have to be generated for the permit application unless the Region has specifically issued instructions requiring such testing.

In some cases, states do not require WET test data in the permit application, but instead will include testing requirements as permit conditions. Illinois, for example, includes a requirement in every NPDES permit for major industrial sources to analyze samples once a month during the year immediately preceding the expiration date of the NPDES permit. This sampling becomes the WET database for permit renewal.

Obviously, WET test data will not be available for a proposed or future discharge. Therefore, it can be expected that the NPDES permit will include some type of WET test requirement.

Not all dischargers are required to perform WET testing. Minor industrial dischargers, small domestic waste dischargers, and similar low impact dischargers may not be required to conduct any WET testing. As indicated earlier, WET testing is required by the EPA NPDES regulations when a permitting agency believes that a discharge may cause or contribute to an excursion of a state WET limit or narrative state water quality criterion. Low impact dischargers often are exempted from WET testing requirements. Thus, if the permit application does not specify WET tests, the state permitting and water quality regulations should be consulted to determine if a low-impact discharge requires WET testing data for the application.

If WET testing is required for a permit application, the discharger should obtain samples following the protocols for WET tests in the EPA manuals listed in this section under **WET Tests**. Also, the state should be consulted for any state-specific requirements.

There are a number of commercial laboratories that can perform WET tests. It is prudent to audit these laboratories before they are selected to perform WET testing work, just as was described in this section under **Auditing the Laboratory**.

WET Testing in NPDES Permits

WET test requirements typically take two forms in NPDES permits: (1) a WET limit; or (2) a WET testing requirement that triggers a toxicity reduction evaluation (TRE) in the event that the test shows unacceptable toxicity to the test organisms. Of the two forms, the testing requirement generally is much preferred by the permittee because if a test indicates toxicity, it does not result in a permit noncompliance.

A WET limit, as the term implies, is an enforceable numeric permit limit just like the permit limits on any other regulated pollutant such as TSS. The WET limit is expressed in either toxicity units or a percent effluent, which is defined by the allowable effluent dilution in the receiving water mixing zone. Acute

and chronic toxicity units are based on the LC_{50} and no observed effects concentration (NOEC), respectively. The LC_{50} was defined previously in **WET Tests**. The NOEC is the no observed effects concentration measured in the WET test, and is defined as the effluent dilution at which there is no statistically significant difference between it and the control. When calculating acute and chronic toxicity units, the LC_{50} and NOEC are expressed as percent effluent.

Acute toxicity units (TU_a) are calculated as:

$$100 \div LC_{50} \text{ (units expressed as } TU_a)$$

Chronic toxicity units (TU_c) are calculated as:

$$100 \div NOEC \text{ (units expressed as } TU_c)$$

When reporting toxicity in toxicity units, it is important to include the units showing whether the value is for acute or chronic toxicity. For example, if the acute toxicity unit value is calculated for an LC_{50} of 20% effluent, the result is 5 TU_a.

When setting limits for acute toxicity units, EPA recommends a limit of 0.3 TU_a, as described in the TSD. The 0.3-factor is based on EPA test data relating an LC_{50} to an LC_1 ($LC_1=0.3LC_{50}$). As described earlier in **WET Tests**, an LC_{50} is the percent effluent that results in death for 50% of the test organisms. Similarly, an LC_1 is the percent effluent that results in death for only 1% of the test organisms. Thus, if a limit is based on an LC_1, which is essentially what EPA recommends with the 0.3 TU_a, it is more protective. In the case of the chronic toxicity test, no factor is used to adjust the NOEC because it is based on no observed effects and thus, is considered protective.

Toxicity limits in permits also allow for mixing zones, where applicable. For an acute limit, the dilution at the ZID is used; for a chronic limit, the dilution at the edge of the mixing zone is used. An example of how toxicity unit permit limits would be calculated is shown below.

In the example, the WET permit limits would be 1.0 TU_a and 10 TU_c. The discharger would run the acute and chronic WET tests specified in its NPDES permit, and would then calculate the acute and chronic toxic units from the LC_{50} and NOEC. If the values of the acute and chronic toxicity units were less than the permit limits, then the discharger would be in compliance with its WET permit limits.

EXAMPLE - Calculations for Toxicity Unit Limits

Given

Allowable dilution at the edge of ZID (acute limit)	= 33% effluent
Allowable dilution at edge of mixing zone (chronic limit)	= 10% effluent

Toxicity Unit Permit Limits

Allowable acute toxic units	= 0.3 $TU_a \div 0.33$	$=1.0\ TU_a$
Allowable chronic toxic units	= 1.0 $TU_c \div 0.10$	$= 10\ TU_c$

Typically, NPDES permits do not include both acute and chronic WET limits. Because the chronic WET test generally is considered more sensitive than the acute test, if the permit includes chronic WET limits, then it usually does not contain acute WET limits. Unless both types of limits are required by state law, permit applicants should strongly resist having both types in their NPDES permits. When both types of limits are present in a permit, there is a strong potential for two permit noncompliances for a single toxic event, because if the effluent fails the acute WET test, it will almost certainly fail the chronic WET test as well.

It is EPA's national policy that WET limits be included in NPDES permits if the discharger has a history of WET test failure, and a specific chemical has not been identified as the cause of the effluent toxicity. Most states follow this principle; however, often they also will allow a best management practice (BMP) to control toxicity in lieu of a chemical-specific limit, if the BMP has been demonstrated to be effective at controlling toxicity. For example, a discharger that has demonstrated a cooling water chemical was the cause of toxicity could institute a BMP that would prohibit the use of that chemical and require effluent toxicity testing of alternative cooling chemicals before use.

If a discharger does not have a history of effluent toxicity, or has conducted a TRE and identified a chemical-specific control, then most states will include in the NPDES permit a periodic WET testing requirement with a trigger for a TRE if persistent toxicity is observed. For most dischargers, this is the most desirable WET test provision (if periodic WET testing is required at all) because in that case WET test failure would not imply a permit limit exceedance. The TRE trigger mechanism should be based on a demonstration of persistent toxicity, not a single WET test failure. Most permit provisions of this type require accelerated WET testing after an initial WET test failure, a typical frequency being once per month for a specified number of tests. For example, if the WET test is failed on two of three consecutive tests, the permittee may discontinue the accelerated testing and initiate the TRE. If the additional WET tests following the initial test failure do not show

unacceptable toxicity, then the permittee returns to the periodic testing required by the permit and no TRE is initiated. It is absolutely essential that a permit applicant insist on the demonstration of persistent effluent toxicity as a requirement for triggering a TRE because a TRE is expensive and more importantly, will be unsuccessful if effluent toxicity is not persistent.

If the WET test triggers a TRE study, the NPDES permit typically will have conditions describing how the TRE is to be initiated and that the permitting agency be informed of the study. These provisions typically will require submitting a work plan and progress reports to the permitting agency and will specify the maximum time for completing the TRE. Under no circumstances should a permit applicant accept a TRE completion time of less than 18 months. Experience has shown that TREs easily can take this long for a complex toxicity problem. In fact, the permit should allow an extension of time for the TRE, if the TRE has been diligently pursued by the permittee.

Typically, the frequency of periodic WET testing is set by the permit writer, based on permitting agency policy and the toxicity potential of the discharge, which is based on the complexity of the facility's operations and on effluent quality data in the permit application. Typically, states have established minimum test frequencies, which can be increased by the permit writer if it is believed that the effluent has a greater-than-average potential to exhibit effluent toxicity. It should be emphasized again that WET testing is not necessarily required for every industrial discharger. Routine WET testing should only be required in an NPDES permit if the "reasonable potential" determination indicates that it is needed. Unfortunately, many states have fairly rigid policies, so that only the most minimal point sources are exempt from WET testing. It is best to determine early in the permit process what the minimum requirements are for WET testing before trying to eliminate it altogether from an NPDES permit. Generally, the appeal of a permit requirement for WET testing will not be granted because it is considered a standard analytical procedure that is widely accepted as a regulatory tool.

In many cases, WET test frequency is a negotiable item, however, and if a permit writer can be convinced that only infrequent testing is needed, then significant monitoring cost can be reduced. It is not unreasonable to request monitoring frequencies of once or twice per year, especially when a facility has a history of passing the WET test.

Aquatic Organism Testing

Because effluent concentrations of pollutants that are below analytical quantification limits may still affect the aquatic ecosystem, direct sampling of exposed organisms or biological surveys may be used to determine if adverse effects are occurring. EPA has included other forms of biomonitoring in NPDES permits, such as: (1) collection and chemical analysis of the tissues of

fish from the receiving waters; (2) caged fish testing; and (3) biological surveys of the receiving waters. These conditions are only required when there is a question of significant water quality impact, such as the discharge of a bioaccumulative pollutant such as mercury or dioxin.

These types of permit conditions are unusual, and typically are only included when required by enforcement action. Although EPA has broad authority to require point sources to collect relevant data under the provisions of Section 308 of the CWA, it rarely uses this power in NPDES permit actions. Therefore, a permit applicant should not expect any type of special biomonitoring requirement and should resist such conditions in its NPDES permit.

Mixing Zones

A mixing zone is a small volume where the effluent from a point source mixes with the receiving water. In the mixing zone there is a transition from 100% effluent in the pipe, just before the discharge enters the receiving water, to a point at some distance from the pipe, where the effluent makes up a very small percentage of the receiving stream. At the edge of the mixing zone, the chemical and physical characteristics are those of the ambient water rather than the effluent. Mixing zones are a fact of nature; they always exist when two fluids with different properties mix. Their size is a function of the physical properties of the two fluids and the intensity of mixing generated by the internal momentum of each fluid at the point of mixing.

In the context of the NPDES program, mixing zones are important because they are used to set water-quality-based permit limits. The regulatory agencies essentially have two choices when applying water quality standards to a point source discharge: (1) the standard can be applied to 100% effluent before it is discharged; or (2) the standard can be applied at the edge of a defined mixing zone, which recognizes that potentially significant exposures to the effluent will occur after it is diluted with the ambient water. In the small volume which constitutes the regulatory mixing zone for a point source discharge, concentrations of chemicals greater than the water quality criteria are acceptable because the exposure time of aquatic life, wildlife, and humans to potentially toxic concentrations of chemicals is considered negligible.

Because states establish water quality standards and implementation procedures, they must include provisions in such standards for mixing zones if they are to be allowed. All states have adopted some form of mixing zone in their water quality standards.

Mixing zone allowances are essential to dischargers. The numeric water quality criteria for many chemicals found in effluents, such as metals, are very low, making them difficult and costly to achieve. For some chemicals, the water quality criteria are sufficiently low that treatment technologies for reducing them to the required concentrations are practically unavailable. Likewise, achieving compliance with the chronic WET test in 100% effluent would be difficult, if not almost impossible, for many dischargers. The regulatory mixing zone recognizes that such water quality criteria are applicable to dilutions of the effluent, determined on a site-specific basis, and not to 100% effluent.

The following subsections describe regulatory mixing zones used by states, methods for determining the mixing zone size on a site-specific basis, and methods to improve mixing of the effluent with the receiving water to increase the allowable dilution.

Regulatory Mixing Zones

Mixing zones are physical phenomena that always must occur when two liquids with different characteristics mix. However, EPA requires state regulatory agencies to define the size of mixing zones in their regulations to assure that they are protective of the water quality standards and uses of all receiving waters in the state.

There are actually three separate mixing zones which are used in the water quality standards programs: (1) the acute mixing zone, also known as the ZID; (2) the chronic mixing zone; and (3) the human health mixing zone. At the edge of the acute mixing zone, all numerical criteria to protect aquatic life from acute toxicity (which EPA defines as the criterion maximum concentration, CMC) must be achieved and the acute WET test also must show no significant toxicity. Within the acute mixing zone, the CMC and WET test requirements can be exceeded. At the edge of and outside of the chronic mixing zone, all numeric criteria for protection of aquatic life from chronic toxicity (which EPA defines as the criterion continuous concentration, CCC) must be met and the chronic WET test must not show significant toxicity. Inside the boundaries of the chronic mixing zone, the CCC can be exceeded. The physical relationships of these two mixing zones for aquatic life protection are shown in Figure 9-4.

In addition to the aquatic life mixing zones, states typically establish a mixing zone for human health criteria. Because the human health water quality criteria are developed by assuming long-term exposures (30 days to 70 years), it is typically assumed that the entire flow of a river can be used to dilute the effluent. The human health mixing zone criteria in most states will prohibit discharges where the effluent would not be completely mixed before the first

downstream drinking water intake. For discharges to lakes, states will set a human health mixing zone measured from the point of effluent discharge.

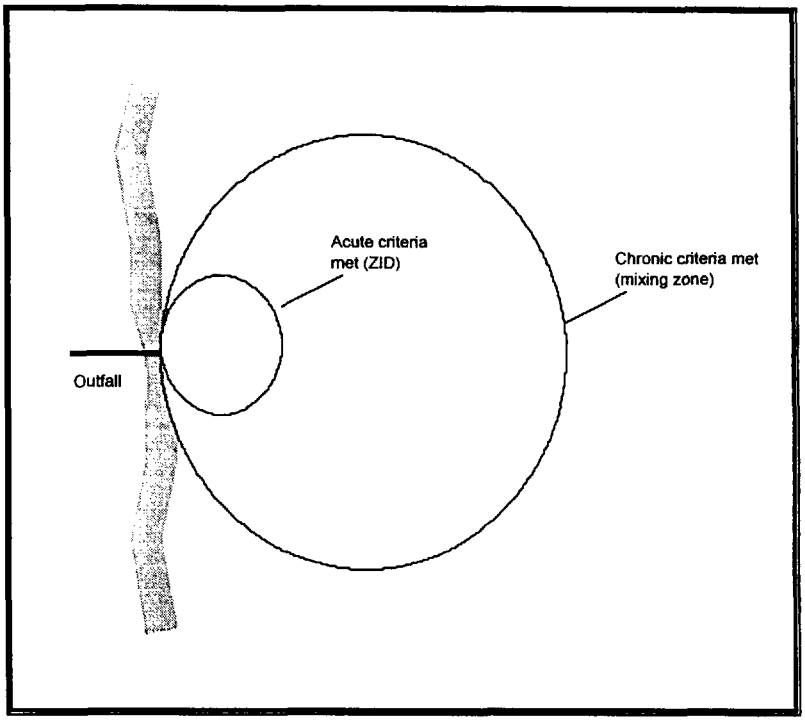

Figure 9-4. Aquatic Life Mixing Zones

States have considerable latitude in the size of mixing zones. Typically, states will establish default mixing zones, but will include provisions for determination of site-specific mixing zones. In addition, states normally will set maximum dimensions for mixing zones.

For discharges to rivers, states typically will establish the chronic mixing zone as 1/4 to 1/2 of the river width, to provide a zone of passage for aquatic organisms. The dimension of the acute mixing zone is usually 1/4 to 1/10 of the chronic mixing zone. Some states also establish maximum upstream and downstream dimensions on both of the aquatic life mixing zones. For example, Texas allows the chronic mixing zone to extend 100 feet upstream and 300 feet downstream from the discharge point.

Mixing zones in lakes and estuaries are based on radial distances from the point of discharge, similar to those shown in Figure 9-4. The radius of the chronic mixing zone in a lake or estuary is typically 50 to 200 feet. The acute mixing zone or ZID radius would thus be 5 to 20 feet in such cases.

In addition to specifying the dimensions of the mixing zones, states will establish the allowable default dilution in each type of mixing zone, which is used in the absence of site-specific mixing zone determinations.
In most states, the default dilution factors for effluent discharges to rivers are expressed in terms of the critical low flow established in the state water quality standards. This critical low flow is usually the 7-day average, 1-in-10 year low flow (7Q10), although in some states a 7Q2 (1-in-2 year low flow) is used. Typical examples of default mixing zone allowable dilutions are shown in Table 9-4.

Table 9-4. Examples of Allowable Mixing Zone Dilution (Default)

State/Water Body	Flow Basis	Acute Mixing Zone Dilution as Fraction of Flow Basis	Chronic Mixing Zone Dilution as Fraction of Flow Basis
Louisiana - rivers	7Q10	1/30 if 7Q10 >100 cfs 1/10 if 7Q10 < 100 cfs	1/3 if 7Q10 > 100 cfs 1 if 7Q10 < 100 cfs
Louisiana - tidal rivers	1/3 of tidal flow	1/30 if flow >100 cfs 1/10 if flow < 100 cfs	1/3 if flow > 100 cfs 1 if flow < 100 cfs
Louisiana - estuaries	NA	30% effluent at 50 feet	8% effluent at 200 feet
Texas - rivers	7Q2	1/4 of 7Q2	7Q2
Texas - estuaries	NA	30% effluent at 50 feet	8% effluent at 200 feet
Texas - lakes	NA	60% effluent at 25 feet	15% effluent at 100 feet
Great Lakes Water Quality Guidance - rivers	7Q10	Final acute value which is equivalent to 50% effluent	1/10 of 7Q10
Great Lakes Water Quality Guidance - lakes	NA	Final acute value which is equivalent to 50% effluent	10% effluent

Usually, state water quality regulations allow site-specific determinations of mixing zone dilution. Typically, these determinations are performed at the option of the discharger, in order to obtain greater allowable dilutions for calculations of water-quality-based limits. In some cases, however, states may not be willing to provide the full default dilution allowances without a site-specific study by the discharger. This situation may occur when the physical and hydraulic conditions at a site are such that the permitting agency believes

that the underlying assumptions of its default dilution allowances are not satisfied and that the actual dilution at a site may be less. An example of where this might happen is when the discharge is to very shallow water.

Most dischargers will find the state default dilution allowances acceptable for water-quality-based permit limits. Although these allowances are designed to be conservative, many states have set them at levels where water-quality-based effluent limits are achievable without resorting to exotic treatment technologies or expensive in-plant controls. If the default dilution factors are believed to be too conservative, then the discharger has the option to determine the actual dilution of its effluent in the receiving waters.

If a discharger wants to determine the site-specific dilution at its discharge location, it has two choices when to perform a study: (1) prior to filing the permit application; or (2) after the final permit is issued. In the latter case, the permitting agency will include a compliance schedule in the permit, after which the water-quality-based limits based on the default dilution factors become effective. In this way, the permittee becomes obligated to develop its site-specific limits before the compliance period ends. If the site-specific dilution factor study demonstrates that the dilution is greater than the default dilution, then the discharger will have to amend its NPDES permit to have its water-quality-based permit limits recalculated with the site-specific dilution.

Because human health water quality standards are based on long-term exposures, use of critical low flows for aquatic life protection, such as the 7Q2, are inappropriate. Most states use the harmonic mean stream flow in a river to calculate the dilution factor because the human health criteria are, for the most part, based on lifetime exposure. The harmonic mean stream flow is a good measure of long-term average exposure because it is not significantly biased by very high and very low stream flows. Some states also use a 30Q5 (30-day average low flow with a 1-in-5 year recurrence) for certain chemicals with water quality standards based on short-term exposures. For discharges to lakes and estuaries, for which no comparable flows can be calculated, states typically will specify a default dilution that recognizes the long-term exposure assumption. For example, Texas uses a 4% effluent concentration for human health protection in estuaries as compared to the default dilution for the chronic aquatic life criteria of 8%.

There is controversy over the use of mixing zones for chemicals that may bioaccumulate in aquatic life tissue, exposing humans and wildlife to high concentrations when they consume contaminated aquatic life. The exposure assumptions used in the development of water quality criteria for such bioaccumulative chemicals, combined with conservative dilution allowances, are believed by many states to provide acceptable levels of protection. However, the EPA's GLWQG, which applies to all Great Lakes states, requires the phase-out of mixing zones for certain chemicals that it has

designated as bioaccumulative chemicals of concern (BCC). New dischargers after 1996 are not allowed any mixing zone allowances for BCCs. Although these regulations are only applicable to discharges to the Great Lakes and Great Lakes tributaries, other states may adopt similar prohibitions in the future.

Because mixing zone dimensions and default dilution allowances are state-specific, a permit applicant must obtain the applicable state regulations. These mixing zone dimensions and dilution allowances can then be used to evaluate water-quality-based permit limits on a site-specific basis, both for planning purposes and to evaluate proposed permit limits.

For a more complete discussion of regulatory mixing zone concepts, EPA's TSD should be consulted.

Site-Specific Dilution Estimates

Dischargers can conduct site-specific studies to provide more accurate estimates of the dilution in the mixing zone for their discharge. There are two types of studies that can be conducted to determine site-specific dilution in the mixing zone: (1) computer modeling of the mixing zone with site-specific physical and hydrologic data; and (2) field tracer studies of the mixing zone. Each of these approaches is discussed in the following sections.

Mixing Zone Modeling

There are EPA-approved computer models that can be used to calculate the dilution in, and size of, the mixing zone using site-specific physical and hydrologic data. These models are available from EPA's Center for Exposure Assessment Modeling (CEAM) in Athens, Georgia. The models have specific algorithms for estimating the dimensions and shapes of effluent plumes in what is known as the near-field region of the discharge, which is the area of the mixing zone. In the near-field region, chemical and biological reactions can generally be ignored because the residence time of any parcel of water in the region is very short. The models also have algorithms for estimating mixing of the effluent in the far-field region, but typically this region is outside of the regulatory mixing zone. The models that are available from EPA for mixing zone analyses are as follows:

- CORMIX models—These models were developed by Cornell University for EPA and are useful for a wide range of mixing zone configurations and conditions. They are specifically applicable to discharges to shallow surface waters. Both positively and negatively buoyant plumes can be modeled with CORMIX. CORMIX1 is used

for single port, submerged discharges to stratified or unstratified ambient surface waters. CORMIX2 models multi-port submerged discharges for the same type of ambient conditions. CORMIX3 is used for surface discharges to receiving waters. The CORMIX models are organized into a single computer program. The user is prompted for model inputs and there are online instructions and descriptions of input and output. The CORMIX models run on a personal computer (PC) with a 386 or higher processor.

- PLUMES models — These models were developed under the sponsorship of EPA's Newport, Oregon Environmental Research Laboratory. They were developed primarily for multi-port diffusers discharging into ocean waters. The models use a common Windows®-based interface. The two models that are included in the current PLUME package are the Roberts, Snyder, and Baumgartner (RSB) model and the UM (formerly UMERGE) model. These models are not as user-friendly as the CORMIX models, but are easier to use than CORMIX when multiple effluent and ambient surface water conditions are evaluated. The PLUMES models are usable for single or multi-port diffusers and will simulate the effluent plumes in stratified and unstratified surface waters. Both positively and negatively buoyant plumes can be modeled with PLUMES. The PLUMES models will run on a PC computer with a 386 or higher processor.

Generally, the CORMIX models are best-suited to a typical point source discharge to rivers, lakes, and estuaries in shallow water. Also, CORMIX is the only model that will evaluate the mixing of a surface discharge. The PLUMES models are a good choice for estimating mixing in deep ocean waters, lakes, and estuaries.

All of these models require site-specific data for proper use. The required data include:

- Physical configuration of the discharge point including pipe/port/channel dimensions and submergence;
- Temperature and salinity (or density) of the receiving water and effluent for a range of operating conditions; and
- Depths and flow (or velocity) in the ambient water near the discharge point.

To determine the critical (minimum) dilution of the effluent in the mixing zone, it is necessary to model a number of combinations of effluent and receiving water density and receiving water flows.

Although a permit applicant can obtain these computer models from EPA to use them to estimate the dilution in the mixing zone and the shape of the effluent plume, it is wise to obtain experienced assistance. Often, the physical data for the receiving water and point source have to be adjusted to fit the model requirements (because the models have certain simplifying assumptions with regard to physical characteristics), and it is important to be sure that such adjustments are consistent with the model assumptions to assure that predictions are reliable.

There also are simple mathematical models that can be used to estimate site-specific dilution. One of these is presented in EPA's TSD as a method for calculating dilution in the near-field region of a discharge. This model is:

$$S = 0.3\frac{x}{d}$$

where

S = flux-averaged dilution, expressed as a dilution factor,
x = distance from outlet, and
d = diameter of outlet.

This equation provides a very conservative estimate of mixing because it is based on the assumption that the exit velocity of the discharge is zero and the effluent is neutrally buoyant in the ambient water. It can be applied only to a single port discharge.

Another simple model that can be used to estimate near-field mixing is the "horizontal jet" model (Fischer, H.B., et al., 1979, *Mixing in Inland and Coastal Waters*, Academic Press, Inc., San Diego). This model, which is for surface plumes, is expressed by the following two equations:

Dischargers from pipes

$$C(x) = 2.8\pi^{0.5}\left(\frac{C_e D}{x}\right)$$

Discharges from ditches/canals

$$C(x) = 2.38\left(\frac{C_e W^{0.5}}{x^{0.5}}\right)$$

where

$C(x)$ = concentration at a distance x from the discharge,
C_e = concentration in the effluent,
x = distance from effluent discharge (feet),
D = pipe diameter (feet), and
W = effective width of canal or ditch (feet).

The horizontal jet mix model assumes that the discharge has a neutral buoyancy with respect to the receiving water. It accounts for the momentum of the discharge, but assumes that the ambient water is stagnant. This model provides a conservative estimate of dilution and is acceptable for screening calculations.

There are other models that have been developed for calculating the plume shape and dilution in the near-field region. These models also can be used to estimate the dilution in mixing zones; however, it is recommended that one of the EPA-approved models described above be used instead because it is easy to gain permitting agency acceptance of model results. Most agencies have staff that are capable of using the EPA models and therefore can verify the model results provided by a discharger.

Most states will accept the dilution predictions made with these models, if the study is well documented and evaluates a complete range of possible effluent and receiving water conditions. In some cases, especially where very high dilutions are predicted with the models (less than 1% effluent in the mixing zone), a state agency may require field validation of the model-predicted dilution using a tracer study as described below.

Tracer Studies

Tracer studies, using a dye or other type of chemical tracer, are another method for determining effluent dilution. The tracer is added to the effluent in a known amount (either as a slug or continuously), and then water samples are collected in the receiving water at various distances from the discharge over a predetermined time period. The concentrations of the tracer are then measured in the receiving water samples, and the dilution at each point where a sample was collected can be calculated.

The most popular tracers are fluorescent dyes, such as Rhodamine WT, because they can be measured at very low concentrations with a high level of precision. There are also field fluorometers, which continually record the fluorescence in samples pumped through the instrument. Continuous fluorometers used in this way allow a plume to be tracked at varying depths in the receiving water (by moving the pump inlet up and down in the water column) and also avoid the logistical problems of collecting, storing, and

analyzing multiple samples. Furthermore, because the plume is not always visible to the eye, even when using a fluorescent dye as the tracer, the continuous fluorometer operated from a boat allows the sampling team to locate and track the plume. When samples are collected and analyzed on shore, a sampling grid must be used and a large number of samples must be collected to be sure that the plume is not missed.

Sometimes a constituent in the effluent can be used as a tracer. For example, if an effluent has a high total dissolved solids concentration or chloride concentration as compared to the receiving water, it can serve as a tracer for determining dilution in the mixing zone. To be suitable as a tracer, the constituent has to be conservative (i.e., nonreactive) and must also be measurable with precision at low concentrations. Effluent constituents such as COD typically are not suitable as tracers, because they are not conservative parameters.

Tracer studies must be conducted at hydrologic conditions that are typical of the critical (minimum) dilution in the receiving water. In rivers this means at a low stream flow, but usually permitting agencies will not require the study to be conducted at the critical low flow (7Q10). In tidal waters, it is necessary to measure the tracer concentrations at several points in the tidal cycle, including high tide, low tide, and slack tide.

Tracer studies provide the best estimate of site-specific dilution, but they are quite expensive compared to modeling of the effluent plume. If a fluorescent dye or similar injected tracer is used, an experienced contractor with the necessary equipment should be hired. If a constituent of the effluent can be used as a tracer, it is possible for the study to be done by the discharger's staff although the logistical effort usually is substantial. From a practical standpoint, if a site-specific field dilution study is needed, it is best to engage the services of a contractor experienced in such studies.

Diffusers

The preceding discussions have described how to estimate mixing zone dilution. It is possible and often practical to enhance mixing in the near-field region of a discharger by installing a high-rate diffuser. A high-rate diffuser is simply an effluent discharge device that imparts significant momentum to the effluent as it is discharged into the receiving water. This effluent momentum creates a turbulent jet that entrains large amounts of ambient water as the jet loses momentum. When buoyancy differences between the effluent and ambient water become more significant than the jet momentum, the plume rises (or sinks) and this induces additional entrainment and dilution. These processes can result in substantial near-field dilution; in moderately deep

waters (greater than 20 meters [m]) dilutions of 1 to 2% effluent often can be achieved.

A diffuser is submerged always below the water surface. The diffuser can have a single or multiple ports. EPA's TSD defines a high-rate diffuser as one with an effluent velocity at the discharge port of at least 3 meters per second (m/s). In deep waters, such as ocean waters, a diffuser can have a port velocity below 3 m/s and still function as a high-rate diffuser. High-rate diffusers can have port velocities of 10 m/s or more, although most will have maximum port exit velocities in the 3 to 6 m/s range.

The dilution performance of a diffuser is a function of the port velocity and the depth of the ambient water. Diffusers achieve the highest dilution when the water depth at the point of discharge is 10 m or greater. However, diffusers can still provide substantial dilution in water as shallow as 1 to 2 m. The required minimum water depth increases as the effluent discharge rate increases, although even in shallow water the mixing of effluent with ambient water can be improved with a diffuser, regardless of the discharge rate.

Diffusers typically are designed with the CORMIX and PLUMES models described in **Mixing Zone Modeling**. These models are used to examine a range of effluent and receiving water conditions, with different diffuser configurations, to determine the design that provides the best overall mixing for the range of hydrologic and effluent conditions that can be reasonably expected. Typically, states will use the minimum dilution that is predicted to be achieved with the diffuser (critical hydrological conditions) as the basis for establishing water-quality-based permit limits and WET test critical dilutions. Most states will accept the dilution results from a properly-conducted diffuser design as the basis for calculating water-quality-based permit limits. Sometimes a state will require a field tracer test to demonstrate the diffuser performance after it is installed. This is most likely to occur if the predicted dilution from the diffuser is very high (very low percent effluent, such as less than 1%).

An effluent diffuser is a viable technical approach for increasing effluent dilution for most dischargers. If a specific water-quality-based permit limit will be very difficult to achieve with treatment or in-plant controls, including WET limits or WET test requirements, then a high-rate diffuser may be an attractive option for the discharger. The proper design of an effluent diffuser generally requires engaging the services of an engineer that is experienced in diffuser design.

TMDLs and Waste Load Allocations

The term "TMDL" stands for total maximum daily load. It refers to a methodology for developing water-quality-based permit limits and limits for nonpoint sources, when there are multiple pollutant sources which cause or contribute to an exceedance of a water quality criterion or failure to achieve a designated water use in a receiving water body. The objective of the TMDL is to identify and implement controls on all point and nonpoint sources discharging to a receiving water body, which may encompass an entire watershed, to achieve compliance with the water quality standard. Sections 302(a) and 303(d)(1)(C) of the CWA are the statutory authority that requires states and/or EPA to develop TMDLs to bring all surface waters into compliance with applicable water quality standards. The TMDL process is described in detail in EPA's TSD.

Because states have primary responsibility for the development and implementation of water quality standards, they also have primary responsibility for performing TMDL studies and implementing TMDL requirements. In the event that a state does not or cannot perform the required TMDLs in a timely manner and/or with sufficient technical rigor, then the EPA Region has the responsibility to develop the TMDLs.

Receiving water bodies in a state that are subject to a TMDL are identified by what is known as the Section 303(d) listing process. Every three years, states are required to prepare lists of surface water segments that are not achieving their numeric or narrative water quality criteria or designated uses. The surface water segments that are on a state's Section 303(d) list are targeted for development of TMDLs. A TMDL analysis must be performed for each constituent or characteristic for which the water quality standards are not being achieved. The states are also responsible for prioritizing the development of TMDLs.

A TMDL consists of two parts: (1) a WLA or waste load allocation for point sources; and (2) a load allocation (LA) for nonpoint sources. States have been developing and implementing WLAs for a number of years, typically for BOD and ammonia, to meet the dissolved oxygen water quality standards. These WLAs are performed with mathematical models to predict the relationships between point source discharges of the oxygen-demanding pollutants and the dissolved oxygen concentrations in the receiving water. In some cases, these models also include nonpoint source loadings of oxygen-demanding pollutants (such as sediment oxygen demand), so that they are effectively TMDLs although they have not historically been referred to by that term.

The term TMDL is currently used to describe the development of any form of water-quality-based controls and limits that are implemented on a stream-segment-wide basis for multiple point and/or nonpoint sources. This includes

standards for toxic substances, bacteria, dissolved oxygen, and whole effluent toxicity. These TMDLs are also conducted using water quality models or other forms of simulation methodologies. These predictive methods are described in the EPA's TSD and in the list of references included in this manual.

The development and implementation of a TMDL by a state (or EPA Region) generally is done through a formal administrative rulemaking process. A comprehensive TMDL or WLA typically requires extensive data collection and model development, accompanied by public hearings and the opportunity for written public comment. The process usually takes a year or more to complete. All NPDES permits issued after the TMDL becomes effective must include permit limits based on the approved TMDL for any pollutants regulated by the TMDL. If a discharger wants to influence a TMDL or WLA, the way to do this is to participate in the TMDL study and approval process. Because these are public processes, the opportunity exists for dischargers to become active participants in the development of a TMDL. This participation could include collecting and submitting data and evaluating the predictive models being used by the state for development of the TMDL. Dischargers can usually appeal an improperly-developed TMDL through the same administrative and legal appeals procedures that are provided for water quality standards rulemaking.

A TMDL can result in water-quality-based permit limits that are more restrictive than the water-quality-based limits that would be calculated from a state's default water quality standards implementation procedure, if that procedure does not include the possible additive effects of other point and nonpoint sources of the regulated pollutant. For example, if a point source discharges copper, a state's implementation procedures typically will calculate the allowable discharge to protect the water quality criteria for copper by using a default dilution (as described earlier in **Mixing Zones**) and assuming that there is a zero or low background concentration of copper in the ambient water at the point of discharge. If there are other sources of copper upstream of the discharge, then this assumption will not be conservative and the additive effects of the upstream sources, which may be either point sources, nonpoint sources, or combinations of the two, could result in an exceedance of the water quality criterion for copper.

A TMDL analysis would account for all point and nonpoint sources of copper discharging to the receiving water segment. This could mean that the additive effects of one or more discharges would exceed the assimilative capacity of the receiving water (which for a metal such as copper would be primarily the rate of sedimentation from the water column), which in turn would result in the need to consider this additive effect in the development of the water-quality-based limits for copper. In this event, the water-quality-based permit limits that a discharger would be given for copper would be lower than the

limits that would be allowed if no additive effect from other dischargers were occurring.

The permit applicant needs to assure that the TMDL has been used properly by the permit writer for preparing the water-quality-based permit limits. An applicant should determine from the permitting agency whether or not there is an applicable TMDL for any pollutant that it discharges. If there is, then the applicant should become familiar with the agency's TMDL implementation procedures.

Site-Specific Water Quality Criteria

Every state's water quality standards regulations contain provisions for development of site-specific water quality criteria. The reason for this is that the EPA numeric water quality criteria, which have often been directly adopted by states with no modifications, were developed with highly conservative assumptions. This is true for both the aquatic life and human health criteria.

Site-specific water quality criteria for a chemical often will result in water-quality-based permit limits that are considerably less restrictive than the limits based on statewide criteria for the chemical. This can often mean the difference between having permit limits that can be achieved with a reasonably available and cost-effective technology or having limits that are economically difficult to achieve, or may not be achievable with any existing technologies. If faced with water-quality-based permit limits that are difficult or impractical to achieve, a discharger can develop site-specific water quality criteria if it follows procedures that are established in the state water quality standards. Although it may seem unfair to place the burden of developing site-specific water quality criteria on a discharger, states simply do not have the resources to develop such standards for all surface waters in their jurisdiction.

The aquatic life water quality criteria often are the basis for water-quality-based permit limits that are more restrictive than technology-based permit limits, or that are required for pollutants for which there are no applicable technology-based limits. Aquatic life water quality criteria are also the best candidates for obtaining less restrictive site-specific criteria, because EPA's national criteria are based on very conservative bioavailability assumptions and sensitive aquatic life species that are not present in many surface waters.

Site-specific water quality criteria for the protection of human health also can be developed, but typically these will be much harder and more expensive to develop and have approved. The potential bases of site-specific human health criteria are development of site-specific bioaccumulation factors for bioaccumulative chemicals (chemicals that accumulate in the tissues of fish

and shellfish) and site-specific exposure assumptions that are less restrictive than those used to develop the statewide criteria. Bioavailability may also be important for some chemicals, typically those that bioaccumulate.

The following subsections describe the methods available to dischargers and regulatory agencies for the development of site-specific water quality criteria.

Bioavailability Adjustments to Water Quality Criteria

Site-specific criteria are especially applicable to aquatic life water quality criteria for metals, because EPA's national criteria are based on aquatic toxicity tests that were performed in extremely clean surface waters. The presence of significant quantities of dissolved and particulate organic carbon and inorganic particulate matter in many surface waters may substantially reduce the toxicity of many heavy metals to aquatic life that inhabit such waters. The metals adsorb to particulate matter or may form complexes with dissolved organic chemicals. These particulate or complexed metals do not readily transport into the vital organs of aquatic species, thus reducing their toxicity. EPA now recommends, and most states have adopted, aquatic life criteria for metals that are based on the dissolved form of the metal. For most metals, the dissolved component is most closely correlated to the toxicity of the metal, although for some metals such as silver and selenium, the valence state of the metal is the most important variable. There are two widely used approaches to adjust numeric water quality criteria for metals for bioavailability. Each of these is described in the next subsection.

Partitioning Coefficients

In the water column, metals will exist in two phases: particulate and dissolved. Dissolved metal is considered bioavailable and particulate metal generally is considered to be nontoxic, at least for most metals. However, EPA's regulations at 40 CFR 122.45(c) require NPDES permit limits for metals to be based on total recoverable metal because EPA believes that the metal in an effluent may change phase (from particulate to dissolved) when the discharge mixes with the ambient surface water. Therefore, permit writers convert the dissolved metals water quality criteria to total recoverable metals water-quality-based permit limits using methods established in the state water quality standards implementation procedures. This conversion is made with what is known as a dissolved:particulate partitioning coefficient. The partitioning coefficient used by the state may be a constant value or may be adjusted to the site using site-specific data for total suspended solids (a surrogate for particulate matter) and/or hardness. (Most states have adopted EPA's national aquatic life criteria for metals, which provide for site-specific adjustments for ambient water hardness for chromium, copper, cadmium, lead, nickel, and zinc.) If the state makes an adjustment to the metals partitioning

coefficient to account for site-specific total suspended solids, this adjustment usually is done with a default equation developed by the state or one taken from an EPA study of metals partitioning.

Adjustments to metal partitioning coefficients involve collecting site-specific data on the receiving water. The simplest approach is to measure the suspended solids or hardness of the receiving water, or both, depending upon which are used in calculating the partitioning coefficient. Samples of the receiving water are collected upstream and downstream of the mixing zone for the effluent. Generally, such studies must be conducted for at least a year to assure that potential seasonal effects are included. Then states will use the data to develop a site-specific partitioning coefficient for calculating the total recoverable metals concentration-based permit limits. This relatively simple approach can result in significantly increased water-quality-based permit limits for certain metals, at a relatively low cost (typically less than $20,000). Its potential must be judged by an assessment of the adequacy of the default suspended solids or hardness concentrations used by the state for calculating the water-quality-based permit limits. If they appear to be unrepresentative of the discharge site, then a permit applicant may elect to conduct a study to develop site-specific input data for calculation of the partitioning coefficient.

A more expensive, but potentially more rewarding approach is to develop a true site-specific partitioning coefficient by collecting dissolved and particulate metals data for the receiving water. Generally at least one year of data will be required to capture any seasonal variations in the metals partitioning coefficient. This site-specific methodology can be expensive because sampling and analytical methods for the metals must meet *clean* or, in some cases, *ultra-clean* requirements. At the low metals concentrations that are characteristic of aquatic life water quality criteria, unintentional contamination of the ambient water samples during collection and analysis is a major concern. Therefore, sampling and analytical methods have been developed that minimize such contamination and are appropriate for measuring trace metals concentrations (< 1 microgram per liter [µg/L]) in ambient waters (EPA, 1996, "Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels," Engineering and Analysis Division, Office of Water, Washington, D.C.). These methods are complex and expensive to develop (typically, $50,000 to $75,000 for one metal; somewhat less for each additional metal). Notwithstanding its cost, this approach to site-specific metals partitioning coefficient development offers the potential for significant increases in the applicable water-quality-based permit limits, so some dischargers will find it useful.

The following example is a case history of a chemical plant that performed a study of site-specific partitioning coefficients.

EXAMPLE - Site-Specific Partitioning Coefficients Case History

A company operates a chemical plant that is located on a small tidal stream. Its effluent makes up about 100% of the fresh water flow at critical hydrologic conditions. This plant discharges small amounts of copper and zinc, which are primarily corrosion products. The state's water quality criteria for copper in marine waters are 16.27 µg/L for protection of aquatic life from acute toxicity and 4.37 µg/L for protection from chronic toxicity. The criteria for zinc are 98 µg/L for the acute protection and 89 µg/L for chronic protection. Using the state's water quality standards implementation procedures, the permit writer established water-quality-based permit limits using copper concentrations of 4.41 µg/L daily average and 9.33 µg/L daily maximum. The calculated zinc permit limits were based on a daily average of 75 µg/L and a daily maximum of 158 µg/L. The plant was given a 3-year compliance schedule to achieve these limits, during which time it also had the option of developing site-specific partitioning coefficients for copper and zinc.

The plant performed a 12-month study in which it collected monthly samples at 5 sites in the small tidal stream, 2 sites in the larger bayou downstream, and in the treated effluent. Sediment samples were also collected to demonstrate that metals were not accumulating in the sediment to levels of concern. These samples were analyzed for dissolved and total copper and zinc using clean sampling and analytical methods. Samples were also analyzed for hardness, salinity, temperature, and total suspended solids.

At the end of the study, site-specific partitioning coefficients for copper and zinc were calculated from the dissolved:total recoverable metals data. The site-specific partitioning coefficients were significantly different than the state's default values and showed that a much higher percentage of the metals in this tidal stream were in the particulate phase than was calculated with the default partitioning coefficients. The resulting site-specific permit limits for copper were based on concentrations of 12.25 µg/L daily average and 25.91 µg/L daily maximum, which were more than twice the concentrations calculated with the default partitioning coefficient. The site-specific permit limits for zinc were calculated using concentrations of 148.71 µg/L daily average and 314.61 µg/L daily maximum, which were not as large an increase from the default values as for copper, but were still significant. The site-specific water-quality-based limits resulting from this study allowed the plant to achieve compliance with the water-quality-based limits for copper and zinc without having to make any major capital expenditures.

The Water-Effect Ratio Procedure

The water-effect ratio (WER) procedure is one of three methods identified in EPA's "Water Quality Standards Handbook," 2nd edition (EPA-823-B-94-005a) for developing site-specific water quality criteria. It was previously called the "indicator species procedure." The WER procedure is a direct measure of the bioavailability of a chemical or chemicals in a receiving water and is used to adjust state or national water quality criteria for such chemicals for site-specific conditions.

The WER procedure relies on the standard WET tests that were discussed earlier in **WET Tests**. The WET tests are performed on a mixture of effluent and receiving water, which represents the downstream conditions at critical dilution (i.e., the maximum amount of effluent expected at the edge of the mixing zone). The effluent/receiving water mixture is spiked with the chemical of interest at a range of concentrations selected to assure that an LC_{50} can be calculated from the WET test results. Then, the standard WET test is performed on the spiked samples to determine the LC_{50} in the effluent/receiving water mixture. Simultaneously, a control test is run using 100% synthetic dilution water that is also spiked with the chemical of interest at concentrations that will allow the calculation of the LC_{50} of the chemical in the dilution water. The ratio of the LC_{50} of the effluent/receiving water mixture to the LC_{50} of the chemical in synthetic dilution water is calculated and this is the water effects ratio.

The LC_{50} of the chemical in the synthetic dilution water is considered equivalent to the LC_{50} data used to establish the state and national water quality criteria because very clean water was used to develop the toxicity data for these criteria. Therefore, the state or national water quality criteria for the chemical can be multiplied by the WER to obtain the site-specific water quality criteria for the chemical. In almost every case, the WER will be greater than 1, meaning that the site-specific criteria will be less restrictive than the state and/or national criteria. However, dischargers who have very low organic and suspended solids concentrations should know that it is possible to obtain a WER that is less than 1, which means that the site-specific criteria would be lower than the state and/or national criteria.

The WER procedure requires that species from at least two families be used in the WET tests. Typically, this will be one of the standard invertebrate species and one of the standard vertebrate species (see Table 9-2). The WER procedure must be repeated at least three times over a period sufficiently long to capture any changes in seasonal water quality. If the WER values obtained with the two species are statistically the same (there is a procedure for determining this), then all the WER values (both species, repeated tests) are combined to obtain the WER that is used to develop the site-specific criterion. If the WER values for the two species are statistically dissimilar, then the species that gives the lower WER value is used to develop the site-specific criterion.

EPA's "Interim Guidance on Determination and Use of Water-Effect Ratios for Metals" (EPA-823-B-94-001) gives a complete description of the WER procedure. Although the guidance describes the WER procedure for metals, this methodology can also be applied to organic toxic chemicals for which bioavailability in ambient waters may reduce toxicity.

The WER procedure has proven to be a valuable method for developing site-specific water quality criteria. It has been used mostly for metals because, as discussed above for partitioning coefficients, the water quality criteria for metals often are quite low concentrations and the state and national criteria for metals tend to be overconservative.

The following example describes a case history of a facility that used the WER procedure to develop an alternative water quality criterion for a metal.

EXAMPLE - WER Procedure for Alternative Water Quality Criterion for Aluminum

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A paper mill discharges to a small river, and its discharge makes up about 76% of the flow in the river under critical conditions. The state has an acute water quality criterion for aluminum of 0.991 mg/L. The permitting agency established a water-quality-based grab sample limit on aluminum of 2.6 mg/L in the discharger's permit, which would have become effective three years after the effective date of the permit. Multiple analyses of the effluent demonstrated that the range in aluminum concentrations was 2.25 mg/L to 5.05 mg/L, which is considerably above the calculated water-quality-based permit limits. Because aluminum is an essential chemical in the pulp and paper making process and could not be eliminated, the company conducted a site-specific water quality standards study to determine if the aluminum criterion used to establish the permit limit is appropriate and necessary to protect indigenous aquatic life in the receiving water. To achieve this objective, the mill used the WER procedure to develop an alternative aluminum criterion for the receiving water.

The WER guidance requires that two sensitive species be tested using the standard bioassay test procedures. The discharger used *Ceriodaphnia dubia* as the sensitive test organism from the family Daphnidae. *C. dubia* is the most sensitive organism in the water quality criteria data base for aluminum. The second organism tested was *Pimephales promeles*. *P. promeles* is the eighth (8th) most sensitive organism in the aluminum criteria document (out of a total of 14 aquatic genera). The 48-hour static renewal test procedures promulgated by EPA at 40 CFR 136 were used for the WET tests. A total of four separate WER tests, representing possible seasonal variations in the receiving water quality, were performed to develop the site-specific standard. River water from upstream of the discharge was mixed with the treated mill effluent at a dilution corresponding to the critical (low flow) effluent concentration in the river downstream of the discharge.

The calculated site-specific total recoverable aluminum acute aquatic life criterion for the river is 8.67 mg/L, based on a geometric mean WER of 8.75. Thus, the site-specific aluminum criterion to protect aquatic life is almost nine times the statewide aluminum criterion. This site-specific criterion was used to develop permit limits for the discharger.

Recalculation Procedure

The recalculation procedure is another method described in EPA's "Water Quality Standards Handbook" (2nd edition) for developing site-specific water quality criteria. It is based on determining whether the aquatic species present in a particular receiving water differ substantially in response to a specific toxic chemical from the species set that EPA or the state used to establish the water quality criteria for that chemical. Reasons EPA cites for recalculation include: (1) the national data set includes aquatic species that are sensitive to many chemicals, but these and comparably sensitive species may not occur at a site; (2) because of natural habitat limitations, species that occur at a site may represent a narrower mix of species and families than used to develop the national criteria; and (3) the site may have more sensitive species, of important commercial and/or recreational value, than were used to develop the national criteria (in this case, the site-specific criteria would become more stringent). The recalculation procedure is described in detail in Appendix L of EPA's "Water Quality Standards Handbook."

The recalculation procedure requires knowledge of the aquatic species that are present in the receiving water. This may require site-specific biological studies to identify which aquatic organisms are present. Typically, however, adjustments can be made to the national data set by simply removing species that have limited ranges and are not indigenous to the region where the site-specific criterion is being calculated. (It should be noted that some states have already done this in the development of their water quality criteria.) Most commonly, cold water aquatic species, which are generally more sensitive than warm water species, can be removed from the national criteria data set for recalculation of specific chemical criteria.

There is an important caution for users of the recalculation procedure. Because the EPA method for calculating water quality criteria from aquatic life toxicity data is a statistical confidence interval procedure, removal of genera toxicity data from the national data set without replacement with relevant toxicity data for resident genera usually will *lower* the national or state criterion, even if the genera removed from the data set are the most sensitive genera. This is because the criteria are very sensitive to the number of individual toxicity data sets in the total toxicity data set; the smaller the number of data sets used in the estimation, the more stringent are the resulting water quality criteria. Therefore, to make the recalculation procedure work as intended, it is necessary to collect additional qualified aquatic toxicity data for resident genera to replace every toxicity data set for nonresident genera that is removed. In fact, if the national data set size can be increased by the addition of resident genera toxicity data, then the resulting site-specific criteria will be even more representative.

Resident Species Procedure

This is the most expensive and time-consuming of the methods identified by EPA in its "Water Quality Standards Handbook" (2nd edition) for developing site-specific water quality criteria. It is essentially a combination of the WER procedure and the objective of the recalculation procedure.

This procedure requires that WET testing be conducted for resident aquatic life using site water. The aquatic life used in the WET testing is supposed to meet requirements of the EPA water quality criteria development process, that is, an 8-family minimum data set containing resident species. This WET testing will have to account for seasonal variations in water quality. The water quality criteria must be calculated from these WET test data using the statistical procedure defined by EPA for water quality criteria development.

The resident species procedure essentially requires the user to perform the same type of toxicity studies that EPA did to develop the national water quality criteria, only the resident aquatic life and site water are used to develop the criteria. This is such a massive and expensive effort, however, that few individual dischargers would ever consider doing it. It is possible that a group of dischargers, or a state or local agency, could chose to implement this procedure if the water quality criterion was for a chemical that was determined to have great importance, either in terms of water quality effects or socioeconomic effects on the regulated community.

Indicator Parameters

An indicator parameter is a pollutant that can be regulated in a permit and its regulation will assure that one or more nonregulated pollutants of concern in the discharge will be effectively controlled. Indicator pollutants can be used for both technology-based effluent limits and water-quality-based effluent limits. An indicator pollutant often is used when there is not a reliable, approved, analytical method for a pollutant of concern. An indicator pollutant may also be used to regulate a group of pollutants with similar chemical and toxicological properties to reduce the amount of monitoring required by a discharger. From the perspective of a permittee, an indicator pollutant has two principal advantages over regulating every pollutant of concern individually: (1) it reduces monitoring costs; and (2) it reduces the exposure to permit exceedances because fewer specific pollutants are regulated in the NPDES permit.

A required property of an indicator pollutant is that its treatability correlates with the treatability of the nonregulated pollutants it is intended to represent. Sometimes this may mean that an appropriate indicator pollutant will be specific to the wastewater characteristics and treatment system at a site. For example, COD, TOC, and BOD are good indicator pollutants for most

biodegradable organic chemicals. However, they are not appropriate indicators for ammonia or heavy metals.

It is often advantageous to dischargers to negotiate the use of indicator parameters in NPDES permits when this option is available. It is not an alternative for pollutants regulated by a categorical effluent limitations guideline, unless the guideline specifically provides for indicator parameters. It is an option for BPJ-based technology limits that are negotiated with the permit writer. It is also an alternative, in some cases, for water-quality-based effluent limits. A few examples of indicator parameters are described in the following sections. As these examples show, the use of indicator parameters for permit limits is usually a case-by-case decision, with the exception of those that are written into effluent guidelines. Usually either the discharger or permit writer will identify the possible value of an indicator parameter and suggest its use in a permit. The permit applicant should be cognizant of the value of indicator parameters in permits, and look for opportunities to recommend this approach when it is applicable.

Technology-Based Limits

Probably the best example of indicator parameters can be found in the categorical effluent limitations guidelines for petroleum refineries at 40 CFR 419. In these guidelines, EPA uses the pollutant parameters COD and total phenols as indicators of the effectiveness of removal for all of the organic priority pollutants. When EPA last revisited the petroleum refinery effluent guidelines in 1983, it determined that refineries that could achieve the effluent guidelines for COD and total phenols also effectively removed the specific organic chemicals found in refinery wastewaters, including benzene, toluene, ethylbenzene, phenol (the specific chemical), and a number of polynuclear aromatic hydrocarbons. EPA also found that the limitations on total chromium in the effluent guidelines also served as an indicator that other metals were also being effectively treated. For these reasons, EPA did not add specific organic chemicals or a long list of regulated metals to the petroleum refinery effluent limitations guidelines.

Another example of indicator parameters is the use of total toxic organics (TTO) rather than limits on specific organic compounds. The TTO limitations are found in the categorical effluent limitations guidelines and pretreatment standards for metal finishers and electronics manufacturers, for example.

When a permit writer is developing BPJ permit limits for a discharge to which no categorical limitations apply, the use of an indicator parameter may be particularly applicable to reduce the number of pollutants that must be monitored or to reduce the analytical effort. For example, a permit applicant could propose that limits on TOC or COD would be sufficient to assure that

the effluent BOD was at acceptable levels. Because both TOC and COD are much easier and quicker to analyze in an effluent than BOD, this is an attractive alternative. For some effluents, turbidity measurements possibly could be substituted for TSS. Total phenol (4AAP) could be used as an indicator parameter for many of the specific phenolic chemicals, thus avoiding analysis and reporting (and limits) for each. With BPJ-based permit limits, often there are opportunities for using indicator parameters if a correlation can be shown between them and the other pollutants of concern.

Water-Quality-Based Limits

The NPDES regulations at 40 CFR 122.44(d)(vi)(C) specifically provide for the use of indicator pollutants in the implementation of water-quality-based effluent limits. Indicator pollutants are specifically applicable to WQBELs when there is not an established numeric water quality criterion for the toxic pollutant that is causing or contributing to the failure of a water body to achieve the water quality standards or designated use. In this case, the permitting agency can use indicator pollutants to regulate the toxicity to acceptable levels, if the following requirements are met:

- The permit identifies which pollutants are to be controlled by the indicator pollutant limit;
- The fact sheet for the permit must set forth the basis for the indicator pollutant limits, including a finding that compliance with the effluent limit on the indicator pollutant will result in controls on the pollutant(s) of concern that are sufficient to achieve the water quality standards and designated uses;
- The permit requires monitoring that will demonstrate that the permit limits on the indicator pollutant are achieved; and
- The permit includes a reopener clause that can be used in the event that the limits on the indicator pollutant do not result in attainment of the water quality standard or designated use.

In the case of WQBELs, EPA is specifically thinking of WET limits as the "indicator pollutant" that could be used to control a toxic pollutant that would otherwise be controlled by a chemical-specific effluent limit. However, there is nothing to prevent the use of one chemical constituent of a wastewater to serve as an indicator of other chemicals with similar treatability. For example, if a discharger had several heavy metals in its effluent (e.g., chromium, copper, zinc) and used a treatment process that would effectively remove all of

the metals to levels that were below the WQBELs, it would be possible that one of the metals, the one that was demonstrated to be the least treatable of the group, coulde be the indicator pollutant for the others. For example, if copper has the lowest WQBEL and is the most difficult to remove, it could be the indicator pollutant because, if it is controlled to the WQBEL, then the WQBELs for chromium and zinc would be consistently achieved. To be successful, the discharger would have to demonstrate to the permitting agency that there is a reasonable correlation between the treatability and amounts of these pollutants in the wastewater, and that permit limits on one of them would be as protective of water quality as limits on each of the individual metals.

The same type of approach could be used with inorganic chemicals. Suppose, for example, that effluent limits were required on total dissolved solids (TDS), chlorides, and sulfates to assure that the water quality criteria for these constituents are achieved in the receiving water. If a good correlation can be shown for the specific discharge among these three constituents, then TDS could be selected and regulated as an indicator pollutant.

Acronyms and Abbreviations

30Q5	30-day average, 1-in-5 year low flow
7Q2	7-day average, 1-in-2 year low flow
7Q10	7-day average, 1-in-10 year low flow
ACS	American Chemical Society
API	American Petroleum Institute
AO	Administrative order
BAT	Best available technology
BCC	Bioaccumulative chemicals of concern
BCT	Best conventional technology
BMP	Best Management Practices
BOD	Biochemical oxygen demand
BPJ	Best professional judgment
BPT	Best practicable technology
CBOD	Carbonaceous biochemical oxygen demand
CCC	Criterion continuous concentration
CEAM	Center for Exposure Assessment Modeling
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CMC	Criterion maximum concentration
COD	Chemical oxygen demand
CWA	Clean Water Act
DMR	Discharge monitoring report
DO	Dissolved oxygen
EAB	Environmental Appeals Board
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDF	Fundamentally different factors
GLWQG	Great Lakes Water Quality Guidance
IC	Ion chromatography
ICS	Individual control strategies
IT	Inhibition Threshold
kbbl/day	Thousand barrels per day
kgal/day	Thousand gallons per day
LA	Load allocation
LC	Lethal concentration
LOD	Limit of detection
LOQ	Limit of quantitation
m	Meters
MDL	Method detection limit
MGD	Million gallons per day
ML	Minimum level
mg/L	Milligram per liter
MQL	Minimum quantification level

MOA	Memorandum of agreement
m/s	Meters per second
NOD	Notice of Deficiency
NOEC	No observed effects concentration
NOI	Notice of intent
NOT	Notice of termination
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
OCPSF	Organic chemicals, plastics, and synthetic fibers
O&G	Oil and grease
PBMS	Performance-based measurement system
PC	Personal computer
PCB	Polychlorinated biphenyls
POTW	Publicly owned treatment works
PQL	Practical quantitation level
QA/QC	Quality assurance/quality control
RSB	Roberts, Snyder, and Baumgartner (plume model)
SHPO	State Historic Preservation Officer
SIC	Standard Industrial Classification
TDS	Total dissolved solids
TMDL	Total maximum daily loading
TOC	Total organic carbon
TRE	Toxicity reduction evaluation
TSD	Technical Support Document for Water-Quality-Based Toxics Limits
TSS	Total suspended solids
TTO	Total toxic organics
TU_a	Acute toxicity units
TU_c	Chronic toxicity units
µg/L	Microgram per liter
USGS	United States Geological Survey
WER	Water-effect ratio
WET	Whole effluent toxicity
WLA	Waste load allocation
WQBEL	Water-quality-based effluent limits
ZID	Zone of initial dilution

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Appendix 1

EPA Correspondence on Baseline and Multi-Sector Storm Water General Permits

U.S. Environmental Protection Agency
Office of Wastewater Management
401 M Street, S.W.
Washington, D.C. 20460

Instructions for Permittees Regarding the Expiration of the EPA Storm Water Baseline Industrial General Permit

The EPA Storm Water Baseline Industrial Permit, which was issued in 1992, expires in September 1997. EPA is proposing to terminate this permit in most locations where it was issued[1] and, in its place, cover all industrial storm water dischargers under the EPA Multi-Sector General Permit originally issued in 1995. To accomplish this, EPA is proposing to modify the Multi-Sector General Permit.

Please read these instructions carefully. Following these instructions will assist you in maintaining NPDES Storm Water General Permit coverage for your industrial activity in States where EPA is the permitting authority during the permit termination and reissuance period.

General Information

The 1987 Congressional Amendments to the Clean Water Act require EPA to control the discharge of pollutants from storm water point sources. Regulations were finalized by EPA in 1990, and storm water permits for industrial activities were required starting in 1992. **The 1992 EPA Storm Water Baseline General Permit for Industrial Activities expires at midnight, September 9, 1997, or midnight, September 25, 1997, depending on where the Industrial activity is located[2].**

EPA proposed to modified the Multi-Sector General Permit in the Federal Register on July 11, 1997 (Volume 62, Number 133, pages 37448-37475). Public comments will be accepted on the proposed permit through August 15, 1997. Copies of the proposed permit are available through the USEPA Office of Water Resources Center at (202) 260-7786 or through the following internet sites:

http://www.epa.gov/owmitnet/pipes/storm.htm
http://www.epa.gov/earth1r6/6en/w/sw/home.htm

There exists the potential that the modified Multi-Sector General Permit will not be issued prior to the expiration of the 1992 Baseline Industrial General Permit. **Industrial facilities that are currently covered under the Baseline Industrial General Permit and are eligible to transfer coverage to the existing Multi-Sector General Permit may do so beginning June 9, 1997 (Refer to the September 29, 1995 Federal Register Volume 60, Number 189, pages 50821-50824 for eligibility). Transferring coverage before the Baseline Industrial General Permit expires is a recommended option which will be less burdensome on permitted facilities and will avoid any gaps in storm water discharge permit coverage.**

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[1] EPA proposes to let the Baseline Industrial General Permit continue in the following locations-- the Island of American Samoa, Federal facilities in Colorado, and Indian Country lands located in Colorado (including the portion of the Ute Mountain Ute Reservation located in New Mexico), Montana, North Dakota, South Dakota (including the portion of the Pine Ridge Reservation located in Nebraska), Utah (except for the Goshute and Navajo Reservation lands) and Wyoming. To continue coverage under the Baseline Industrial Permit in these areas, permittees must submit a new NOI prior to the expiration date of the Baseline Permit.

[2] The 1992 EPA Baseline Industrial General Permit expires at midnight, September 25, 1997, in Massachusetts, Washington DC, Guam, American Samoa, Puerto Rico, Indian lands in New York, and for Federal Facilities in Delaware. The permit expires at midnight, September 9, 1997, in all other areas where EPA is the permitting authority. It should be noted that there is conflicting information in the 1992 Baseline Industrial General Permit that states that the expiration date is October 1, 1997 (57 FR 41223 and 57 FR 44454). However, EPA believes that the more consistent reading of the permit in accordance with the Clean Water Act would provide for the permit to expire at midnight, September 9, 1997, and September 25, 1997, respectively.

According to the Administrative Procedures Act, permittees that wish to continue permit coverage for their industrial activities under the 1992 Baseline General Permit beyond September 9, 1997 (or September 25, 1997 in certain areas[1]) must "administratively extend" their existing Baseline Industrial General Permit to have continuing permit coverage until EPA finalizes modifications to the MSGP. The following instructions provide guidance on how to administratively extend your existing permit and how to apply for the replacement permit once it is final.

Please note that the following instructions are based on the terms and conditions of the proposed modified Multi-Sector General Permit published in the *Federal Register* on July 11, 1997.

Instructions:

A. TO EXTEND EXISTING BASELINE INDUSTRIAL GENERAL PERMIT COVERAGE:

1. Submit a Notice of Intent (NOI) form for extended coverage under the 1992 Baseline Industrial General Permit **prior to September 9, 1997 (or September 25, 1997 in certain areas[1])** to the address given in B.3 below. Use EPA NOI Form 3510-6 (enclosed). The form number is printed on the bottom left corner of the form. This indicates that you wish to continue coverage under an "administratively extended" Baseline Industrial General Permit until EPA publishes the modified Multi-Sector General Permit. Include the project's existing NPDES Permit Number in Section IV of the NOI form. If the NPDES Permit Number is not known, contact the EPA NOI Processing Center at (703) 931-3230.

2. Continue to follow the terms and conditions of the 1992 Baseline Industrial General Permit until coverage is acquired under the modified Multi-Sector General Permit as described in section B. below.

   NOTE: Permittees that have terminated industrial activity and do not wish to remain covered under the Baseline Industrial General Permit, should **not** submit an NOI for an administrative extension. Permittees **may** submit a Notice of Termination (NOT) (EPA Form 3510-7) to terminate coverage at any time prior to September 9, 1997 (or September 25, 1997, in certain areas[1]) but coverage will terminate automatically when the permit expires at midnight, September 9, 1997 (or September 25, 1997, in certain areas[1]) unless an NOI for extended permit coverage is submitted.

B. TO ACQUIRE COVERAGE UNDER THE EPA MODIFIED MULTI-SECTOR GENERAL PERMIT WHEN FINAL

1. Obtain a copy of the final EPA Modified Multi-Sector General Permit when it is published in the *Federal Register*.

2. Read and comply with all aspects of the Modified Multi-Sector General Permit (note that some requirements may differ from those of the 1992 Baseline Industrial General Permit).

3. Submit an NOI form **within 30 days of the effective date** of the final Modified Multi-Sector General Permit to:

   Storm Water Notice of Intent (4203)
   USEPA
   401 M Street, S.W.
   Washington, DC 20460

USEPA/OWM, August 1997

Appendix 2

EPA Memo on Permit as Shield

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 1 '94

MEMORANDUM

SUBJECT: Policy Statement on Scope of Discharge Authorization and Shield Associated with NPDES Permits

FROM: Robert Perciasepe
Assistant Administrator for Water

Steven A. Herman
Assistant Administrator for Enforcement

Jean C. Nelson
General Counsel

TO: Regional Administrators
Regional Counsels

Recently, questions have been raised regarding EPA's interpretation of the scope of the "shield" associated with National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act (CWA). Section 402(k) of the CWA -- the "shield" provision -- provides that compliance with an NPDES permit shall be deemed compliance, for purposes of section 309 and 505 enforcement, with sections 301, 302, 306, 307 and 403 of the CWA (except for any standard imposed under section 307 for toxic pollutants injurious to human health). This policy statement describes EPA's position on the scope of the authorization to discharge under an NPDES permit, and the shield thus associated with the permit authorization.

Individual NPDES Permits

As part of an application for an individual NPDES permit, EPA requires that an applicant provide information on its facility. In the case of industrial permit applications, this includes specific information about the presence and quantity of a number of specific pollutants in the facility's effluent, as well as on all waste streams and operations contributing to the facility's effluent and the treatment the wastewater receives. Applications for municipal discharges focus primarily on the operation and treatment processes at the municipal treatment works. See 40 C.F.R. § 122.21.

Historically, EPA has viewed the permit, together with material submitted during the application process and information in the public record accompanying the permit, as important bases

Proceed on Reverse

for an authorization to discharge under section 402 of the CWA. The availability of the section 402(k) shield is predicated upon the issuance of an NPDES permit and a permittee's full compliance with all applicable application requirements, any additional information requests made by the permit authority and any applicable notification requirements. See 40 C.F.R. §§122.41(l) and 122.42 Also see, 45 Fed. Reg. 33311-12, 33522-23 (May 19, 1980).

A permit provides authorization and therefore a shield for the following pollutants resulting from facility processes, waste streams and operations that have been clearly identified in the permit application process when discharged from specified outfalls:

1) Pollutants specifically limited in the permit or pollutants which the permit, fact sheet, or administrative record explicitly identify as controlled through indicator parameters;[1]

2) Pollutants for which the permit authority has not established limits or other permit conditions, but which are specifically identified as present in facility discharges during the permit application process; and

3) Pollutants not identified as present but which are constituents of wastestreams, operations or processes that were clearly identified during the permit application process.[2]

With respect to subparts 2 and 3 of the permit authorization described above, EPA recognizes that a discharger may make changes to its permitted facility (which contribute pollutants to the effluent at a permitted outfall) during the effective period of the NPDES permit. Pollutants associated with these changes (provided they are within the scope of the operations identified in the permit application) are also authorized provided the discharger has complied in a timely manner with all applicable notification requirements (see 40 C.F.R. §§ 122.41(l) and 122.42(a) & (b)) and the permit does not otherwise limit or prohibit such discharges.

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[1] Of course, authorization is only provided to discharge such pollutants within the limits and subject to the conditions set forth in the permit.

[2] The permit, of course, may explicitly prohibit or limit the scope of such discharges.

Notwithstanding any pollutants that may be authorized pursuant to subparts 1 and 2 above, an NPDES permit does not authorize the discharge of any pollutants associated with wastestreams, operations, or processes which existed at the time of the permit application and which were not clearly identified during the application process.

General NPDES Permits

Section 402(k) also shields discharges of pollutants authorized under a general permit. EPA's position is that general permits authorize the discharge of all pollutants within the specified scope of a particular general permit, subject to all pollutant limits, notification requirements and other conditions within a particular general permit so long as the permittee complies with all EPA application requirements for the general permit.

EPA regulations provide the circumstances for which discharges may be authorized under a general permit. See 40 C.F.R. §122.28. To obtain authorization to discharge under a general permit (and consequently, the protection of the shield), in most cases, the prospective permittee must submit either a written notice of intent to be subject to the general permit or a permit application as appropriate. General permittees are also subject to the notification provisions of 40 C.F.R. §§ 122.41 and 122.42.

Spills

While NPDES permits may authorize the discharge of pollutants associated with intermittent flows, permits do not generally authorize the discharge of pollutants associated with spills. There may be limited circumstances where anticipated spills are fully disclosed to EPA and considered during the permitting process as documented in the public record consistent with applicable NPDES regulations. In such circumstances, the discharge of pollutants from such spills would be authorized so long as the permit does not otherwise limit or prohibit such discharges and such a spill does not violate any statutory or regulatory provision.

CERCLA

Finally, there also has been some question regarding the relationship of the NPDES permit shield and the "federally permitted release" exemption under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

EPA's position is that the scope of federally permitted releases under CERCLA section 101(10)(A), (B) and (C) is currently defined by the regulations at 40 C.F.R. § 117.12, which implement language in section 311 of the CWA that is very similar to the federally permitted release definitions. Thus, the Agency takes the position that the NPDES permit shield outlined above in no way expands the scope of the federally permitted releases under CERCLA.

Next Steps

The Office of Water has established two regulatory workgroups which are working on revisions to the NPDES permit application regulations for municipal and industrial dischargers. We want the regulations to ensure the applicant has the responsibility to more fully characterize the nature of its effluent, and the contributions of the effluent to the receiving water. In addressing this issue, we will review EPA's position on the scope of the shield provided by §402(k). In addition, we will consider changes to related NPDES permit regulations, including whether to revise the requirements for: facilities to notify EPA (or the State) of modifications to its operations or processes; facilities to notify EPA (or the State) of changes in the discharge; notification to the public of the nature of the discharge limitations a permittee is held responsible for; and the use of indicator pollutants.

We encourage the Regions to actively participate in the development of these updated regulations. The current schedule calls for proposal of the changes to the municipal application requirements in 1994 and promulgation of the revised regulations in 1996. Our new schedule for changes to the industrial application requirements, for which there is more interest in permit shield issues, is proposal of the regulation changes in FY 1995.

If you have any questions on these issues, please contact us or have your staff contact, Cynthia Dougherty in the Office of Water at 202 260-9545, David Kindin in the Office of Enforcement at 202 501-6004, or Richard Witt in OGC at 202 260-7715.

cc: Elliott P. Laws
Regional Water Management Division Directors
ORC Water Branch Chiefs
Lois Schiffer, DoJ
Joel Gross, DoJ

Appendix 3

Example of Standard Conditions in NPDES Permit

III. STANDARD CONDITIONS FOR NPDES PERMITS

A. GENERAL CONDITIONS

1. INTRODUCTION

In accordance with the provisions of 40 CFR Part 122.41, et. seq., this permit incorporates by reference ALL conditions and requirements applicable to NPDES Permits set forth in the Clean Water Act, as amended, (hereinafter known as the "Act") as well as ALL applicable regulations.

2. DUTY TO COMPLY

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. TOXIC POLLUTANTS

a. Notwithstanding Part III.A.5, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition.

b. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

4. DUTY TO REAPPLY

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated at 40 CFR Part 122.6 and any subsequent amendments.

5. PERMIT FLEXIBILITY

This permit may be modified, revoked and reissued, or terminated for cause in accordance with 40 CFR 122.62-64. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

7. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

8. CRIMINAL AND CIVIL LIABILITY

Except as provided in permit conditions on "Bypassing" and "Upsets", nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the Permit may subject the Permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

9. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

10. STATE LAWS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

11. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

B. PROPER OPERATION AND MAINTENANCE

1. NEED TO HALT OR REDUCE NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators or retention of inadequately treated effluent.

2. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

3. PROPER OPERATION AND MAINTENANCE

a. 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 permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

4. BYPASS OF TREATMENT FACILITIES

a. BYPASS NOT EXCEEDING LIMITATIONS

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.B.4.b. and 4.c.

b. NOTICE

(1)
ANTICIPATED BYPASS

If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2)
UNANTICIPATED BYPASS

The permittee shall, within 24 hours, submit notice of an unanticipated bypass as required in Part III.D.7.

c. PROHIBITION OF BYPASS

(1)
Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(a)
Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b)
There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

© The permittee submitted notices as required by Part III.B.4.b.

(2) The Director may allow an anticipated bypass after considering its adverse effects, if the Director determines that it will meet the three conditions listed at Part III.B.4.c(1).

5. UPSET CONDITIONS

a. EFFECT OF AN UPSET

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Part III.B.5.b. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. CONDITIONS NECESSARY FOR A DEMONSTRATION OF UPSET

A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated;

(3) The permittee submitted notice of the upset as required by Part III.D.7; and,

(4) The permittee complied with any remedial measures required by Part III.B.2.

c. BURDEN OF PROOF

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. REMOVED SUBSTANCES

Unless otherwise authorized, solids, sewage sludges, filter backwash, or other pollutants removed in the course of treatment or wastewater control shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. PERCENT REMOVAL (PUBLICLY OWNED TREATMENT WORKS)

For publicly owned treatment works, the 30-day average percent removal for Biochemical Oxygen Demand and Total Suspended Solids shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR 133.103.

C. MONITORING AND RECORDS

1. INSPECTION AND ENTRY

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by the law to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

2. REPRESENTATIVE SAMPLING

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

3. RETENTION OF RECORDS

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

4. RECORD CONTENTS

Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;

c. The date(s) and time(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used; and
f. The results of such analyses.

5. MONITORING PROCEDURES

a. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.

b. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.

c. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory.

6. FLOW MEASUREMENTS

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes.

D. REPORTING REQUIREMENTS

1. PLANNED CHANGES

a. INDUSTRIAL PERMITS

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR Part 122.29(b); or,

(2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements listed at Part III.D.10.a.

b. MUNICIPAL PERMITS

Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges of pollutants) must be reported to the permitting authority. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. ANTICIPATED NONCOMPLIANCE

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. TRANSFERS

This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

4. DISCHARGE MONITORING REPORTS AND OTHER REPORTS

Monitoring results must be reported on Discharge Monitoring Report (DMR) Form EPA No. 3320-1 in accordance with the "General Instructions" provided on the form. The permittee shall submit the original DMR signed and certified as required by Part III.D.11 and all other reports required by Part III.D. to the EPA at the address below. Duplicate copies of DMR's and all other reports shall be submitted to the appropriate State agency(ies) at the following address(es):

EPA:
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

New Mexico:
Program Manager
Surface Water Quality Bureau
New Mexico Environment Department
1190 Saint Francis Drive
Santa Fe, NM 87502

Oklahoma (Industrial Permits Only):
Director
Oklahoma Department of Environmental Quality
1000 NE 10th Street
Oklahoma City, OK 73117-1212

Louisiana:
Assistant Secretary for Water
Water Pollution Control Division
Louisiana Department of Environmental Quality
P.O. Box 82215
Baton Rouge, LA 70884-2215

5. ADDITIONAL MONITORING BY THE PERMITTEE

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased monitoring frequency shall also be indicated on the DMR.

6. AVERAGING OF MEASUREMENTS

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

7. TWENTY-FOUR HOUR REPORTING

a. 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. A written submission shall be provided within 5 days of the time the permittee becomes aware of the circumstances. The report, shall contain the following information:

(1) A description of the noncompliance and its cause;

(2) The period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and,

(3) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. The following shall be included as information which must be reported within 24 hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit;

(2) Any upset which exceeds any effluent limitation in the permit; and,

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part II (industrial permits only) of the permit to be reported within 24 hours.

c. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

8. OTHER NONCOMPLIANCE

The permittee shall report all instances of noncompliance not reported under Parts III.D.4 and D.7 and Part I.B (for industrial permits only) at the time monitoring reports are submitted. The reports shall contain the information listed at Part III.D.7.

9. OTHER INFORMATION

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

10. CHANGES IN DISCHARGES OF TOXIC SUBSTANCES

All existing manufacturing, commercial, mining, and silvacultural permittees shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) One hundred micrograms per liter (100 µg/L);
(2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitro-phenol and for 2-methyl-4,6-dinitrophenol; and one

milligram per liter (1 mg/L) for antimony;

(3) Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established by the Director.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) Five hundred micrograms per liter (500 µg/L);

(2) One milligram per liter (1 mg/L) for antimony;

(3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established by the Director.

11. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to the Director shall be signed and certified.

a. ALL PERMIT APPLICATIONS shall be signed as follows:

(1) FOR A CORPORATION - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(a) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

(b) The manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) FOR A PARTNERSHIP OR SOLE PROPRIETORSHIP - by a general partner or the proprietor, respectively.

(3) FOR A MUNICIPALITY, STATE, FEDERAL, OR OTHER PUBLIC AGENCY - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(a)
The chief executive officer of the agency, or

(b)
A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. ALL REPORTS required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

(3) The written authorization is submitted to the Director.

c. CERTIFICATION

Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for

gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

12. AVAILABILITY OF REPORTS

Except for applications, effluent data, permits, and other data specified in 40 CFR 122.7, any information submitted pursuant to this permit may be claimed as confidential by the submitter. If no claim is made at the time of submission, information may be made available to the public without further notice.

13. ARCHEOLOGICAL/HISTORICAL SITES (TEXAS PERMITS ONLY)

If during the life of this permit, new construction or land acquisition or any construction related activity where previously undisturbed ground is proposed for disturbance by the permittee which is related to an activity authorized by this permit, the permittee shall send the following items to the Texas State Historic Preservation Officer (SHPO): (1) a description of the new construction and the potential impact that this activity may have upon the ground (including sludge application methods, if applicable), and (2) a copy of a USGS topographic map outlining the location of the project and associated sludge disposal areas or other ancillary impact areas. The address of the Texas SHPO is:

Texas State Historic Preservation Officer
Department of Antiquities Protection
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

This information will be used by the Texas SHPO and EPA to consult according to the requirements of 36 CFR Part 800.4-800.6 on methods to minimize harm to historical properties. The applicant will be contacted within 30 days about further actions that may be needed to meet the requirements of 36 CFR Part 800.

E. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

1. CRIMINAL

a. NEGLIGENT VIOLATIONS

The Act provides that any person who negligently violates permit conditions implementing Section 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both.

b. KNOWING VIOLATIONS

The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. KNOWING ENDANGERMENT

The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both.

d. FALSE STATEMENTS

The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or by both. (See Section 309.c.4 of the Clean Water Act)

2. CIVIL PENALTIES

The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $25,000 per day for each violation.

3. ADMINISTRATIVE PENALTIES

The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

a. CLASS I PENALTY

Not to exceed $10,000 per violation nor shall the maximum amount exceed $25,000.

b. CLASS II PENALTY

Not to exceed $10,000 per day for each day during which the violation continues nor shall the maximum amount exceed $125,000.

F. DEFINITIONS

All definitions contained in Section 502 of the Act shall apply to this permit and are incorporated herein by reference. Unless otherwise specified in this permit, additional definitions of words or phrases used in this permit are as follows:

1. ACT means the Clean Water Act (33 U.S.C. 1251 et. seq.), as amended.

2. ADMINISTRATOR means the Administrator of the U.S. Environmental Protection Agency.

3. APPLICABLE EFFLUENT STANDARDS AND LIMITATIONS means all state and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards or performance, toxic effluent standards and prohibitions, and pretreatment standards.

4. APPLICABLE WATER QUALITY STANDARDS means all water quality standards to which a discharge is subject under the Act.

5. BYPASS means the intentional diversion of waste streams from any portion of a treatment facility.

6. DAILY DISCHARGE means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the sampling day. "Daily discharge" determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the "daily discharge" determination of concentration shall be arithmetic average (weighted by flow value) of all samples collected during that sampling day.

7. DAILY AVERAGE (also known as MONTHLY AVERAGE) discharge limitations means the highest allowable average of "daily discharge(s)" over a calendar month, calculated as the sum of all "daily discharge(s)" measured during a calendar month divided by the number of "daily discharge(s)" measured during that month. When the permit establishes daily average concentration effluent limitations or conditions, the daily average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar month where C = daily concentration, F = daily flow and n = number of daily samples; daily average discharge =

$$\frac{C_1F_1 + C_2F_2 + \ldots + C_nF_n}{F_1 + F_2 + \ldots + F_n}$$

8. DAILY MAXIMUM discharge limitation means the highest allowable "daily discharge" during the calendar month.

9. DIRECTOR means the U.S. Environmental Protection Agency Regional Administrator or an authorized representative.

10. ENVIRONMENTAL PROTECTION AGENCY means the U.S. Environmental Protection Agency.

11. GRAB SAMPLE means an individual sample collected in less than 15 minutes.

12. INDUSTRIAL USER means a nondomestic discharger, as identified in 40 CFR 403, introducing pollutants to a publicly owned treatment works.

13. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the Act.

14. SEVERE PROPERTY DAMAGE means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

15. SEWAGE SLUDGE means the solids, residues, and precipitates separated from or created in sewage by the unit processes of a publicly owned treatment works. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff, that are discharged to or otherwise enter a publicly owned treatment works.

16. TREATMENT WORKS means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement Section 201 of the Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof.

17. UPSET means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

18. FOR FECAL COLIFORM BACTERIA, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

19. The term "MGD" shall mean million gallons per day.

20. The term "mg/L" shall mean milligrams per liter or parts per million (ppm).

21. The term "µg/L" shall mean micrograms per liter or parts per billion (ppb).

22. MUNICIPAL TERMS

a. 7-DAY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The 7-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

b. 30-DAY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The 30-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

c. 24-HOUR COMPOSITE SAMPLE consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

d. 12-HOUR COMPOSITE SAMPLE consists of 12 effluent portions collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

e. 6-HOUR COMPOSITE SAMPLE consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

f. 3-HOUR COMPOSITE SAMPLE consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

Appendix 4

Individual Permit Application Forms

Note that these forms are provided only to give the user an idea of what information is included in a particular application.

The instructions with these forms are *not* included here.

For copies of these forms to be used to prepare permit applications, the user should obtain the forms directly from the permitting agency or copy them from the relevant sections in the NPDES regulations (see Section 5, **Permit Applications**).

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved. OMB No. 2040-0086 Approval expires 7-31-88

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program
(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F

LABEL ITEMS

- I. EPA I.D. NUMBER
- III. FACILITY NAME
- V. FACILITY MAILING ADDRESS
- VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill—in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill—in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all Items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold—faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)			
B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)			
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)			
D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)			
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)			
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)			
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)			
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)			
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)			
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)			

III. NAME OF FACILITY

1 SKIP

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)* | B. PHONE *(area code & no.)*

2

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3

B. CITY OR TOWN | C. STATE | D. ZIP CODE

4

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5

B. COUNTY NAME

C. CITY OR TOWN | D. STATE | E. ZIP CODE | F. COUNTY CODE *(if known)*

6

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
C 7 (specify)	C 7 (specify)
C. THIRD	**D. FOURTH**
C 7 (specify)	C 7 (specify)

VIII. OPERATOR INFORMATION

A. NAME C 8

B. Is the name listed in Item VIII-A also the owner? ☐ YES ☐ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)

F = FEDERAL
M = PUBLIC (other than federal or state)
S = STATE
O = OTHER (specify)
P = PRIVATE

(specify)

D. PHONE (area code & no.) C A

E. STREET OR P.O. BOX

F. CITY OR TOWN C B

G. STATE

H. ZIP CODE

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☐ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)
C T 1 9 N	C T 1 9 P
B. UIC (Underground Injection of Fluids)	**E. OTHER** (specify)
C T 1 9 U	C T 1 9 (specify)
C. RCRA (Hazardous Wastes)	**E. OTHER** (specify)
C T 1 9 R	C T 1 9 (specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED

COMMENTS FOR OFFICIAL USE ONLY

C

EPA Form 3510-1 (Rev. 10-80) Reverse

☆ U.S. Government Printing Office : 1985 - 486-785/32991

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*

Please print or type in the unshaded areas only.

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OMB No. 2040-0086
Approval expires 7-31-88

FORM 2C NPDES

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS

Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER *(list)*	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER *(name)*
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined *(e.g., for certain mining activities)*, provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUT-FALL NO. *(list)*	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT		
	a. OPERATION *(list)*	b. AVERAGE FLOW *(include units)*	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	

OFFICIAL USE ONLY *(effluent guidelines sub-categories)*

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

☐ YES *(complete the following table)* ☐ NO *(go to Section III)*

1. OUTFALL NUMBER *(list)*	2. OPERATION(s) CONTRIBUTING FLOW *(list)*	3. FREQUENCY		4. FLOW				
		a. DAYS PER WEEK *(specify average)*	b. MONTHS PER YEAR *(specify average)*	a. FLOW RATE *(in mgd)*		b. TOTAL VOLUME *(specify with units)*		c. DURATION *(in days)*
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☐ YES *(complete Item III-B)* ☐ NO *(to to Section IV)*

B. Are the limitations in the applicable effluent guideline expressed in terms of production *(or other measure of operation)*?

☐ YES *(complete Item III-C)* ☐ NO *(go to Section IV)*

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS *(list outfall numbers)*
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. *(specify)*	

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

☐ YES *(complete the following table)* ☐ NO *(go to Item IV-B)*

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED

B. OPTIONAL. You may attach additional sheets describing any additional water pollution control programs *(or other environmental projects which may affect your discharges)* you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction. ☐ MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

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CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided. NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ YES *(list all such pollutants below)* ☐ NO *(go to Item VI-B)*

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☐ YES *(identify the test(s) and describe their purposes below)* ☐ NO *(go to Section VIII)*

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

☐ YES *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* ☐ NO *(go to Section IX)*

A. NAME	B. ADDRESS	C. TELEPHONE *(area code & no.)*	D. POLLUTANTS ANALYZED *(list)*

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE *(type or print)*	B. PHONE NO. *(area code & no.)*
C. SIGNATURE	D. DATE SIGNED

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets *(use the same format)* instead of completing these pages. SEE INSTRUCTIONS.

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OUTFALL NO.

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)*

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT						3. UNITS *(specify if blank)*		4. INTAKE *(optional)*		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand *(BOD)*												
b. Chemical Oxygen Demand *(COD)*												
c. Total Organic Carbon *(TOC)*												
d. Total Suspended Solids *(TSS)*												
e. Ammonia *(as N)*												
f. Flow	VALUE		VALUE		VALUE					VALUE		
g. Temperature *(winter)*	VALUE		VALUE		VALUE			°C		VALUE		
h. Temperature *(summer)*	VALUE		VALUE		VALUE			°C		VALUE		
i. pH	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM				STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. *(if available)*	2. MARK 'X'		3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Bromide (24959-67-9)														
b. Chlorine, Total Residual														
c. Color														
d. Fecal Coliform														
e. Fluoride (16984-48-8)														
f. Nitrate–Nitrite *(as N)*														

CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK 'X' a. BELIEVED PRESENT	2. MARK 'X' b. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE (optional) b. NO. OF ANALYSES
g. Nitrogen, Total Organic (as N)														
h. Oil and Grease														
i. Phosphorus (as P), Total (7723-14-0)														
j. Radioactivity														
(1) Alpha, Total														
(2) Beta, Total														
(3) Radium, Total														
(4) Radium 226, Total														
k. Sulfate (as SO_4) (14808-79-8)														
l. Sulfide (as S)														
m. Sulfite (as SO_3) (14265-45-3)														
n. Surfactants														
o. Aluminum, Total (7429-90-5)														
p. Barium, Total (7440-39-3)														
q. Boron, Total (7440-42-8)														
r. Cobalt, Total (7440-48-4)														
s. Iron, Total (7439-89-6)														
t. Magnesium, Total (7439-95-4)														
u. Molybdenum, Total (7439-98-7)														
v. Manganese, Total (7439-96-5)														
w. Tin, Total (7440-31-5)														
x. Titanium, Total (7440-32-6)														

CONTINUE ON PAGE V-3

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CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a *(secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions)*, mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table *(all 7 pages)* for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TEST-ING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)															
2M. Arsenic, Total (7440-38-2)															
3M. Beryllium, Total, 7440-41-7)															
4M. Cadmium, Total (7440-43-9)															
5M. Chromium, Total (7440-47-3)															
6M. Copper, Total (7440-50-8)															
7M. Lead, Total (7439-92-1)															
8M. Mercury, Total (7439-97-6)															
9M. Nickel, Total (7440-02-0)															
10M. Selenium, Total (7782-49-2)															
11M. Silver, Total (7440-22-4)															
12M. Thallium, Total (7440-28-0)															
13M. Zinc, Total (7440-66-6)															
14M. Cyanide, Total (57-12-5)															
15M. Phenols, Total															
DIOXIN															
2,3,7,8-Tetrachlorodibenzo-P-Dioxin (1764-01-6)				DESCRIBE RESULTS											

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TEST... INFORMATION... b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION – VOLATILE COMPOUNDS														
1V. Acrolein (107-02-8)														
2V. Acrylonitrile (107-13-1)														
3V. Benzene (71-43-2)														
4V. Bis (Chloromethyl) Ether (542-88-1)														
5V. Bromoform (75-25-2)														
6V. Carbon Tetrachloride (56-23-5)														
7V. Chlorobenzene (108-90-7)														
8V. Chlorodibromomethane (124-48-1)														
9V. Chloroethane (75-00-3)														
10V. 2-Chloroethylvinyl Ether (110-75-8)														
11V. Chloroform (67-66-3)														
12V. Dichlorobromomethane (75-27-4)														
13V. Dichlorodifluoromethane (75-71-8)														
14V. 1,1-Dichloroethane (75-34-3)														
15V. 1,2-Dichloroethane (107-06-2)														
16V. 1,1-Dichloroethylene (75-35-4)														
17V. 1,2-Dichloropropane (78-87-5)														
18V 1,3-Dichloropropylene (542-75-6)														
19V. Ethylbenzene (100-41-4)														
20V Methyl Bromide (74-83-9)														
21V Methyl Chloride (74-87-3)														

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'			3. EFFLUENT						d. NO. OF ANALYSES	4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)			a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS *(continued)*															
22V. Methylene Chloride (75-09-2)															
23V. 1,1,2,2-Tetrachloroethane (79-34-5)															
24V. Tetrachloroethylene (127-18-4)															
25V. Toluene (108-88-3)															
26V. 1,2-Trans-Dichloroethylene (156-60-5)															
27V. 1,1,1-Trichloroethane (71-55-6)															
28V. 1,1,2-Trichloroethane (79-00-5)															
29V. Trichloroethylene (79-01-6)															
30V. Trichlorofluoromethane (75-69-4)															
31V. Vinyl Chloride (75-01-4)															
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)															
2A. 2,4-Dichlorophenol (120-83-2)															
3A. 2,4-Dimethylphenol (105-67-9)															
4A. 4,6-Dinitro-O-Cresol (534-52-1)															
5A. 2,4-Dinitrophenol (51-28-5)															
6A. 2-Nitrophenol (88-75-5)															
7A. 4-Nitrophenol (100-02-7)															
8A. P-Chloro-M-Cresol (59-50-7)															
9A. Pentachlorophenol (87-86-5)															
10A. Phenol (108-95-2)															
11A. 2,4,6-Trichlorophenol (88-06-2)															

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TEST INCLUDED ON QUAL. ID	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE (optional) b. NO. OF ANALYSES
GC/MS FRACTION -- BASE/NEUTRAL COMPOUNDS															
8. Acenaphthene (83-32-9)															
9B. Acenaphtylene (208-96-8)															
10B. Anthracene (120-12-7)															
11B. Benzidine (92-87-5)															
12B. Benzo (a) Anthracene (56-55-3)															
13B. Benzo-(a) Pyrene (50-32-8)															
14B. 3,4-Benzo-fluoranthene (205-99-2)															
15B. Benzo (ghi) Perylene (191-24-2)															
16B. Benzo (k) Fluoranthene (207-08-9)															
17B. Bis (2-Chloro-ethoxy) Methane (111-91-1)															
18B. Bis (2-Chloro-ethyl) Ether (111-44-4)															
19B. Bis (2-Chloroiso-propyl) Ether (102-60-1)															
20B. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)															
21B. 4-Bromo-phenyl Phenyl Ether (101-55-3)															
22B. Butyl Benzyl Phthalate (85-68-7)															
23B. 2-Chloro-naphthalene (91-58-7)															
24B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)															
25B. Chrysene (218-01-9)															
26B. Dibenzo (a,h) Anthracene (53-70-3)															
27B. 1,2-Dichloro-benzene (95-50-1)															
28B. 1,3-Dichloro-benzene (541-73-1)															

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Approval expires 7-31-88

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE (optional) b. NO. OF ANALYSES
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS *(continued)*															
22B. 1,4-Dichlorobenzene (106-46-7)															
23B. 3,3'-Dichlorobenzidine (91-94-1)															
24B. Diethyl Phthalate (84-66-2)															
25B. Dimethyl Phthalate (131-11-3)															
26B. Di-N-Butyl Phthalate (84-74-2)															
27B. 2,4-Dinitrotoluene (121-14-2)															
28B. 2,6-Dinitrotoluene (606-20-2)															
29B. Di-N-Octyl Phthalate (117-84-0)															
30B. 1,2-Diphenylhydrazine *(as Azobenzene)* (122-66-7)															
31B. Fluoranthene (206-44-0)															
32B. Fluorene (86-73-7)															
33B. Hexachlorobenzene (118-74-1)															
34B. Hexachlorobutadiene (87-68-3)															
35B. Hexachlorocyclopentadiene (77-47-4)															
36B. Hexachloroethane (67-72-1)															
37B. Indeno *(1,2,3-cd)* Pyrene (193-39-5)															
38B. Isophorone (78-59-1)															
39B. Naphthalene (91-20-3)															
40B. Nitrobenzene (98-95-3)															
41B. N-Nitrosodimethylamine (62-75-9)															
42B. N-Nitrosodi-N-Propylamine (621-64-7)															

NTINUED FROM THE FRONT

POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
C/MS FRACTION – BASE/NEUTRAL COMPOUNDS (continued)															
B. N-Nitrosodiphenylamine 6-30-6)															
B. Phenanthrene 5-01-8)															
B. Pyrene 29-00-0)															
B. 1,2,4-Trichlorobenzene 20-82-1)															
C/MS FRACTION – PESTICIDES															
. Aldrin 09-00-2)															
. α-BHC 19-84-6)															
. β-BHC 19-85-7)															
. γ-BHC 3-89-9)															
. δ-BHC 19-86-8)															
. Chlordane 7-74-9)															
. 4,4'-DDT 0-29-3)															
. 4,4'-DDE 2-55-9)															
. 4,4'-DDD 2-54-8)															
P. Dieldrin 0-57-1)															
P. α-Endosulfan 15-29-7)															
P. β Endosulfan 15 29-7)															
P. Endosulfan Iluth 031-07-8)															
P Endrin 2-20-8)															
P. Endrin ldehyde 421-93 4)															
P Heptachlor 5-44-8)															

CONTINUE ON PAGE V-9

EPA I.D. NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER

Form Approved
OMB No. 2040-0086
Approval expires 7-31-88

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION – PESTICIDES (continued)															
17P. Heptachlor Epoxide (1024-57-3)															
18P. PCB-1242 (53469-21-9)															
19P. PCB-1254 (11097-69-1)															
20P. PCB-1221 (11104-28-2)															
21P. PCB-1232 (11141-16-5)															
22P. PCB-1248 (12672-29-6)															
23P. PCB-1260 (11096-82-5)															
24P. PCB-1016 (12674-11-2)															
25P. Toxaphene (8001-35-2)															

Please type or print in the unshaded areas only

EPA ID Number *(copy from Item 1 of Form 1)*

Form Approved
OMB No. 2040-0086
Approval expires 7-31-86

Form 2D NPDES

EPA

New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude, and the name of the receiving water.

Outfall Number *(list)*	Latitude			Longitude			Receiving Water *(name)*
	Deg	Min	Sec	Deg	Min	Sec	

II. Discharge Date *(When do you expect to begin discharging?)*

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and stormwater runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow *(list)*	2. Average Flow *(include units)*	3. Treatment *(Description or List Codes from Table 2D-1)*

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in item III-A be intermittent or seasonal?

☐ Yes *(complete the following table)* ☐ No *(go to item IV)*

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week *(specify average)*	b. Months Per Year *(specify average)*	a. Maximum Daily Flow Rate *(in mgd)*	b. Maximum Total Volume *(specify with units)*	c. Duration *(in days)*

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	a. Quantity Per Day	b. Units of Measure	c. Operation, Product, Material, etc *(specify)*

CONTINUED FROM THE FRONT	EPA ID Number *(copy from Item 1 of Form 1)*	Outfall Number

V. Effluent Characteristics

A; and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*

CONTINUED FROM THE FRONT	EPA ID Number *(copy from Item 1 of Form 1)*	

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☐ No Report

B Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location

CONTINUE ON NEXT PAGE

EPA ID Number *(copy from item one of Form 1)*

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title *(type or print)*	B. Phone No.
C. Signature	D. Date Signed

*U.S. Government Printing Office : 1986 - 491-191/52946

Please type or print in the unshaded areas only

EPA ID Number *(copy from Item 1 of Form 1)*

Form Approved OMB No. 2040-0086
Approval expires 5-31-92

Form 2E NPDES

EPA Facilities Which Do Not Discharge Process Wastewater

I. Receiving Waters

For this outfall, list the latitude and longitude, and name of the receiving water(s).

Outfall Number *(list)*	Latitude			Longitude			Receiving Water *(name)*
	Deg	Min	Sec	Deg	Min	Sec	

II. Discharge Date *(If a new discharger, the date you expect to begin discharging)*

III. Type of Waste

A. Check the box(es) indicating the general type(s) of wastes discharged

☐ Sanitary Wastes ☐ Restaurant or Cafeteria Wastes ☐ Noncontact Cooling Water ☐ Other Nonprocess Wastewater *(Identify)*

B. If any cooling water additives are used, list them here. Briefly describe their composition if this information is available

IV. Effluent Characteristics

A. **Existing Sources** — Provide measurements for the parameters listed in the left-hand column below, unless waived by the permitting authority *(see instructions)*.

B. **New Dischargers** — Provide estimates for the parameters listed in the left-hand column below, unless waived by the permitting authority. Instead of the number of measurements taken, provide the source of estimated values *(see instructions)*

Pollutant or Parameter	(1) Maximum Daily Value *(include units)*		(2) Average Daily Value *(last year)* *(include units)*		(3) Number of Measurements Taken *(last year)*	(or) (4) Source of Estimate *(if new discharger)*
	Mass	Concentration	Mass	Concentration		
Biochemical Oxygen Demand (BOD)						
Total Suspended Solids (TSS)						
Fecal Coliform *(if believed present or if sanitary waste is discharged)*						
Total Residual Chlorine *(if chlorine is used)*						
Oil and Grease						
*Chemical oxygen demand (COD)						
*Total organic carbon (TOC)						
Ammonia *(as N)*						
Discharge Flow	Value					
pH *(give range)*	Value					
Temperature *(Winter)*		°C		°C		
Temperature *(Summer)*		°C		°C		

*If noncontact cooling water is discharged

V Except for leaks or spills, will the discharge described in this form be intermittent or seasonal? ☐ Yes ☐ No

If yes, briefly describe the frequency of flow and duration.

VI. Treatment System *(Describe briefly any treatment system(s) used or to be used)*

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations. Attach additional sheets, if necessary.

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title	B. Phone No. *(area code & no.)*
C. Signature	D. Date Signed

Please print or type in the unshaded areas only

EPA ID Number *(copy from Item I of Form 1)*

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

Form 2F NPDES

United States Environmental Protection Agency
Washington, DC 20460

Application for Permit to Discharge Storm Water Discharges Associated with Industrial Activity

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 28.6 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of this collection of information, or suggestions for improving this form, including suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. Outfall Number *(list)*	B. Latitude	C. Longitude	D. Receiving Water *(name)*

II. Improvements

A. Are you now required by any Federal, State, or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

1. Identification of Conditions, Agreements, Etc.	2. Affected Outfalls		3. Brief Description of Project	4. Final Compliance Date	
	number	source of discharge		a. req.	b. proj.

B. You may attach additional sheets describing any additional water pollution (or other environmental projects which may affect your discharges) you now have under way or which you plan. Indicate whether each program is now under way or planned, and indicate your actual or planned schedules for construction.

III. Site Drainage Map

Attach a site map showing topography (or indicating the outline of drainage areas served by the outfall(s) covered in the application if a topographic map is unavailable) depicting the facility including: each of its intake and discharge structures; the drainage area of each storm water outfall; paved areas and buildings within the drainage area of each storm water outfall, each known past or present areas used for outdoor storage or disposal of significant materials, each existing structural control measure to reduce pollutants in storm water runoff, materials loading and access areas, areas where pesticides, herbicides, soil conditioners and fertilizers are applied; each of its hazardous waste treatment, storage or disposal units (including each area not required to have a RCRA permit which is used for accumulating hazardous waste under 40 CFR 262.34); each well where fluids from the facility are injected underground; springs, and other surface water bodies which receive storm water discharges from the facility.

Continued from the Front

IV. Narrative Description of Pollutant Sources

A. For each outfall, provide an estimate of the area (include units) of impervious surfaces (including paved areas and building roofs) drained to the outfall, and an estimate of the total surface area drained by the outfall.

Outfall Number	Area of Impervious Surface (provide units)	Total Area Drained (provide units)	Outfall Number	Area of Impervious Surface (provide units)	Total Area Drained (provide units)

B. Provide a narrative description of significant materials that are currently or in the past three years have been treated, stored or disposed in a manner to allow exposure to storm water; method of treatment, storage, or disposal; past and present materials management practices employed to minimize contact by these materials with storm water runoff; materials loading and access areas; and the location, manner, and frequency in which pesticides, herbicides, soil conditioners, and fertilizers are applied.

C. For each outfall, provide the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of the treatment the storm water receives, including the schedule and type of maintenance for control and treatment measures and the ultimate disposal of any solid or fluid wastes other than by discharge.

Outfall Number	Treatment	List Codes from Table 2F-1

V. Nonstormwater Discharges

A. I certify under penalty of law that the outfall(s) covered by this application have been tested or evaluated for the presence of nonstormwater discharges, and that all nonstormwater discharges from these outfall(s) are identified in either an accompanying Form 2C or Form 2E application for the outfall.

Name and Official Title *(type or print)*	Signature	Date Signed

B. Provide a description of the method used, the date of any testing, and the onsite drainage points that were directly observed during a test.

VI. Significant Leaks or Spills

Provide existing information regarding the history of significant leaks or spills of toxic or hazardous pollutants at the facility in the last three years, including the approximate date and location of the spill or leak, and the type and amount of material released.

Appendix 5

General Storm Water Permit NOI and NOT Forms

Instructions - EPA Form 3510-6
Notice Of Intent (NOI) For Storm Water Discharges Associated With Industrial Activity
To Be Covered Under a NPDES General Permit

Who Must File A Notice Of Intent (NOI) Form

Federal law at 40 CFR Part 122 prohibits point source discharges of storm water associated with industrial activity to a water body(ies) of the U.S. without a National Pollutant Discharge Elimination System (NPDES) permit. The operator of an industrial activity that has such a storm water discharge must submit a NOI to obtain coverage under a NPDES Storm Water General Permit. If you have questions about whether you need a permit under the NPDES Storm Water program, or if you need information as to whether a particular program is administered by EPA or a state agency, telephone or write to the Notice of Intent Processing Center at (703) 931-3230.

Where To File NOI Form

NOIs must be sent to the following address: Storm Water Notice of Intent (4203)
401 M Street, S.W.
Washington, DC 20460

Completing The Form

You must type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the Notice of Intent Processing Center at (703) 931-3230.

Section I Permit Selection

You must indicate the NPDES storm water general permit under which you are applying for coverage. Check one box only. The Baseline Industrial and Baseline Construction permits were issued in September 1992. The Multi-Sector Permit became effective October 1, 1995.

Section II Facility Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility: F = Federal; S = State; M = Public (other than federal or state); P = Private.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete street address, including city, state, and ZIP code. Do not provide a P.O. Box number as the street address. **If applying for a Baseline Permit and the facility or site lacks a street address**, indicate the state and either the latitude and longitude of the facility to the nearest 15 seconds or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site. **If applying for the Multi-Sector Permit indicate the complete street address and either the latitude and longitude of the facility to the nearest 15 seconds or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.**

All applicants must indicate whether the facility is located on Indian lands.

Section IV Site Activity Information

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g., municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water(s).

If you are filing as a co-permittee and a storm water general permit number has been issued, enter that number in the space provided.

Indicate the monitoring status of the facility. Refer to the permit for information on monitoring requirements. Indicate the monitoring status by entering one of the following:

1 = Not subject to monitoring requirements under the conditions of the permit.
2 = Subject to monitoring requirements and required to submit data.
3 = Subject to monitoring requirements but not required to submit data.
4 = Subject to monitoring requirements but submitting certification for monitoring exclusion.

List, in descending order of significance, up to two 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section III of this application. If you are applying for coverage under the construction general permit, enter "CO" (which represents SIC codes 1500 - 1799).

For industrial activities defined in 40 CFR 122.26(b)(14)(i)-(xi) that do not have SIC codes that accurately describe the principal products produced or services provided, use the following 2-character codes.

HZ = Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA [40 CFR 122.26 (b)(14)(iv)];
LF = Landfills, land application sites, and open dumps that receive or have received any industrial wastes, including those that are subject to regulation under subtitle D of RCRA [40 CFR 122.26 (b)(14)(v)];
SE = Steam electric power generating facilities, including coal handling sites [40 CFR 122.26 (b)(14)(vii)];
TW = 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 [40 CFR 122.26 (b)(14)(ix)]; or,
CO = Construction activities [40 CFR 122.26 (b)(14)(x)].

If there is an other NPDES permit presently issued for the facility or site listed in Section III, enter the permit number. If an application for the facility has been submitted but no permit number has been assigned, enter the application number.

Facilities applying for coverage under the Multi-Sector storm water general permit must answer the last three questions in Section IV. Refer to Addendum H of the Multi-Sector general permit for a list of species that are either proposed or listed as threatened or endangered. "BMP" means "Best Management Practices" that are used to control storm water discharges.

Indicate whether any construction will be conducted to install or develop storm water runoff controls.

Section V Additional Information Required for Construction Activities Only

Construction activities must complete Section V in addition to Sections I through IV. Only construction activities need to complete Section V.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, permits, or storm water management plans.

Section VI Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, Federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

THIS FORM REPLACES PREVIOUS FORM 3510-7 (8-92)
Please See Instructions Before Completing This Form

Form Approved. OMB No. 2040-0086
Approval expires: 8-31-98

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Termination (NOT) of Coverage Under a NPDES General Permit for Storm Water Discharges Associated with Industrial Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the NPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

NPDES Storm Water General Permit Number: _____

Check Here if You are No Longer the Operator of the Facility: ☐

Check Here if the Storm Water Discharge is Being Terminated: ☐

II. Facility Operator Information

Name: _____ Phone: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

III. Facility/Site Location Information

Name: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

Latitude: _____ Longitude: _____ Quarter: _____ Section: _____ Township: _____ Range: _____

IV. Certification:

I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: _____ Date: _____

Signature: _____

Instructions for Completing Notice of Termination (NOT) Form

Who May File a Notice of Termination (NOT) Form

Permittees who are presently covered under an EPA-issued National Pollutant Discharge Elimination System (NPDES) General Permit (including the 1995 Multi-Sector Permit) for Storm Water Dicharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26(b)(14), or when they are no longer the operator of the facilities.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

Where to File NOT Form

Send this form to the the following address:

Storm Water Notice of Termination (4203)
401 M Street, S.W.
Washington, DC 20460

Completing the Form

Type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, telephone or write the Notice of Intent Processing Center at (703) 931-3230.

Instructions - EPA Form 3510-7
Notice of Termination (NOT) of Coverage Under The NPDES General Permit
for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information

Enter the existing NPDES Storm Water General Permit number assigned to th e facility or site identified in Section III. If you do not know the permit number , telephone or write your EPA Regional storm water contact person.

Indicate your reason for submitting this Notice of Termination by checking th e appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II Facility Operator Information

Give the legal nam e of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or sit e manager. Do not use a colloquial nam e. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter , section, township, and range (to the nearest quarter section) of the approximat e center of the site.

Section IV Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed a s follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principa l business function, or any other person who performs similar policy or decisio n making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, State, Federal, or other public facility: by either a principa l executive officer or ranking elected official.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0.5 hours pe r application, including time for reviewing instructions, searching existing dat a sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief , Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or Director, Office of Information an d Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Instructions - EPA Form 3510-7
Notice of Termination (NOT) of Coverage Under The NPDES General Permit
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THIS FORM REPLACES PREVIOUS FORM 3510-6 (8-92)
See Reverse for Instructions

Form Approved. OMB No. 2040-0086
Approval expires: 8-31-98

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under a NPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section II of this form intends to be authorized by a NPDES permit issued for storm water discharges associated with industrial activity in the State identified in Section III of this form. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Selection: You must indicate the NPDES Storm Water general permit under which you are applying for coverage. Check one of these.

Baseline Industrial ☐ Baseline Construction ☐ Multi-Sector (Group Permit) ☐

II. Facility Operator Information

Name: Phone:

Address: Status of Owner/Operator:

City: State: ZIP Code:

III. Facility/Site Location Information

Name: Is the facility located on Indian Lands? (Y or N) ☐

Address:

City: State: ZIP Code:

Latitude: Longitude: Quarter: Section: Township: Range:

IV. Site Activity Information

MS4 Operator Name:

Receiving Water Body:

If you are filing as a co-permittee, enter storm water general permit number:

SIC or Designated Activity Code: Primary: 2nd:

Is the facility required to submit monitoring data? (1, 2, 3, or 4) ☐

If You Have Another Existing NPDES Permit, Enter Permit Number:

Multi-Sector Permit Applicants Only:

Based on the instructions provided in Addendum H of the Multi-Sector permit, are species identified in Addendum H in proximity to the storm water discharges to be covered under this permit, or the areas of BMP construction to control those storm water discharges? (Y or N) ☐

Will construction (land disturbing activities) be conducted for storm water controls? (Y or N) ☐

Is applicant subject to and in compliance with a written historic preservation agreement? (Y or N) ☐

V. Additional Information Required for Construction Activities Only

Project Start Date: Completion Date:

Estimated Area to be Disturbed (in Acres):

Is the Storm Water Pollution Prevention Plan in compliance with State and/or Local sediment and erosion plans? (Y or N) ☐

VI. Certification: The certification statement in Box 1 applies to all applicants. The certification statement in Box 2 applies only to facilities applying for the Multi-Sector storm water general permit.

BOX 1

ALL APPLICANTS:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

BOX 2

MULTI-SECTOR STORM WATER GENERAL PERMIT APPLICANTS ONLY:

I certify under penalty of law that I have read and understand the Part I.B. eligibility requirements for coverage under the Multi-Sector storm water general permit, including those requirements relating to the protection of species identified in Addendum H.

To the best of my knowledge, the discharges covered under this permit, and construction of BMPs to control storm water run-off, are not likely to and will not likely adversely affect any species identified in Addendum H of the Multi-Sector storm water general permit or are otherwise eligible for coverage due to previous authorization under the Endangered Species Act.

To the best of my knowledge, I further certify that such discharges, and construction of BMPs to control storm water run-off, do not have an effect on properties listed or eligible for listing on the National Register of Historic Places under the National Historic Preservation Act, or are otherwise eligible for coverage due to a previous agreement under the National Historic Preservation Act.

I understand that continued coverage under the Multi-Sector general permit is contingent upon maintaining eligibility as provided for in Part I.B.

Print Name: Date:

Signature: _____

EPA ID Number *(copy from Item I of Form 1)*

Continued from Page 2

VII. Discharge Information

A,B,C, & D: See instructions before proceeding. Complete one set of tables for each outfall. Annotate the outfall number in the space provided.

Tables VII-A, VII-B, and VII-C are included on separate sheets numbered VII-1 and VII-2.

E: Potential discharges not covered by analysis - is any toxic pollutant listed in table 2F-2, 2F-3 or 2F-4, a substance or a componant of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ Yes *(list all such pollutants below)* ☐ No *(go to Section IX)*

VIII. Biological Toxicity Testing Data

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☐ Yes *(list all such pollutants below)* ☐ No *(go to Section IX)*

IX. Contract Analysis Information

Were any of the analysis reported in item VII performed by a contract laboratory or consulting firm?

☐ Yes *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* ☐ No *(go to Section X)*

A. Name	B. Address	C. Area Code & Phone No.	D. Pollutants Analyzed

X. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title *(type or print)*	B. Area Code and Phone No.
C. Signature	D. Date Signed

EPA ID Number *(copy from Item I of Form 1)*

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

VII. Discharge Information *(Continued from page 3 of Form 2F)*

Part A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-weighted Composite		
Oil and Grease		N/A				
Biological Oxygen Demand (BOD5)						
Chemical Oxygen Demand (COD)						
Total Suspended Solids (TSS)						
Total Nitrogen						
Total Phosphorus						
pH	Minimum	Maximum	Minimum	Maximum		

Part B - List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-weighted Composite		

Continue on Reverse

Continued from the Front

Part C - List each pollutant shown in Tables 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfall.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-weighted Composite		

Part D - Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm Event *(in minutes)*	3. Total rainfall during storm event *(in inches)*	4. Number of hours between beginning of storm measured and end of previous measurable rain event	5. Maximum flow rate during rain event *(gallons/minute or specify units*	6. Total flow from rain event *(gallons or specify units)*

7. Provide a description of the method of flow measurement or estimate.

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005
202-682-8000
http://www.api.org