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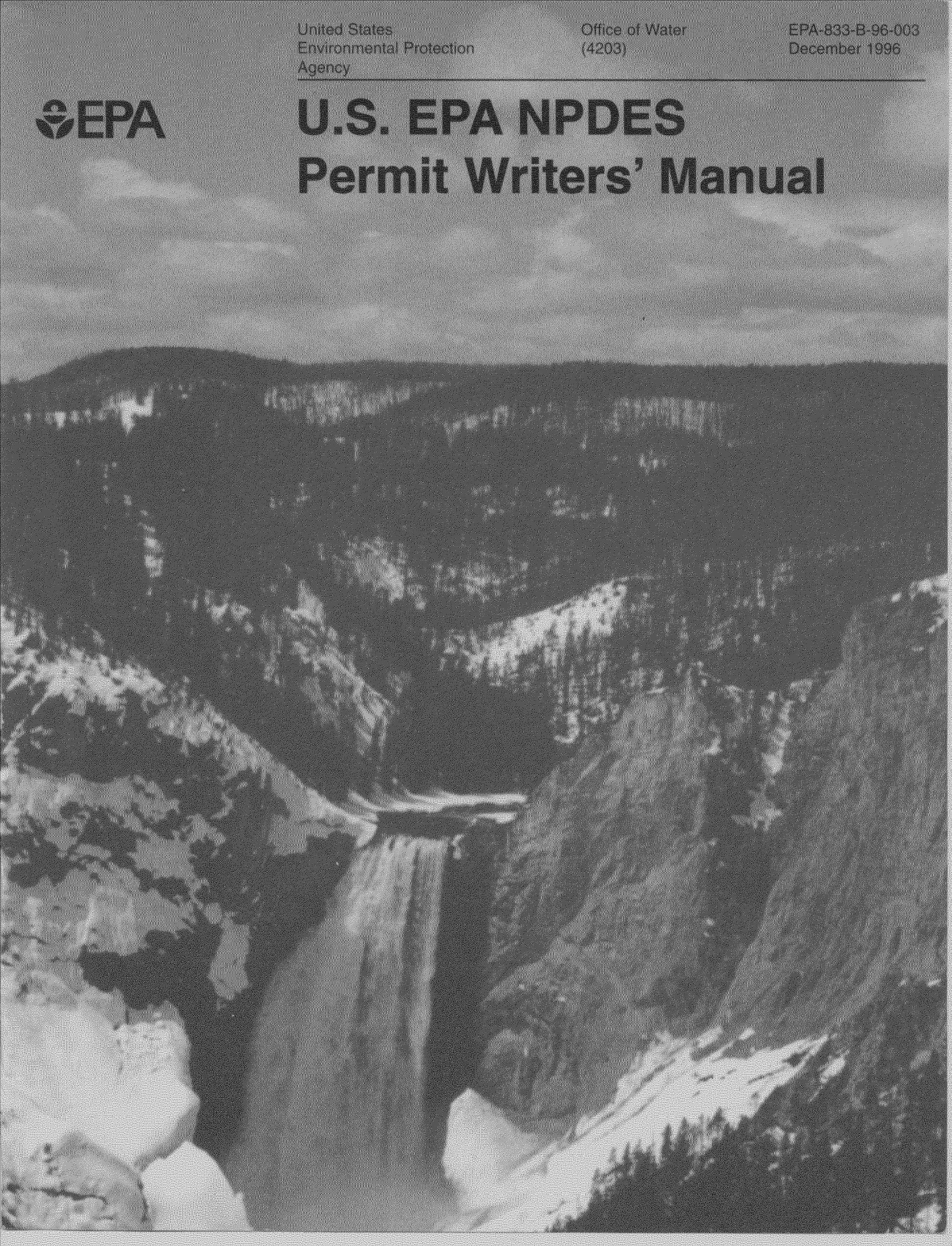
U.S. EPA NPDES Permit Writers' Manual



United States
Environmental Protection
Agency

Office of Water
Washington, DC

NPDES Permit Writers' Manual

December 1996

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Office of Wastewater Management
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Cover Photo:
Lower Yellowstone Falls
Yellowstone National Park
Photograph by Dave Hair

Foreword

Since its establishment in the 1972 amendments to the Federal Water Pollution Control Act, the National Pollutant Discharge Elimination System (NPDES) Program has achieved significant reductions in pollutant discharges, which in turn has resulted in tremendous improvement to the quality of our Nation's water resources. As we move into the 21st century, the objective of the national program will not only be to develop solutions which address remaining impacts to surface waters, but to do so in ways that continue to improve the effectiveness of the NPDES Program and allow us to measure environmental progress and results.

As EPA and States take steps to improve the NPDES Program and how it is implemented, it is essential that all parties involved understand the fundamental basis of the NPDES Program. The NPDES Permit Writers' Manual is principally designed to help permit writers prepare legally defensible and enforceable NPDES permits. Its purpose is to serve as a useful resource in providing the technical and legal considerations which support the development of NPDES permits. However, the manual is also intended to serve as a resource for others, including stakeholders and the regulated community, interested in the NPDES permitting process. Only after reaching some common level of understanding of the NPDES Program and the issues surrounding the permitting process, can EPA, State permitting authorities, and stakeholders develop optimal solutions to improve the quality of our surface water resources. To that end, I would like to take this opportunity to highlight some of the changes taking place within the NPDES Program:

- ***Stakeholder Involvement and Public Participation***—EPA is committed to getting permittees and other interested parties involved at an early stage of the permit development and decision making process. For example, several NPDES authorities involve permittees and stakeholders in the permit development phase before the public notice process. This early involvement provides an opportunity for the permitting authorities, permittees and stakeholders to identify errors, address questions and develop optimal solutions.

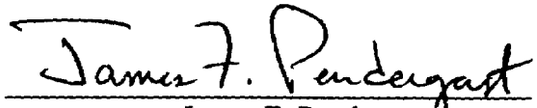
- ***Watershed Approach***—The Watershed Approach is EPA's renewed emphasis to address all stressors within a hydrologically defined drainage basin instead of viewing individual pollutant sources in isolation of other stressors. The watershed approach allows us to recognize that the health of our water resources are the result of complex interactions of various pollution sources, habitat conditions, flow and many other factors. EPA believes that these problems are best addressed through the development of watershed plans that integrate controls of point and nonpoint sources and provide decision-makers with an opportunity to consider issues such as

protection and restoration of habitats, drinking water sources, ground water protection and other environmental and social objectives. EPA strongly encourages innovative approaches that implement NPDES requirements in ways that achieve greater environmental results at the least cost.

- ***Refining of Point Source Focus***—As we place greater emphasis on environmental results we realize that certain sources of pollution may require increased national attention to achieve local watershed goals. EPA is actively engaged with States, environmental groups and the regulated community to address pollution problems from wet weather sources (CSOs, storm water and sanitary sewer overflows), mining operations, concentrated animal feeding operations and other key point sources where substantial pollution reduction may be possible. EPA is confident that involving stakeholders in the development of solutions for these remaining sources of pollution will provide optimal solutions.

- ***Burden Reduction***—EPA is also pursuing regulatory reforms to eliminate unnecessary regulations and to reduce administrative burdens. For example, in June 1995, EPA promulgated a rule to eliminate obsolete rules. In 1996, EPA finalized national guidance on ways to reduce reporting and monitoring for permittees that have good historical compliance records.

As we move forward, we will continue to explore ways to promote watershed, streamlining, and reinvention concepts discussed above to facilitate the continual evolution and success of the NPDES Program. As such, this manual is expected to be revised periodically to reflect improvements, regulatory changes, and policy decisions. Thank you for using this permit writers' guide. We hope that it serves as a valuable resource and tool for helping to achieve healthy water resources throughout the Nation.



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Contents

Page

List of Acronyms A-1

Glossary of Terms G-1

Chapter 1—Introduction 1

1.1 History and Evolution of the NPDES Program 2

Chapter 2 —Regulatory Framework and Scope of the NPDES Program 7

2.1 Regulatory Framework of the NPDES Program 7
2.2 Scope of the NPDES Program 8
2.3 NPDES Program Areas 14
2.3.1 NPDES Program Areas Applicable to Municipal Sources 14
2.3.2 NPDES Program Areas Applicable to Industrial Sources 18

Chapter 3—Overview of the NPDES Permitting Process 21

3.1 Types of Permits 21
3.2 Major Components of a Permit 23
3.3 Overview of the Development/Issuance Process for NPDES Individual Permits 23
3.4 Overview of the Development/Issuance Process for NPDES General Permits 26
3.5 Roles and Responsibilities of the Federal and State Authorities 27

Chapter 4—The Permit Application Process 29

4.1 NPDES Permit Application Forms 29
4.1.1 Municipal Application Requirements (Form A and Short Form A) 31
4.1.2 Non-Municipal Permit Application Requirements 32
4.1.3 Application Requirements for NPDES General Permits 36
4.2 Application Deadlines 36
4.3 Review of the Application 37
4.3.1 The Complete Application 39
4.3.2 Common Omissions and Errors in Applications 39
4.3.3 The Accurate Application 42

4.4 Facility Information Review 43
4.4.1 Background Information Review 43
4.4.2 Facility Site Visits 45
4.5 Confidential Information 47

Chapter 5—Technology-Based Effluent Limits 49

5.1 Application of Technology-Based Effluent Limitations for Non-Municipal Dischargers 50
5.1.1 Statutory and Regulatory Foundation 50
5.1.2 Development of National Effluent Limitations Guidelines and Performance Standards 53
5.1.3 General Considerations Concerning the Use of Effluent Limitation Guidelines 56
5.1.4 Best Professional Judgment Permit Limits 68
5.2 Application of Technology-Based Effluent Limitations for Municipal Dischargers 75
5.2.1 Secondary Treatment 75
5.2.2 Equivalent-to-Secondary Treatment Definition 79

Chapter 6—Water Quality-Based Effluent Limits 87

6.1 Overview of Water Quality Standards 88
6.1.1 Components of Water Quality Standards 89
6.1.2 Establishing Water Quality Criteria 91
6.1.3 Future Directions for Water Quality Standards 93
6.2 Approaches to Implementing Water Quality Standards 94
6.2.1 Chemical-Specific Approach 94
6.2.2 Whole Effluent Toxicity (WET) Approach 94
6.2.3 Biological Criteria or Biological Assessment Approach 98
6.3 Determining the Need for WQBELs 99
6.3.1 Defining "Reasonable Potential" to Exceed Applicable Criteria . 99
6.3.2 Determining Reasonable Potential With Effluent Monitoring Data 101
6.3.3 Determining Reasonable Potential Without Effluent Monitoring Data 103
6.4 Exposure Assessment and Wasteload Allocation 104
6.4.1 Total Maximum Daily Loads 104
6.4.2 Calculating Wasteload Allocations 106
6.4.3 Selecting a Water Quality Model 107
6.5 Permit Limit Derivation 111
6.5.1 Expression of Permit Limits 112
6.5.2 Limits Derived from Steady-State Model Outputs 112
6.5.3 Limits Derived from Dynamic Model Outputs 114
6.5.4 Special Considerations Permits Protecting Human Health . . . 114

Chapter 7—Monitoring and Reporting Conditions 115

7.1 Establishing Monitoring Conditions 116
7.1.1 Monitoring Location 117
7.1.2 Monitoring Frequency 119
7.1.3 Sample Collection Methods 122
7.1.4 Analytical Methods 125
7.1.5 Other Considerations in Establishing Monitoring Requirement . 127
7.1.6 Establishing Monitoring Conditions for Unique Discharges . . . 129
7.2 Reporting and Recordkeeping Requirements 134

Chapter 8—Special Conditions 137

8.1 General Types of Special Conditions 138
8.1.1 Special Studies and Additional Monitoring 138
8.1.2 Best Management Practices (BMPs) 141
8.1.3 Pollution Prevention 146
8.1.4 Compliance Schedules 148
8.2 Permit Conditions Addressing Storm Water Discharges Associated With Industrial Activities 149
8.3 Special Conditions for Municipal Facilities 151
8.3.1 The National Pretreatment Program 151
8.3.2 Municipal Sewage Sludge 156
8.3.3 Combined Sewer Overflows (CSOs) 159
8.3.4 Sanitary Sewer Overflows 164
8.3.5 Municipal Separate Storm Sewer Systems (MS4) 164

Chapter 9—Standard Conditions of NPDES Permits 167

9.1 Types of Standard Conditions 168
9.2 Other Standard Conditions 170

Chapter 10—Variances to Permit Requirements and Other Regulatory Considerations 171

10.1 Variances to Technology-Based Permit Requirements 171
10.1.1 Economic Variances 172
10.1.2 Variances Based on Localized Environmental Factors 173
10.1.3 Marine Discharge Variances 174
10.1.4 Fundamentally Different Factors Variances 175
10.1.5 Thermal Discharge Variances 175
10.1.6 Net Credits 176
10.2 Variances to Water Quality-Based Permit Requirements 176
10.2.1 Site-Specific Water Quality Criteria Modification 177
10.2.2 Designated Use Reclassification 177
10.2.3 Water Quality Standard Variance 177

10.3 Additional Programmatic Considerations and Requirements 178
10.3.1 Anti-Backsliding 178
10.3.2 Considerations for Other Federal Laws 185

Chapter 11—Administrative Process 191

11.1 Documentation For Development of the Draft Permit 192
11.1.1 Administrative Record 193
11.1.2 Fact Sheets and Statements of Basis 194
11.2 Items to Address Prior to Issuance of a Final Permit 197
11.2.1 Public Notice 198
11.2.2 Public Comments 199
11.2.3 Public Hearing 201
11.2.4 State/Tribal Roles in Reviewing Draft Permit 202
11.2.5 Schedule for Final Permit Issuance 203
11.3 Administrative Actions After Final Permit Issuance 203
11.3.1 Permit Appeals 204
11.3.2 Permit Modification, Revocation, Termination, and Transfer . . 206
11.3.3 Termination of Permits 208
11.3.4 Transfer of Permits 209

Chapter 12—Permit Compliance and Enforcement 211

12.1 Overview 211
12.2 Compliance Monitoring 212
12.2.1 Compliance Review 212
12.2.2 Compliance Inspections 213
12.3 Quarterly Noncompliance Reports 214
12.4 Enforcement 216
12.5 Public Participation 218
12.6 Compliance Assistance and Voluntary Compliance Policies 218

Appendix A Index to NPDES Regulations
Appendix B Effluent Guidelines and Standards
Appendix C List of SIC Codes
Appendix D How to Obtain Additional EPA Documents

List of Exhibits

		Page
EXHIBIT 1-1	Organization of the Clean Water Act	4
EXHIBIT 2-1	Federal NPDES Regulations (40 CFR Part 122)	9
EXHIBIT 2-2	Sources of Discharge to Waters of the United States	11
EXHIBIT 2-3	NPDES Program Areas and Applicable Regulations	12
EXHIBIT 3-1	NPDES Permit Components	24
EXHIBIT 3-2	Major Steps Involved in Developing and Issuing an Individual NPDES Permit	25
EXHIBIT 4-1	Applications Forms Required for NPDES Discharges	30
EXHIBIT 4-2	Permit Application Review	38
EXHIBIT 5-1	Statutory Deadlines for BPT, BAT, and BCT	53
EXHIBIT 5-2	Effluent Guidelines Flowchart	54
EXHIBIT 5-3	ELGs for Iron and Steel Manufacturing	57
EXHIBIT 5-4	OCPSF Effluent Limitations Guidelines	62
EXHIBIT 5-5	BPJ Permitting Tools	72
EXHIBIT 5-6	Secondary Treatment Standards	76
EXHIBIT 5-7	State-Specific ASRs	84
EXHIBIT 6-1	Components of an Integrated Approach to Water Quality-Based Toxics Control	95
EXHIBIT 6-2	Basic Mass Balance Water Quality Equation	102
EXHIBIT 6-3	Components of a TMDL	105
EXHIBIT 7-1	Examples of Specifying Sampling Locations in Permits	120
EXHIBIT 7-2	Compositing Methods	126
EXHIBIT 7-3	Estimated Costs for Common Analytical Procedures	128
EXHIBIT 7-4	Minimum Requirements for Sewage Sludge Monitoring, Based on Method of Sludge Use or Disposal	133
EXHIBIT 7-5	Discharge Monitoring Report (DMR)	135
EXHIBIT 8-1	Categories of CSO Permitting Conditions	162
EXHIBIT 8-2	Nine Minimum CSO Controls	163
EXHIBIT 8-3	Elements of the Long-Term CSO Control Plan	163

EXHIBIT 10-1 Anti-Backsliding Rules Relating to Water Quality-Based Effluent Limitations 181

EXHIBIT 11-1 NPDES Permitting Administrative Process 192
EXHIBIT 11-2 Elements of the Draft NPDES Permit Administrative Record 194
EXHIBIT 11-3 Elements of the Administrative Records for a Final Permit 195
EXHIBIT 11-4 Required Contents of a Fact Sheet 196
EXHIBIT 11-5 Actions That Must Receive Public Notice 198
EXHIBIT 11-6 Contents of the Public Notice 199
EXHIBIT 11-7 Conditions Requiring Major Modification 207
EXHIBIT 11-8 Conditions Requiring Minor Modification 208

List of Acronyms

Acronym	Full Phrase
ACR	Acute-to-Chronic Ratio
ANPRM	Advanced Notice of Proposed Rulemaking
ASR	Alternative State Requirement
ASTM	American Society for Testing and Materials
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
BOD_5	5-day BOD
BPJ	Best Professional Judgment
BPT	Best Practicable Control Technology Currently Available
CBOD	Carbonaceous BOD
CERCLA	Comprehensive Environmental Response, Compensation and Liabilities Act
CERI	Center for Environmental Research Information
CFR	Code of Federal Regulations
ChV	Chronic Value
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
DWO	Dry Weather Overflow
EIS	Environmental Impact Statement
ELG	Effluent Limitations Guidelines
EMMI	Environmental Monitoring Methods Index
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FDF	Fundamentally Different Factor
FR	*Federal Register*
FWS	Fish and Wildlife Service
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectroscopy
gpd	Gallons per Day
IC	Inhibition Concentration

I/I	Infiltration/Inflow
LA	Load Allocation
LC	Lethal Concentration
LC_{50}	Concentration at which 50% of test organisms die in a specified time period
LD_{50}	Dose at which 50% of test organisms die in a specific time period
LOEC	Lowest Observed Effect Concentration
LTA	Long Term Average
LTCP	Long Term Control Plan
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MEP	Maximum Extent Practicable
mg/l	Milligram per Liter
mgd	Million Gallons per Day
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMC	Nine Minimum Controls
NMFS	National Marine Fisheries Service
NOEC	No Observable Effect Concentration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NTIS	National Technical Information Service
O&M	Operations and Maintenance
PCS	Permit Compliance System
PL	Public Law
POTW	Publicly Owned Treatment Works
PPETS	Pretreatment Permits and Enforcement Tracking System
PPIC	Pollution Prevention Information Clearinghouse
PQL	Practical Quantification Limit
PSD	Prevention Significant Deterioration
PSES	Pretreatment Standards for Existing Sources
PSNS	Pretreatment Standards for New Sources
QA	Quality Assurance
QC	Quality Control
QNCR	Quarterly Noncompliance Report
RAPP	Refuse Act Permit Program
R&D	Research and Development
RCRA	Resource Conservation and Recovery Act
RNC	Reportable Noncompliance
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SNC	Significant Noncompliance
SPCC	Spill Prevention Control and Countermeasure Plan

SS	Suspended Solids
SSO	Sanitary Sewer Overflow
STORET	EPA Storage and Retrieval Database
TCLP	Toxicity Characteristic Leaching Procedure
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TMDL	Total Maximum Daily Load
TRC	Technical Review Criteria
TRE	Toxicity Reduction Evaluation
TRI	Toxic Release Inventory
TS	Total Solids
TSCA	Toxic Substances Control Act
TSD	Technical Support Document
TSDF	Treatment, Storage, and Disposal Facility
TSS	Total Suspended Solids
TTO	Total Toxic Organics
TUa	acute Toxic Units
TUc	chronic Toxic Units
TVS	Total Volatile Solids
TWTDS	Treatment Works Treating Domestic Sewage
USC	United States Code
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WET	Whole Effluent Toxicity
WLA	Waste Load Allocation
WQA	Water Quality Act of 1987
WQBEL	Water Quality-Based Effluent Limit(s)
WQS	Water Quality Standard(s)

Glossary of Terms

This glossary includes a collection of the terms used in this manual and an explanation of each term. To the extent that **definitions and explanations provided in this glossary differ from those in EPA regulations or other official documents**, they are intended for use in understanding this manual only.

- **401(a) Certification**—A requirement of Section 401(a) of the Clean Water Act that all federally issued permits be certified by the State in which the discharge occurs. The State certifies that the proposed permit will comply with State water quality standards and other State requirements.

- **Acute**—A stimulus severe enough to rapidly induce an effect; in aquatic toxicity tests, an effect observed in 96 hours or less is typically considered acute. When referring to aquatic toxicology or human health, an acute effect is not always measured in terms of lethality.

- **Anti-backsliding**—A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); CFR §122.44(l)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

- **Antidegradation**—Policies which ensure protection of water quality for a particular water body where the water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. This also includes special protection of waters designated as outstanding natural resource waters. Antidegradation plans are adopted by each State to minimize adverse effects on water.

- **Authorized Program or Authorized State**—A State, Territorial, Tribal, or interstate NPDES program which has been approved or authorized by EPA under 40 CFR Part 123.

- **Average Monthly Discharge Limitations**—The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during that month divided by the number of days on which monitoring was performed (except in the case of fecal coliform).

- **Average Weekly Discharge Limitation**—The highest allowable average of daily discharges over 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.

- **Best Available Technology Economically Achievable (BAT)**—Technology-based standard established by the Clean Water Act (CWA) as the most appropriate means available on a national basis for controlling the direct discharge of toxic and nonconventional pollutants to navigable waters. BAT effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable within an industrial point source category or subcategory.

- **Best Conventional Pollutant Control Technology (BCT)**—Technology-based standard for the discharge from existing industrial point sources of conventional pollutants including BOD, TSS, fecal coliform, pH, oil and grease. The BCT is established in light of a two-part "cost reasonableness" test which compares the cost for an industry to reduce its pollutant discharge with the cost to a POTW for similar levels of reduction of a pollutant loading. The second test examines the cost-effectiveness of additional industrial treatment beyond BPT. EPA must find limits which are reasonable under both tests before establishing them as BCT.

- **Best Management Practice (BMP)**—Permit condition used in place of or in conjunction with effluent limitations to prevent or control the discharge of pollutants. May include schedule of activities, prohibition of practices, maintenance procedure, or other management practice. BMPs may include, but are not limited to, treatment requirements, operating procedures, or practices to control plant site runoff, spillage, leaks, sludge or waste disposal, or drainage from raw material storage.

- **Best Practicable Control Technology Currently Available (BPT)**—The first level of technology-based standards established by the CWA to control pollutants discharged to waters of the U.S. BPT effluent limitations guidelines are generally based on the average of the best existing performance by plants within an industrial category or subcategory.

- **Best Professional Judgment (BPJ)**—The method used by permit writers to develop technology-based NPDES permit conditions on a case-by-case basis using all reasonably available and relevant data.

- **Bioassay**—A test used to evaluate the relative potency of a chemical or a mixture of chemicals by comparing its effect on a living organism with the effect of a standard preparation on the same type of organism.

- **Biochemical Oxygen Demand (BOD)**—A measurement of the amount of oxygen utilized by the decomposition of organic material, over a specified time period (usually 5 days) in a wastewater sample; it is used as a measurement of the readily decomposable organic content of a wastewater.

- **Bypass**—The intentional diversion of wastestreams from any portion of a treatment (or pretreatment) facility.

- **Categorical Industrial User (CIU)**—An industrial user subject to National categorical pretreatment standards.

- **Categorical Pretreatment Standards**—Limitations on pollutant discharges to publicly owned treatment works promulgated by EPA in accordance with Section 307 of the Clean Water Act that apply to specified process wastewaters of particular industrial categories [40 CFR §403.6 and Parts 405-471].

- **Chemical Oxygen Demand (COD)**—A measure of the oxygen-consuming capacity of inorganic and organic matter present in wastewater. COD is expressed as the amount of oxygen consumed in mg/l. Results do not necessarily correlate to the biochemical oxygen demand (BOD) because the chemical oxidant may react with substances that bacteria do not stabilize.

- **Chronic**—A stimulus that lingers or continues for a relatively long period of time, often one-tenth of the life span or more. Chronic should be considered a relative term depending on the life span of an organism. The measurement of a chronic effect can be reduced growth, reduced reproduction, etc., in addition to lethality.

- **Clean Water Act (CWA)**—The Clean Water Act is an act passed by the U.S. Congress to control water pollution. It was formerly referred to as the Federal Water Pollution Control Act of 1972 or Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), 33 U.S.C. 1251 et. seq., as amended by: Public Law 96-483; Public Law 97-117; Public Laws 95-217, 97-117, 97-440, and 100-04.

- **Code of Federal Regulations (CFR)**—A codification of the final rules published daily in the *Federal Register.* Title 40 of the CFR contains the environmental regulations.

- **Combined Sewer Overflow (CSO)**—A discharge of untreated wastewater from a combined sewer system at a point prior to the headworks of a publicly owned treatment works. CSOs generally occur during wet weather (rainfall or snowmelt). During periods of wet weather, these systems become overloaded, bypass treatment works, and discharge directly to receiving waters.

- **Combined Sewer System (CSS)**—A wastewater collection system which conveys sanitary wastewaters (domestic, commercial and industrial wastewaters) and storm water through a single pipe to a publicly owned treatment works for treatment prior to discharge to surface waters.

- **Compliance Schedule**—A schedule of remedial measures included in a permit or an enforcement order, including a sequence of interim requirements (for example, actions, operations, or milestone events) that lead to compliance with the CWA and regulations.

- **Composite Sample**—Sample composed of two or more discrete samples. The aggregate sample will reflect the average water quality covering the compositing or sample period.

- **Conventional Pollutants**—Pollutants typical of municipal sewage, and for which municipal secondary treatment plants are typically designed; defined by Federal Regulation [40 CFR §401.16] as BOD, TSS, fecal coliform bacteria, oil and grease, and pH.

- **Criteria**—The numeric values and the narrative standards that represent contaminant concentrations that are not to be exceeded in the receiving environmental media (surface water, ground water, sediment) to protect beneficial uses.

- **Daily Discharge**—The discharge of a pollutant measured during any 24-hour period that reasonably represents a calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged during the day. For pollutants with limitations expressed in other units of measurement (e.g., concentration) the daily discharge is calculated as the average measurement of the pollutant throughout the day (40 CFR §122.2).

- **Daily Maximum Limit**—The maximum allowable discharge of pollutant during a calendar day. Where daily maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where daily maximum limitations are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that day.

- **Development Document**—A report prepared during the development of an effluent limitation guideline by EPA that provides the data and methodology used to develop limitations guidelines and categorical pretreatment standards for an industrial category.

- **Director**—The Regional Administrator or State Director, as the context requires, or an authorized representative. When there is no approved State program, and there is an EPA administered program, Director means the Regional Administrator. When there is an approved State program, "Director" normally means the State Director.

- **Discharge Monitoring Report (DMR)**—The form used (including any subsequent additions, revisions, or modifications) to report self-monitoring results by NPDES permittees. DMRs must be used by approved States as well as by EPA.

- **Draft Permit**—A document prepared under 40 CFR §124.6 indicating the Director's tentative decision to issue, deny, modify, revoke and reissue, terminate, or reissue a permit. A notice of intent to terminate a permit, and a notice of intent to deny a permit application, as discussed in 40 CFR §124.5, are considered draft permits. A denial of a request for modification, revocation and reissuance, or termination, as discussed in 40 CFR §124.5, is not a draft permit.

- **Effluent Limitation**—Any restriction imposed by the Director on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into waters of the United States, the waters of the contiguous zone, or the ocean.

- **Effluent Limitations Guidelines (ELG)**—A regulation published by the Administrator under Section 304(b) of CWA that establishes national technology-based effluent requirements for a specific industrial category.

- **Fact Sheet**— A document that must be prepared for all draft individual permits for NPDES major dischargers, NPDES general permits, NPDES permits that contain variances, NPDES permits that contain sewage sludge land application plans and several other classes of permittees. The document summarizes the principal facts and the significant factual, legal, methodological and policy questions considered in preparing the draft permit and tells how the public may comment (40 CFR §124.8 and §124.56). Where a fact sheet is not required, a statement of basis must be prepared (40 CFR §124.7).

- **Fundamentally Different Factors (FDF)**—Those components of a petitioner's facility that are determined to be so unlike those components considered by EPA during the effluent limitation guideline and pretreatment standards rulemaking that the facility is worthy of a variance from the effluent limitations guidelines or categorical pretreatment standards.

- **General Permit**—An NPDES permit issued under 40 CFR §122.28 that authorizes a category of discharges under the CWA within a geographical

area. A general permit is not specifically tailored for an individual discharger.

- **Grab Sample**—A sample which is taken from a wastestream on a one-time basis without consideration of the flow rate of the wastestream and without consideration of time.

- **Hazardous Substance**—Any substance, other than oil, which, when discharged in any quantities into waters of the U.S., presents an imminent and substantial danger to the public health or welfare, including but not limited to fish, shellfish, wildlife, shorelines and beaches (Section 311 of the CWA); identified by EPA as the pollutants listed under 40 CFR Part 116.

- **Indirect Discharge**—The introduction of pollutants into a municipal sewage treatment system from any nondomestic source (i.e., any industrial or commercial facility) regulated under Section 307(b), (c), or (d) of the CWA.

- **Instantaneous Maximum Limit**—The maximum allowable concentration of a pollutant determined from the analysis of any discrete or composite sample collected, independent of the flow rate and the duration of the sampling event.

- **Local Limits**—Conditional discharge limits imposed by municipalities upon industrial or commercial facilities that discharge to the municipal sewage treatment system.

- **Major Facility**—Any NPDES facility or activity classified as such by the Regional Administrator, or in the case of approved State programs, the Regional Administrator in conjunction with the State Director. Major municipal dischargers include all facilities with design flows of greater than one million gallons per day and facilities with EPA/State approved industrial pretreatment programs. Major industrial facilities are determined based on specific ratings criteria developed by EPA/State.

- **Mass-Based Standard**—A discharge limit that is measured in a mass unit such as pounds per day.

- **Method Detection Limit (MDL)**-Defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

- **Million Gallons per Day (mgd)**—A unit of flow commonly used for wastewater discharges. One mgd is equivalent to 1.547 cubic feet per second.

- **Mixing Zone**—An area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient water body. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented.

- **Municipal Separate Storm Sewer System (MS4)**—A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) owned by a State, city, town or other public body, that is designed or used for collecting or conveying storm water, which is not a combined sewer, and which is not part of a publicly owned treatment works. Commonly referred to as an "MS4" [40 CFR §122.26(b)(8)].

- **National Pollutant Discharge Elimination System (NPDES)**—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 CWA.

- **National Pretreatment Standard or Pretreatment Standard**—Any regulation promulgated by the EPA in accordance with Sections 307(b) and (c) of the CWA that applies to a specific category of industrial users and provides limitations on the introduction of pollutants into publicly owned treatment works. This term includes the prohibited discharge standards under 40 CFR §403.5, including local limits [40 CFR §403.3(j)].

- **New Discharger**—Any building, structure, facility, or installation:

  a. From which there is or may be a discharge of pollutants;

  b. That did not commence the discharge of pollutants at that particular site prior to August 13, 1979;

  c. Which is not a new source; and

  d. Which has never received a finally effective NPDES permit for discharges at that site.

- **New Source**—Any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced:

  a. After promulgation of standards of performance under Section 306 of the CWA which are applicable to such source; or

b. After proposal of standards of performance in accordance with Section 306 of the CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 of the CWA within 120 days of their proposal.

c. Except as otherwise provided in an applicable new source performance standard, a source is a new source if it meets the definition in 40 CFR §122.2; and

   i. It is constructed at a site at which no other source is located; or

   ii. It totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or

   iii. Its processes are substantially independent of an existing source at the same site. In determining whether these processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source.

- **New Source Performance Standards (NSPS)**—Technology-based standards for facilities that qualify as new sources under 40 CFR §122.2 and 40 CFR §122.29. Standards consider that the new source facility has an opportunity to design operations to more effectively control pollutant discharges.

- **Nonconventional Pollutants**—All pollutants that are not included in the list of conventional or toxic pollutants in 40 CFR Part 401. Includes pollutants such as chemical oxygen demand (COD), total organic carbon (TOC), nitrogen, and phosphorus.

- **pH**—A measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration in mg/l. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.

- **Point Source**—Any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fixture, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged.

- **Pollutant**—Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

- **Pollutant, Conservative**—Pollutants that do not readily degrade in the environment, and which are mitigated primarily by natural stream dilution after entering receiving bodies of waters. Included are pollutants such as metals.

- **Pollutant, Non-Conservative**—Pollutants that are mitigated by natural biodegradation or other environmental decay or removal processes in the receiving stream after in-stream mixing and dilution have occurred.

- **Practical Quantification Limit (PQL)**—The lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

- **Pretreatment**—The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a publicly owned treatment works [40 CFR §403.3(q)].

- **Primary Industry Categories**—Any industry category listed in the Natural Resources Defense Council (NRDC) settlement agreement [(*NRDC et al. v. Train*, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D.D.C. 1979)] for which EPA has or will develop effluent guidelines; also listed in Appendix A of 40 CFR Part 122.

- **Primary Treatment**—The practice of removing some portion of the suspended solids and organic matter in a wastewater through sedimentation. Common usage of this term also includes preliminary treatment to remove wastewater constituents that may cause maintenance or operational problems in the system (i.e., grit removal, screening for rags and debris, oil and grease removal, etc.).

- **Priority Pollutants**—Those pollutants considered to be of principal importance for control under the CWA based on the NRDC consent decree settlement [(*NRDC et al. v. Train*, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D.D.C. 1979)]; a list of these pollutants is provided as Appendix A to 40 CFR Part 423.

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

- **Production-Based Standard**—A discharge standard expressed in terms of pollutant mass allowed in a discharge per unit of product manufactured.

- **Proposed Permit**—A State NPDES permit prepared after the close of the public comment period (and when applicable, any public hearing and administrative appeals) which is sent to EPA for review before final issuance by the State.

- **Publicly Owned Treatment Works (POTW)**—A treatment works, as defined by Section 212 of the CWA, that is owned by the State or municipality. This definition includes any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW treatment plant [40 CFR §403.3].

- **Sanitary Sewer**—A pipe or conduit (sewer) intended to carry wastewater or water-borne wastes from homes, businesses, and industries to the POTW.

- **Sanitary Sewer Overflows (SSO)**—Untreated or partially treated sewage overflows from a sanitary sewer collection system.

- **Secondary Industry Category**—Any industry category which is not a primary industry category.

- **Secondary Treatment**—Technology-based requirements for direct discharging municipal sewage treatment facilities. Standard is based on a combination of physical and biological processes typical for the treatment of pollutants in municipal sewage. Standards are expressed as a minimum level of effluent quality in terms of: BOD_5, suspended solids (SS), and pH (except as provided for special considerations and treatment equivalent to secondary treatment).

- **Self-Monitoring**—Sampling and analyses performed by a facility to determine compliance with a permit or other regulatory requirements.

- **Spill Prevention Control and Countermeasure Plan (SPCC)**—A plan prepared by a facility to minimize the likelihood of a spill and to expedite control and cleanup activities should a spill occur.

- **Significant Industrial User (SIU)**—An indirect discharger that is the focus of control efforts under the national pretreatment program; includes all indirect dischargers subject to national categorical pretreatment standards, and all other indirect dischargers that contribute 25,000 gpd or more of process wastewater, or which make up five percent or more of the hydraulic or organic loading to the municipal treatment plant, subject to certain exceptions [40 CFR §403.3(t)].

- **Standard Industrial Classification (SIC) Code**—A code number system used to identify various types of industries. The code numbers are published by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. A particular industry may have more than one SIC code if it conducts several types of commercial or manufacturing activities onsite.

- **Statement of Basis**—A document prepared for every draft NPDES permit for which a fact sheet is not required. A statement of basis briefly describes how permit conditions were derived and the reasons the conditions are necessary for the permit [40 CFR §124.7].

- **STORET**—EPA's computerized STOrage and RETrieval water quality data base that includes physical, chemical, and biological data measured in waterbodies throughout the United States.

- **Storm Water**—Storm water runoff, snow melt runoff, and surface runoff and drainage [40 CFR §122.26(b)(13)].

- **Technology-Based Effluent Limit**—A permit limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration.

- **Tiered Permit Limits**—Permit limits that only apply to the discharge when a certain threshold (e.g., production level), specific circumstance (e.g., batch discharge), or timeframe (e.g., after 6 months) triggers their use.

- **Tiered Testing**—Any of a series of tests that are conducted as a result of a previous test's findings.

- **Total Maximum Daily Load (TMDL)**—The amount of pollutant, or property of a pollutant, from point, nonpoint, and natural background sources, that may be discharged to a water quality-limited receiving water. Any pollutant loading above the TMDL results in violation of applicable water quality standards.

- **Total Organic Carbon (TOC)**—Measures the amount of organic carbon in water.

- **Total Suspended Solids (TSS)**—A measure of the filterable solids present in a sample, as determined by the method specified in 40 CFR Part 136.

- **Toxic Pollutant**—Pollutants or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring. Toxic pollutants also include those pollutants listed by the Administrator under CWA Section 307(a)(1) or any pollutant listed under Section 405(d) which relates to sludge management.

- **Toxicity Reduction Evaluation (TRE)**—A site-specific study conducted in a stepwise process designed to identify the causative agent(s) of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

- **Toxicity Test**—A procedure to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of effect on exposed test organisms of a specific chemical or effluent.

- **Treatability Manual**—Five-set library of EPA guidance manuals that contain information related to the treatability of many pollutants. This manual can be used in developing NPDES permit limitations for facilities and/or pollutants which, at the time of permit issuance, are not subject to industry-specific effluent guidelines. The five volumes that comprise this series include: *Vol. I - Treatability Data* (EPA-600/8-80-042a); *Vol. II - Industrial Descriptions* (EPA-600/8-80-042b); *Vol. III - Technologies* (EPA-600/8-80-042c); *Vol. IV - Cost Estimating* (EPA-600/8-80-042d); *Vol. V - Summary* (EPA-600/8-80-042e).

- **TSD**—Abbreviation for the *Technical Support Document Water Quality-based Toxics Control* (EPA-505/2-90-001), EPA Office of Water Enforcement and Permits, 1991. It contains procedures for water quality-based limitation development.

- **TWTDS**—Abbreviation for *Treatment Works Treating Domestic Sewage.* Includes all POTWs and other facilities that treat domestic wastewater, and facilities that do not treat domestic wastewater, but that treat or dispose of sewage sludge.

- **Upset**—An exceptional incident in which there is unintentional and temporary noncompliance with the permit limit 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.

- **Variance**—Any mechanism or provision under Sections 301 or 316 of the CWA or under 40 CFR Part 125, or in the applicable "effluent limitations guidelines" which allows modification to or waiver of the generally applicable effluent limitations requirements or time deadlines of the CWA. This includes provisions which allow the establishment of alternative limitations based on fundamentally different factors.

- **Wastesload Allocation (WLA)**—The proportion of a receiving water's total maximum daily load that is allocated to one of its existing or future point sources of pollution.

- **Water Quality-Based Effluent Limit (WQBEL)**—A value determined by selecting the most stringent of the effluent limits calculated using all applicable water quality criteria (e.g., aquatic life, human health, and wildlife) for a specific point source to a specific receiving water for a given pollutant.

- **Water Quality Criteria**—Comprised of numeric and narrative criteria. Numeric criteria are scientifically derived ambient concentrations developed by EPA or States for various pollutants of concern to protect human health and aquatic life. Narrative criteria are statements that describe the desired water quality goal.

- **Water Quality Standard (WQS)**—A law or regulation that consists of the beneficial use or uses of a waterbody, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular waterbody, and an antidegradation statement.

- **Waters of the United States**—All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters subject to the ebb and flow of the tide. Waters of the United States include but are not limited to all interstate waters and intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, play lakes, or natural ponds. [See 40 CFR §122.2 for the complete definition.]

- **Whole Effluent Toxicity (WET)**—The total toxic effect of an effluent measured directly with a toxicity test.

Chapter 1

Introduction

The purpose of this manual is to provide the basic regulatory framework and technical considerations that support the development of wastewater discharge permits as required under the National Pollutant Discharge Elimination System (NPDES) Program. It is designed for new permit writers, but may also serve as a reference for experienced permit writers. In addition, the manual will serve as a useful source of information for anyone interested in learning about the legal process and technical aspects of developing NPDES permits. This manual updates the *Training Manual for NPDES Permit Writers.*[1]

It is recognized that each United States Environmental Protection Agency (EPA) Regional office or approved State will have NPDES permitting procedures adapted to address local situations. Therefore, it is the objective of this manual to explain the minimum national NPDES Program elements common to any State or Regional office that issues NPDES permits. The specific objectives and functions of this training manual are to:

- Provide an overview of the scope and regulatory framework of the NPDES Program

[1]USEPA (1993). *Training Manual for NPDES Permit Writers.* EPA/B-93-003. Office of Wastewater Management.

- Describe the components of a permit and provide an overview of the permitting process
- Describe the different types of effluent limits and the legal and technical considerations involved in limit development
- Describe other permit conditions including:
  - special conditions
  - standard conditions
  - monitoring and reporting requirements
- Describe other permitting considerations including:
  - variances
  - anti-backsliding
  - other applicable statutes (e.g., National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act)
- Explain the administrative process for issuing, modifying, revoking and terminating NPDES permits.

This manual is not intended to be a stand-alone reference document. Instead, it is intended to establish the framework for NPDES permit development and should be supplemented, where necessary, by additional EPA and State guidance applicable to specific types of dischargers and circumstances. To this end, the *NPDES Permit Writers' Manual* identifies and references other guidance documents throughout the text and provides information on how these documents can be obtained. **Appendix D** of this manual provides the reader with detailed information on how to obtain comprehensive lists of available EPA publications and how these documents can be ordered.

1.1 History and Evolution of the NPDES Program

The NPDES Program has evolved from numerous legislative initiatives dating back to the mid-1960s. In 1965, Congress enacted legislation requiring States to develop water quality standards for all interstate waters by 1967. However, despite increasing public concern and increased Federal spending, only about 50 percent of the States had established water quality standards by 1971. Enforcement of the Federal legislation was minimal because the burden of proof lay with the regulatory agencies in demonstrating that a water quality problem had implications for human health or violated water quality standards. Specifically, the agencies had to demonstrate a direct link between a discharger and a water quality problem in order to enforce against a discharger. The lack of success in developing adequate water

quality standards programs, combined with ineffective enforcement of Federal water pollution legislation prompted the Federal government to advance the 1970 Refuse Act Permit Program (RAPP), under the Rivers and Harbors Act of 1899, as a vehicle to control water pollution.

RAPP required any facility that discharged wastes into public waterways to obtain a Federal permit specifying abatement requirements from the United States Army Corps of Engineers. The Administrator of EPA endorsed the joint program with the Corps of Engineers, and on December 23, 1970, the permit program was mandated through Presidential Order. EPA and the Corps of Engineers rapidly began to prepare the administrative and technical basis for the permit program. However, in December 1971, RAPP was struck down by a decision of the Federal District Court in Ohio (*Kalur v. Resor*), which held that the issuance of a permit for an individual facility could require the preparation of an environmental impact statement under the National Environmental Policy Act (NEPA) of 1969. The concept of a permit program survived, however, and, in November 1972, Congress passed a comprehensive recodification and revision of Federal water pollution control law, known as the Federal Water Pollution Control Act amendments of 1972. These amendments included the NPDES permit program as the centerpiece of the efforts for national water pollution control.

The enactment of the 1972 amendments marked a distinct change in the philosophy of water pollution control in the United States. The amendments maintained the water quality-based controls, but added an equal emphasis on a technology-based, or end-of-pipe, control strategy. The 1972 Act established a series of goals or policies in Section 101 that illustrated Congressional intent. Perhaps the most notable was the goal that the discharge of pollutants into navigable waters be eliminated by 1985. This goal was not realized, but remains a principle for establishing permit requirements. The Act had an interim goal to achieve "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water" by July 1, 1983. This is more commonly known as the "fishable, swimmable" goal. The Act also contained four important principles:

- The discharge of pollutants to navigable waters is not a right.
- A discharge permit is required to use public resources for waste disposal and limits the amount of pollutants that may be discharged.

- Wastewater must be treated with the best treatment technology economically achievable—regardless of the condition of the receiving water.
- Effluent limits must be based on treatment technology performance, but more stringent limits may be imposed if the technology-based limits do not prevent violations of water quality standards in the receiving water.

More specifically, Title IV of the Act created a system for permitting wastewater discharges (Section 402), known as the National Pollutant Discharge Elimination System (NPDES), with the objective to implement the goals and objectives of the Act. An outline of the Titles contained in the Act is provided as **Exhibit 1-1**.

EXHIBIT 1-1
Organization of the Clean Water Act

Title I – Research and Related Programs

Title II – Grants for Construction of Treatment Works

Title III – Standards and Enforcement

- Section 301 Effluent Limitations
- Section 302 Water Quality-Related Effluent Limitations
- Section 303 Water Quality Standards and Implementation Plans
- Section 304 Information and Guidelines [Effluent]
- Section 305 Water Quality Inventory
- Section 307 Toxic and Pretreatment Effluent Standards.

Title IV – Permits and Licenses

- Section 402 National Pollutant Discharge Elimination System (NPDES)
- Section 405 Disposal of Sewage Sludge.

Title V – General Provisions

- Section 502 Definitions
- Section 510 State Authority
- Section 518 Indian Tribes.

Title VI – State Water Pollution Control Revolving Funds

The first round of NPDES permits issued between 1972 and 1976 provided for control of a number of traditionally regulated pollutants, but focused on 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), pH, oil and grease, and some metals, by requiring the use of the Best Practicable Control Technology currently available (BPT). The Act established a July 1, 1977, deadline for all facilities to be in compliance with BPT. Additionally, the Act established the compliance deadline for installing Best Available Technology Economically Achievable (BAT) as July 1, 1983. Most of the major permits issued to industrial facilities in the first round of NPDES permitting contained effluent limitations based on Best Professional Judgment (BPJ) because regulations prescribing nationally uniform, technology-based effluent limitations were generally unavailable. The second round of permitting in the late 1970s and early 1980s began to emphasize the control of toxics, but, due to a lack of information on treatability, failed to complete the task.

EPA's failure to develop adequate controls for toxic discharges under the 1972 Act prompted the Natural Resources Defense Council (NRDC) to sue EPA. [NRDC v. Train, 8 E.R.C. 2120 (D.D.C. 1976)]. The suit was settled through a court supervised "consent decree" in 1976. The consent decree identified (1) the "priority" pollutants to be controlled; (2) the "primary industries" for technology-based control; and (3) the methods for regulating toxic discharges through the authorities of the 1972 Act. The provisions of the consent decree were incorporated into the framework of the 1977 amendments of the Act, and resulted in the Act's refocus toward toxics control.

The 1977 amendments to the legislation, known formally as the Clean Water Act (CWA) of 1977, shifted emphasis from controlling conventional pollutants to controlling toxic discharges. This era of toxic pollutant control is referred to as the second round of permitting. The concept of BAT controls was clarified and expanded to include toxic pollutants. Hence, the compliance deadline for BAT was extended to July 1, 1984. The conventional pollutants (BOD_5, TSS, pH, fecal coliform, and oil and grease) controlled by BPT in the first round of permitting were now subject to a new level of control, termed Best Conventional Pollutant Control Technology (BCT). The compliance deadline for meeting BCT was also July 1, 1984.

On February 4, 1987, Congress amended the CWA with the Water Quality Act (WQA) of 1987. The amendments outlined a strategy to accomplish the goal of

meeting water quality standards set by the States. The WQA required all States to identify waters that were not expected to meet water quality standards after technology-based controls on point sources have been imposed. The State must then prepare an individual control strategy to reduce toxics from point and nonpoint sources in order to meet the water quality standards. Among other measures, these plans were expected to address control of pollutants beyond technology-based levels.

The WQA once again extended the time to meet BAT and BCT effluent limitations. The new compliance deadline was no later than March 31, 1989. The WQA also established new schedules for industrial and municipal storm water discharges to be regulated by NPDES permits. Industrial storm water discharges must meet the equivalent of BCT/BAT effluent quality. Discharges from municipal separate storm sewer systems (MS4) required controls to reduce the discharge of pollutants to the maximum extent practicable (MEP). Additionally, the WQA required EPA to identify toxics in sewage sludge and establish numerical limits to control these pollutants. The WQA also established a statutory anti-backsliding requirement that would not allow an existing permit to be modified or reissued with less stringent effluent limitations, standards, or conditions than those already imposed. There were a few exceptions for technology-based limits, but in no case could the limits be less stringent than existing effluent guidelines (unless a variance has been granted) or violate water quality standards.

Chapter 2

Regulatory Framework and Scope of the NPDES Program

This chapter provides a discussion of the regulatory framework of the NPDES Program, identifies the types of activities regulated under the NPDES Program, and discusses the program areas that address the various types of regulated activities.

2.1 Regulatory Framework of the NPDES Program

Chapter 1 discussed how Congress, in Section 402 of the CWA, required EPA to develop and implement the NPDES permit program. While Congress' intent was established in the CWA, EPA had to develop specific regulations to carry out the congressional mandate. The primary regulations developed by EPA to implement and administer the NPDES Program are found in Title 40 of the *Code of Federal Regulations* (CFR) Part 122.

The CFR is a set of documents listing all regulations issued by every United States government agency. The CFR is published by the National Archives and Records Service of the General Services Administration. The CFR is updated annually based on the regulations published daily in the *Federal Register* (*FR*).

The *FR* is the vehicle by which EPA and other branches of the Federal government provide notice of, propose, and promulgate regulations. Although all of the regulations can be found in the CFR, the background and implementation information related to these regulations can be found in the preamble to the regulations contained in the *FR*. This information is important to the permit writer because it explains the regulatory basis upon which permitting decisions are made.

An outline of the Federal NPDES regulations (40 CFR Part 122) is provided in **Exhibit 2-1**. Other parts of 40 CFR that are related to the NPDES Program include:

- 40 CFR Part 123 (State program requirements)
- 40 CFR Part 124 (procedures for decision making)
- 40 CFR Part 125 (technology-based standards)
- 40 CFR Part 129 (toxic pollutant standards)
- 40 CFR Part 130 (water quality management plans)
- 40 CFR Part 131 (water quality-based standards)
- 40 CFR Part 133 (sewage secondary treatment regulations)
- 40 CFR Part 135 (citizen suits)
- 40 CFR Part 136 (analytical procedures)
- 40 CFR Part 257 (State sludge disposal regulations)
- 40 CFR Part 401 (general effluent guidelines provisions)
- 40 CFR Part 403 (general pretreatment regulations)
- 40 CFR Parts 405-471 (effluent limitations guidelines)
- 40 CFR Part 501 (State sludge permitting requirements)
- 40 CFR Part 503 (sewage sludge disposal standards).

An index to the NPDES regulations is provided in **Appendix A**. This index groups the regulatory requirements by subject area to provide the permit writer easier access to specific provisions.

2.2 Scope of the NPDES Program

Under the NPDES Program, all facilities which discharge pollutants from any point source into waters of the United States are required to obtain a NPDES permit. Understanding how each of the key terms ("pollutant," "point source," and "waters of

EXHIBIT 2-1
Federal NPDES Regulations (40 CFR Part 122)

Subpart A - Definitions and General Program Requirements

122.1 Purpose and Scope of NPDES Program
122.2 Definitions
122.3 Exclusions
122.4 Prohibitions
122.5 Effect of a Permit
122.6 Continuation of Expired Permits
122.7 Confidentiality of Information

Subpart B - Permit Application and Special NPDES Program Requirements

122.21 Applications
122.22 Signatures Requirements for Applications
122.23 Animal Feeding Operations
122.24 Aquatic Animal Production
122.25 Aquaculture
122.26 Storm Water Discharges
122.27 Silviculture
122.28 General Permits
122.29 New Sources and New Discharges

Subpart C - Permit Conditions

122.41 Standard Conditions
122.42 Standard Conditions Applicable to Specified Categories
122.43 Permit Conditions
122.44 Permit Limitations

(a) Technology Basis
(b) Other Basis (not WQ)
(c) Reopeners
(d) Water Quality Basis
(e) Priority Pollutants
(f) Notification Levels
(g) 24 Hour Reporting
(h) Duration of Permits
(i) Monitoring
(j) Pretreatment Program
(k) Best Management Practices
(l) Anti-Backsliding
(m) Private Treatment Works
(n) Grants
(o) Sludge
(p) Coast Guard
(q) Navigation

122.45 Calculating Limitations

(a) Discharge Points
(b) Production Basis
(c) Metals
(d) Continuous Discharges
(e) Non-continuous Discharges
(f) Mass Based Limits
(g) Intake Water Pollutants
(h) Internal Waste Streams
(i) Discharge into Wells

122.46 Duration of Permits
122.47 Schedules of Compliance
122.48 Reporting
122.49 Consideration of Other Federal Laws
122.50 Disposal to Other Points

Subpart D - Transfer, Modification, Revocation and Reissuance, and Termination of Permit

122.61 Transfer of Permits
122.62 Modification or Revocation and Reissuance of Permits
122.63 Minor Modifications of Permits
122.64 Termination of Permits

the United States") have been defined and interpreted by the regulations is the key to defining the scope of the NPDES Program.

Pollutant

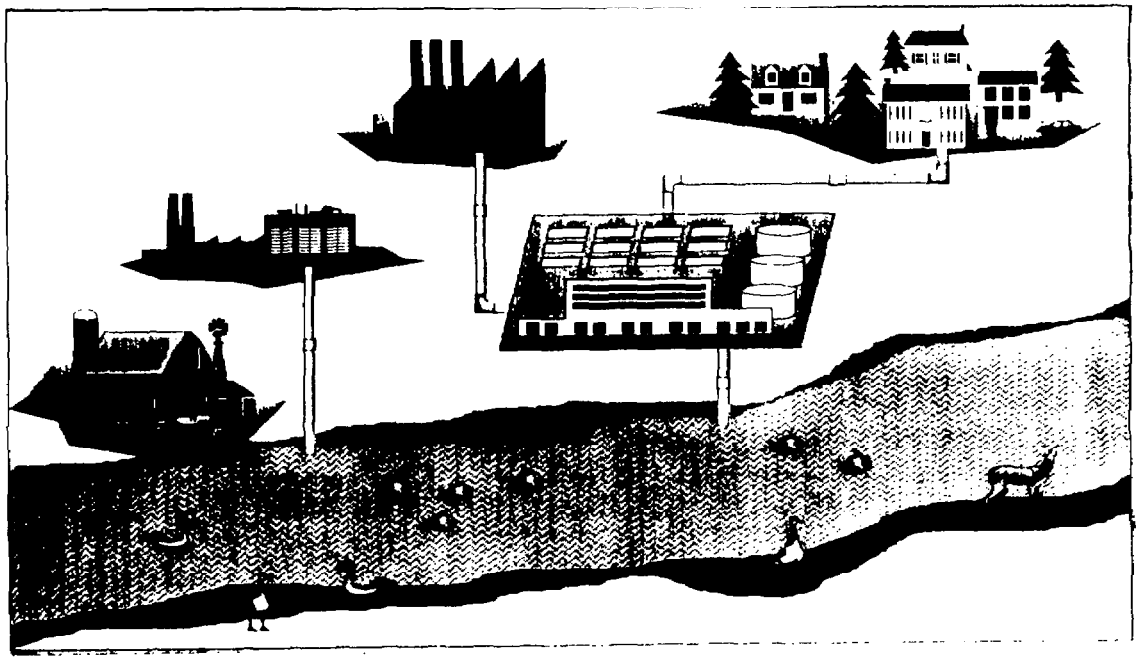
The term "pollutant" is defined very broadly by the NPDES regulations and includes any type of industrial, municipal, and agricultural waste discharged into water (see glossary). For regulatory purposes, pollutants have been grouped into three general categories under the NPDES Program: conventional, toxic, and nonconventional. By definition, there are five conventional pollutants: 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform, pH, and oil and grease. Toxic or "priority" pollutants are those defined in Section 307(a)(1) of the CWA (and listed in 40 CFR §401.15) and include metals and manmade organic compounds. Nonconventional pollutants are those which do not fall under either of the above categories and include such parameters as ammonia, nitrogen, phosphorus, chemical oxygen demand (COD), and whole effluent toxicity (WET).

Point Source

Pollutants can enter waters of the United States from a variety of pathways including agricultural, domestic and industrial sources (see **Exhibit 2-2**). For regulatory purposes these sources are generally categorized as either "point sources" or "non-point sources." Typical point source discharges include discharges from publicly owned treatment works (POTWs), industrial facilities, and discharges associated with urban runoff. While provisions of the NPDES Program do address certain specific types of agricultural activities (i.e., concentrated animal feeding operations), the majority of agricultural facilities are defined as non-point sources and are exempt from NPDES regulation.

Pollutant contributions to waters of the United States may come from both "direct" and "indirect" sources. "Direct" sources discharge wastewater directly into the receiving waterbody, whereas "indirect" sources discharge wastewater to a POTW, which in turn discharges into the receiving waterbody. Under the national program, NPDES permits are issued only to direct point source discharges. Industrial and commercial indirect dischargers are controlled by the national pretreatment program (see Section 8.3.1).

EXHIBIT 2-2
Sources of Discharge to Waters of the United States



As indicated above, the primary focus of the NPDES permitting program is municipal and non-municipal (industrial) direct dischargers. Within these major categories of dischargers, however, there are a number of more specific types of discharges that are regulated under the NPDES Program. **Exhibit 2-3** provides an overview of the scope of the NPDES Program and identifies the program areas that control various categories of wastewater discharges.

Municipalities (e.g., POTWs receive primarily domestic sewage from residential and commercial customers. Larger POTWs will also typically receive and treat wastewater from industrial facilities (indirect dischargers) connected to the POTW sewerage system. The types of pollutants treated by a POTW, therefore, will always include conventional pollutants (BOD_5, TSS, pH, oil and grease, fecal coliform), and will include nonconventional and toxic pollutants depending on the unique characteristics of the commercial and industrial sources discharging to the POTW. The treatment typically provided by POTWs includes physical separation and settling (e.g., screening, grit removal, primary settling), biological treatment (e.g., trickling filters, activated sludge), and disinfection (e.g., chlorination, UV, ozone). These processes produce the treated effluent and a biosolids (sludge) residual. An additional

EXHIBIT 2-3
NPDES Program Areas and Applicable Regulations

Source	Activity	[illegible]	[illegible] Regulations
Municipal	Municipal Effluent Discharge	NPDES Point Source Control Program	40 CFR 122 40 CFR 125 40 CFR 133
	Indirect Industrial/ Commercial Discharges	Pretreatment Program	40 CFR 122 40 CFR 403 40 CFR 405-499
	Municipal Sludge Use and Disposal	Municipal Sewage Sludge Program	40 CFR 122 40 CFR 257 40 CFR 501 40 CFR 503
	Combined Sewer Overflow (CSO) Discharges	CSO Control Program	40 CFR 122 40 CFR 125
	Storm Water Discharges (Municipal)	Storm Water Program	40 CFR 122 40 CFR 125
Industrial	Process Wastewater Discharges	NPDES Point Source Control Program	40 CFR 122 40 CFR 125 40 CFR 405-499
	Non-process Wastewater Discharges	NPDES Point Source Control Program	40 CFR 122 40 CFR 125
	Storm Water Discharges (Industrial)	Storm Water Program	40 CFR 122 40 CFR 125

concern to some older POTWs are "combined sewer" systems (i.e., sewerage systems that are designed to collect both sanitary sewage and storm water). Exhibit 2-3 illustrates how the NPDES Program is structured to control all of the various types of pollutant sources and wastestreams that contribute to municipal point sources.

Non-municipal sources, which include industrial and commercial facilities, are unique with respect to the products and processes present at the facility. Unlike municipal sources, the types of raw materials, production processes, treatment technologies utilized, and pollutants discharged at industrial facilities vary widely and are dependent on the type of industry and specific facility characteristics. The

operations, however, are generally carried out within a more clearly defined plant area; thus, collection system considerations are generally much less complex than for POTWs. In addition, residuals (sludge) generated by industrial facilities are not currently regulated by the NPDES Program. Industrial facilities may have discharges of storm water that may be contaminated through contact with manufacturing activities, or raw material and product storage. Industrial facilities may also have non-process wastewater discharges such as non-contact cooling water. As illustrated in Exhibit 2-3, the NPDES Program addresses each of these potential wastewater sources for industrial facilities.

Waters of the United States

The term "waters of the United States," has been defined by EPA to include:

- Navigable waters
- Tributaries of navigable waters
- Interstate waters
- Intrastate lakes, rivers, and streams:
  - Used by interstate travelers for recreation and other purposes; or
  - Which are the source of fish or shellfish sold in interstate commerce; or
  - Which are utilized for industrial purposes by industries engaged in interstate commerce.

The intent of this definition is to cover all possible waters within Federal jurisdiction under the framework of the Constitution (i.e., Federal versus State authorities). The definition has been interpreted to include virtually all surface waters in the United States, including wetlands and ephemeral streams. As a general matter, groundwater is not considered a waters of the United States. Therefore discharges to groundwater are not subject to NPDES requirements. If, on the other hand, there is a discharge to groundwater that results in a "hydrological connection" to a nearby surface water, the Director may require the discharger to apply for an NPDES permit. [Note: Because States maintain jurisdiction over groundwater resources, they may choose to require NPDES permits for discharges to groundwater.]

2.3 NPDES Program Areas

As indicated in Exhibit 2-3, the national NPDES Program includes provisions that address several different types of discharges from municipal and industrial sources. This section provides a brief description of how the NPDES Program addresses each of these program areas.

2.3.1 NPDES Program Areas Applicable to Municipal Sources

The NPDES permitting program focuses on the development of effluent limits and conditions for the discharge of treated effluent. The NPDES Program, however, also incorporates other control measures to address certain types and categories of discharges that may be present at some municipal facilities. A description of these control measures, and a discussion of how they are incorporated into the permitting process is provided below.

National Pretreatment Program

The national pretreatment program regulates the discharges of wastewater from non-domestic (i.e., industrial and commercial) facilities that discharge to POTWs (i.e., "indirect" discharges). The pretreatment program requires industrial and commercial indirect dischargers to "pretreat" their wastes, as necessary, prior to discharge to POTWs, to prevent interference or upset to the operation of the POTW. The Federal program also requires many indirect dischargers to meet technology-based requirements similar to those for direct dischargers. The pretreatment program is generally implemented directly by the POTW receiving indirect discharges, under authority granted through the NPDES permit. The Federal regulations specifying which POTWs must have pretreatment programs, and the authorities and procedures that must be developed by the POTW prior to program approval are found in 40 CFR Part 403. The implementation of a local pretreatment program is typically included as a special condition in NPDES permits issued to POTWs. The incorporation of pretreatment special conditions is discussed in Chapter 8.

Municipal Sewage Sludge Program

Section 405 of the CWA requires that all NPDES permits issued to POTWs and other Treatment Works Treating Domestic Sewage (TWTDS) contain conditions

implementing 40 CFR Part 503 Standards for the Use and Disposal of Sewage Sludge. Thus, POTWs and other TWTDS must submit permit applications for their sludge use or disposal practices. TWTDS include sewage sludge incinerators, sewage sludge surface disposal sites, and facilities that do not discharge to waters of the United States (sludge-only facilities such as sludge composting facilities that treat sewage sludge).

The permitting regulations can be found at 40 CFR Part 122 for the Federal program. Regulations for State program approval are found at 40 CFR Parts 123 or 501 (depending on whether the State wishes to administer the sewage sludge program under its NPDES Program or under another program, e.g., a solid waste program). The technical regulations governing sewage sludge use and disposal are contained in 40 CFR Part 503. Where applicable, sludge management requirements are included as a special condition in permits issued to POTWs. The incorporation of special conditions that address sludge requirements is discussed in Chapter 8.

Combined Sewer Overflows

Combined sewer systems (CSS) are wastewater collection systems designed to carry sanitary wastewaters (commercial and industrial wastewaters) and storm water through a single conduit to a POTW. As of 1995, CSSs serve about 43 million people in approximately 1,100 communities nationwide. During dry weather, CSSs collect and convey domestic, commercial, and industrial wastewater to a POTW; however, during periods of rainfall or snowmelt, these systems can become overloaded. When this occurs, the CSS overflows at designed relief points, discharging a combination of untreated sanitary wastewaters and storm water directly to a surface water body. These overflows, called combined sewer overflows (CSOs), can be a major source of water pollution in communities served by CSSs. CSOs often contain high levels of suspended solids (SS), pathogenic microorganisms, toxic pollutants, floatables, nutrients, and other pollutants, causing exceedances of water quality standards.

To address CSOs, EPA issued the National CSO Control Strategy on August 10, 1989 (54 *FR* 37370). While the 1989 Strategy resulted in some progress in controlling CSOs, significant public health risks and water quality impacts remained. To expedite compliance with the CWA and to elaborate on the 1989 Strategy, EPA, in collaboration with other CSO stakeholders (communities with CSSs, State water

quality authorities, and environmental groups), developed and published the CSO Control Policy on April 19, 1994 (59 *FR* 18688). The Policy establishes a uniform, nationally consistent approach to developing and issuing NPDES permits that address CSOs. With respect to NPDES permittees, State water quality standards authorities, and NPDES permitting and enforcement authorities, the CSO Policy states the following:

- Permittees should immediately implement the nine minimum controls (NMCs), which are technology-based actions or measures designed to reduce CSOs and their effects on receiving water quality, as soon as practicable, but no later than January 1, 1997.
- Permittees should give priority to environmentally sensitive areas.
- Permittees should develop long-term control plans (LTCPs) for controlling CSOs. A permittee may use one of two approaches: (1) demonstrate that its plan is adequate to meet the water quality-based requirements of the CWA ("demonstration approach"), or (2) implement a minimum level of treatment (e.g., primary clarification of at least 85% of the collected combined sewage flows) that is presumed to meet the water quality-based requirements of the CWA, unless data indicate otherwise ("presumptive approach").
- Water quality standards authorities should review and revise, as appropriate, State water quality standards during the CSO long-term planning process.
- NPDES permitting authorities should consider the financial capability of permittees when reviewing CSO control plans.

The CSO Policy recommends that NPDES permitting authorities utilize a phased approach in addressing CSOs. Phase I permits should require the permittee to implement the NMC within two years of notice from the NPDES permitting authority and to develop a LTCP. Phase II permits should require continued implementation of the NMC and implementation of a LTCP.

Prior to issuing a permit that requires conditions that address CSOs, permit writers should consult the CSO Control Policy and associated guidance materials. The incorporation of permit conditions that address CSOs is provided in Chapter 8.

Storm Water Program (Municipal)

EPA has determined that storm water runoff from major metropolitan areas is a significant source of pollutants discharged to waters of the United States. While rainfall and snow are natural events, the nature of runoff and its impact on receiving waters is highly dependent on human activities and use of the land. Runoff from lands modified by human activities (i.e., metropolitan areas) can affect surface water resources in two ways: (1) natural flow patterns can be modified; and (2) pollution concentrations and loadings can be elevated.

To address these discharges, the 1987 amendments to the CWA added a provision [Section 402(p)] that directed EPA to establish phased NPDES requirements for storm water discharges. Section 402(p)(2) of the Act identifies discharges covered under Phase I of the Storm Water Program and includes discharges from municipal separate storm sewer systems (MS4s) serving a population of 100,000 or more. Section 402(p)(3) identifies the standards for MS4 permits. These standards mark the significant difference in permits that address storm water discharges from MS4s versus permits that address other more traditional sources (i.e., POTWs and non-municipal sources). In general, Congress provided that permits for discharges from MS4s:

- May be issued on a system- or jurisdiction wide basis;
- Shall effectively prohibit non-storm water discharges into the MS4; and
- Shall require controls to reduce the discharge of pollutants to maximum extent practicable (MEP).

In response, EPA published regulations addressing storm water discharges from municipal separate storm sewer systems on November 16, 1990 (55 *FR* 47990). The regulations define a MS4 as any conveyance or system of conveyances that is owned or operated by a State or local government entity designed for collecting and conveying storm water. Under Phase I of the Storm Water Program, only those MS4s which served a population of 100,000 or more were required to apply for a NPDES permit. Unlike permits that are developed and issued to individual POTWs (also referred to as "municipals"), permits that address storm water discharges from MS4s may be issued on a jurisdiction-wide basis to the operator of the storm water collection

system (e.g., a county or city public works department). Chapter 8 discusses considerations for developing NPDES permits for storm water discharges from MS4s.

2.3.2 NPDES Program Areas Applicable to Industrial Sources

In addition to the development of effluent limits and conditions for discharges of process and non-process wastewater from direct dischargers, the NPDES Program also includes provisions for control of storm water discharges from industrial sources. A description of this program area and a discussion of how it is incorporated into the permitting process is provided below.

Storm Water Program (Industrial)

All storm water discharges associated with industrial activity that discharge through municipal separate storm sewer systems or that discharge directly into the waters of the United States are required to obtain NPDES permit coverage, including those which discharge through MS4s located in municipalities with a population of less than 100,000. Discharges of storm water to a sanitary sewer system or to a POTW are excluded. As with the Municipal Storm Water Program discussed in Section 2.3.1 above, EPA published the initial permit application requirements for certain categories of storm water discharges associated with industrial activity on November 16, 1990 (55 *FR* 48065).

The regulations define storm water discharges associated with industrial activity as discharges from any conveyance used for collecting and conveying storm water directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. The NPDES permitting regulations at 40 CFR §122.26 were promulgated on November 16, 1990 (55 *FR* 48065) to identify the following 11 industrial categories required to apply for NPDES permits for storm water discharges:

- Facilities subject to storm water effluent limitations guidelines (ELG), new source performance standards (NSPS), or toxic pollutant effluent standards under 40 CFR Subchapter N
- Certain heavy manufacturing facilities (lumber, paper, chemicals, petroleum refining, leather tanning, stone, clay, glass, concrete, ship construction)
- Active and inactive mining operations and oil and gas operations with contaminated storm water

- Hazardous waste treatment, storage, or disposal facilities, including Resource Conservation and Recovery Act (RCRA) Subtitle C facilities
- Landfills, open dumps, and RCRA Subtitle D facilities
- Recycling facilities, including metal scrapyards, battery reclaimers, salvage yards, and automotive junkyards
- Steam electric power generating facilities, including coal handling sites
- Transportation facilities that have vehicle maintenance shops, equipment cleaning operations, or airport de-icing operations
- Major POTW sludge handling facilities, including onsite application of sewage sludge
- Construction activities that disturb five acres or more
- Light industrial manufacturing facilities.

Operators of industrial facilities that are federally, state or municipally owned or operated that meet the description of the facilities listed in 40 CFR 122.26(b)(14)(1)-(xi) must also submit applications (note: the Transportation Act of 1991 provides exceptions for certain municipally owned or operated facilities). EPA published final rules regarding the NPDES Storm Water Regulations on both April 1, 1992 (57 *FR* 11394) and December 18, 1992 (57 *FR* 60444). The rule promulgated on April 2, 1992 was, in part, to codify provisions of the Transportation Act of 1991. The December 18, 1992 rule was in response to the mandate of the Ninth Circuit United States Court of Appeals in NRDC v. EPA (June 4, 1992). Each of these final rules are summarized below:

- **Transportation Act of 1992**—The Transportation Act of 1991 provides an exemption from Phase I storm water permitting requirements for certain industrial activities owned or operated by municipalities with a population of less than 100,000 (note: population threshold not tied to a service population for a MS4). Such municipalities must submit storm water discharge permit applications only for airports, powerplants, and uncontrolled sanitary landfills that they own or operate.
- **Ninth Circuit Court Decision**—The Ninth Circuit United States Court of Appeals' opinion in NRDC v. EPA (June 4, 1992) invalidated and remanded for further proceedings two regulatory exemptions from the definition of "storm water discharges associated with industrial activity":
  1. The exemption for construction sites disturbing less than five acres of land (category x), and
  2. The exemption of certain "light" manufacturing facilities without exposure of materials and activities to storm water (category xi).

> In response to these two remands, EPA intends to conduct further rulemaking proceedings on construction activities under five acres and light industry without exposure. As ordered by the Court, EPA will not require permit applications for construction sites disturbing less than five acres of land and category xi facilities without exposure until this further rulemaking is completed.

Generally, storm water discharges from industrial sources are regulated by Federal or State issued general permits (see Section 3.1 for a description of the types of NPDES permits). However, in some cases, storm water conditions may be incorporated into a comprehensive individual NPDES permit for a facility, or a storm water-specific individual NPDES permit. The incorporation of permit conditions that address storm water discharges from industrial facilities is provided in Chapter 8. For more information regarding the scope of the NPDES Storm Water Program, refer to EPA's storm water regulations at 40 CFR 122.26 and the *Overview of the Storm Water Program*.[2]

[2]USEPA (1996). *Overview of the Storm Water Program.* EPA 833-R-96-008. Office of Water.

Chapter 3

Overview of the NPDES Permitting Process

This chapter presents an overview of the different types of NPDES permits, permit components, the permitting development and issuance process, and the roles and responsibilities of the Federal and State governments. The intent of this chapter is to give the permit writer an introduction to the elements of a NPDES permit and to provide a brief overview of the process of writing a permit. The process is illustrated by the use of flow charts. The tasks identified within the flow charts are described in detail in subsequent chapters.

3.1 Types of Permits

A permit is typically a license for a facility to discharge a specified amount of a pollutant into a receiving water under certain conditions; however, permits may also authorize facilities to process, incinerate, landfill, or beneficially use sewage sludge. The two basic types of NPDES permits that can be issued are individual and general permits.

An **individual permit** is a permit specifically tailored for an individual facility. Upon submitting the appropriate application(s), the permitting authority develops a permit for that particular facility based on the information contained in the permit

application (e.g., type of activity, nature of discharge, receiving water quality). The permit is then issued to the facility for a specific time period (not to exceed 5 years) with a requirement to reapply prior to the expiration date.

A **general permit** is developed and issued by a permitting authority to cover multiple facilities within a specific category. General permits may offer a cost-effective option for agencies because of the large number of facilities that can be covered under a single permit. According to 40 CFR §122.28, general permits may be written to cover categories of point sources having common elements, such as:

- Storm water point sources
- Facilities that involve the same or substantially similar types of operations
- Facilities that discharge the same types of wastes or engage in the same types of sludge use or disposal
- Facilities that require the same effluent limitations or operating conditions, or standards for sewage sludge use or disposal
- Facilities that require the same monitoring where tiered conditions may be used for minor differences within class (e.g., size or seasonal activity)
- Facilities that are more appropriately regulated by a general permit.

General permits, however, may only be issued to dischargers within a specific geographical area such as the following:

- Designated planning area
- Sewer district
- City, county, or State boundary
- State highway system
- Standard metropolitan statistical area
- Urbanized area.

The use of general permits allows the permitting authority to allocate resources in a more efficient manner and to provide more timely permit coverage. For example, a large number of facilities that have certain elements in common may be covered under a general permit without expending the time and money necessary to issue an individual permit to each of these facilities. In addition, the use of a general permit ensures consistency of permit conditions for similar facilities.

3.2 Major Components of a Permit

All NPDES permits, at a minimum, consist of five general sections:

- **Cover Page**—Typically contains the name and location of the permittee, a statement authorizing the discharge, and a listing of the specific locations for which a discharge is authorized.
- **Effluent Limitations**—The primary mechanism for controlling discharges of pollutants to receiving waters. The majority of the permit writer's time is spent deriving appropriate effluent limitations based on applicable technology and water quality standards.
- **Monitoring and Reporting Requirements**—Used to characterize wastestreams and receiving waters, evaluate wastewater treatment efficiency, and determine compliance with permit conditions.
- **Special Conditions**—Conditions developed to supplement effluent limitations guidelines. Examples include best management practices (BMPs), additional monitoring activities, ambient stream surveys, toxicity reduction evaluations (TREs), etc.
- **Standard Conditions**—Pre-established conditions that apply to all NPDES permits and that delineate the legal, administrative, and procedural requirements of the NPDES permit.

Although these sections compose all permits, the contents of some of these sections will vary depending on whether the permit is to be issued to a municipal or industrial facility, and whether the permit will be issued to an individual facility or to multiple dischargers (i.e., a general permit). **Exhibit 3-1** shows the components of a permit and highlights some of the distinctions between the contents of NPDES permits for industrial and municipal permits.

3.3 Overview of the Development/Issuance Process for NPDES Individual Permits

While the limits and conditions in an individual NPDES permit are unique to the permittee, the process used to develop the limits and conditions, and issue the permit, generally follows a common set of steps. **Exhibit 3-2** illustrates the major steps involved in developing and issuing an individual NPDES permit. Exhibit 3-2 also serves as an index for the subsequent chapters of this manual by identifying the chapters where more detailed information for each step is presented.

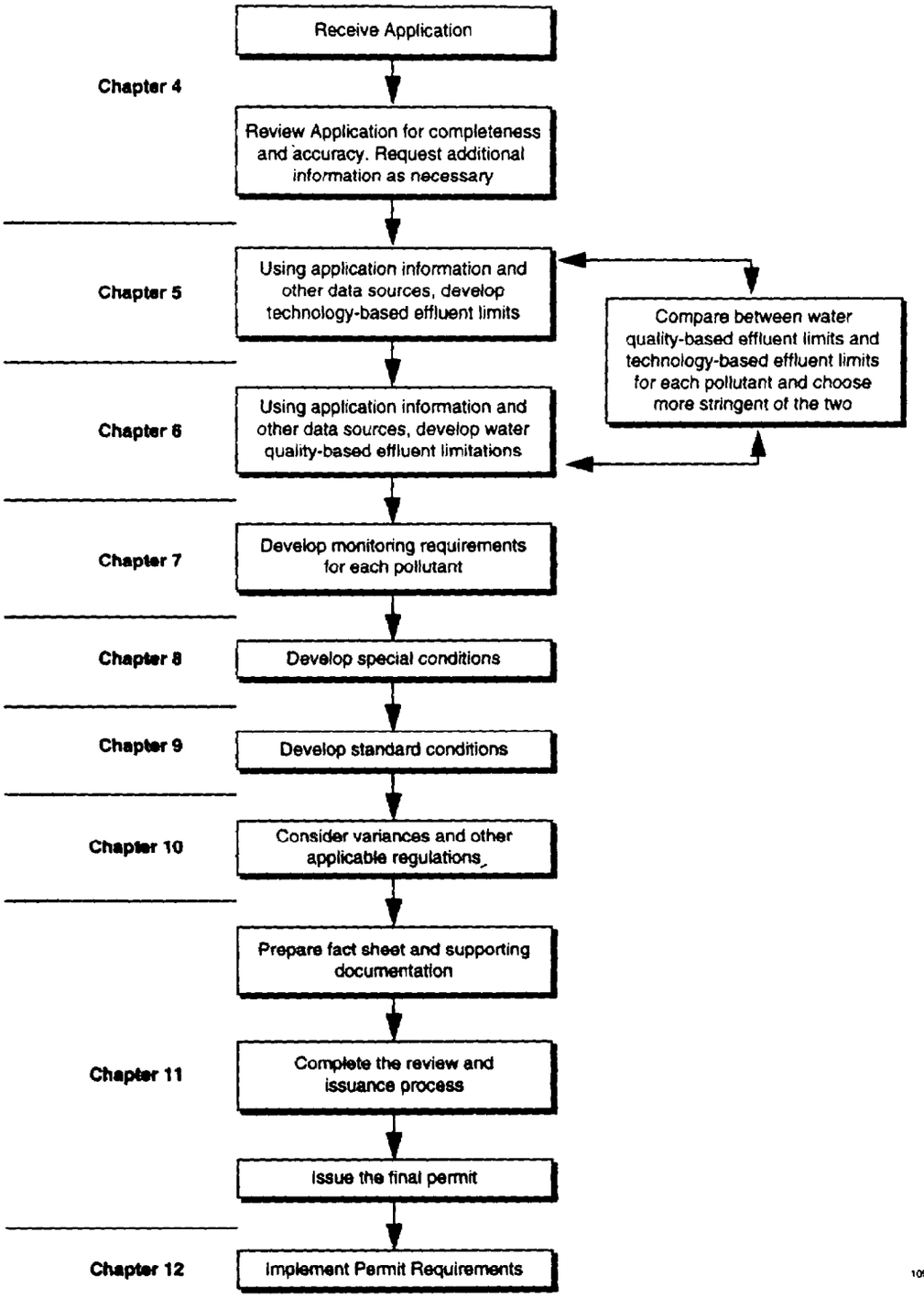
EXHIBIT 3-1
NPDES Permit Components

Industry-Specific Components	Components of All NPDES Permits	Municipal-Specific Components
	Cover Page	
Technology-Based: • Effluent Guidelines • Best Professional Judgment (BPJ).	**Effluent Limitations:** – Technology-Based – Water Quality-Based	Technology Based: • Secondary Treatment • Equivalent to Secondary Treatment.
	Monitoring and Reporting Requirements	
Other Requirements: • Best Management Practices (BMP).	**Special Conditions:** – Compliance Schedules – Storm Water – Special Studies, Evaluation, and Other Requirements	Other Requirements: • Pretreatment Program • Combined Sewer Overflow • Municipal Sewage Sludge.
	Standard Conditions	

The permitting process begins when an application is submitted by the operator of a facility. After receiving the application and making a decision to proceed with the permit, the permit writer reviews the application for completeness and accuracy. When the application is determined to be complete, the permit writer begins to develop the draft permit and the justification for the permit conditions (referred to as the fact sheet or statement of basis) based, in part, on the application data.

The first major step in the permit development process is the derivation of technology-based effluent limits. Following this step, the permit writer derives effluent limits that are protective of State water quality standards (i.e., water quality-based effluent limits (WQBEL)). The permit writer then compares the technology-based limits with the WQBELs and applies the more stringent limits in the NPDES permit. The

EXHIBIT 3-2
Major Steps Involved in Developing and Issuing an Individual NPDES Permit



decision-making process for deriving limits is documented in the permit fact sheet. It is quite possible that a permit may have limitations that are technology-based for some parameters and water quality-based for others. For example, a permit may contain an effluent limit for TSS based on national effluent limitations guidelines (technology-based), a limit for ammonia based on prevention of aquatic toxicity (water quality-based), and a BOD_5 limit based for part of the year on effluent limitations guidelines (technology-based) and for the remainder of the year on water quality considerations.

Following the development of effluent limits, the permit writer develops appropriate monitoring and reporting conditions, facility-specific special conditions, and includes standard conditions that are the same for all permits.

The next step is to provide an opportunity for public participation in the permit process. A public notice is issued announcing the permit and interested parties may submit comments regarding the draft permit. Based on the comments, the permitting authority then finalizes the permit, with careful attention to documenting the process and decisions for the administrative record, and issues the final permit to the facility.

3.4 Overview of the Development/Issuance Process for NPDES General Permits

The process for developing and issuing general NPDES permits is similar to the process for individual permits, however, there are certain differences. In the general permit development/issuance process, the permitting authority first identifies the need for a general permit, and collects data that demonstrate that a group or category of dischargers have similarities that warrant a general permit. In deciding whether to develop a general permit, permitting authorities should consider the following:

- Are there a large number of facilities to be covered?
- Do the facilities have similar production processes or activities?
- Do the facilities generate similar pollutants?
- Do only a small percentage of the facilities have the potential for water quality standards violations?

The remaining steps of the permit process are the same as the individual permits. A draft permit and fact sheet are developed, a public notice is issued and public comments are addressed, the issues are documented for the administrative record, and the final permit is issued. After the general permit has been issued, facilities that wish to be covered under the general permit then generally submit a Notice of Intent (NOI) to the permitting authority. The permitting authority may then either request additional information describing the facility, notify the facility that it is covered by the general permit, or require the facility to apply for an individual permit.

3.5 Roles and Responsibilities of the Federal and State Authorities

EPA is authorized under the CWA to directly implement the NPDES Program. EPA, however, may authorize States, Territories, or Tribes to implement all or parts of the national program. States, Territories, or Tribes applying for authorization may seek the authority to implement the base program (i.e., issue individual NPDES permits for industrial and municipal sources), and may seek authorization to implement other parts of the national program including, Federal facilities, the national pretreatment program, general permits, and/or the municipal sewage sludge program. If the State has only partial authority (e.g., only the base NPDES permits program), EPA will implement the other program activities (e.g., pretreatment program, Federal facilities, and sewage sludge program). For example, where a State has an approved NPDES Program but has not received EPA approval of its State sludge management program, the EPA Region is responsible for including conditions to implement the Part 503 Standards for the Use or Disposal of Sewage Sludge in NPDES permits issued to treatment works in that State. EPA may issue a separate NPDES permit with the applicable sewage sludge standards and requirements, or negotiate with the State on joint issuance of NPDES permits containing the Part 503 sewage sludge standards. The same process also applies where a State has not received approval of its pretreatment program or Federal facilities. One exception to this process is where a NPDES-authorized State, Territory, or Tribe is not approved to implement the general permit program. In these cases, EPA may not issue a general permit in that State, Territory, or Tribe.

In general, once a State, Territory, or Tribe is authorized to issue permits, EPA is prohibited from conducting these activities. However, EPA must be provided with

an opportunity to review each permit issued by the State, Territory, or Tribe and may formally object to elements that conflict with Federal requirements. If the permitting agency does not address the objection points, EPA will issue the permit directly. Once a permit is issued through a government agency, it is enforceable by the approved State, Territorial, and Federal agencies (including EPA) with legal authority to implement and enforce the permit, and by private citizens (in Federal court).

Chapter 4

The Permit Application Process

This chapter describes the NPDES permit application process including the permit writer's role in reviewing the application and evaluating background information about the applicant. Through this process, the permit writer gains an understanding of the circumstances of the discharge and the characteristics of the proposed effluent that will allow proper development of permit limits and conditions.

4.1 NPDES Permit Application Forms

When it is determined that a facility needs an individual NPDES permit, the facility must submit an application for a permit. Application forms and requirements are specific to the type of facility and discharge. NPDES permit application regulations are contained in 40 CFR Part 122, Subpart B. Most application requirements are contained in forms developed by EPA. **Exhibit 4-1** provides an overview of the types of dischargers required to submit NPDES application forms, identifies the form(s) that they must submit, and references the corresponding NPDES regulation citation. It should be noted that authorized States are not required to use the EPA application forms. However, any alternative form used by an authorized State must contain the information required in 40 CFR Part 122, Subpart B. An application form must also be submitted for permit renewals. Permits may no longer be renewed by submitting a

EXHIBIT 4-1
Applications Forms Required for NPDES Discharges

Type of Facility	Status	Forms	Regulatory Citation (40 CFR Part 122)
All NPDES Applicants (except MS4s)	New and Existing	Form 1	122.21(f)
Municipal Facilities – Major POTWs (Facilities with flows greater than 1.0 mgd or populations greater than 10,000, or receive industrial process wastewater)	New and Existing	Standard A	122.21(j) (reserved)
– Minor POTWs	New and Existing	Short A	122.21(j) (reserved)
Industrial Facilities – Manufacturing Facilities – Commercial Facilities – Mining Activities – Silvicultural Activities – Water Treatment Facilities	New	2D	122.21(f) and (k)
	Existing	2C	122.21(f) and (g)
	Non-Process Wastewater	2E	122.21(f) and (h)
Concentrated Animal Production Facilities – Animal Feedlots – Hatcheries	New and Existing	2B	122.21(f) and 122.21(i)
Storm water discharges associated with industrial activities	New and Existing	2F	122.26(c)
Storm water discharges from MS4s serving a population greater than 100,000	New and Existing	None	122.26(d)

Key: Form 1 - General Information.
Standard Form A - Municipal (new and existing major municipal facilities).
Short Form A - Municipal (new and existing minor municipal facilities).
Form 2B - Concentrated Animal Feeding Operations and Aquatic Animal Production Facilities.
Form 2C - Existing Manufacturing, Commercial, Mining, and Silvicultural Operations.
Form 2D - New Sources and New Dischargers Application for Permit to Discharge Process Wastewater.
Form 2E - Facilities Which Do Not Discharge Process Wastewater.
Form 2F - Application for Permit To Discharge Storm Water Discharges Associated With Industrial Activity.

letter stating that no significant changes occurred at the facility during the term of the expiring permit.

Form 1 - General Information

All facilities applying for an individual NPDES permit, with the exception of MS4s applying for a municipal storm water permit, must submit **Form 1**. Form 1 requires general facility information including:

- Name, mailing address, facility contact, and facility location
- Standard industrial classification (SIC) code and a brief description of nature of business
- Topographic map showing the location of the existing or proposed intake and discharge structures.

4.1.1 Municipal Application Requirements (Form A and Short Form A)

All new and existing POTWs must submit **Form A** or **Short Form A** (used for minor POTWs). POTWs with design influent flows equal to or greater than 1 million gallons per day (mgd) and POTWs with approved pretreatment programs, or POTWs required to develop a pretreatment program are required to submit Form A. Form A requires submission of the following types of information:

- Name, mailing address, authorized agent, and facility location
- Collection system type, areas served, and total population served
- Description of influent, including major industrial facilities discharging to the system
- Description of treatment practices and plant design, schedule of improvements, number of discharge points, total volume discharged, and receiving water name.

Although testing of the influent and effluent for specific pollutants is not required, Form A does request any available data on the following parameters: flow, pH, temperature, fecal coliform, BOD_5, COD or total organic carbon (TOC), total residual chlorine, total solids, total dissolved solids, settleable matter, ammonia, Kjeldahl nitrogen, nitrate, nitrite, phosphorus, and dissolved oxygen. The municipal application regulations also require POTWs with design influent flows equal to or

greater than 1.0 mgd, and POTWs with approved pretreatment programs, to submit results of whole effluent toxicity (WET) testing (40 CFR §122.21(j)(1)). In addition, POTWs with approved pretreatment programs are also required to submit a written technical evaluation of the need to revise local limits (40 CFR §122.21(j)(4)).

POTWs with design flows of less than 1.0 mgd, and which are not required to have an approved pretreatment program, may generally use Short Form A. Short Form A requires only general information such as the name, mailing address, and facility location as well as a description of any major changes at the facility.

Reg Update:

On December 6, 1995, EPA proposed revisions to the municipal application requirements and accompanying application forms [60 *FR* 62545]. The proposed regulation replaces Form 1, Form A, and Short Form A with a new **Form 2A** for use by all municipal dischargers. Form 2A is divided into five individual sections that must be completed depending on the characteristics of the municipal discharger. In the same proposal, EPA introduced **Form 2S** to obtain information on municipal sewage sludge such as volume, characteristics, and sludge use or disposal practices. The Form 2S regulations will replace the interim sludge use and disposal application requirements that are currently in use.

4.1.2 Non-Municipal Permit Application Requirements

In addition to Form 1, which requests general information, non-municipal dischargers applying for an individual NPDES permit are required to submit additional detailed facility information. The types of forms required depend upon the activities of the facility applying for a permit. Each of the forms and the types of activities for which they apply are briefly described below.

Form 2B - New and Existing Animal Feeding Operations and Aquatic Animal Production Facilities

Owners of new and existing animal feeding operations and aquatic animal production facilities must submit Application **Form 2B**. The types of information required by Form 2B include:

- Animal feeding operations
  - Type and number of animals in open confinement and housed under roof
  - Number of acres used for confinement feeding

  - Calendar month of maximum feeding and total mass of food fed during that month

- Aquatic animal production facilities

  - Maximum daily and average monthly flow from each outfall
  - Number of ponds, raceways, and similar structures
  - Total yearly and maximum harvestable weight for each species of aquatic animal.

Form 2C - Existing Manufacturing, Commercial, Mining, and Silvicultural Discharges

Operators of existing (i.e., currently permitted) manufacturing, commercial, mining, and silvicultural discharges must submit Application **Form 2C**. The types of information required in Form 2C include:

- Outfall location(s)
- Flow characteristics
- Sources of pollutants
- Intake and effluent characteristics
- Pollutants expected to be present
- Treatment technologies
- Production information (if applicable).

Quantitative effluent data requirements for existing industrial dischargers varies depending on the facility's discharge characteristics and the types of pollutants expected to be present in the discharge.

Form 2D - New Manufacturing, Commercial, Mining, and Silvicultural Discharges

Operators of new manufacturing, commercial, mining, and silvicultural discharges must submit Application **Form 2D**. "New" dischargers are those that have not previously obtained permits for a discharge and have not commenced operation. The types of information required in Form 2D include:

- Expected outfall location(s)
- Date of expected commencement of discharge

- Expected flow characteristics
- Sources of pollutants
- Treatment technologies
- Production information (if applicable)
- Expected intake and effluent characteristics.

Form 2E - Manufacturing, Commercial, Mining, and Silvicultural Facilities that Discharge Only Nonprocess Wastewater

Operators applying for an individual NPDES permit for manufacturing, commercial, mining, and silvicultural facilities that are not regulated by an effluent limitation guideline or new source performance standard, and which discharge only non-process wastewaters, must submit Application **Form 2E**. "Nonprocess wastewaters" include sanitary wastes, restaurant or cafeteria wastes, and non-contact cooling water, but do not include storm water. Storm water is specifically excluded from the definition of "non-process wastewater." The types of information required in Form 2E include:

- Outfall location(s)
- Type of waste discharged
- Effluent characteristics, including quantitative data for selected parameters
- Flow characteristics
- Treatment technologies.

Form 2F - Storm Water Discharges Associated with Industrial Activities

Operators applying for an individual NPDES permit for discharges of storm water associated with industrial activity must submit Application **Form 2F**. The types of information required in Form 2F include:

- A topographic map and estimates of impervious surfaces
- Descriptions of material management practices and control measures
- A certification that outfalls have been evaluated for non-storm water discharges
- Descriptions of past leaks and spills
- Analytical data from each outfall for several specified parameters.

Storm Water Discharges from Municipal Separate Storm Sewers Serving a Population of Greater Than 100,000

The 1990 Storm Water application regulations (55 *FR* 48062), list the application requirements for operators of a large or medium MS4 to submit a two-part application. Part 1 application information was required to be submitted by large MS4s (serving a population >250,000) by November 18, 1991 and by medium MS4s (serving a population >100,000 but ≤ 250,000) by May 18, 1992. Part 2 application information was required to be submitted by large MS4s by November 16, 1992 and by medium MS4s by May 17, 1993. The following summarizes the key requirements of each part of the application:

- Part 1 of the application must include:
  - General information (e.g., name, address)
  - Existing legal authorities and any additional authority required
  - Source identification information
  - Discharge characterization, including results from dry weather flow screening
  - Identification of 5 to 10 representative outfalls for storm water sampling
  - Description of existing storm water management practices
  - Descriptions of existing financial budget and resources available to complete Part 2 of the application.
- Part 2 of the application must include:
  - Demonstration of adequate legal authority
  - Identification of any major storm sewer outfalls
  - Discharge characterization data from sampling three representative storm events
  - Proposed storm water management program
  - Assessment of controls, including expected reductions in pollutant loadings
  - Fiscal analysis, including necessary capital and operation and maintenance expenditures for each year of the permit.

Under the NPDES regulations, permittees are required to reapply for a new NPDES permit prior to the expiration of their existing permit. However, in the case of storm water permits for MS4s, Part 1 and Part 2 application requirements were intended only for the initial issuance of a MS4 permit and specific requirements for reapplication have not been defined in the regulations. On May 17, 1996, EPA issued

a policy which sets forth a streamlined approach for reapplication requirements for operators of MS4s. It allows municipalities to use recommended changes submitted in their fourth annual report as the principal component of their reapplication package. It also encourages changes to monitoring programs to make them appropriate and useful to storm water management decisions. With the policy, EPA seeks to improve municipal storm water management efforts by allowing municipalities to target their resources for the greatest environmental benefit.

4.1.3 Application Requirements for NPDES General Permits

As previously discussed, general permits (see 40 CFR §122.28) are permits that are developed for storm water dischargers or a specific category of dischargers within a specified geographic or political boundary. The use of a general permit may simplify the permitting process for both EPA and the permittee. Unlike individual permits, however, operators can only apply for coverage under a general permit if one has been issued that is applicable to the type of facility for which coverage is sought and covers the facility's activities. In addition, the permitting authority may determine that a general permit is not appropriate for a particular facility applying for coverage under the general permit, and can require the facility to apply for an individual permit. Furthermore, a facility that otherwise qualifies for a general permit may opt to apply for an individual permit.

An applicant for a general permit, in almost all cases, must apply by submitting a Notice of Intent (NOI) to be covered under the permit. The contents of a NOI, and any additional information requirements, must be specified in the general permit and in the fact sheet or instructions, and at a minimum must include the following:

- Name and address of the owner or operator
- Name and address of the facility
- Type of facility or discharges
- The receiving stream(s).

4.2 Application Deadlines

The Federal regulations contained in 40 CFR §122.21 require that applications for new discharges be made no later than 180 days before discharges actually begin.

Applications for permit renewals (i.e., for existing dischargers) must be made at least 180 days before the expiration of the existing NPDES permit. Authorized states, however, may have slightly different schedules but generally no less stringent. Furthermore, the State Director or the Regional Administrator may allow individual applications to be submitted at dates later than these but not later than the expiration date of the existing permit.

It should be noted that according to 40 CFR §122.6, an expired NPDES permit remains in effect until the new permit is issued as long as the application for permit renewal was submitted on time and complete (per 40 CFR §122.21). However, if State law does not allow expired permits to remain in effect until a permit is reissued, or if the permit application is not on time and complete, the facility is considered to be discharging without a permit from the time the permit expired until the effective date of the new permit.

4.3 Review of the Application

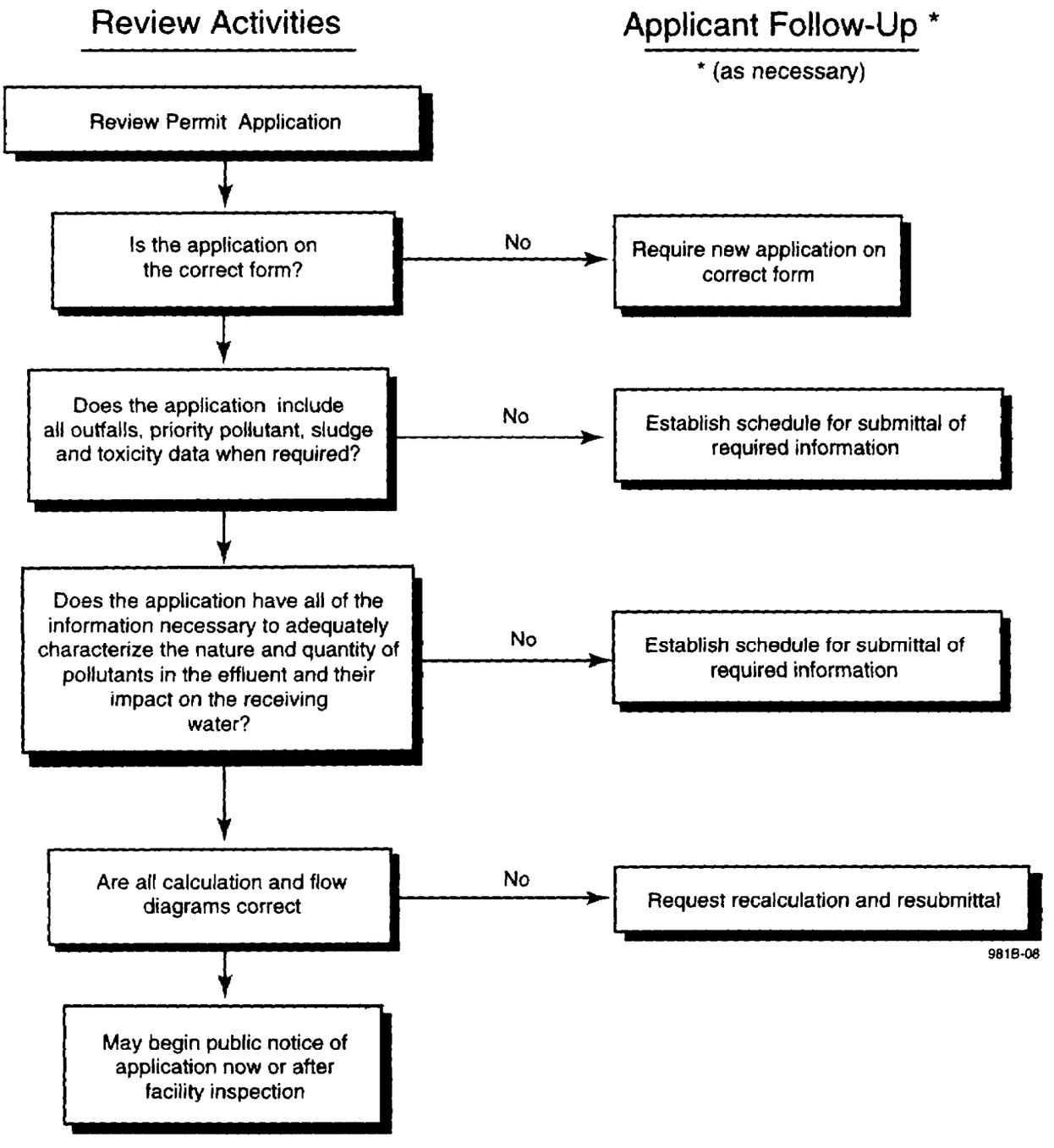
The contents of individual NPDES permits are based in part upon the information included in the application. Thus, the application must be complete and accurate before a permit writer can properly develop a permit. **Exhibit 4-2** depicts a general process for reviewing a permit application.

After the initial review of an application, the permit writer may request that an applicant submit other information which may be needed in deciding whether to issue a permit. The requested information may include:

- Additional information, quantitative data, or recalculated data
- Submission of a new form (if an inappropriate form was used)
- Resubmission of application (if incomplete or outdated information was initially submitted).

A considerable amount of correspondence, therefore, may be required before the permit writer obtains an application that can be considered complete and accurate.

EXHIBIT 4-2
Permit Application Review



4.3.1 The Complete Application

Regulations under 40 CFR §122.21(e) state that the Director "shall not issue a permit before receiving a complete application...." At a minimum, the application form must have all applicable spaces filled in. Instructions for the application form states that all items must be completed and that the statement "not applicable" (NA) be used to indicate that the item had been considered by the applicant. Blanks on a form can occur for a number of reasons, such as:

- The response was inadvertently left out; or
- The applicant had difficulty determining the correct response and rather than provide misleading or incorrect information, left the space blank.

A response to the blank items must be obtained by contacting the facility in writing or, in some cases, by telephone. Because of the administrative record (discussed in Chapter 11) that must be maintained in processing an application, and the possibility of legal challenges regarding permit decisions, it is recommended that only minor items be handled by telephone, and even these should be documented in writing.

If the changes or corrections to any application are extensive, the permit writer may require the permit applicant to submit a new application. Supplementary information, such as more detailed production information or maintenance and operating data for a treatment system, may also be required to process the permit. Supplementary information can also be obtained at a later date when the permit writer is actually drafting the permit. According to 40 CFR §122.21(e), an application is considered to be complete when the permit writer is satisfied that all required information has been submitted.

4.3.2 Common Omissions and Errors in Applications

This section identifies some of the most common omissions and errors found in NPDES permit applications. Examples of ways to identify missing information and of verifying the accuracy of some of the data are also provided.

One of the most common items overlooked is the provision of a topographic map which is required as an attachment to Form 1. Other industrial or municipal-

specific information is also often omitted. For example, industrial applicants sometimes fail to submit a process line diagram required by Part II-A of Form 2C. The process line diagram is important for ensuring that the location and description of the outfalls and the description of processes (Parts I and II-B of Form 2C) given by the applicants are accurate.

Often, applicants do not properly submit the effluent characterization data required for the permit applications. Applicants may fail to submit data necessary to properly characterize the facility. The following highlights some of the data requirements that are required in applications:

- POTWs with design flows greater than 1 mgd or those with a pretreatment program are required to submit valid WET testing data. This requirement may be satisfied if the expiring permit contains a requirement for effluent characterization of WET. The permit writer should note the use of this option on the fact sheet.
- POTWs and other treatment works treating domestic sewage (TWTDS) must submit any sludge monitoring data; a description of sludge use and disposal procedures at the facility; annual sludge production volumes; and for land application sites, information on the suitability of the site and a description of the site management. A land application plan is required for any sites not identified in the application.
- Every non-POTW applicant must submit data for BOD, COD, TOC, TSS, ammonia, temperature (winter and summer), and pH.
- Non-municipal dischargers categorized as "primary industries" have some mandatory testing requirements for toxic pollutants (see 40 CFR §122.21, Appendix D, Table I and Table II; also listed in Application Form 2C). Primary industries are identified in Appendix A of 40 CFR Part 122. Primary industries that are also small businesses [see 40 CFR §122.21(g)(8)] may be exempted from these testing requirements. Existing dischargers who believe certain pollutants may be present in their effluent must test for those pollutants (40 CFR §122.21 Appendix D, Table IV and Table V).
- Industrial facilities that are subject to production- or flow-based effluent guidelines must report production rates and flow data, using units of measure corresponding to applicable effluent limitations guidelines, that will allow calculation of effluent limits.
- Sample types for all required pollutants and parameters must be appropriate for the parameter being analyzed (as per 40 CFR Part 136; see Sections 7.1.3 and 7.1.4 for more information). For example, only grab samples may be used for pH, temperature, cyanide, total phenols, volatile

organics, residual chlorine, oil and grease, fecal coliform, and fecal streptococcus.

Examples of the types of data that the permit writer will need to obtain before the application can be considered complete are given in the text boxes which follow.

Are required toxic organic pollutants (gas chromatograph/mass spectrometer [GC/MS] fractions) listed?

Example:

An application from a plastics processor fails to list any GC/MS fraction.

Discussion:

The plastics processor is required to test for the volatile GC/MS fraction (Table 2C-2 in the application form instructions and 40 CFR §122.21(g)(7)(ii)(A) of the NPDES regulations).

Are required heavy metals listed?

Example:

A primary felt producer marks thallium and beryllium as believed absent in the wastewater.

Discussion:

Although thallium and beryllium are not expected to be found in a felt producer's discharge, page 2C-3 of the application form instructions and 40 CFR §122.21(g)(7)(ii)(B) require testing for these metals. Occasionally, unexpected contaminants will be present in a waste stream due to poor housekeeping, unusual production methods, etc.

The comprehensive testing requirements that apply to the various categories of industry are designed to determine whether any unexpected contaminants are present in significant quantities, as well as to determine levels of pollutants that are known to be present. In the above example, the submission is incomplete because additional information is needed and "believed absent" is wrongly indicated.

Are all expected pollutants listed?

Example:

A producer of wood-resin-based derivatives does not indicate the presence of zinc in his wastewater.

Discussion:

Testing for zinc is required. Zinc is used as a catalyst in the production of wood-resin-based derivatives. This type of information can be found in the effluent limitations guidelines development documents.

What pollutant data are needed to characterize the industries above?

Example:

Consider the plastics processor, the felt producer, and the producer of wood-resin-based derivatives, mentioned above, and answer the following questions:

- For which toxic organic pollutants are they required to test?
- For which heavy metals are they required to test?
- Which metals would you expect to find in their wastewaters regardless of whether testing is required or not?

Discussion:

The application form in Table 2C-2 and 40 CFR §122.21(g)(7)(ii)(A) of the NPDES regulations require testing of the volatile GC/MS fraction by the plastics processor, and testing of all four GC/MS fractions by the felt producer and the producer of wood-resin-based derivatives. Page 2C-3 of the application instructions and 40 CFR §122.21(g)(7)(ii)(B) require testing of all of the metals listed in item V part C1 of the application form by all three manufacturers. For the expected metals, see the effluent limitations guidelines development documents for information.

4.3.3 The Accurate Application

All information submitted on a permit application should be accurate, in addition to being complete. Although it may be difficult to detect certain inaccuracies, a number of common mistakes can be readily detected. When mistakes are detected, they must be corrected. The permit writer should follow the same procedures for correcting inaccurate information as used for obtaining missing information. The following text boxes contain examples that reflect the types of questions that the permit writer may consider while reviewing the permit application.

Can we verify flow data using a water balance calculation?

Example:

An industrial user has estimated a wastestream flow of 50,000 gpd using water usage records. However, a review of historical water usage records and an old permit application indicates wastewater flows ranged from 100,000 to 150,000 gpd. The facility had not instituted any water-reduction measures, significantly changed its process operations, or decreased its number of employees.

Discussion:

An inspection of the facility revealed two separate water meters (one for sanitary and one for process water); the industrial user had overlooked the sanitary meter. Further, the process water meter was found to be defective. Subsequent flow monitoring of the total wastestream recorded a flow of 125,000 gpd. A new water meter was installed and concurrent wastestream flow monitoring and water meter readings resulted in the following water balances:

- **Water In** (based on both water meter readings): 148,000 gpd (131,000 gpd process line and 17,000 gpd sanitary line)
- **Water Out** (based on wastestream flow monitoring): 125,000 gpd total wastestream discharged to sewer system. Evaporative and consumption losses were estimated at 23,000 gpd (15 percent of total water usage).

Do the concentration, mass, and flow values correspond?

Example:

Suppose the maximum daily flow is shown as 1.2 million gallons per day (MGD), the maximum daily suspended solids concentration is 23 milligrams per liter (mg/l), and the maximum daily mass discharge is reported as 690 pounds per day (lbs/day).

$$23 \text{ mg/l} \times 8.34 \times 1.2 \text{ MGD} = 230 \text{ lb/d}$$

The mass corresponding to the solids concentration (23 mg/l) and flow (1.2 MGD) is 230 pounds per day. However, the maximum daily mass discharge is 690 pounds per day.

Discussion:

Assuming that the maximum daily flow and the maximum daily concentration occurred on the same day (worst case scenario), the highest mass discharge should not exceed 230 pounds per day. Since the applicant reported a maximum mass discharge of 690 pounds per day, a significant discrepancy is indicated. The permit writer should contact the facility to resolve the discrepancy.

Do concentration values correspond with analytical detection limits?

Example:

The acid GC/MS fraction (phenols) compounds are all reported as less than 1 mg/l.

Discussion:

According to 40 CFR Part 136, the detection limits for the compounds in this organic fraction are all near 0.01 mg/l. Probably the 4AAP method for phenols was used, rather than the required testing procedure using GC/MS.

4.4 Facility Information Review

In addition to the submitted application form, the permit writer should consider collecting other information that could be utilized for development of permit limits and conditions.

4.4.1 Background Information Review

Prior to developing permit conditions, the permit writer should collect and review any additional background information on the facility. Much of this information may already be available in the permit file. In-house file information typically includes:

- The current permit
- The fact sheet or statement of basis for the current permit

- Discharge Monitoring Reports (DMRs)
- Compliance inspection reports
- Engineering reports
- Correspondence or information on changes in plant conditions or problems, and compliance issues.

Much of this information, particularly DMR data, may be already stored in an interoffice automated data tracking system such as the EPA Permit Compliance System (PCS).

The permit writer may check with other permit writers who have permitted similar types of facilities to see if there are any special considerations related to the facility to be permitted. A permit writer also may wish to discuss compliance issues, changes, or history of complaints with compliance personnel who conducted previous inspections of the facility. Examples of some other sources of information that could be used by the permit writer include:

- EPA development documents that contain detailed information that was collected by the EPA for the purpose of developing effluent guidelines and categorical pretreatment standards for a variety of industrial categories
- Reference textbooks, which address specific industry categories and which are available from the National Technical Information Service (NTIS), United States EPA library and other libraries. These technical documents provide information about manufacturing processes and wastestreams.
- EPA's *Treatability Manual*,[3] which is a five-volume guidance (also refer to glossary) and which provides detailed descriptions of industrial processes, potential pollutants from each process, appropriate treatment technologies, and cost estimating procedures
- Receiving water quality data (e.g., the EPA Storage and Retrieval data base [STORET])
- Related environmental permits that could provide site-specific background information about the types of pollutants and wastestreams at a facility, including, for example:

  – RCRA permit—which regulates the management of hazardous waste from its generation through ultimate disposal for waste generators,

[3]USEPA (1980). *Treatability Manual, Volumes I - V.* EPA-600/8-80-042a-e. Office of Research and Development.

transporters, and owners and operators of treatment, storage, and disposal facilities [42 USC 6901 *et seq.*]
  - Clean Air Act permit—which regulates the discharge of atmospheric pollutants.
- The Toxic Release Inventory (TRI), which is accessible on EPA's mainframe and through a public online service. TRI contains facility information on over 300 listed toxic chemicals released by specific facilities, including chemical identification, quantity of chemical released to various environmental media, offsite waste transfer and waste treatment and minimization information.

If the permit writer must address special conditions in the permits for municipal dischargers for development or implementation of a pretreatment program, combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), sewage sludge use or disposal, or storm water discharges, information relevant to these issues would need to be obtained. Such information may be found in:

- Annual pretreatment reports, pretreatment compliance inspections and audits
- CSO reports
- Bypass notifications or SSOs reports
- Storm water discharge applications or NOI for a general permit.

4.4.2 Facility Site Visits

Facility site visits can be invaluable to update information on manufacturing processes, obtain information about the facility's operations, equipment or management, and to verify application information. A site visit also acquaints the permit writer with the people who will be operating under the permit and participating in the permit development process.

Site visits may also allow the permit writer to gain a better understanding of more complex facilities. Site visits are especially warranted if significant pollution control or treatment improvements will be required, if there have been frequent problems in complying with the present permit, if there are known problems with spills or leaks or with contaminated surface runoff, or if there are other onsite activities that may impact the characteristics of the discharge from the facility.

The site visit should include a detailed review of production processes in order to evaluate the types of toxic or hazardous substances that may be present in raw materials, as well as in products and byproducts. The water uses, the resulting wastewater streams, and any in-process pollution controls should be reviewed. This review is needed to assist in selecting toxic and other pollutants to be limited and in evaluating possible in-process control improvements.

In addition, the site visit should include a review of the performance, operation and maintenance practices of wastewater treatment facilities. This review is useful in evaluating the adequacy of existing treatment performance and assessing the feasibility of improvements and performance. Effluent monitoring points, sampling methods, and analytical techniques should also be examined to identify any needed changes to monitoring requirements and to evaluate the quality of DMR data.

Raw material and product storage and loading areas, sludge storage and disposal areas, hazardous waste management facilities, including onsite disposal areas, and all process areas should be observed to determine the need for controls on surface runoff and for specific best management practices (BMPs). As noted previously, the information from other environmental programs (e.g., Comprehensive Environmental Response, Compensation, and Liabilities Act [CERCLA]; RCRA) may be important in this regard.

While onsite, the permit writer should note any needs for spill prevention and housekeeping problems, which are not usually well-described in permit applications. If allowed, photographs of problem areas should be taken for future use during permit preparation. A meeting with management should be included if necessary to ask questions and clarify information on the permit application. If any inaccuracies in the application were found as a result of the site visit, corrected information should be requested at this time.

The time required to conduct a site visit will vary according to the complexity of the facility. For facilities with only a few basic processes, one main waste treatment system, limited in-process controls, few surface runoff outfalls, and limited onsite management of sludges or hazardous wastes, an adequate site visit can most likely

be completed in 1 day. Complex, larger plants with several treatment systems, numerous outfalls, and extensive ancillary activities may require several days.

Time spent on site visits often results in time savings during permit preparation. However, time and/or travel resources are generally not adequate to allow viewing of all facilities to be permitted. In such cases, the permit writer may be able to obtain much of the desired information from the next (or previous) compliance inspection performed at the facility.

Aerial photographs are also an excellent aid for conducting a plant visit and may provide much of the needed information on the potential for contamination of surface runoff and on ancillary activities in the absence of a site visit or inspection. In addition, comparison of aerial photographs with site and process diagrams provided with the application may provide the permit writer with a complete visual description of the facility. Aerial photographs may be obtained from a variety of sources, including the United States Geological Survey (USGS), Environmental Services Division in some EPA Regions, the National Enforcement Investigation Center, Las Vegas, Nevada; the Environmental Photo Interpretation Lab, Vint Hill, Virginia; and private contractors.

4.5 Confidential Information

In accordance with 40 CFR Part 2, information submitted to EPA pursuant to the NPDES permitting regulations under 40 CFR Part 122 may be claimed as confidential by the submitter. However, EPA has determined that the following information will not be held confidential:

- Name and address of the applicant
- Permit applications and information submitted with applications
- Permits
- Effluent data.

Any claims of confidentiality must be made at the time of submission or the information will not be considered confidential.

Information that may be treated as confidential includes material related to manufacturing processes unique to the applicant, or if such information might

adversely affect the competitive position of the applicant if released to the public. Under these circumstances, the permit writer will be required to treat the information as confidential in accordance with the requirements in 40 CFR Part 2.

Chapter 5

Technology-Based Effluent Limits

When developing effluent limits for a NPDES permit, a permit writer must consider limits based on both the technology available to treat the pollutants (i.e., technology-based effluent limits), and limits that are protective of the designated uses of the receiving water (water quality-based effluent limits). This chapter discusses considerations for deriving technology-based effluent limitations for both non-municipal (i.e., industrial) and municipal discharges.

There are two general approaches for developing technology-based effluent limits for industrial facilities: (1) using national effluent limitations guidelines (ELGs) and (2) using Best Professional Judgment (BPJ) on a case-by-case basis (in the absence of ELGs). Technology-based effluent limits for municipal facilities (POTWs) are derived from secondary treatment standards. The intent of a technology-based effluent limitation is to require a minimum level of treatment for industrial/municipal point sources based on currently available treatment technologies while allowing the discharger to use any available control technique to meet the limitations.

For industrial sources, the national ELGs are developed based on the demonstrated performance of a reasonable level of treatment that is within the

economic means of specific categories of industrial facilities. Where national ELGs have not been developed, the same performance-based approach is applied to a specific industrial facility based on the permit writer's BPJ. In some cases, effluent limits based on ELGs and BPJ (as well as water quality considerations) may be included in a single permit.

5.1 Application of Technology-Based Effluent Limitations for Non-Municipal Dischargers

When developing technology-based effluent limitations for non-municipal dischargers, the permit writer must consider all applicable standards and requirements for all pollutants discharged. As indicated above, applicable technology-based requirements may include national standards and requirements applicable to all facilities in specified industrial categories, or facility-specific technology-based requirements based on the permit writer's BPJ. It is important, therefore, that permit writers understand the basis of the national standards and the differences between the various required levels of treatment performance. This section describes the statutory and regulatory foundation of the performance-based standards, and discusses considerations in the application of these standards for non-municipal dischargers.

5.1.1 Statutory and Regulatory Foundation

Originally, the Federal Water Pollution Control Act amendments of 1972 directed EPA to develop standards of performance (effluent limitation guidelines) for industrial categories. Specifically, for "existing" industrial dischargers, the Act directed the achievement:

> "...by July 1, 1977, of effluent limitations which will require application of the best practicable control technology currently available [BPT], and by July 1, 1983, of effluent limitations which will require application of the best available technology economically achievable [BAT]."

EPA defined BPT performance as the "average of the best existing performance by well operated plants within each industrial category or subcategory." The BAT level of performance was defined as the "very best control and treatment measures that have been or are capable of being achieved." The 1972 amendments, however, made no distinction regarding the application of BPT or BAT to different types of pollutants (i.e.,

BPT and BAT applied to all pollutants). The CWA did provide additional guidance for determining the economic achievability of BPT and BAT. The BPT standards required that effluent limits be justified in terms of the "total cost of [industry wide] application of the technology in relation to the effluent reduction benefits to be achieved." Thus, BPT required EPA to consider a cost-benefit test that considered a broad range of engineering factors relating to a category's ability to achieve the limits. For BAT, the Agency must still consider the cost of attainability, however, it is not required to balance cost against the effluent reduction benefit.

In addition to BPT and BAT requirements, Section 306 of the 1972 amendments established more restrictive requirements for "new sources." EPA has defined "new source" as any facility that commenced construction following the publication of the proposed standards of performance. The intent of this special set of guidelines is to set limitations that represent state-of-the-art treatment technology for new sources because these dischargers have the opportunity to install the latest in treatment technology at the time of start-up. These standards, identified as new source performance standards (NSPS), are described as the best available demonstrated control technology, processes, operating methods, or other alternatives including, where practicable, standards permitting no discharge of pollutants. NSPSs are effective on the date of the commencement of a new facility's operation and the facility must demonstrate compliance within 90 days [see 40 CFR §122.29(d)]. A major difference between NSPS and either BPT or BAT, is the absence of the kind of requirements for a detailed consideration of costs and benefits when establishing the technology requirements.

As noted above, the 1972 amendments tasked EPA with developing ELGs representing application of BPT, BAT, and NSPS; however, EPA was unable to complete development of all effluent guidelines within the statutory deadlines. In addition, EPA did not fully address toxic discharges in the guidelines it did promulgate. As a result, EPA was sued by several environmental groups for failing to accomplish the promulgation of effluent guidelines as directed by the 1972 amendments. As a consequence of the suit, EPA and the environmental groups entered into a settlement agreement that required EPA to develop a program and adhere to a schedule for promulgating BAT effluent guidelines, pretreatment standards, and NSPSs (NRDC v. Train, 1976). The standards focused on 65 toxic "priority pollutants" (including classes

of pollutants) for 21 major categories of industries (known as "primary" industries). This settlement was incorporated in the 1977 amendments to the Act. This settlement was further amended to include a total of 34 major categories of industries and 129 priority pollutants (NRDC v. Costle, March 1979). [Note: The list of priority pollutants was subsequently revised to include 126 specific parameters which are listed in Appendix A of 40 CFR §423.]

In light of the settlement agreement, the 1977 amendments to the Federal Water Pollution Control Act (renamed the Clean Water Act [CWA]) revised the scope and application of BAT requirements to focus solely on toxic and nonconventional pollutants. The amendments also required the application of the best conventional pollutant control technology (BCT) for conventional pollutants. Both the BAT and BCT standards were defined to represent the best control and treatment measures that have been developed or that are capable of being developed within the industrial category or subcategory. With respect to the cost reasonableness, the 1977 CWA left the BAT definition relatively unchanged. For BCT, EPA was to consider the reasonableness of the relationship between the cost of attaining a reduction in effluent discharge and the benefits that would result. The cost of meeting BCT limits was expected by Congress to be comparable to the costs of achieving secondary treatment [see discussion in Section 5.2] for POTWs.

As noted in the discussion of the statutory evolution of the technology-based standards, deadlines for development of the various standards were established by the CWA and amendments. Due to technical and administrative difficulties, most of the initial deadlines were postponed. A summary of final statutory deadlines for the different required levels of treatment technologies is provided in **Exhibit 5-1**.

When applying applicable ELGs in permits, permit writers need to be aware that they do not have the authority to extend statutory deadlines in a NPDES permit; thus, all applicable technology-based requirements (i.e., ELGs and BPJ) must be applied in NPDES permits without the benefit of a compliance schedule.

EXHIBIT 5-1
Statutory Deadlines for BPT, BAT, and BCT

Pollutant	Level of Treatment	Statutory Deadlines
Conventional	BPT	July 1, 1977
Conventional	BCT	March 31, 1989
Nonconventional	BPT	July 1, 1977
Nonconventional	BAT	March 31, 1989
Toxic	BPT	July 1, 1977
Toxic	BAT	March 31, 1989

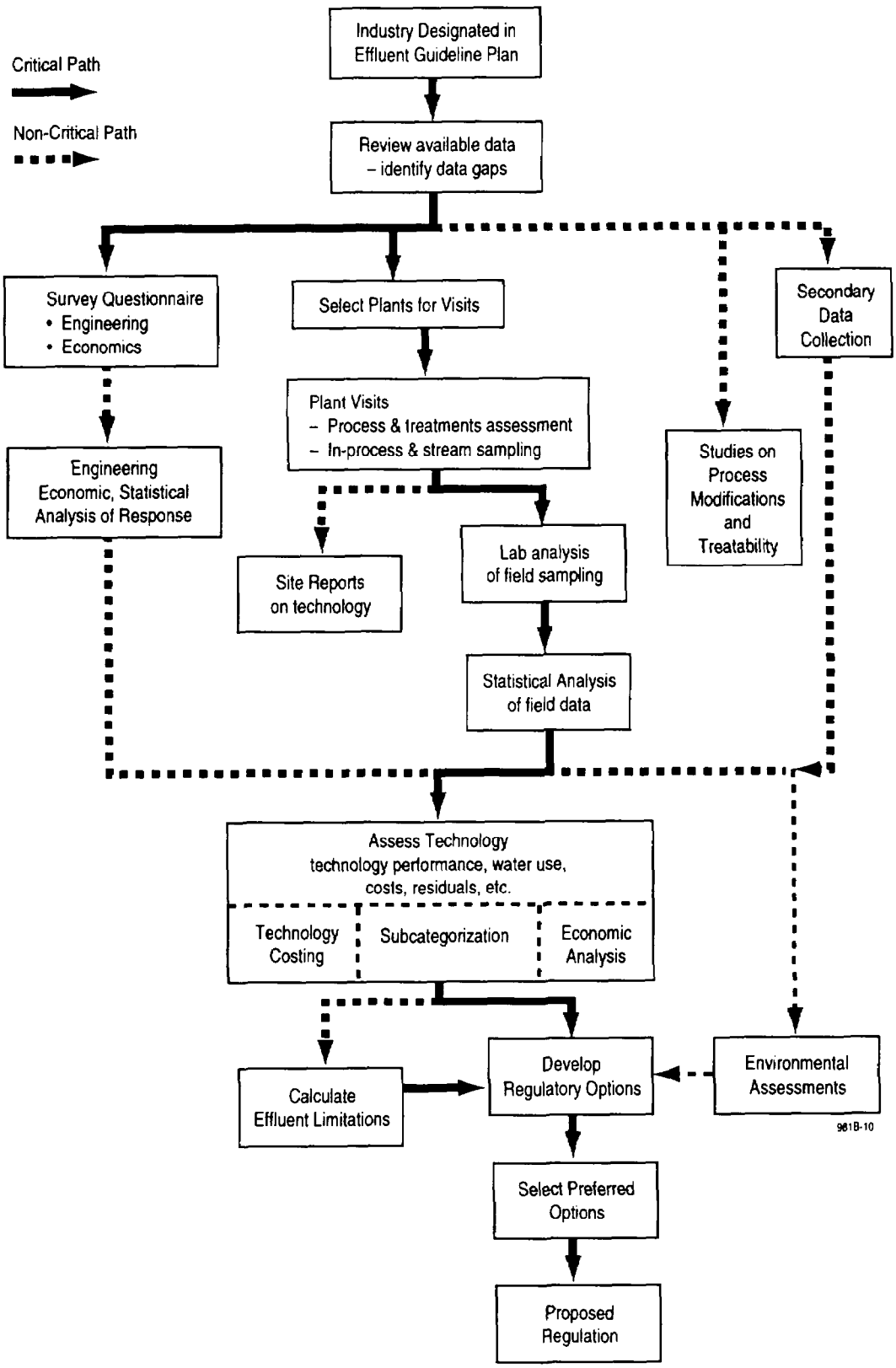
5.1.2 Development of National Effluent Limitations Guidelines and Performance Standards

Effluent limitations guidelines and performance standards are established by EPA for different industrial categories since the best control technology for one industry is not necessarily the best for another. These guidelines are developed based on the degree of pollutant reduction attainable by an industrial category through the application of control technologies, irrespective of the facility location. Using these factors, similar facilities are regulated in the same manner. In theory, for example, a pulp and paper mill on the west coast of the United States would be required to meet the same technology-based limitations as an identical plant located on the east coast (unless there were special site-specific concerns that had to be addressed).

To date, EPA has established guidelines and standards for more than 50 different industrial categories (e.g., metal finishing facilities, steam electric power plants, iron and steel manufacturing facilities). These guidelines appear in 40 CFR Parts 405-499, a list of which is provided in **Appendix B**. Additionally, Section 304(m) of the 1987 Water Quality Act (WQA) requires EPA to publish a biennial plan for developing new ELGs and a schedule for the annual review and revision of existing promulgated guidelines. As such, EPA is constantly developing new guidelines, and revising or updating existing guidelines.

Developing ELGs is a complicated and time-consuming effort. A schematic showing the general guidelines development process is presented in **Exhibit 5-2**. The regulations are based on complex engineering and economic studies that determine a subcategorization scheme for each industrial category and the wastewater

EXHIBIT 5-2
Effluent Guidelines Flowchart



characteristics and treatment capabilities of each industrial category and/or subcategory. The CWA requires EPA to assess certain factors when establishing ELGs, including the following:

- Age of the equipment and facilities involved
- Manufacturing processes used
- Engineering aspects of the application of recommended control technologies, including process changes and in-plant controls
- Non-water quality impacts, including energy requirements
- Cost
- Other factors, as deemed appropriate.

Where necessary, EPA sets multiple ELGs for facilities within a given category, where data indicates varying conditions warranting different requirements. These subdivisions, known as subcategories, provide EPA with a second level of regulatory control to improve consistency of the guidelines within an industrial category.

EPA develops both daily maximum and long-term average limitations for all ELGs, both of which must be included in the permit by the permit writer. The daily maximum limitations are based on the assumption that daily pollutant measurements are lognormally distributed. Long-term average limitations are based on the distribution of averages of measurements drawn from the distribution of daily measurements. When designing a treatment system, EPA recommends that the permittee target the design of its treatment system to meet the long-term average rather than the daily maximum. The daily maximum is intended to account for variation in effluent concentration above the long-term average.

It should be noted that ELGs are not always established for every pollutant present in a point source discharge. In many instances, ELGs are established only for those pollutants that are necessary to ensure that industrial facilities comply with the technology-based requirements of the CWA (i.e., BPT, BCT, BAT, NSPS). These are often referred to as "indicator" pollutants. For example, EPA may choose to regulate only one of several metal pollutants that are present in the effluent from an industrial category; however, compliance with the ELG (i.e., implementation of technology-based controls) will ensure that all metals present in the discharge are adequately treated.

EPA produces a number of documents that will prove useful to permit writers responsible for applying ELGs in permits. Most notable are the "Development Documents," prepared by EPA for every industrial category with ELGs. Development Documents are produced by EPA as part of the development of ELGs and provide a detailed overview of the limitations development process, including decisions made on applicability of the regulations to various process operations.

5.1.3 General Considerations Concerning the Use of Effluent Limitation Guidelines

Derivation of effluent limits based on ELGs requires that the permit writer have a general understanding of the ELGs for all industrial categories, and detailed knowledge of the ELGs applicable to the permittee. In order to properly apply effluent guidelines, there are several considerations that a permit writer must take into account:

- **Categorization**—Determination of the proper category and subcategory of the facility and proper use of the guidelines applicable to the category or subcategory under consideration
- **Multiple Products or Multiple Categories**—Classification of plants that fall under more than one subcategory and/or have multiple products with multiple measures of production
- **Production/Flow-based Limitations**—Determination of the appropriate measure of production or flow
- **Tiered Permit Limits**—Use of alternate limits for varying production and flow scenarios
- **Mass Versus Concentration Limits**—Considerations in the application of mass versus concentration limits.

Each of these considerations is discussed further below.

Once the appropriate ELGs have been identified, application of the limitations is relatively straightforward since it involves the application of a guideline that has already been technically derived (and sometimes litigated). Implementation of ELGs does require familiarity with several sources of information, particularly the CFR and the *Federal Register* (*FR*). As an example, two pages of the ELGs for the Iron and Steel Manufacturing industrial category are presented as **Exhibit 5-3**.

EXHIBIT 5-3
ELGs for Iron and Steel Manufacturing

SUBPART H—Continued

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
Chromium	0.00709	0.00284
Nickel	0.00636	0.00213
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

(4) Continuous.

SUBPART H

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/kkg (pounds per 1,000 lb) of product	
TSS	0.0964	0.0413
Chromium	0.00138	0.000551
Nickel	0.00124	0.000413
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

(b) Salt bath descaling, reducing.

(1) Batch.

SUBPART H

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/kkg (pounds per 1,000 lb) of product	
TSS	0.0949	0.0407
Cyanide	0.00102	0.000339
Chromium	0.00136	0.000542
Nickel	0.00122	0.000407
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

(2) Continuous.

SUBPART H

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/kkg (pounds per 1,000 lb) of product	
TSS	0.532	0.228
Cyanide	0.00569	0.00190

SUBPART H—Continued

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
Chromium	0.00759	0.00304
Nickel	0.00683	0.00228
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

[47 FR 23284, May 27, 1982; 47 FR 41739, Sept. 22, 1982]

§ 420.83 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(a) Salt bath descaling, oxidizing.

(1) Batch, sheet and plate.

SUBPART H

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/kkg (pounds per 1,000 lb) of product	
Chromium	0.00292	0.00117
Nickel	0.00263	0.000876

(2) Batch, rod and wire.

SUBPART H

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/kkg (pounds per 1,000 lb) of product	
Chromium	0.00175	0.000701
Nickel	0.00158	0.000526

(3) Batch, pipe and tube.

EXHIBIT 5-3
ELGs for Iron and Steel Manufacturing (continued)

SUBPART H

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/dkg (pounds per 1,000 lb) of product	
Chromium	0.00709	0.00284
Nickel	0.00638	0.00213

(4) Continuous.

SUBPART H

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/dkg (pounds per 1,000 lb) of product	
Chromium	0.00138	0.000551
Nickel	0.00124	0.000413

(b) Salt bath descaling, reducing.
(1) Batch.

SUBPART H

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/dkg (pounds per 1,000 lb) of product	
Cyanide	0.00102	0.000339
Chromium	0.00136	0.000542
Nickel	0.00122	0.000407

(2) Continuous.

SUBPART H

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/dkg (pounds per 1,000 lb) of product	
Cyanide	0.00569	0.00190
Chromium	0.00759	0.00304
Nickel	0.00683	0.00228

§ 420.84 New source performance standards (NSPS).

The discharge of wastewater pollutants from any new source subject to this subpart shall not exceed the standards set forth below.

(a) Salt bath descaling, oxidizing.
(1) Batch, sheet and plate.

SUBPART H

Pollutant or pollutant property	New source performance standards	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/dkg (pounds per 1,000 lb) of product	
TSS	0.204	0.0876
Chromium	0.00292	0.00117
Nickel	0.00263	0.000876
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

(2) Batch, rod and wire.

SUBPART H

Pollutant or pollutant property	New source performance standards	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/dkg (pounds per 1,000 lb) of product	
TSS	0.123	0.0526
Chromium	0.00175	0.000701
Nickel	0.00158	0.000526
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

(3) Batch, pipe and tube.

SUBPART H

Pollutant or pollutant property	New source performance standards	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Kg/dkg (pounds per 1,000 lb) of product	
TSS	0.496	0.213
Chromium	0.00709	0.00284
Nickel	0.00638	0.00213
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

Categorization

To properly use and apply ELGs, the permit writer must first determine which industrial category(s) applies to the facility being permitted. In determining the appropriate category(s) into which a facility falls, the Standard Industrial Classification (SIC) code is often very helpful. SIC codes were developed and are maintained by the Federal government as a way to classify establishments by type of activity for comparing economic and other types of facility-specific data. A listing of SIC codes corresponding with ELG categories is provided in **Appendix C** and is useful for determining applicable industrial categories.

Item V-II of NPDES Application Form I requires that the applicant provide the SIC code for the activity covered by the permit application. In some instances, the SIC code will identify both the industrial category and the subcategory of a particular facility. Often, the SIC code will identify the appropriate industrial category, but may not necessarily identify the subcategory.

Example:

A primary smelter of copper, SIC code 3331, falls under the Nonferrous Metals Manufacturing category listed in 40 CFR Part 421. In this particular case, SIC code 3331 also clearly identifies the facility in the Copper Smelting Subcategory.

Example:

A facility that manufactures acrylic acids and acrylic acid esters (SIC code 2869) can easily be classified as subject to the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) category based on its SIC code; however, determination of the applicable subcategory requires additional effort. In this example, the permit writer can determine from a review of the industrial categorization discussion in the Development Document for the OCPSF industry that facilities performing these manufacturing operations are subject to Subpart G (bulk organic chemicals).

Although SIC codes provide a helpful starting point for categorizing a facility, the permit writer should be cautious of relying exclusively on SIC codes for determining the appropriate industrial category. SIC codes were not developed based on EPA's industrial classification scheme, or vice versa, and, therefore, may not always correspond exactly with the categorization process. It is also important to note that more than one SIC code may apply to a facility. EPA's Development Documents,

provide detailed information on the applicability of the regulations to specific types of facilities and are useful sources of information when categorizing a facility. Similarly, *FR* notices of the promulgated ELGs provide additional insight into applicability of the guideline to various types of facilities.

When determining applicable ELGs, it is best to identify the categories first, and then, through a careful analysis of plant operations, determine the subcategories. The determination of applicable categories can be accomplished by quickly classifying the categories as "not applicable" or "potentially applicable."

Example:

If a brewery is under consideration, the Iron and Steel Manufacturing category would obviously not be applicable but Organic Chemicals might be, depending on the extent of recovery and processing of byproducts. A careful analysis of the production of the plant and comparison to the subcategories under Organic Chemicals would establish which, if any, of the subcategories are applicable.

In many cases, industrial facilities may not clearly fall into a category or a subcategory, thus requiring some research on the part of the permit writer to identify the applicable category and subcategory.

Example:

An integrated washing machine producer (SIC code 3633) would be categorized in the Household Laundry Equipment category (as specified under the SIC code system). However, depending on the activities occurring at the facility, it may also fall under the Porcelain Enameling, Metal Finishing, or Plastic Molding and Forming categories for purposes of regulation under effluent guidelines.

After determination of potential categories, the permit writer can conduct a more detailed evaluation to narrow the list to only the applicable categories and subcategories using more detailed facility information.

Multiple Products or Multiple Categories

There are instances when one facility produces multiple products, or whose production process is covered by multiple categories and subcategories. In these cases, the permit writer must examine the applicable guidelines closely to ensure that (1) one guideline does not supersede another, and (2) the guidelines are properly

applied. For example, as presented in **Exhibit 5-4**, the preamble to the final rule for the OCPSF ELGs (52 *FR* 42523) identified numerous circumstances where the OCPSF regulations are superseded by existing ELGs for other industrial categories.

When a facility is subject to multiple effluent guidelines, the permit writer must apply each of the effluent guidelines in deriving the technology-based effluent limits for the particular facility. If all wastewaters regulated by effluent guidelines are combined prior to treatment and discharge to navigable waters, then the permit writer could simply combine the allowable pollutant loadings from each effluent guideline to arrive at a single technology-based effluent limit for the facility (i.e., a "building block" approach).

Circumstances will also arise when an effluent guideline for one subcategory regulates a different set of pollutants than the effluent guidelines applicable to another subcategory. If all regulated wastestreams are combined, there are two approaches to ensure proper application of the effluent guidelines:

- If one wastestream containing a pollutant that is not covered by an effluent guideline is combined with another wastestream that has applicable effluent guidelines for the same pollutant, then the permit writers must use BPJ to establish a technology-based effluent limit for the non-regulated wastewater (see Section 5.1.4).
- If one wastestream that does not contain a pollutant is combined with another wastestream that has applicable effluent guidelines for the pollutant, the permit writer must ensure that the non-regulated wastestream does not dilute the regulated wastestream to the point where the pollutant is not analytically detectable. If this circumstance occurs, then the permit writer will most likely need to establish internal outfalls, as allowed under 40 CFR §122.45(h).

Effluent guidelines may also specify inconsistent limit expressions that will have to be adjusted. For example, effluent guidelines for one category (e.g., porcelain enameling) may contain limits with a daily maximum limit, while effluent guidelines for another category (e.g., electroplating) sets a 4-day average limit for the same pollutant. In this case, both ELGs must be applied in the permit. If this situation arises, a permit writer has several alternatives such as:

EXHIBIT 5-4
OCPSF Effluent Limitations Guidelines

(OCPSF) manufacturing facilities. It applies to process wastewater discharges from these facilities.

For the purposes of this regulation, OCPSF process wastewater discharges are defined as discharges from all establishments or portions of establishments that manufacture products or product groups listed in the applicability sections of this regulation, and are included within the following U.S. Department of Commerce Bureau of the Census Standard Industrial Classification (SIC) major groups:

(1) SIC 2865—Cyclic Crudes and Intermediates, Dyes, and Organic Pigments,

(2) SIC 2869—Industrial Organic Chemicals, not Elsewhere Classified,

(3) SIC 2821—Plastic Materials, Synthetic Resins, and Nonvulcanizable Elastomers,

(4) SIC 2823—Cellulosic Man-Made Fibers, and

(5) SIC 2824—Synthetic Organic Fibers, Except Cellulosic.

The OCPSF regulation does not apply to process wastewater discharges from the manufacture of organic chemical compounds solely by extraction from plant and animal raw materials or by fermentation processes.

The OCPSF regulation covers all OCPSF products or processes whether or not they are located at facilities where the OCPSF covered operations are a minor portion of and ancillary to the primary production activities or a major portion of the activities.

The OCPSF regulation does not apply to discharges from OCPSF product/process operations which are covered by the provisions of other categorical industry effluent limitations guidelines and standards if the wastewater is treated in combination with the non-OCPSF industrial category regulated wastewater. (Some products or product groups are manufactured by different processes and some processes with slight operating condition variations give different products. EPA uses the term "product/process" to mean different variations of the same basic process to manufacture different products as well as to manufacture the same product using different processes.) However, the OCPSF regulation does apply to the product/processes covered by this regulation if the facility reports OCPSF products under SIC codes 2865, 2869, or 2821, and its OCPSF wastewaters are treated in a separate treatment system at the facility or discharged separately to a municipal treatment system.

For example, some vertically integrated petroleum refineries and pharmaceutical manufacturers discharge wastewaters from the production of synthetic organic chemical products that are specifically regulated under the Petrochemical and Integrated Subcategories of the Petroleum Refining Point Source Category (40 CFR Part 419, Subparts C and E) or the Chemical Synthesis Products Subcategory of the Pharmaceuticals Manufacturing Point Source Category (40 CFR Part 439, Subpart C). The principles discussed in the preceding paragraph apply as follows: The process wastewater discharges by petroleum refineries and pharmaceutical manufacturers from production of organic chemical products specifically covered by 40 CFR Part 419 Subparts C and E and Part 439 Subpart C, respectively, that are treated in combination with other petroleum refinery or pharmaceutical manufacturing wastewater, respectively, are not subject to the OCPSF regulation no matter what SIC code they use to report their products. However, if the wastewaters from their OCPSF production are separately discharged to a POTW or treated in a separate treatment system, and they report their products (from these processes) under SIC codes 2865, 2869, or 2821, then discharges from these manufacturing operations are subject to regulation under the OCPSF regulation, regardless of whether the OCPSF products are covered by 40 CFR Part 419, Subparts C and E and Part 439, Subpart C.

Today's OCPSF category regulation applies to plastics molding and forming processes when plastic resin manufacturers mold or form (e.g., extrude and pelletize) crude intermediate plastic material for shipment off-site. This regulation also applies to the extrusion of fibers. Plastics molding and forming processes other than those described above are regulated by the Plastics Molding and Forming effluent guidelines and standards (40 CFR Part 463).

Public comments requested guidance relating to the coverage of OCPSF research and development facilities. Stand-alone OCPSF research and development, pilot plant, technical service, and laboratory bench scale operations are not covered by the OCPSF regulation. However, wastewater from such operations conducted in conjunction with and related to existing OCPSF manufacturing operations at OCPSF facilities is covered by the OCPSF regulation because these operations would most likely generate wastewater with characteristics similar to the commercial manufacturing facility. Research and development, pilot plant, technical service, and laboratory operations which are unrelated to existing OCPSF plant operations, even though conducted on-site, are not covered by the OCPSF regulation because they may generate wastewater with characteristics dissimilar to that from the commercial OCPSF manufacturing facility.

Finally, as described in the following paragraphs, this regulation does not cover certain production that has historically been reported to the Bureau of Census under a non-OCPSF SIC subgroup heading, even if such production could be reported under one of the five SIC code groups covered by today's regulation.

The Settlement Agreement (see Section III.A) requires the Agency to establish regulations for the Organic Chemicals Manufacturing SIC codes 2865 and 2869 and for the Plastics and Synthetic Materials manufacturing SIC code 282. SIC 282 includes the three codes covered by this regulation, 2821, 2823, and 2824, as well as SIC 2822, Synthetic Rubber (Vulcanizable Elastomers), which is covered specifically in the Settlement Agreement by another industrial category, Rubber Manufacturing (40 CFR Part 428). The Agency therefore directed its data collection efforts to those facilities that report manufacturing activities under SIC codes 2821, 2823, 2824, 2865 and 2869. Based on an assessment of this information and the integrated nature of the synthetic organic chemicals, plastics and synthetic fibers industry, the Agency also defined the applicability of the OCPSF regulation by listing the specific products and product groups that provide the technical basis for the regulation.

Since many of these products may be reported under more than one SIC code even though they are often manufactured with the same reaction chemistry or unit operations, the Agency considered extending the applicability of the OCPSF regulation (50 FR 29066; July 17, 1985, or 51 FR 44082; December 8, 1986) to include OCPSF production reported under the following SIC subgroups:

1. SIC 2911058—aromatic hydrocarbons manufactured *from* purchased refinery products,

2. SIC 2911632—aliphatic hydrocarbons manufactured *from* purchased refinery products,

3. SIC 28914—synthetic resin and rubber adhesives (including only those synthetic resins listed under both SIC 28914 and SIC 2821 that are polymerized for use or sale by adhesive manufacturers).

- Place both limits in the permit (i.e., both the daily maximum and 4-day average)
- Apply the applicable effluent guidelines at internal outfalls [as allowed under 40 CFR §122.45(h)].

Example 1:

A facility with a newly constructed metal plating production line is added to a facility with an existing metal plating production line. Wastewater from both of these lines is commingled prior to treatment, treated, and then discharged. In this situation, the combination of the NSPS (for the new line) and BAT/BCT standards (for the older line) would be used to derive a limitation.

Example 2:

An integrated lamp maker conducts copper forming, aluminum forming, metal finishing, and porcelain enameling processes with wastewater combined prior to treatment and discharge. In this situation, the appropriate effluent guidelines for these categories must be applied to each waste stream and combined when developing limitations.

Production/Flow-Based Limitations

Most ELGs are expressed in terms of allowable pollutant discharge per unit of production (or some other measure of production) or are based on wastewater flow rates. In general, production/flow-based standards are developed for industries that incorporate flow reduction practices, and EPA considers this in the ELG development process. This methodology forces permittees to implement comparable measures to comply with the limitations. To determine permit limits, and in accordance with the requirements at 40 CFR §122.45(b), these standards are multiplied by a reasonable measure of the facility's actual production/flow rate (i.e., not the design production or flow rate). Thus, it is necessary for the permit writer to determine the facility's actual production or flow, based on information supplied by the facility in the permit application.

The ideal situation for the application of ELGs is where production or flow is constant from day-to-day and month-to-month. Production or flow for the purposes of calculating the limitations would then be the average rate. In actuality, production or flow rates are not as constant as this ideal situation. They vary based on factors such as the market demand, maintenance, product changes, down times, breakdowns, and facility modifications. As such, the production or flow rate of a facility will vary with time.

To apply production/flow-based ELGs to a facility with varying production or flow rates, the permit writer should determine a single estimate of the long-term average rate that is expected to exist during the term of the permit being prepared. It is recommended that the permit writer establish this average from the past 5 years of facility data. This single value is then multiplied by the ELGs to obtain permit limits. In certain instances, the permit writer may find that fewer than 5 years of data may better represent conditions that are anticipated for the next 5 years. This would be the case for a facility that has undergone major renovations that would impact production or flow; making use of data prior to this construction inappropriate to model future process options.

The objective in determining a production or flow estimate for a facility is to develop a single estimate of the long-term average production rate (in terms of mass of product per day or volume of process wastewater per day), which can reasonably be expected to prevail during the next term of the permit. The following example illustrates the proper application of production-based guidelines:

Example:

Company A has produced 331,000 tons, 301,500 tons, 361,500 tons, 332,000 tons, and 331,500 tons per year for the previous 5 years operating 255 days per year. What would be a reasonable measure of production for permitting purposes? Assuming that pollutant X has an effluent limitation guideline of 0.1 lbs/1,000 lbs for the monthly average and 0.15 lbs/1,000 lbs for the daily maximum, what would be the resulting effluent limitations?

Discussion:

The use of the long-term average production (i.e., average production over past 5 years = 331,500 tons per year) would be an appropriate and reasonable measure of production, if this figure represents the actual production expected to occur over the next term of the permit. Also, in evaluating these gross production figures, the number of production days must be considered. If the number of production days per year is not comparable, the numbers must be converted to production per day before they may be compared. To convert from the annual production rate to average daily rate, the annual production rate is divided by the number of production days per year. To determine the number of production days, the total number of normally scheduled nonproduction days are subtracted from the total days in a year.

If Company A normally has 255 production days per year, the annual production rate of 331,500 tons per year would yield an average daily rate of 1,300 tons per day.

Monthly average limit:
1,300 tons/day x 2,000 lbs/ton x 0.10 lbs/1,000 lbs = 260 lbs/day

Daily maximum limit:
1,300 tons/day x 2,000 lbs/ton x 0.15 lbs/1,000 lbs = 390 lbs/day

In the example above, the average production rate during the last 5 years was used as the estimate of production. This average rate is appropriate when production is not expected to change significantly during the permit term. However, if historical trends, market forces, or company plans indicate that a different level of production will prevail during the permit term, a different basis for estimating production should be used.

Tiered Permit Limits

If production rates are expected to change significantly during the life of the permit, the permit writer can include alternate or tiered limits. These tiered limits would become effective when production exceeds a threshold value, such as during seasonal production variations. As a general rule of thumb, up to a 20 percent fluctuation in production is within the range of normal variability, while changes in production higher than 20 percent could warrant consideration of alternate limits. The major characteristics of tiered limits are best described by illustration and example.

Example:

Plant B produced approximately 40 tons per day of product during spring and summer months (i.e., March through August) and 280 tons per day during fall and winter months during the previous 5 years. Production during the fall and winter months are significantly higher than during the off-season and the permittee has made a plausible argument that production is expected to continue at that level. The guideline for pollutant X is 0.08 lbs/1,000 lbs for the monthly average and 0.14 lbs/1,000 lbs for the daily maximum. What are the tiered effluent limitations?

Discussion:

The first tier or lower limits would be based on a production rate of 40 tons per day. These limits would apply between March and August.

Monthly average limit:
40 tons/day x 2,000 lbs/ton x 0.08 lbs/1,000 lbs = 6.4 lbs/day

Daily maximum limit:
40 tons/day x 2,000 lbs/ton x 0.14 lbs/1,000 lbs = 11.2 lbs/day

The second tier or higher limits would be based on a production rate of 280 tons per day. These limits would apply between September and February.

Monthly average limit:
280 tons/day x 2,000 lbs/ton x 0.08 lbs/1,000 lbs = 44.8 lbs/day

Daily maximum limit:
280 tons/day x 2,000 lbs/ton x 0.14 lbs/1,000 lbs = 78.4 lbs/day

Tiered permits with alternate limits should be used only after careful consideration of production data and only when a substantial increase or decrease in production is likely to occur. In the example above, the lower limits would be in effect when production was at "low" levels. During periods of significantly higher production, the higher limits would be in effect. In addition, alternate limits may also be appropriate in the case of special processes or product lines. The thresholds, measures of production, and special reporting requirements must be detailed in the permit. Special reporting requirements include provisions such as:

- The permittee notifying the permitting authority at least two business days prior to the month they expect to be operating at a higher level of production and the duration this level of production is expected to continue
- The permittee reporting, in the discharge monitoring report, the level of production and the limitation and standards applicable to that level.

Mass Versus Concentration Limits

The regulations at 40 CFR §122.45(f)(1) require that all permit limits, standards, or prohibitions be expressed in terms of mass units (e.g., pounds, kilograms, grams) except under the following conditions:

1) For pH, temperature, radiation, or other pollutants that cannot appropriately be addressed by mass limits;
2) When applicable standards and limitations are expressed in terms of other units of measurement; or
3) If in establishing technology-based permit limitations on a case-by-case basis limitations based on mass are infeasible because the mass or pollutant cannot be related to a measure of production. The limitations, however, must ensure that dilution will not be used as a substitute for treatment.

While the regulations require that limitations be expressed in terms of mass, a provision is included at 40 CFR §122.45(f)(2) that allows that permit writer, at his or her discretion, to express limits in additional units (e.g., concentration units). Where limits are expressed in more than one unit, the permittee must comply with both.

As provided by the regulations, the permit writer may determine that expressing limits in more than one unit is appropriate under certain circumstances. For example,

expressing limitations in terms of concentration as well as mass encourages the proper operation of a treatment facility at all times. In the absence of concentration limits, a permittee would be able to increase its effluent concentration (i.e., reduce its level of treatment) during low flow periods and still meet its mass-based effluent limits. Concentration limits discourage the reduction in treatment efficiency during low flow periods, and require proper operation of treatment units at all times.

The derivation of concentration limits should be based on evaluating historical monitoring data and using engineering judgment to be sure they are reasonable. In certain situations, the use of concentration limits may not be appropriate since they may discourage the use of innovative techniques, such as water conservation by the permittee. For example, if a facility had a history of providing efficient treatment of its wastewater and also wished to practice water conservation, inclusion of concentration limits would not be appropriate (i.e., concentration limits would prohibit decreases in flow that would concurrently result in an increase in pollutant concentration). To summarize, the applicability of concentration limits should be a case-by-case determination based upon the professional judgment of the permit writer.

It should be noted that the long-term average flow should be used to calculate both the monthly average and daily maximum concentrations. The use of the long-term average flow is most appropriate for the calculation of concentration limits because it will reflect the range of concentrations that could be expected in a well operated plant. The use of the maximum daily flow is not appropriate to determine concentration limits from the mass limitations because it will reduce the concentration below the value which could be expected in a well operated plant. Alternatively, use of the lowest flow value will increase the concentration limit to levels above what would be expected in a well operated plant.

Example 1:

An industrial facility (leather tanner) is subject to effluent limitations guidelines based on its rate of production. The permit writer calculates the applicable mass-based limits based on the long-term production rate at the facility and incorporates the mass limits in accordance with 40 CFR §122.45(f)(1).

In reviewing the past inspection records for the facility, the permit writer notes that while the facility is generally in compliance with its mass limits, the effluent flow and concentration vary widely. To ensure that the treatment unit is operated properly at all times, the permit writer determines that concentration-based limits are also appropriate. The permit writer consults the EPA Development Document for the leather tanning effluent limitations guidelines and bases the concentration-based limits on the demonstrated performance of the treatment technology upon which the effluent guidelines were based. The concentration-based limits are then incorporated in the permit in accordance with 40 CFR §122.45(f)(2).

Example 2:

For Company A, the mass limits for pollutant X have been set at 260 lbs/day and 390 lbs/day monthly average and daily maximum, respectively. What are the monthly average concentration limitations in milligrams per liter (mg/l) using both an average flow of 0.9 mgd and the low flow of 0.6 mgd? Note: 8.34 is a conversion factor with the units (lbs/day)/(mgd)(mg/l).

Discussion:

Monthly average limit (based on average flow):
260 lbs/day/(8.34 x 0.9 mgd) = 35 mg/l

Monthly average limit (based on low flow):
260 lbs/day/(8.34 x 0.6 mgd) = 52 mg/l

This is almost 150 percent more than the concentration during average flow!

In determining applicable effluent concentration limitations, the monthly average and daily maximum mass limits divided by the average flow will provide appropriate concentrations.

Monthly average limit:
260 lbs/day/(8.34 x 0.9 mgd) = 35 mg/l

Daily maximum limit:
390 lbs/day/(8.34 x 0.9 mgd) = 52 mg/l

5.1.4 Best Professional Judgment Permit Limits

Best Professional Judgment (BPJ)-based limits are technology-based limits derived on a case-by-case basis for non-municipal (industrial) facilities. BPJ limits are established in cases where ELGs are not available for, or do not regulate, a particular pollutant of concern. BPJ is defined as the highest quality technical opinion developed by a permit writer after consideration of all reasonably available and pertinent data or information that forms the basis for the terms and conditions of a NPDES permit.

The authority for BPJ is contained in Section 402(a)(1) of the CWA, which authorizes the EPA Administrator to issue a permit containing "such conditions as the Administrator determines are necessary to carry out the provisions of this Act" prior to taking the necessary implementing actions, such as the establishment of ELGs. During the first round of NPDES permits in the early-to-mid-1970s, a majority of permits were based on the authority of Section 402(a)(1) of the CWA. These first round so-called best engineering judgment permits were drafted because effluent guidelines were not available for many industries. As effluent guidelines began to be promulgated, permit writers had to rely less on their best engineering judgment and could apply the ELGs in permits. As the implementation of the age of toxic pollutant

control continues, the use of BPJ conditions in permits has again become more common. However, the statutory deadline for compliance with technology-based effluent limits (including BPJ-based pollutant limits) was March 31, 1989. Therefore, compliance schedules cannot be placed in permits to allow for extensions in meeting BPJ pollutant limits.

BPJ has proven to be a valuable tool for NPDES permit writers over the years. Because it is so broad in scope, BPJ allows the permit writer considerable flexibility in establishing permit terms and conditions. Inherent in this flexibility, however, is the burden on the permit writer to show that the BPJ is reasonable and based on sound engineering analysis. If this evaluation of reasonableness does not exist, the BPJ condition is vulnerable to a challenge by the permittee. Therefore, the need for and derivation of the permit condition, and the basis for its establishment, should be clearly defined and documented. References used to determine the BPJ condition should be identified. In short, the rationale for a BPJ permit must be carefully drafted to withstand the scrutiny of not only the permittee, but also the public and, ultimately, an administrative law judge.

Establishment of BPJ Permit Limits

The NPDES regulations in 40 CFR §125.3 state that permits developed on a case-by-case basis under Section 402(a)(1) of the CWA must consider (1) the appropriate technology for the category class of point sources of which the applicant is a member, based on all available information, and (2) any unique factors relating to the applicant. To set BPJ limits, a permit writer must first determine a need for additional controls beyond existing ELGs. The need for additional controls may be the result of the facility not falling under any of the categories for which ELGs exist (e.g., barrel reclaimers, transportation equipment cleaning facilities, or industrial laundries) or discharging pollutants of concern that are not directly or indirectly addressed by the development of the ELGs (e.g., a pharmaceutical manufacturer or a petroleum refiner may discharge elevated levels of organic solvents for which category-specific guidelines do not exist). It should be noted that prior to establishing BPJ-based limits for a pollutant not regulated in an effluent guideline, the permit writer should ensure that the pollutant was not considered by EPA while developing the ELGs (i.e., BPJ-based effluent limits are not required for pollutants that were considered by EPA for regulation under the effluent guidelines, but for which EPA determined that no ELG

was necessary). Information contained in the appropriate "Development Document" should assist permit writers in making this determination.

In setting BPJ limitations, the permit writer must consider several specific factors as they appear in 40 CFR §125.3(d). These factors, which are enumerated below, are the same factors required to be considered by EPA in the development of ELGs and, therefore, are often referred to as the Section 304(b) factors:

- For BPT requirements:
  - The total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application
  - The age of equipment and facilities involved*
  - The process employed*
  - The engineering aspects of the application of various types of control techniques*
  - Process changes*
  - Non-water quality environmental impact including energy requirements*
- For BCT requirements:
  - All items in the BPT requirements indicated by an asterisk (*) above
  - The reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived
  - The comparison of the cost and level of reduction of such pollutants from the discharge of POTWs to the cost and level of reduction of such pollutants from a class or category of industrial sources
- For BAT requirements:
  - All items in the BPT requirements indicated by an asterisk (*) above
  - The cost of achieving such effluent reduction.

A permit writer must consider each of these factors in establishing BPJ-based conditions in permits. Since BPJ contains an element of judgment or educated opinion, a permit writer with the proper tools should be able to establish BPJ conditions in permits that are both technically sound and reasonable.

A technically sound and reasonable permit is not likely to be successfully challenged by the permittee or a third party. In this context, "technically sound permit conditions" means that the conditions are achievable with existing technology.

"Reasonable" means that the conditions are achievable at a cost that the facility can afford. Historically, some of the other factors, such as age, process employed and non-water quality impacts have assumed lesser importance than the technical and economic feasibility evaluations.

BPJ Permitting Tools and References

Permit writers can develop BPJ limits using one of two different methods. A permit writer can either transfer numerical limitations from an existing source such as from a similar NPDES permit or an existing ELG, or derive new numerical limitations. Numerous tools and references for BPJ permit writing exist. As one gains experience drafting BPJ permits, it is common practice to rely on some references more than others. **Exhibit 5-5** lists references and provides some examples for selected BPJ data sources that have proven useful to permit writers over the years.

Most of the tools and references listed in Exhibit 5-5 can be used to derive new BPJ-based permit limits. They provide information related to the expected performance of wastewater treatment systems. For example, the *Treatability Manual*[4] and associated data base provides treatability information for over 1,400 pollutants. Information collected for use in developing effluent guidelines and standards can also provide treatability data for a significant number of pollutants and for a variety of types of industrial wastewaters. The *Technical Support Document for Water Quality-Based Toxics Control*[5] provides extensive information and guidance related to the statistical considerations when establishing effluent limits.

Since best management practices (BMPs) can also be used by permit writers as the basis for effluent limits, the *Guidance Manual for Developing Best Management Practices*[6] can be used by permit writers to identify potentially applicable BMPs that could be used for the facility to be permitted. In addition, *Storm Water Management*

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[4]USEPA (1980). *Treatability Manual, Volumes I - V.* EPA-600/8-80-042a-e. Office of Research and Development.

[5]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

[6]USEPA (1993). *Guidance Manual for Developing Best Management Practices.* (BMPs). EPA-833-B-93-004. Office of Water.

EXHIBIT 5-5
BPJ Permitting Tools

- Abstracts of Industrial NPDES Permits
- Treatability Manual and Data Base
- NPDES Best Management Practices Guidance Document
- Guidance Manual for Developing Best Management Practices (BMPs). EPA 833-B-93-004. (USEPA, 1993) Office of Water and Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. EPA 832-R-92-006. (USEPA, 1992) Office of Water.
- Technical Support Document for the Development of Water Quality-based Permit Toxic Control
- Workbook for Determining Economic Achievability for NPDES Permits
- National Environmental Investigation Center reports on specific facilities
- Toxicity reduction evaluations for selected industries
- Industry experts within EPA Headquarters, Regions, and States
- Effluent guidelines development information
  - CWA Section 308 questionnaires
  - Screening and verification data
  - Development documents
  - Contractor's reports
  - Proposed regulations
  - Project Officers
- Permit Compliance System data
- Permit/compliance file information
  - Previous NPDES application forms
  - Discharge Monitoring Reports
  - Compliance Inspection reports
- Other media permit files (e.g., Resource Conservation and Recovery Act (RCRA) permit applications and Spill Prevention Countermeasure and Control (SPCC) plans)
- Literature (e.g., technical journals and books).

for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices[7] can be used by permit writers responsible for establishing BPJ permit limits for storm water discharges.

[7]USEPA (1992). *Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices.* EPA 832-R-92-006. Office of Water.

To assist permit writers in identifying other NPDES permits from which technology-based effluent limits can be transferred, EPA has developed the *NPDES Industrial Permit Abstracts*[8]. The abstracts are a compilation of NPDES permits issued by authorized State agencies and EPA Regional offices to a variety of non-municipal dischargers. The abstracts assist permit writers by providing rapid access to permit information in a standardized, cross-referenced and easy-to-read format.

As previously discussed, permit writers must consider the costs to comply when establishing BPJ permit limits for toxic and nonconventional pollutants. To assist permit writers in determining whether the estimated costs are reasonable for the facility to be permitted, a draft document, *Workbook for Determining Economic Achievability for National Pollutant Discharge Elimination System Permits*[9], has been developed. This guidance document provides a step-by-step procedure for permit writers to determine the economic achievability of BPJ effluent limits.

BPJ Statistical Considerations

The quality of the effluent from a treatment facility will normally vary over time. If BOD_5 data for a typical treatment plant are plotted against time, the day-to-day variations of effluent concentrations can be seen. Some of this behavior can be described by constructing a frequency-concentration plot. From this plot, one can see that for most of the time, BOD_5 concentrations are near some average value. Any treatment system can be described using the mean concentration of the parameter of interest (i.e., the long-term average) and the variance (or coefficient of variation) and by assuming a particular statistical distribution (usually lognormal).

Permit limits are generally set at the upper bounds of acceptable performance. As required at 40 CFR §122.45(d), two expressions of permit limits are required—an average monthly limit and a maximum daily limit. The use of average and maximum limits can vary depending on the effluent guidelines and water quality criteria that are consulted. Instantaneous maximums, daily averages and daily maximums, weekly averages, and monthly averages are all commonly used limitation expressions.

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[8]USEPA (1993). *NPDES Industrial Permit Abstracts 1993.* EPA-833/B-93-005. Office of Water.

[9]USEPA (1982). *Workbook for Determining Economic Achievability for National Pollutant Discharge Elimination System Permits* (DRAFT). Permits Division Prepared by Putnam, Wayes & Bartlett, Inc.

Generally, the definitions are consistent with those set forth in the Glossary of this manual.

If permit limits are set too lenient relative to the long-term average, a discharger not complying with expected performance will not exceed the limits. If permit limits are set too stringently, a discharger that is complying with expected performance may frequently exceed the limits. It is important to note that statistical variability is already built in with respect to the ELGs, and the permit writer may not perform a separate evaluation in those cases where a permit limitation is derived from a guideline.

When developing a BPJ limit, permit writers can use an approach consistent with EPA's ELG statistical approach. Specifically, the daily maximum limitation can be calculated by multiplying the long-term average by a daily variability factor. The monthly maximum limitation can be calculated similarly except that the variability factor corresponds to the distribution of monthly averages instead of daily concentration measurements.

The daily variability factor is a statistical entity defined as the ratio of the estimated 99th percentile of a distribution of daily values divided by the mean of the distribution. Similarly, the monthly variability factor is typically defined as the estimated 95th percentile of the distribution of 4-day averages divided by the mean of the monthly averages.

A modified delta-lognormal distribution can be fit to concentration data. Variability factors can then be computed for a facility distribution. The modified delta-lognormal distribution models the data as a mixture of non-detect observations and measured values. This distribution is often selected because the data for most analytes consists of a mixture of measured values and non-detects. The modified delta-lognormal distribution assumes that all non-detects have a value equal to the detection limit and that the detected values follow a lognormal distribution.

For more details on EPA's use of statistical methods for developing ELGs, refer to *Development Document for Effluent Limitations Guidelines and Standards for the*

Organic Chemicals, Plastics and Synthetic Fibers Point Source Category[10] or *Technical Support Document for Water Quality-Based Toxics Control*[11].

5.2 Application of Technology-Based Effluent Limitations for Municipal Dischargers

The largest category of dischargers requiring individual NPDES permits is municipal POTWs. Similar to its approach for controlling the discharges from industrial sources, the 1972 CWA required POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977.

More specifically, Section 301(b)(1)(B) of the CWA requires that EPA develop secondary treatment standards for POTWs as defined in Section 304(d)(1) of the Act. Based on this statutory requirement, EPA developed secondary treatment regulations which are specified in 40 CFR Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD_5, TSS, and pH. The regulations provide for special considerations regarding combined sewers, industrial wastes, waste stabilization ponds, and less concentrated influent wastewater for combined and separate sewers. Pursuant to Section 304(d)(4) of the CWA, the regulations also define "treatment equivalent to secondary treatment" and the alternative standards that apply to facilities meeting this definition.

5.2.1 Secondary Treatment

An important aspect of municipal wastewater is that it is amenable to biological treatment. The biological treatment component of a municipal treatment plant is termed secondary treatment and is usually preceded by simple settling (primary treatment). In response to the CWA requirements, EPA evaluated performance data

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[10]USEPA (1987). *Development Document for Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category.* Vol I and Vol II. EPA 440/1-87/009. Office of Water, Industrial Technology Division.

[11]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

for POTWs practicing secondary treatment and established performance standards based on its evaluation. Secondary treatment standards, therefore, are defined by the limitations provided in **Exhibit 5-6**.

EXHIBIT 5-6
Secondary Treatment Standards

Parameter	30-Day Average	7-Day Average
5-Day BOD	30 mg/l	45 mg/l
TSS	30 mg/l	45 mg/l
pH	6 - 9 s.u. (instantaneous)	–
Removal	85% BOD_5 and TSS	–

According to 40 CFR §122.45(f), permit writers must apply these secondary treatment standards as mass-based limits using the design flow of the plant. Permit writers may also apply concentration-based effluent limitations for both 30-day and 7-day average limitations.

Example:

A POTW with a design flow rate of 2.0 mgd would have permit limits based on secondary treatment standards as follows:

Mass-Based Limit = Design Flow × Concentration-Based Limit × Conversion Factor

BOD

(30-day average) 2.0 mgd × 30mg/l × 8.34 (lb)(l)/(mg)(gal) = 500 lb/day
(7-day average) 2.0 mgd × 45mg/l × 8.34 (lb)(l)/(mg)(gal) = 750 lb/day

TSS

(30-day average) 2.0 mgd × 30mg/l × 8.34 (lb)(l)/(mg)(gal) = 500 lb/day
(7-day average) 2.0 mgd × 45mg/l × 8.34 (lb)(l)/(mg)(gal) = 750 lb/day

pH

(instantaneous) 6-9 s.u.

Removal

(30-day average) 85% BOD_5 and TSS removal

Where nitrification is occurring in a treatment process, BOD_5 may not provide a reliable measure of the oxygen demand of the effluent. This is because nitrifying bacteria use a large amount of oxygen to consume unoxidized nitrogen and ammonia-

nitrogen and convert these to oxidized nitrate. In these instances, basing permit limits on carbonaceous BOD_5 ($CBOD_5$) instead of BOD_5 eliminates the impact of nitrification on effluent limits. EPA, therefore, allows for the use of $CBOD_5$ limits to minimize false indications of poor facility performance as a result of nitrogenous pollutants. Allowed under 40 CFR §133.102(a)(4), the permit writer does have the discretion to set effluent limits for $CBOD_5$ in lieu of a BOD_5 limit. EPA has studied the use of a $CBOD_5$ limit and has concluded that a 25 mg/l 30-day average and 40 mg/l 7-day average are effectively equivalent to the (30/45) BOD_5 limits.

Chemical oxygen demand (COD) and total organic carbon (TOC) laboratory tests can provide an accurate measure of the organic content of wastewater in a shorter time frame than a BOD_5 test (i.e., several hours versus 5 days). Pursuant to 40 CFR §133.104(b), the permit writer may substitute COD or TOC monitoring for BOD_5 when a long-term BOD:COD or BOD:TOC correlation has been demonstrated.

Municipal wastewater treatment facilities are required to meet secondary treatment standards with few exceptions. The exceptions, identified at 40 CFR §133.103, include:

- Treatment works that receive flows from combined sewers during wet weather can qualify for alternative monthly percent removal limits during wet weather events.
- Treatment works that receive wastes from industrial categories that have ELGs for BOD_5 and TSS less stringent than the secondary treatment requirements in 40 CFR Part 133, can qualify to have their BOD_5 and TSS limits adjusted upwards provided that: (1) the permitted discharge is less than would be permitted under the corresponding ELGs for direct discharges, and (2) the flow or loading of such pollutants introduced by the industrial category exceeds ten percent of the design flow or loading of the POTW.
- Treatment works that use waste stabilization ponds as the principal process for secondary treatment and whose operation and maintenance data indicate that the TSS values specified in the equivalent-to-secondary regulations (discussed in Section 5.2.2) cannot be achieved, can qualify to have their minimum TSS levels adjusted upwards.
- Treatment works that receive less concentrated wastes from separate sewer systems can qualify to have their percent removal limit reduced or receive a mass loading limit provided that: (1) the facility can consistently meet its permit effluent concentration limits but cannot meet its percent

removal limits because of less concentrated effluent water, (2) the facility would have been required to meet significantly more stringent limitations than would otherwise be required by the concentration-based standards, and (3) the less concentrated effluent is not the result of excessive infiltration/inflow (I/I).

[Note: The determination of excessive I/I is based on (1) the "excessive I/I" definition in 40 CFR §35.2005(b)(16) as the quantities of I/I which can be economically eliminated from a sewer system as determined in a cost-effectiveness analysis that compares the costs for correcting the I/I conditions to the total costs for transportation and treatment of the I/I and (2) I/I is not excessive if the total flow (i.e., wastewater plus I/I) to the POTW is less than 275 gallons per capita per day.]

- Treatment works receiving less concentrated wastes from combined sewers during dry weather can qualify to have their percent removal limit reduced or receive a mass loading limit provided that: (1) the facility can consistently meet its permit effluent concentration limits, but cannot meet its percent removal limits because of less concentrated effluent water, (2) the facility would have been required to meet significantly more stringent limitations than would otherwise be required by the concentration-based standards, and (3) the less concentrated influent wastewater does not result from either excessive infiltration or clear water industrial discharges during dry weather periods. If the less concentrated influent is the result of clear water industrial discharges, the treatment works must control such discharges pursuant to 40 CFR Part 403.

  [Note: The determination of excessive infiltration is based on (1) the "excessive infiltration" definition in 40 CFR §35.2005(b)(28) as the quantity of flow which is less than 120 gallons per capita per day (domestic flow and infiltration) or the quantity of infiltration which cannot be economically and effectively eliminated from a sewer system as determined in a cost effectiveness analysis and (2) the criterion that either 40 gallons per capita per day or 1,500 gallons per inch diameter per mile of sewer may be used as the threshold value for that portion of the dry weather base flow attributed to infiltration.]

The NPDES regulations also provide for a waiver from secondary treatment requirements for discharges into marine waters. In these instances, the POTW must file a modification request for a marine discharge in accordance with the requirements of 40 CFR Part 125, Subpart G. More detail on marine variance requests is provided in Section 10.1.3.

5.2.2 Equivalent-to-Secondary Treatment Definition

Following publication of the secondary treatment regulations, legislative history indicates that Congress was concerned that EPA had not "sanctioned" the use of certain biological treatment techniques that were effective in achieving significant reductions in BOD_5 and SS for secondary treatment. Therefore, to prevent unnecessary construction of costly new facilities, Congress included language in the 1981 amendment to the Construction Grants statutes [Section 23 of Pub. L. 97-147] that required EPA to provide allowances for alternative biological treatment technologies, such as a trickling filter or waste stabilization pond. In response to this requirement, definition of secondary treatment was modified on September 20, 1984, and June 3, 1985, and published in the revised secondary treatment regulations contained in 40 CFR §133.105. These regulations allow alternative limits for facilities using trickling filters and waste stabilization ponds that meet the requirements for "equivalent to secondary treatment." Several important concepts form the basis for this revision of the regulations:

- Certain classes of biological treatment facilities that are capable of achieving significant reductions in BOD_5 and TSS, but cannot consistently achieve secondary treatment, should be defined as separate and distinct from secondary treatment facilities.
- These facilities (equivalent-to-secondary) are cheaper and easier to operate and, therefore, are utilized by smaller communities. The provisions established by EPA should provide for continued use of these technologies where possible.
- The technology-based effluent limitation approach used to establish secondary treatment should be retained for equivalent-to-secondary treatment limits.
- Water quality must not be adversely affected by the application of equivalent-to-secondary treatment.
- Costly treatment plant upgrading or replacement should be avoided where equivalent facilities are operating sufficiently (e.g., achieving their original design performance levels).
- Regulations should address variations in facility performance due to geographic, climatic, or seasonal conditions.

In recognition of the above factors, the revisions to include a definition for equivalent-to-secondary treatment entail a change in the traditional definition of secondary treatment for some POTWs. The capability and performance of an

individual plant is assessed, and limits are selected from a range of possible values. Although this process has been used for industrial facilities, the concept has generally not been applied to municipal permits (with the exception of interim permit limits).

To be eligible for equivalent-to-secondary limitations, a POTW must meet all of the following criteria:

- The principal treatment process must be either a trickling filter or waste stabilization pond (e.g., the largest percentage of BOD_5 and TSS removal is provided by the trickling filter or waste stabilization pond system).
- The effluent quality consistently achieved, despite proper operations and maintenance, is in excess of 30 mg/l BOD_5 and TSS.
- Water quality is not adversely affected by the discharge.
- The treatment works as a whole provides significant biological treatment such that a minimum 65 percent reduction of BOD_5 is consistently attained (30-day average).

A treatment works that is operating beyond its design hydraulic or organic loading limit is not considered an eligible facility. If overloading or structural failure is causing poor performance, the solution to the problem is construction, not effluent limitations adjustment. There are several important implications of the equivalent-to-secondary treatment regulation as it applies to specific municipal permitting issues. These issues are discussed below.

New Facility Limitations

As specified in 40 CFR §133.105(f), the permitting authority must set more stringent limits for new facilities if an analysis of new plant performance shows that more stringent limits than the maximum equivalent-to-secondary limits (45/45) can be met. Recently, a wide range of designs (e.g., solids contact channels, covers) have been used on trickling filters to improve their performance. This situation creates a performance dichotomy between old trickling filters and current state-of-the-art plants. The regulations recognize this disparity and encourage States to establish separate limits for new trickling filters based on current design practices in the State. Where possible, an analysis of similar plants is the preferred method for establishing permit limits where in-state data on new trickling filters are not available. Where no

performance data are available for determining new plant capability, literature values may be used.

Calculation of Permit Limits for Equivalent-to-Secondary Facilities

In most cases, the permit limits for equivalent-to-secondary facilities will be selected from the 30 to 45 mg/l BOD_5 and TSS monthly average, and 45 to 65 mg/l BOD_5 and TSS weekly average range established by the regulation. Obviously, not all permits will be set at the 45 mg/l monthly average and 65 mg/l weekly average top of the range. The selection should be based on current performance data for the last two years of operation, at a minimum.

Where the plant performance data contain erroneous values because of plant upsets, or other situations not associated with poor operation or maintenance, an adjustment to the permit limit calculation may be made. The data for the month in question may be adjusted by dropping the erroneous daily value and recalculating the monthly average based on the remaining daily values. Another alternative is to analyze monthly average values for a period greater than two years and drop the monthly averages that are erroneous because of explained upset situations. Discharge Monitoring Report (DMR) data should be used for calculations whenever possible. The DMRs must support the permit writer's decision for an equivalent to secondary facility. It should be noted that the burden of proof for performance data and demonstration of proper operation and maintenance is the responsibility of the municipality.

A trickling filter or lagoon will often be combined with another biological process (i.e., activated sludge process) in one treatment plant. In this case, if the trickling filter or lagoon qualifies for equivalent-to-secondary limits, the permit limits for the treatment plant can be derived by averaging the equivalent-to-secondary and conventional secondary treatment limits. To accomplish this, a flow-weighted average of the two effluent concentration limits should be calculated and applied as the outfall limitation for the permit. An alternative to this approach is the use of internal waste stream limitations as authorized by 40 CFR §122.45(h) for each biological process effluent line. The permit writer should encourage the continued use of existing trickling filters and lagoons, where appropriate, through the application of appropriate equivalent-to-secondary limits. However, the permit writer must be sure that these facilities are

capable of meeting the proposed effluent limits without causing water quality impacts before the permit limits can be adjusted. If one cannot determine this, equivalent-to-secondary limits cannot be used in the permit.

Alternative State Requirements (ASRs)

The Alternative State Requirement (ASR) provision contained in 40 CFR §133.105(d) of the regulation allows States the flexibility to set permit limits above the maximum levels of 45 mg/l monthly average and 65 mg/l weekly average BOD_5 and TSS from lagoons meeting certain requirements. Where lagoon suspended solids requirements are already above 45 mg/l in accordance with 40 CFR §133.103(c), an ASR by the State is not necessary, unless higher limits are desired. To establish an ASR, the State must do two things:

- Identify a group of equivalent facilities that warrant different limits in exceedance of the equivalent-to-secondary values contained in 40 CFR Part 133
- Justify the higher permit limitations for these facilities.

The group of facilities can be selected because of climatic or geographic location, the type of technology used, or any other supportable criteria. The analysis of plant data for the group must be statistically sound and should follow the methods presented in EPA's *Technical Support Document for Water Quality-Based Toxics Control.*[12] The ASR must be approved by the EPA Region before permits can be written using the ASR values. The public notice of a proposed ASR is the responsibility of the State. EPA has published approved ASRs in 49 *FR* 37005, September 20, 1984. **Exhibit 5-7** is a summary of the ASRs for each State.

Carbonaceous BOD Limits

EPA recognizes that the carbonaceous BOD (CBOD) test can provide accurate information on treatment plant performance in many cases. However, the use of CBOD in permits should be focused on facilities with known or suspected nitrification

[12]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

problems such as underloaded facilities and new facilities with long detention times. These conditions favor nitrifying bacteria and can lead to erroneous BOD_5 test results.

The equivalent-to-secondary treatment regulations in 40 CFR §133.105(e) allow optional use of a CBOD limit and test procedure in municipal permits as a substitute for the standard BOD_5. This substitution is at the discretion of the permitting authority. To establish a CBOD limit for an equivalent-to-secondary treatment facility, the permitting authority must have data to show that nitrifying bacteria in the treatment plant are causing the BOD_5 test results to be significantly impacted. Extensive BOD_5/CBOD comparisons should not be necessary because the actual CBOD limit will be established by (1) determining the BOD_5 limit that can be met through proper operation and maintenance, and (2) if the BOD_5 limit is between 30 and 45 mg/l, setting the CBOD limit 5 units lower (e.g., between 25 and 40 mg/l).

The EPA-approved test procedures in 40 CFR Part 136 now contain a CBOD (nitrogen inhibited) test procedure. The CBOD test can be specified for any municipal permit. However, the BOD_5/CBOD relationship (5 mg/l difference) may not apply outside the 30 to 45 mg/l BOD_5 range. If CBOD limits will be used for equivalent-to-secondary permits above 45 mg/l (BOD_5), a BOD_5/CBOD relationship should be established during the ASR process. Where parallel BOD_5/CBOD test data are available, they must be submitted to the EPA Regional office with the proposed ASRs for approval. For permit limits below 30 mg/l BOD_5 the corresponding CBOD limit should be developed during an advanced treatment review or from the wasteload allocation. The use of CBOD in the permit is not a substitute for nitrogen or ammonia limits if in-stream nitrification or ammonia toxicity is creating a problem.

EXHIBIT 5-7
State-Specific ASRs

Location	Alternate TSS Limit (30-day average) (mg/l)
Alabama	90
Alaska	70
Arizona	90
Arkansas	90
California	95
Colorado	
Aerated ponds	75
All others	105
Connecticut	None
Delaware	None
District of Columbia	None
Florida	None
Georgia	90
Guam	None
Hawaii	None
Idaho	None
Illinois	37
Indiana	70
Iowa	
Controlled discharge, 3 cell	Case-by-case but not greater than 80
All others	80
Kansas	80
Kentucky	None
Louisiana	90
Maine	45
Maryland	90
Massachusetts	None
Michigan: Controlled seasonal discharge	
Summer	70
Winter	40
Minnesota	None
Mississippi	90
Missouri	80
Montana	100

EXHIBIT 5-7
State-Specific ASRs (continued)

Location	Alternate TSS Limit (30-day average) (mg/l)
Nebraska	80
North Carolina	90
North Dakota	
North and East of Missouri River	60
South and West of Missouri River	100
Nevada	90
New Hampshire	45
New Jersey	None
New Mexico	90
New York	70
Ohio	65
Oklahoma	90
Oregon	
East of Cascade Mountains	85
West of Cascade Mountains	50
Pennsylvania	None
Puerto Rico	None
Rhode Island	45
South Carolina	90
South Dakota	120
Tennessee	100
Texas	90
Utah	None
Vermont	55
Virginia	
East of Blue Ridge Mountains	60
West of Blue Ridge Mountains	78
East slope counties: Loudoun, Fauquier, Rappahannock, Madison, Green, Albemarle, Nelson, Amherst, Bedford, Franklin, Patrick.	Case-by-base application of 60/78 limits.
Virgin Islands	None
Washington	75
West Virginia	80
Wisconsin	80
Wyoming	100
Trust Territories and N. Marianas	None

Source: 49 *FR* 37005; 9/20/84

Chapter 6

Water Quality-Based Effluent Limits

Permit writers must consider the impact of every proposed surface water discharge on the quality of the receiving water. Water quality goals for a water body are defined by State water quality standards. A permit writer may find, by analyzing the effect of a discharge on the receiving water, that technology-based permit limits are not sufficiently stringent to meet these water quality standards. In such cases, the CWA and EPA regulations require development of more stringent, water quality-based effluent limits (WQBEL) designed to ensure that water quality standards are met. In order to develop effective WQBELs, permit writers must be familiar with State water quality standards methods for predicting water quality impacts from discharges, and procedures for establishing WQBELs. This chapter provides basic information on these subjects. For more detailed information on water quality-based permitting, refer to the *Technical Support Document for Water Quality-Based Toxics Control* (TSD),[13] or equivalent State or regional procedures.

[13]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

6.1 Overview of Water Quality Standards

WQBELs involve a site-specific evaluation of the discharge and its effect on the receiving water. A WQBEL is designed to protect the quality of the receiving water by ensuring that State water quality standards are met. To understand how to develop WQBELs, the permit writer must understand State water quality standards and the water quality goals they define.

Section 303(c) of the CWA requires every State to develop water quality standards applicable to all water bodies or segments of water bodies that lie within the State. Once standards are developed, EPA must approve or disapprove them. Water quality standards should (1) include provisions for restoring and maintaining the chemical, physical, and biological integrity of State waters, (2) provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water ("fishable/swimmable"), and (3) consider the use and value of State waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation. Currently, States are required to review their water quality standards at least once every three years and revise them as necessary. When writing a permit, the permit writer must use the most current State water quality standards. For more information regarding procedures for developing water quality standards, refer to EPA's Water Quality Standards Regulation at 40 CFR Part 131 and the *Water Quality Standards Handbook: Second Edition.*[14]

Under §510 of the CWA, States may develop water quality standards more stringent than required by the Water Quality Standards Regulation. Also, EPA reviews and approves or disapproves State-adopted water quality standards. EPA's review is to ensure that the State water quality standards meet the requirements of the CWA and the Water Quality Standards Regulation. EPA may promulgate a new or revised standard for a State where necessary to meet the requirements of the CWA.

[14]USEPA (1994). *Water Quality Standards Handbook: Second Edition.* EPA 823-B-94-005a. Office of Water.

6.1.1 Components of Water Quality Standards

Water quality standards are composed of three parts:

- Use classifications
- Numeric and/or narrative water quality criteria
- Antidegradation policy.

Each of these three components is described below.

Use Classification

The first part of a State's water quality standard is a classification system for water bodies based on the expected beneficial uses of those water bodies. The CWA describes various uses of waters that are considered desirable and should be protected. These uses include public water supply, recreation, and propagation of fish and wildlife. The States are free to designate more specific uses (e.g., cold water aquatic life, agricultural), or to designate uses not mentioned in the CWA, with the exception of waste transport and assimilation which is not an acceptable designated use (see 40 CFR §131.10(a)). Designated uses should support the "fishable/ swimmable" goal of Section 101(a)(2) of the CWA where such uses are attainable. A State must perform a use attainability analysis under 40 CFR §131.10(j) where it: (1) does not designate a "fishable/swimmable" use for a water; (2) wishes to remove a "fishable/swimmable" designated use; or (3) wishes to adopt subcategories of a designated "fishable/swimmable" use that would require less stringent criteria. The use attainability analysis is a structured scientific assessment of the factors affecting the attainment of a use. The analysis may include physical, chemical, biological, and economic factors as described in 40 CFR §131.10(g).

Water Quality Criteria

The second part of a State's water quality standard is the water quality criteria deemed necessary to support the designated uses of each water body. Section 303(a-c) of the CWA requires States to adopt criteria sufficient to protect designated uses for State waters. These criteria may be numeric or narrative. The CWA requires States to adopt numeric criteria for certain toxic pollutants where they are necessary to protect designated uses. EPA's Water Quality Standards Regulation encourages

States to adopt both numeric and narrative water quality criteria. See Section 6.1.2, Establishing Water Quality Criteria, of this manual for additional information on the development of numeric and narrative criteria.

Antidegradation Policy

The third part of a State's water quality standard is the State's antidegradation policy. Each State is required to adopt an antidegradation policy consistent with EPA's antidegradation regulations (40 CFR §131.12) and to identify the methods it will use for implementing the policy. Antidegradation policies provide three tiers of protection from degradation of water quality:

- **Tier 1**—Protects existing uses and provides the absolute floor of water quality for all waters of the United States. Existing instream water uses are those uses that were attained on or after November 28, 1975, the date of EPA's first Water Quality Standards Regulation, or uses for which existing water quality is suitable unless prevented by physical problems such as substrate or flow.
- **Tier 2**—Protects the level of water quality necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water in waters that are currently of higher quality than required to support these uses. Before water quality in Tier 2 waters can be lowered, there must be an antidegradation review consisting of: (1) a finding that it is necessary to accommodate important economical or social development in the area where the waters are located; (2) full satisfaction of all intergovernmental coordination and public participation provisions; and (3) assurance that the highest statutory and regulatory requirements for point sources and best management practices for nonpoint sources are achieved. Furthermore, water quality may not be lowered to less than the level necessary to fully protect the "fishable/swimmable" uses and other existing uses.
- **Tier 3**—Protects the quality of outstanding national resources, such as waters of national and State parks and wildlife refuges and waters of exceptional recreational or ecological significance. There may be no new or increased discharges to these waters and no new or increased discharges to tributaries of these waters that would result in lower water quality (with the exception of some limited activities that result in temporary and short-term changes in water quality).

Additional information on water quality standards is available in the *Water Quality Standards Handbook: Second Edition.*[15]

6.1.2 Establishing Water Quality Criteria

Water quality criteria set ambient levels of individual pollutants or parameters, or describe conditions of a water body that, if met, will generally protect the designated use of the water. Water quality criteria are developed to protect aquatic life and human health, and, in some cases, wildlife from the deleterious effects of pollutants. Section 304(a) of the CWA directs EPA to publish water quality criteria guidance to assist States in developing water quality standards. EPA criteria or guidance consists of three components:

- **Magnitude**—The level of pollutant (or pollutant parameter), generally expressed as a concentration, that is allowable.
- **Duration**—The period of time (averaging period) over which the instream concentration is averaged for comparison with criteria concentrations.
- **Frequency**—How often criteria can be exceeded.

EPA's efforts on criteria development have been focused on the 65 pollutants listed in Section 307(a) of the CWA. Some of the 65 pollutants on the list are actually families or classes of organic compounds consisting of many individual chemicals. EPA translated this list into a new list of 129 priority toxic pollutants. Subsequently, two volatile chemicals and one water unstable chemical were removed from the list so that the present list contains 126 priority toxic pollutants. Criteria for the priority toxic pollutants that EPA has developed to date are contained in individual criteria documents and summarized in a document entitled *Quality Criteria for Water 1986,*[16] more commonly referred to as the *Gold Book.*

[15]USEPA (1994). *Water Quality Standards Handbook: Second Edition.* EPA 823-B-94-005a. Office of Water.

[16]USEPA (1986). *Quality Criteria for Water, 1986.* EPA-440/5-86-001. Office of Water Regulations and Standards.

Numeric Criteria

Numeric water quality criteria are values expressed as levels, constituent concentrations, toxicity units (see discussion of whole effluent toxicity below), or numbers deemed necessary to protect designated uses. These criteria often form the basis for NPDES WQBELs. They also can be useful in assessing and managing nonpoint sources. In 1987, Congress increased the emphasis of the CWA on numeric criteria for toxic pollutants by enacting Section 303(c)(2)(B) of the act. This section requires States to adopt numeric criteria for the 126 priority toxic pollutants for which EPA has developed criteria guidance and where the discharge or presence of the pollutant could reasonably be expected to interfere with the designated uses of a water body. States may establish numeric criteria using EPA criteria guidance, modified to reflect site specific conditions, or other scientifically defensible methods.

EPA criteria for the protection of aquatic life address both short-term (acute) and long-term (chronic) effects on both freshwater and saltwater species. The following example shows the current EPA criteria for cadmium.

Example:

Aquatic Life

The procedures described in the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* indicate that, except possibly where a locally important species is very sensitive, freshwater aquatic organisms and their uses should not be affected unacceptably if the 4-day average concentration (in ug/L) of cadmium does not exceed the numerical value given by $e^{(0.7852[\ln(\text{hardness})]-3.490)}$ more than once every 3 years on the average and if the one-hour average concentration (in ug/L) does not exceed the numerical value given by $e^{(1.128[\ln(\text{hardness})]-3.828)}$ more than once every 3 years on the average. For example, at hardnesses of 50, 100, and 200 mg/L as $CaCO_3$ the 4-day average concentrations of cadmium are 0.66, 1.1, and 2.0 ug/L, respectively, and the 1-hour average concentrations are 1.8, 3.9 and 8.6 ug/L. If brook trout, brown trout, and striped bass are as sensitive as some data indicate, they might not be protected by this criterion.

Human health criteria are designed to protect people from exposure resulting from consumption of water and fish or other aquatic life (e.g., mussels, crayfish). The following example contains EPA's human health criteria for cadmium.

Example:

Human Health

The ambient water quality criterion for cadmium is recommended to be identical to the existing drinking water standard which is 10 ug/L. Analysis of the toxic effects data resulted in a calculated level which is protective of human health against the ingestion of contaminated water and contaminated aquatic organisms. The calculated value is comparable to the present standard. For this reason a selective criterion based on exposure solely from consumption of 6.5 grams of aquatic organisms was not derived.

Narrative Criteria

All States have adopted narrative criteria to supplement numeric criteria for toxicants. Narrative criteria are statements that describe the desired water quality goal. Examples of narrative criteria are provided below. Narrative criteria can be the basis for limiting specific pollutants where the State has no numeric criteria for those pollutants or they can be used to limit toxicity where the toxicity cannot be traced to a specific pollutant. EPA's Water Quality Standards Regulation requires States to develop implementation procedures for narrative criteria that address all mechanisms to be used by the State to ensure that narrative criteria are attained.

Example:

Narrative criteria can be statements, requiring that discharges be "free from toxics in toxic amounts" or "free of objectionable color, odor, taste, and turbidity."

6.1.3 Future Directions for Water Quality Standards

The water quality standards program is constantly evolving. New scientific, regulatory, and policy developments affect the nature of the program. For example, three new areas where criteria are being developed include biological, sediment, and wildlife criteria.

- **Biological Criteria**—EPA is developing numerical values or narrative expressions that describe the reference biological integrity of aquatic communities inhabiting unimpaired waters of a designated aquatic life use. The biological communities in these waters represent the best attainable condition for the organisms. According to EPA policy, States should develop and implement biological criteria in their water quality standards.
- **Sediment Criteria**—Sediment contamination can result from the deposition of toxicants over long periods of time and is also responsible for water

quality impacts when these toxicants are released back into the water column. EPA has proposed sediment criteria for five organic chemicals (phenanthrene, fluoranthene, dieldrin, acenaphthene, and endrin) (59 *FR* 2652; 1/18/94). EPA also is developing sediment criteria for metals, and has begun development of implementation guidance for sediment criteria.

- **Wildlife Criteria**—EPA is undertaking an initiative to develop numeric wildlife criteria to establish ambient concentrations of certain chemicals to protect mammals and birds from adverse impacts due to consumption of food and/or water containing those chemicals.

6.2 Approaches to Implementing Water Quality Standards

The control of toxic discharges to waters of the United States in an important objective of the CWA. To effectively accomplish this objective, EPA recommends an integrated approach to implementing water quality standards and developing WQBELs. This integrated approach includes three elements: a chemical-specific approach, a whole effluent toxicity (WET) approach, and a biological criteria or bioassessment approach. Each of the three approaches is briefly described below. **Exhibit 6-1** summarizes the capabilities and limitations of each approach.

6.2.1 Chemical-Specific Approach

The chemical-specific approach uses the chemical-specific criteria for protection of aquatic life, human health, and wildlife adopted into a State's water quality standards. The criteria are used as the basis to analyze an effluent, decide which chemicals need controls, and derive permit limits that will control those chemicals to the extent necessary to achieve water quality standards in the receiving water. Chemical-specific WQBELs in NPDES permits involve a site-specific evaluation of the discharge and its effect upon the receiving water. This approach allows for the control of individual chemicals before a water quality impact has occurred or to assist in returning water quality to a level that will meet designated uses.

6.2.2 Whole Effluent Toxicity (WET) Approach

WET, the second approach to water quality-based toxics control, protects the receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent. The WET approach is useful for complex effluents where it

EXHIBIT 6-1
Components of an Integrated Approach to Water Quality-Based Toxics Control

Control Approach	Capabilities	Limitations
Chemical-Specific	– Human health protection – Complete toxicology – Straightforward treatability – Fate understood – Less expensive testing if only a few toxicants are present – Prevents impacts	– Does not consider all toxics present – Bioavailability not measured – Interactions of mixtures (e.g., additivity) unaccounted for – Complete testing can be expensive – Direct biological impairment not measured
Whole effluent toxicity	– Aggregate toxicity – Unknown toxicants addressed – Bioavailability measured – Accurate toxicology – Prevents impacts	– No direct human health protection – Incomplete toxicology (few species may be tested) – No direct treatment – No persistency or sediment coverage – Conditions in ambient may be different – Incomplete knowledge of causative toxicant
Bioassessments	– Measures actual receiving water effects – Historical trend analysis – Assesses quality above standards – Total effect of all sources, including unknown sources	– Critical flow effects not always assessed – Difficult to interpret impacts – Cause of impact not identified – No differentiation of sources – Impact has already occurred – No direct human health protection

may be infeasible to identify and regulate all toxic pollutants in the discharge or where chemical-specific pollutant limits are set, but synergistic effects are suspected to be problematic. The WET approach allows the permit writer to be protective of the narrative "no toxics in toxic amounts" criterion that is applicable to all waters of the United States and implement numeric criteria for toxicity (see the discussion below on acute and chronic toxicity).

There are two types of WET tests: acute and chronic. An acute toxicity test is usually conducted over a short time period (e.g., 48 hours) and the endpoint measured is mortality. The endpoint for an acute test is often expressed as an LC50

(i.e., the concentration of effluent that is lethal to 50 percent of the exposed test organisms). A chronic toxicity test is usually conducted over a longer period of time (e.g., 7 days) and the endpoint measured is mortality and sublethal effects, such as changes in reproduction and growth. The endpoint is often expressed as the no observed effect concentration (NOEC), the lowest observed effect concentration (LOEC), or the inhibition concentration (IC). The NOEC is the highest concentration of effluent at which no adverse effects are observed on the aquatic test organisms. The LOEC is the lowest concentration of effluent that causes observable adverse effects in exposed test organisms. The IC is an estimate of the effluent concentration that would cause a given percent reduction in a biological measurement of the test organisms.

To express criteria, facilitate modeling, and express permit limits, EPA recommends that toxicity be expressed in terms of "toxic units." A toxic unit (TU) is merely the inverse of the sample fraction. Toxicity, expressed as percent sample, is divided into 100 to obtain toxic units.

Example:

If a chronic test result is a NOEC of 25 percent effluent, that result can be expressed as 100/25 or 4.0 chronic toxic units (4.0 TUc);

If an acute test result is a LC_{50} of 60 percent, that result can also be expressed as 100/60 or 1.7 acute toxic units (1.7 TUa).

It is important to distinguish acute toxic units (TUa) from chronic toxic units (TUc). The difference between TUa and TUc can be likened to the difference between miles and kilometers. Thus, to compare a TUa and a TUc, a conversion factor called an acute-to-chronic ratio (ACR), must be developed. The ACR is a conversion factor that changes TUa into equivalent TUc. If data are insufficient to calculate an ACR (i.e., less than 10 sets of WET data), EPA recommends a default value of ACR=10. Where sufficient data are available, the ACR should be calculated as the mean of the individual ACRs for each pair of acute and chronic WET test data. The following examples show: (1) how the ACR converts TUa into TUc; (2) how to calculate an ACR from existing data; and (3) how the ACR allows permit writers to compare TUa and TUc.

Acute to Chronic Ratio Formulas:

$$ACR = \frac{\text{Acute Endpoint}}{\text{Chronic Endpoint}} = \frac{LC_{50}}{NOEC}$$

- By definition:

$$TUa = \frac{100}{LC_{50}} \qquad TUc = \frac{100}{NOEC}$$

- Thus:

$$LC_{50} = \frac{100}{TUa} \qquad NOEC = \frac{100}{TUc}$$

- Substituting:

$$ACR = \frac{LC_{50}}{NOEC} = \frac{(100/TUa)}{(100/TUc)} = \frac{TUc}{TUa}$$

Example 1:

Given: $LC_{50} = 28\%$
NOEC = 10%

$$ACR = \frac{LC_{50}}{NOEC} = \frac{28\%}{10\%} = 2.8$$

Example 2:

Given: TUc = 10.0
TUa = 3.6

$$ACR = \frac{TUc}{TUa} = \frac{10.0}{3.6} = 2.8$$

Example:

Toxicity data from POTW Discharge Monitoring Reports (C. dubia):

	LC_{50} (% Effluent)	NOEC (% Effluent)	Acute to Chronic Ratio* (ACR)
	62	10	6.2
	18	10	1.8
	68	25	2.7
	61	10	6.1
	63	25	2.5
	70	25	2.8
	17	5	3.4
	35	10	3.5
	35	10	3.5
	35	25	1.4
	47	10	4.7
Mean	**46**	**15**	**3.5**

* Calculated value.

Example:

Where: Wasteload Allocation (WLA) = toxicity level in discharge that will meet state water quality criteria (calculated value)

Acute WLA = 1.5 TUa

Chronic WLA = 4.9 TUc

Because TUc and TUa are in different units, we can use the ACR to convert TUa to TUc assuming an ACR = 10 (default value).

TUa x ACR = TUa,c
[where "TUa,c" = acute toxicity expressed in chronic toxicity units]

1.5 TUa x 10 = 15 TUa,c

4.9 TUc < 15 TUa,c: therefore the chronic WLA (4.9 TUc) is more stringent than the acute WLA (1.5 TUa); thus 4.9 TUc is used to develop the permit limit.

The ACR allows us to directly compare the chronic WLA of 4.9 TUc with the acute WLA of 1.5 TUa. Using the ACR of 10, we can express 1.5 TUa in chronic toxicity units as 15 TUa,c. We see that 4.9 TUc is less than 15 TUa,c, (the acute WLA expressed in chronic toxicity units). The more stringent value should be used for developing permit limits. Thus, the appropriate requirement that would meet both acute and chronic criteria for toxicity is 4.9 TUc.

6.2.3 Biological Criteria or Biological Assessment Approach

The biological criteria or biological assessment approach is the third approach to water quality-based toxics control. This approach is used to assess the overall biological integrity of an aquatic community. Biological criteria, or "biocriteria," are numerical values or narrative statements that describe the reference biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use. When incorporated into State water quality standards, biological criteria and aquatic life use designations serve as direct, legal endpoints for determining aquatic life use attainment. Once biocriteria are developed, the biological condition of a water body may be assessed through a biological assessment, or "bioassessment." A bioassessment is an evaluation of the biological condition of a waterbody using biological surveys and other direct measurements of resident biota in surface waters. A biological survey, or "biosurvey," consists of collecting, processing, and analyzing representative portions of a resident aquatic community to determine the community structure and function. The results of biosurveys may be compared to the reference water body to determine if the biocriteria for the designated use of the water body are

being met. EPA issued guidance on this approach in *Biological Criteria: National Program Guidance for Surface Waters.*[17]

To be fully protective of water quality, EPA developed the concept of "independent application" to characterize the relationship of the three approaches to implementing water quality standards. Independent application says that the results of one approach should not be used to contradict or overrule the results of the others. Independent application recognizes that each approach has unique as well as overlapping attributes, sensitivities, and program applications; thus, no single approach for detecting impact should be considered uniformly superior to any other approach. For example, the inability to detect receiving water impacts using a biosurvey alone is insufficient evidence to waive or relax a permit limit established using either the chemical-specific or WET method.

6.3 Determining the Need for WQBELs

Once the applicable designated uses and water quality criteria for a water body are determined, the permit writer must ensure that dischargers do not cause exceedences of these criteria. If, after technology-based limits are applied, the permit writer projects that a point source discharger may exceed an applicable criterion, a WQBEL must be imposed. EPA regulations at 40 CFR §122.44(d) require that all effluents be characterized by the permitting authority to determine the need for WQBELs in the permit.

6.3.1 Defining "Reasonable Potential" to Exceed Applicable Criteria

In deciding whether or not WQBELs are needed to protect water quality, a permit writer must determine whether the discharge causes, has the reasonable potential to cause, or contributes to an excursion of numeric or narrative water quality criteria. EPA's regulation at 40 CFR §122.44(d)(1) establishes the basis for determining if there is an excursion of the numeric or narrative water quality criteria. At a minimum, the permit writer must make this determination at each permit reissuance and must develop WQBELs as necessary to control the discharge of pollutants.

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[17]USEPA (1990). *Biological Criteria: National Program Guidance for Surface Waters.* EPA-440/5-91-004. Office of Science and Technology.

Reasonable Potential and Numeric Criteria

When conducting an effluent characterization to determine if WQBELs are needed based on chemical-specific numeric criteria in the water quality standards, the permit writer projects the receiving water concentration of pollutants contained in the effluent once that effluent enters the receiving water. If the projected concentration exceeds the applicable numeric water quality criterion for a specific pollutant, there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standards and the permit writer must develop a WQBEL.

If a State has numeric criteria for WET, the permit writer projects the toxicity once the effluent enters the receiving water. The permit writer then compares the toxicity of the receiving water to the applicable State water quality criteria. If the projected toxicity exceeds the applicable numeric water quality criterion for WET, there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standards and the permit writer must develop a WQBEL for WET.

Reasonable Potential and Narrative Criteria

If the permit writer determines that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a **narrative** criterion, the permit must contain effluent limits for WET unless the permit writer demonstrates that chemical-specific limits for the effluent are sufficient to attain and maintain applicable numeric and narrative water quality criteria.

The permit writer must investigate effluents for the presence of specific chemicals for which the State has not adopted numeric criteria, but which may be contributing to an excursion above a narrative criterion. In such cases, permit writers must establish limits using one of three options: (1) use EPA's national criteria, (2) develop their own criteria, or (3) control the pollutant through the use of an indicator.

General Considerations

When determining whether WQBELs are needed in a permit, the permit writer is required to consider, at a minimum: (1) existing controls on point and nonpoint sources of pollution; (2) the variability of the pollutant or pollutant parameter in the effluent; (3) the sensitivity of the species to toxicity testing; and (4) where appropriate, the dilution of the effluent in the receiving water (40 CFR §122.44(d)(ii)). The permit writer also must consider whether technology-based limits are sufficient to maintain State water quality standards. Finally, the permit writer should consider other available data and information pertaining to the discharger (e.g., compliance history, in-stream survey data, dilution, data from similar facilities) in addition to effluent monitoring data to assist in making an informed reasonable potential determination.

6.3.2 Determining Reasonable Potential With Effluent Monitoring Data

When characterizing an effluent for the need for a WQBEL, the permit writer should use any available effluent monitoring data as well as other information pertaining to the discharge (e.g., type of industry, compliance history, stream surveys) as the basis for a decision. The permit writer may already have effluent data available from previous monitoring, or he or she may decide to require the permittee to generate effluent monitoring data prior to permit issuance or as a condition of the issued permit. EPA recommends monitoring data be generated prior to permit limit development for the following reasons: (1) the presence or absence of a pollutant can be more clearly established or refuted; and (2) effluent variability can be more clearly defined. Data collection should begin far enough in advance of permit development to allow sufficient time for conducting toxicity tests and chemical analyses.

The permit writer can use the available effluent data and a water quality model to perform a reasonable potential analysis. The mass balance equation, presented in **Exhibit 6-2**, is a simple water quality model that can be used for this analysis. The permit writer would use the maximum observed effluent concentration, or a statistically projected worst-case value, to calculate a projected in-stream concentration, under critical stream conditions. The permit writer would then compare the projected receiving water concentration to the applicable water quality criteria to determine whether a water quality-based effluent limit is needed.

EXHIBIT 6-2
Basic Mass Balance Water Quality Equation

$$Q_dC_d + Q_sC_s = Q_rC_r$$

Q_d = waste discharge flow in million gallons per day (mgd) or cubic feet per second (cfs)
C_d = pollutant concentration in waste discharge in milligrams per liter (mg/l)
Q_s = background stream flow in mgd or cfs above point of discharge
C_s = background in-stream pollutant concentration in mg/l
Q_r = resultant in-stream flow, after discharge in mgd or cfs
C_r = resultant in-stream pollutant concentration in mg/l in the stream reach (after complete mixing occurs)

All toxic effects testing and exposure assessment parameters, for both effluent toxicity and individual chemicals, have some degree of uncertainty associated with them. The more limited the amount of data, the larger the uncertainty. To better characterize the effects of effluent variability and reduce uncertainty in the process of deciding whether to require an effluent limit EPA has developed a statistical approach to determining reasonable potential. This approach is described in detail in Chapter 3 of the *Technical Support Document for Water Quality-Based Toxics Control*[18] (hereafter referred to as the "TSD"). The statistical approach combines knowledge of effluent variability with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. This projected maximum concentration, after considering dilution, can then be compared to an appropriate water quality criterion to determine the need for an effluent limit.

Example:

Q_s	=	Available dilution from upstream river flow	= 1.2 cfs
Q_d	=	Discharge flow	= 0.31 cfs
C_s	=	Upstream river concentration	= 0.8 mg/l
C_d	=	Statistically projected maximum discharge concentration	= 2.0 mg/l
C_r	=	Receiving water concentration	
Water Quality Criterion			= 1.0 mg/l

$$C_r = \frac{Q_d\,C_d + Q_s\,C_s}{Q_r} = \frac{(0.31\,cfs)\,(2.0\,mg/l) + (1.2\,cfs)\,(0.8\,mg/l)}{(1.2\,cfs) + (0.31\,cfs)}$$

C_r = 1.05 mg/l

Discussion: Since the downstream concentration (C_r) exceeds the water quality criterion, there is a reasonable potential for water quality standards to be exceeded.

[18]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

Example:

$$C_r = \frac{(C_d)(Q_d) + (C_s)(Q_s)}{Q_r}$$

C_r = Receiving water (downstream) concentration (in toxic units)
C_s = Receiving water background concentration = 0 TU
Q_s = Receiving water flow = 23.6 cfs (for acute protection)
70.9 cfs (the 7Q10 for chronic protection)
Q_d = Discharge flow = 7.06 cfs
C_d = Discharge TUa = 2.49 TUa
TUc = 6.25 TUc
Q_r = Downstream flow = $Q_d + Q_s$

Water quality criterion for acute protection = 0.3 TUa

Water quality criterion for chronic protection = 1.0 TUc

$$C_r = \frac{(2.49)(7.06) + (0)(23.6)}{(7.06 + 23.6)} = 0.57 \text{ TUa for acute toxicity}$$

$$C_r = \frac{(6.25)(7.06) + (0)(70.9)}{(7.06 + 70.9)} = 0.57 \text{ TUc for chronic toxicity}$$

Discussion: Since the downstream concentration (C_r) exceeds the water quality criterion for acute toxicity (0.3 TUa), there is reasonable potential for water quality standards for toxicity to be exceeded.

6.3.3 Determining Reasonable Potential Without Effluent Monitoring Data

If the permit writer so chooses, or if the circumstances dictate, he or she may decide to develop and impose a WQBEL without facility-specific effluent monitoring data. WQBELs can be set for a single parameter or WET based on the available dilution and the water quality criterion or State standard in the absence of facility-specific effluent monitoring data. In justifying a limit, the more information the permit writer can acquire to support the limit, the better will be the regulatory authority's position in defending the limit, if necessary. Types of information that the permit writer may find useful include: type of industry or POTW, existing data on toxic pollutants, history of compliance problems and toxic impact, and type of receiving water and designated use. The permit writer must provide adequate justification for the limit in the permit development rationale or in the permit fact sheet. The permit writer may

well find that he or she would benefit from the collection of effluent monitoring data prior to establishing the limit. The TSD[19] provides guidance on collecting monitoring data for establishing WQBELs.

If the permit writer, after evaluating all available information on the effluent, in the absence of effluent monitoring data, is not able to decide whether the discharge causes, has the reasonable potential to cause, or contributes to an excursion above a numeric or narrative criterion for WET or for individual toxicants, the permit writer should require WET or chemical-specific testing to gather further data. In such cases, the permit writer can require the monitoring prior to permit issuance, if sufficient time exists, or may require the testing as a condition of the issued (or reissued) permit. The permit writer could then include a clause in the permit that would allow the permitting authority to reopen the permit and impose an effluent limit if the effluent testing establishes that there is reasonable potential that the discharge will cause or contribute to an excursion above a water quality criterion.

6.4 Exposure Assessment and Wasteload Allocation

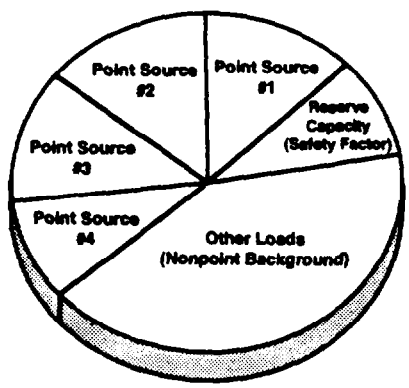
Before calculating a WQBEL, the permit writer must first determine the point source's wasteload allocation (WLA). The WLA is the fraction of a total maximum daily load (TMDL) for the water body that is assigned to the point source. This section discusses the concepts of the TMDL and WLA, describes methods for assessing exposure to pollutants in the receiving water, and explains how WLAs for a point source are calculated.

6.4.1 Total Maximum Daily Loads

A TMDL is a determination of the amount of a pollutant, or property of a pollutant, from point, nonpoint, and natural background sources, including a margin of safety, that may be discharged to a water quality-limited water body. Any loading above this capacity risks violating water quality standards. TMDLs can be expressed in terms of chemical mass per unit of time, by toxicity, or by other appropriate measures. **Exhibit 6-3** provides a graphic illustration of allocations under a TMDL.

[19]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

EXHIBIT 6-3
Components of a TMDL



- **Wasteload allocations (WLAs) are assigned to each point source discharge**
- **Load allocations (LAs) are assigned to nonpoint sources**
- **WLAs and LAs are established so that predicted receiving water concentrations do not exceed water quality criteria**

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Section 303(d) of the CWA established the TMDL process to provide for more stringent water quality-based controls when technology-based controls are inadequate to achieve State water quality standards. These statutory requirements were codified at 40 CFR §130.7. When implemented accordingly, the TMDL process can broaden the opportunity for public comment, expedite water quality-based NPDES permitting, and lead to technically sound and legally defensible decisions for attaining and maintaining water quality standards. Also, the TMDL process provides a mechanism for integrating point and nonpoint pollutant sources into one evaluation.

Based on the TMDL, point source WLAs and nonpoint source load allocations (LAs) are established so that predicted receiving water concentrations do not exceed water quality criteria. TMDLs, WLAs, and LAs are established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards, with seasonal variations and a margin of safety that account for any lack of knowledge concerning the relationship between point source and nonpoint source loadings and water quality.

In some cases, the waterbody segment under consideration may contain only one point source discharger. In this situation, States typically develop a simple TMDL

that considers the point source and background contributions of a pollutant from other sources. For other waterbody segments, a TMDL may not be available at the time the permit must be issued, or a TMDL may not be required at all. In such cases, permitting authorities have historically developed a single WLA for a point source discharging to the waterbody segment. Both simple TMDLs and single WLAs commonly rely on mass balance and simplified water quality models which assume steady-state, or constant conditions for variables such as background pollutant concentrations and stream flow. EPA has encouraged States to develop TMDLs for more difficult water quality problems involving multiple point and nonpoint source pollutant loads. These types of TMDLs require complex water quality models capable of simulating rainfall events and analyzing cumulative chemical fate and transport. Simple, steady-state modeling and more complex, dynamic modeling are discussed in greater detail in Section 6.4.3 below.

EPA is supporting innovative approaches linked to developing and implementing TMDLs, such as watershed-based trading. Trading means that pollution sources can sell or barter their ability to reduce pollution with other sources that are unable to reduce their pollutant loads as economically. TMDLs provide a basis for successful trading because they can be adapted to incorporate trades, and because the data and analyses generated in TMDLs allow water quality managers to better understand and predict the effects of proposed trades. The success of trading will rely on reasonable assurance that a TMDL will be implemented.

Further guidance related to establishing TMDLs can be found in Chapter 4 of EPA's TSD[20] and in the *Guidance for Water Quality-Based Decisions: The TMDL Process.*[21]

6.4.2 Calculating Wasteload Allocations

Before calculating a WQBEL, the permit writer must first know the WLA for the point source involved. As discussed above, the WLA is the fraction of a receiving

[20]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

[21]USEPA 1991, *Guidance for Water Quality-Based Decisions: The TMDL Process.* EPA-440/4-91-0001. Office of Water.

water's TMDL that is allocated to one of its existing or future point sources of pollution. The appropriate WLA is determined through an exposure assessment. Water quality models are the primary tools utilized by regulatory agencies in conducting an exposure assessment to determine a WLA. Models establish a quantitative relationship between a waste's load and its impact on water quality. Modeling is usually conducted by a specialized work group within the regulatory agency; however, it is important that the permit writer understand this process. The permit writer will use the end result of the model, a WLA, to derive a WQBEL.

6.4.3 Selecting a Water Quality Model

Determining which model is appropriate for a given discharge and receiving water is based upon whether or not there is rapid and complete mixing of the effluent with the receiving water. If the receiving water does not have rapid and complete mixing, a mixing zone assessment is recommended. If there is rapid and complete mixing near the discharge point, a complete mix assessment involving fate and transport models is recommended.

Mixing Zone Assessment

In incompletely mixed discharge receiving water situations, mixing zone modeling is appropriate. Mixing zones are areas where an effluent undergoes initial dilution and are extended to cover secondary mixing in the ambient water body. A mixing zone is an allocated impact zone in the receiving water where acute and chronic water quality criteria can be exceeded as long as toxic conditions are prevented and the designated use of the water is not impaired as a result of the mixing zone.

The CWA allows mixing zones at the discretion of the State. Individual State policy determines whether or not a mixing zone is allowed. EPA recommends that States make a definitive statement in their water quality standards on whether or not mixing zones are allowed and how they will be defined. EPA provides guidance on when to require a mixing zone and how to determine the boundaries and size of a mixing zone.

In general, there are two stages of mixing: discharge-induced and ambient induced. The first stage is controlled by discharge jet momentum and buoyancy of the effluent. This stage generally covers most of the mixing zone allowed by State water quality standards. Beyond the point of discharge-induced mixing, mixing is controlled by ambient turbulence. Both discharge-induced mixing and ambient-induced mixing models are available for mixing zone analyses. The *Water Quality Standards Handbook*[22] and Chapter 4 of the TSD[23] provide further guidance on mixing zones and how to conduct a mixing zone analysis.

Complete Mix Assessment

If the distance from the outfall to complete mixing is insignificant, then mixing zone modeling is not necessary. For completely mixed discharge receiving water situations, there are two major types of fate and transport water quality models: steady-state and dynamic. Model selection depends on the characteristics of the receiving water, the availability of effluent data, and the level of sophistication desired. The minimum data required for model input include receiving water flow, effluent flow, effluent concentrations, and background pollutant concentrations.

a. Steady-State Modeling

A steady-state model requires single, constant inputs for effluent flow, effluent concentration, background receiving water concentration, receiving water flow, and meteorological conditions (e.g., temperature). If only a few pollutant or effluent toxicity measurements are available or if a daily receiving water flow record is not available, steady-state assessments should be used. Steady-state models calculate WLAs at critical conditions that are usually combinations of worst-case assumptions of receiving water flow, effluent pollutant concentrations, and environmental effects. For example, a steady-state model for ammonia considers the maximum effluent discharge to occur on the day of the lowest river flow, highest upstream concentration, highest pH, and highest temperature. WLAs and permit limits derived from a steady-state model will be

[22]USEPA (1994). *Water Quality Standards Handbook: Second Edition.* EPA 823-B-94-005a. Office of Water.

[23]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

protective of water quality standards at the critical conditions and for all environmental conditions less than critical.

Steady-state modeling involves the application of a mass balance equation that allows the analyst to equate the mass of pollutants upstream of a given point (generally at a pollutant discharge, tributary stream or lateral inflow) to the mass of pollutants downstream after complete mixing. The basic formula for the mass balance model was presented as Exhibit 6-2. This model assumes that pollutants are conservative and additive, and considers only dilution as a mitigating factor affecting the pollutant concentration in-stream. The formula can be modified to account for factors such as degradation or sorption of the pollutant (in addition to dilution) where appropriate and feasible. A number of steady-state toxicant fate and transport models that consider factors affecting in-stream pollutant concentrations other than dilution are available and are discussed in Chapter 4 of the TSD[24].

The simple mass balance equation can be rearranged as follows to determine the downstream effect of a particular discharge concentration:

$$Q_d C_d + Q_s C_s = Q_r C_r$$

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r}$$

The equation can be further rearranged to determine the WLA necessary to achieve a given in-stream concentration (C_r), such as a water quality criterion:

$$C_d = \frac{C_r Q_r - C_s Q_s}{Q_d}$$

Example:

Assume a stream has a critical design flow of 1.2 cfs and a background zinc concentration of 0.80 mg/l. The State water quality criterion for zinc is 1.0 mg/l or less. The WLA for a discharge of zinc with a flow of 200,000 gpd is [Note: 200,000 gpd = 0.31 cfs]:

$C_d = [(1.0)(0.31+1.2)-(0.8)(1.2)]/0.31 = (1.51-0.96)/0.31 = 0.55/0.31 = 1.77$ mg/l

[24]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

Most States have adopted both acute and chronic numeric criteria for at least some pollutants. As such, steady-state WLA models should be used to calculate the allowable effluent load that will meet criteria at the appropriate design up-stream flow for those criteria. Each State specifies the appropriate design up-stream flow at which its water quality criteria should be applied. EPA recommends a design upstream flow for acute aquatic life criteria at the 1Q10 (1-day low flow over a 10-year period) and for chronic aquatic life criteria at the 7Q10 (7-day low flow over a 10-year period). EPA also recommends that the receiving water harmonic mean flow be used as the design upstream flow for human health protection.

Once a permit writer has a WLA for each applicable criterion, those WLAs must be translated into long term average effluent concentrations and, subsequently, maximum daily and average monthly permit limits. This process is discussed in Section 6.5 - Permit Limit Derivation. Calculating WLAs and the associated long-term average effluent concentrations for each applicable criteria and using the most stringent long-term average effluent concentration to calculate permit limits will ensure that the permit limits are protective of all applicable criteria.

b. Dynamic Modeling

If adequate receiving water flow and effluent concentration data are available to estimate frequency distributions of effluent concentrations, one of the dynamic modeling techniques could be used to develop WLAs. In general, dynamic models account for the daily variations of and relationships between flow, effluent, and environmental conditions, and therefore, directly determine the actual probability that a water quality standard will be exceeded. The three dynamic modeling techniques recommended by EPA include: continuous simulation, Monte Carlo simulation, and lognormal probability modeling.

- **Continuous simulation** is a fate and transport modeling technique that uses time series input data to predict receiving water quality concentrations in the same chronological order as that of the input variables.
- **Monte Carlo simulation** is a modeling technique that involves random selection of sets of input data for use in repetitive model runs in order to predict the probability distributions of receiving water quality concentrations.
- **Lognormal probabilistic dilution** is a modeling technique that calculates the probability distribution of receiving water quality concentrations from the lognormal probability distributions of the input variables.

These methods calculate a probability distribution for receiving water concentrations rather than a single, worst-case concentration based on critical conditions. Thus, they determine the entire effluent concentration frequency distribution required to produce the desired frequency of criteria compliance.

Chapter 4 of the TSD[25] describes steady-state and dynamic models in detail and includes specific model recommendations for toxicity and individual toxic pollutants for each type of receiving water—rivers, lakes, and estuaries. In addition, EPA has issued detailed guidelines on the use of fate and transport models of individual toxicants. Specific references for these models may be found in the *Watershed Tools Directory - A Collection of Watershed Tools*, available through the Assessment and Watershed Protection Division of the Office of Wetlands, Oceans and Watersheds [available through the internet at http://www.epa.gov]. These manuals describe in detail the transport and transformation processes involved in water quality modeling.

6.5 Permit Limit Derivation

WLAs are the outputs of water quality models, and the requirements of a WLA must be translated into a permit limit. The goal of the permit writer is to derive permit limits that are enforceable, adequately account for effluent variability, consider available receiving water dilution, protect against acute and chronic impacts, account for compliance monitoring sampling frequency, and assure attainment of the WLA and water quality standards. To accomplish these objectives, EPA recommends that permitting authorities use the statistical permit limit derivation procedure discussed in Chapter 5 of the TSD[26] with outputs from either steady-state or dynamic water quality models. EPA believes this procedure will result in the most defensible, enforceable, and protective WQBELs for both specific chemicals and WET.

[25]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

[26]ibid.

6.5.1 Expression of Permit Limits

The NPDES regulations at 40 CFR §122.45(d) require that all permit limits be expressed, unless impracticable, as both average monthly limits (AMLs) and maximum daily limits (MDLs) for all discharges other than POTWs, and as average weekly limits (AWLs) and AMLs for POTWs. The MDL is the highest allowable discharge measured during a calendar day or 24-hour period representing a calendar day. The AML is the highest allowable value for the average of daily discharges obtained over a calendar month. The AWL is the highest allowable value for the average of daily discharges obtained over a calendar week.

Technical Note

In lieu of an AWL for POTWs, EPA recommends establishing an MDL (or a maximum test result for chronic toxicity) for toxic pollutants and pollutant parameters in water quality permitting. This is appropriate for at least two reasons. First, the basis for the 7-day average for POTWs derives from the secondary treatment requirements. This basis is not related to the need for assuring achievement of water quality standards. Second, a 7-day average, which could comprise up to seven or more daily samples, could average out peak toxic concentrations and therefore the discharge's potential for causing acute toxic effects would be missed. A MDL, which is measured by a grab sample, would be toxicologically protective of potential acute toxicity impacts.

The objective is to establish permit limits that result in the effluent meeting the WLA under normal operating conditions virtually all the time. It is not possible to guarantee, through permit limits, that a WLA will never be exceeded. It is possible, however, using the recommended permit limit derivation procedures to account for extreme values and establish low probabilities of exceedance of the WLA in conformance with the duration and frequency requirements of the water quality standards.

Since effluents are variable, and permit limits are developed based on a low probability of exceedance, permit limits should take effluent variability into consideration and ensure that the requisite loading from the WLA is not exceeded under normal conditions. In effect, the limits must force treatment plant performance levels that, after considering acceptable effluent variability, will only have a low statistical probability of exceeding the WLA and will achieve the desired loadings.

6.5.2 Limits Derived from Steady-State Model Outputs

A permit limit derived from a steady-state model output depends on the type of WLA. WLAs based on protecting aquatic life will have two results: acute and chronic

requirements because State water quality standards generally provide both acute and chronic protection for aquatic life. In contrast, WLAs based on protecting human health will have only a chronic requirement. In either case, these WLA outputs need to be translated into maximum daily limits and average monthly limits. The acute and chronic WLA can be achieved for either specific chemicals or WET by using the following methodology to derive permit limits:

- Calculate a treatment performance level (frequency distribution described by a long-term average or LTA and a coefficient of variation or CV) that will allow the effluent to meet the WLA requirements modeled (there will be a calculation for the acute WLA requirement and a calculation for the chronic WLA requirement)
- For WET only, convert the acute WLA into an equivalent chronic WLA by multiplying the acute WLA by an acute-to-chronic ratio (ACR) (e.g., 2.0 TUa × 10 = 20 TUc where ACR = TUc/TUa = 10)
- Derive permit limits directly from whichever performance level is more protective.

EPA has developed tables (see Tables 5-1 and 5-2 in Chapter 5 of the TSD[27]) that permit writers can use to quickly determine the values necessary to translate a WLA into a permit limit. In addition, some permit authorities have developed their own computer programs to compute WQBELs from the appropriate inputs.

Some State water quality criteria and the corresponding WLAs are reported as a single value from which to define an acceptable level of effluent quality. An example of such a requirement is "copper concentration must not exceed 0.75 milligrams per liter (mg/l) in stream." Steady state analyses assume that the effluent is constant and that the WLA value will never be exceeded. This assumption presents a problem in deriving permit limits because permit limits need to consider effluent variability. Where there is only one water quality criterion and only one WLA, permit limits can be developed using the following procedure:

- Consider the single WLA to be the chronic WLA

[27]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

- Calculate a treatment performance level (an LTA and CV) that will allow the effluent to meet the WLA requirement modeled
- Derive maximum daily and average monthly permit limits based on the calculated LTA and CV.

6.5.3 Limits Derived from Dynamic Model Outputs

The least ambiguous and most exact way that a WLA for specific chemicals or whole effluent toxicity can be specified is through the use of dynamic modeling from which the wasteload allocation is expressed as a required effluent performance in terms of the LTA and CV of the daily values. When a WLA is expressed as such, there is no confusion about assumptions used and the translation to permit limits. A permit writer can readily design permit limits to achieve the WLA objectives. Once the WLA and corresponding LTA and CV are determined, the permit limit derivation procedure found in Chapter 5 of the TSD[28] may be used to develop effluent limits both for specific chemicals and for whole effluent toxicity.

6.5.4 Special Considerations Permits Protecting Human Health

Developing permit limits for pollutants affecting human health is somewhat different from setting limits for other pollutants because the exposure period is generally longer than one month, and can be up to 70 years, and the average exposure rather than the maximum exposure is usually of concern. Because compliance with permit limits is normally determined on a daily or monthly basis, it is necessary to set human health permit limits that meet a given WLA for every month. If the procedures for aquatic life protection were used for developing permit limits for human health pollutants, both the MDL and AML would exceed the WLA necessary to meet the required criteria concentrations. In addition, the statistical derivation procedure is not applicable to exposure periods over 30 days. Therefore, the recommended approach for setting WQBELs for human health protection is to set the average monthly limit equal to the WLA and calculate the maximum daily limit based on effluent variability and the number of samples per month using the statistical procedures described in Chapter 5 of the TSD[29].

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[28]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

[29]Ibid.

Chapter 7

Monitoring and Reporting Conditions

Having developed the effluent limits for a municipal or industrial discharger, the permit writer's next step is to establish monitoring and reporting requirements. Requiring the permittee to routinely self-monitor its discharge and to report the analytical results of such monitoring provides the permitting authority with the information necessary to evaluate discharge characteristics and compliance status. Periodic monitoring and reporting also serve to remind the permittee of its compliance responsibilities and provides feedback regarding the performance of the treatment facility(s) operated by the permittee. Permit writers should be aware of and concerned with the potential problems that may occur in a self-monitoring program such as improper sample collection procedures, poor analytical techniques, and poor or improper report preparation and documentation. To prevent or minimize these problems, the permit writer should clearly detail monitoring and reporting requirements in the permit.

The monitoring and reporting conditions section of a NPDES individual permit should contain specific requirements for the following items:

- Sampling location
- Sample collection method
- Monitoring frequencies
- Analytical methods
- Reporting and recordkeeping requirements.

Several factors should be considered in determining the specific requirements to be imposed. Basic factors that may affect sampling location, sampling method, and sampling frequency are:

- Applicability of "effluent limitations guidelines" (ELG)
- Effluent and process variability
- Effect of flow and/or pollutant load on the receiving water
- Characteristics of pollutants discharged
- Permittee compliance history.

These factors must be carefully considered by the permit writer, as any error could lead to inaccurate compliance determination, misapplication of national ELGs, and/or misapplication of State water quality standards.

The following sections provide an overview of the considerations involved in determining appropriate monitoring, reporting, and recordkeeping requirements, and describe how to properly incorporate the requirements in a NPDES permit.

7.1 Establishing Monitoring Conditions

The NPDES Program is structured such that facilities that discharge pollutants in waters of the United States are required to periodically evaluate compliance with the effluent limitations established in their permit and provide the results to the permitting authority. In addition, NPDES permits can require the permittee to monitor for additional parameters or processes not directly linked to the effluent discharge such as storm water, combined sewer overflows, municipal sludge, and/or treatment plant influent. This section describes the regulatory requirements and authorities for

monitoring conditions, and describes how these conditions can be incorporated in NPDES permits.

The regulations requiring the establishment of monitoring and reporting conditions in NPDES permits are found in 40 CFR §122.44(i) and 40 CFR §122.48. Section 122.44(i) requires permittees to monitor pollutant mass (or other applicable unit of measure), effluent volume, provide other measurements (as appropriate), and to utilize the test methods established at 40 CFR §136. Section 122.41(i) also establishes that NPDES permittees (with certain specific exceptions) must monitor for all limited pollutants and report data at least once per year.

EPA regulations at 40 CFR §122.48 state that all permits must specify requirements concerning the proper use, maintenance, and installation of monitoring equipment or methods (including biological monitoring methods when appropriate). All permits must also specify the required monitoring including the type, intervals, and frequency sufficient to yield data that are representative of the activity. The following sections focus on ensuring that permit monitoring conditions properly address these regulatory requirements.

7.1.1 Monitoring Location

The NPDES regulations do not specify the exact location to be used for monitoring. The permit writer is responsible for determining the most appropriate monitoring location and explicitly specifying this in the permit. Ultimately, the permittee is responsible for providing a safe and accessible sampling point that is representative of the discharge (40 CFR §122.41(j)(1)).

Specifying the appropriate monitoring location in a NPDES permit is critical to producing valid compliance data. Important factors to consider in selecting a monitoring location include:

- The wastewater flow should be measurable
- The location should be easily and safely accessible
- The sample must be representative of the effluent during the time period that is monitored.

Technical Note

When establishing monitoring locations for determining NPDES permit compliance, permit writers must select locations that are representative of the expected wastewater discharge. Locations should be established where the wastewater is well mixed, such as near a parshall flume or at a location in a sewer with hydraulic turbulence. Weirs tend to enhance the settling of solids immediately upstream and the accumulation of floating oil or grease immediately downstream. Such locations should be avoided for sampling.

The most logical monitoring point for an effluent is just prior to discharge to the receiving water. This is particularly true for ensuring compliance with water quality-based effluent limits (WQBELs). However, there are instances when the permit writer may need to specify alternate monitoring locations in a permit.

One typical instance that necessitates establishing an alternative monitoring location occurs when a facility combines a variety of process and non-process wastewaters prior to discharge through a common outfall structure. Under certain circumstances, when a variety of wastewaters are combined, requiring monitoring only at the final combined outfall may not be appropriate. To address this situation, 40 CFR §122.45(h) allows permit writers to establish monitoring locations at internal outfalls. Examples of situations that may require designation of internal monitoring locations include:

- **To ensure compliance with effluent limitations guidelines and standards (at non-municipal facilities)**—When non-process wastewaters dilute process wastewaters regulated under effluent guidelines, monitoring the combined discharge may not accurately depict whether the facility is complying with the effluent guidelines. Under these circumstances, the permit writer may consider requiring monitoring for compliance with technology-based effluent limits (based on application of effluent guidelines) before the process wastewater is combined with the other wastewaters.
- **To ensure compliance with secondary treatment standards (for POTWs only)**—Certain POTWs include treatment processes that are ancillary to the secondary treatment process that may impact their ability to monitor for compliance with secondary treatment standards. Under these circumstances, the permit writer may consider requiring monitoring for compliance with secondary treatment standards just after the secondary treatment process (e.g., require monitoring of effluent just after secondary clarification) before any additional treatment processes.
- **To allow detection of a pollutant**—Instances may arise where the combination of process and non-process wastewaters result in dilution of a pollutant of concern that will not be detectable using approved analytical

methods. Establishing monitoring for the pollutant at an internal location will enable characterization of the pollutant prior to dilution with other wastewaters.

When establishing internal monitoring points, permit writers need to consider the location of wastewater treatment units within the facility. This is particularly true when establishing internal monitoring locations for determining compliance with technology-based effluent limits. A facility will most likely not be able to comply with technology-based effluent limits if the permit writer establishes the monitoring location prior to the wastewater treatment unit.

Permit writers may also need to require monitoring of influent to the wastewater treatment units for certain facilities. Influent monitoring must be required for POTWs to ensure compliance with the 85 percent removal condition of the secondary treatment standards. Influent monitoring at non-POTWs may also be desired to determine influent characteristics, and if additional information related to the performance of the wastewater treatment unit is needed.

Exhibit 7-1 provides examples of how to specify sampling locations in a permit either by narrative or diagram.

7.1.2 Monitoring Frequency

The frequency for monitoring pollutants should be determined on a case-by-case basis, and decisions for setting the frequency should be set forth in the fact sheet. Some States have their own recommended sampling guidelines that can help a permit writer determine an appropriate sampling frequency. The intent is to establish a frequency of monitoring that will detect most events of noncompliance without requiring needless or burdensome monitoring.

To establish a monitoring frequency, the permit writer should estimate the variability of the concentration of the parameter by reviewing effluent data for the facility (e.g., from DMRs) or in the absence of actual data, information from similar dischargers. A highly variable discharge should require more frequent monitoring than a discharge that is relatively consistent over time (particularly in terms of flow and

EXHIBIT 7-1
Examples of Specifying Sampling Locations in Permits

NARRATIVE:

Part I. SELF-MONITORING REQUIREMENTS

A. Sample Locations

1. Discharge from the Chemistry-Fine Arts Building shall be sampled at outfall 001
2. Discharge from the Duane Physics Building shall be sampled at outfall 002
3. Discharge from the Research Lab No. 1 shall be sampled at outfall 003

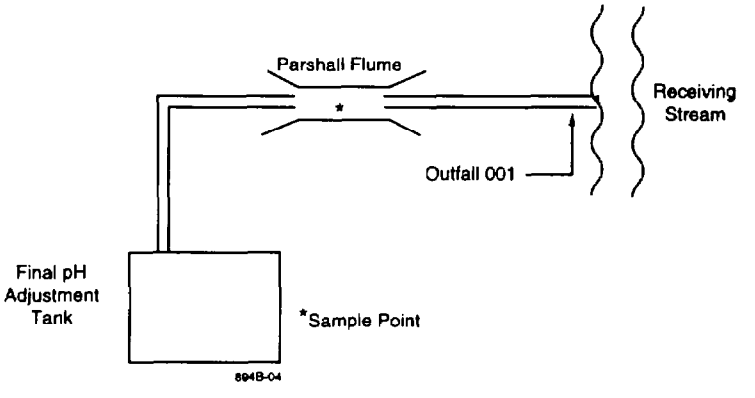
DIAGRAM:

Part I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Sample Locations

Outfall Description

001 Discharge Pipe—Discharge of wastewater generated by all regulated metal finishing processes at the facility. Samples shall be collected at the point indicated on the attached diagram.



pollutant concentration). In addition to the estimated variability, other factors that should be considered when establishing appropriate monitoring frequencies include:

- **Design capacity of treatment facility**—As an example, at equivalent average flow rates, a large lagoon system that is not susceptible to bypasses requires less frequent monitoring than an overloaded treatment facility that experiences fluctuating flow rates due to infiltration or large batch discharges from an industrial user system. The lagoon should have a relatively low variability compared to the facility receiving batch discharges.

- **Type of treatment method used**—The type of wastewater treatment used by the facility will determine the need for process control monitoring and effluent monitoring. An industrial facility with biological treatment would have similar monitoring frequencies to a secondary treatment plant with the same units used for wastewater treatment. If the treatment method is appropriate and achieving high pollutant removals on a consistent basis, the need for monitoring may be less than a plant with little treatment or insufficient treatment.
- **Post compliance record/history**—The monitoring frequency may be adjusted to reflect the compliance history of the facility. A facility with problems achieving compliance generally should be required to perform additional monitoring to characterize the source or cause of the problems or to detect noncompliance.
- **Cost of monitoring relative to discharger's capabilities**—The permit writer should not require excessive monitoring unless it is necessary to provide sufficient information about the discharge (analytical costs are addressed in Section 7.1.5).
- **Frequency of the discharge**—If wastewater is discharged in batches on an infrequent basis, the monitoring frequency should be different from a continuously discharged, highly concentrated wastewater, or a wastewater containing a pollutant that is found infrequently and at very low concentrations. The production schedule of the facility (e.g., seasonal, daily), the plant washdown schedule, and other similar factors should be considered.
- **Number of monthly samples used in developing permit limit**—The monitoring frequency should reflect the number of monthly samples used in developing the permit limits, and/or the monitoring frequencies used to develop any applicable effluent guidelines.
- **Tiered Limits**—Where the permit writer has included "tiered" limits in an NPDES permit, consideration should be given to varying the monitoring frequency requirements to correspond to the applicable tiers. For example, if a facility has seasonal discharge limits, it may be appropriate to increase the monitoring frequency during the higher production season, and reduce the frequency during the off-season.

An alternative method that can be used by permit writers to establish monitoring frequencies is the quantitative approach described in the *Technical Support Document for Water Quality-Based Toxics Control* (TSD)[30]. In short, the TSD[31] approach

[30]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

[31]ibid.

requires calculating the long-term average pollutant concentration (accounting for the expected variability of the discharge) and comparing it to the permit limit to determine the likelihood of noncompliance. The closer the long-term average is to the permit limit, the more frequent the monitoring that should be required. Obviously, this quantitative approach requires a reasonable data set from which to calculate the long-term average. Permit writers should refer to the TSD[32] for more information regarding this approach.

A permit writer may also establish a tiered monitoring schedule that reduces or increases monitoring frequency during a permit cycle. Tiered monitoring, which reduces monitoring over time, may be useful for discharges where the initial sampling shows compliance with effluent limits. If problems are found during the initial sampling, more frequent sampling and more comprehensive monitoring can be applied. This step-wise approach could lead to lower monitoring costs for permittees while still providing an adequate degree of protection of water quality.

Regulatory Update

In response to President Clinton's Regulatory Reinvention initiative, which established the goal of reducing monitoring and reporting burden by 25%, EPA issued *Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequencies* on April 19, 1996 (EPA-833-B-96-001). Under this guidance, NPDES reporting and monitoring requirements are reduced based on a demonstration of excellent historical performance. Facilities can demonstrate this historical performance by meeting a set of compliance and enforcement criteria and by demonstrating their ability to consistently discharge pollutants below the levels necessary to meet their existing NPDES permit limits. Reductions are determined parameter-by-parameter, based on the existing monitoring frequency and the percentage below the limit that parameter is being discharged at. The reductions are incorporated into the permit at the time of permit reissuance. To remain eligible for these reductions, permittees are expected to maintain parameter performance levels and good compliance and enforcement history that were used as the basis for granting the reductions.

7.1.3 Sample Collection Methods

In addition to establishing the frequency of monitoring, the permit writer must specify the type of sample that must be collected. The two basic sample collection methods include "grab" and "composite."

The analytical methods specified in 40 CFR Part 136 are required for all monitoring performed under the NPDES Program, unless the permit specifically

[32]USEPA (1991). *Technical Support Document for Water Quality-Based Toxics Control.* EPA-505/2-90-001. Office of Water Enforcement and Permits.

requires alternate methods. For many analytical procedures, the sample collection method (grab or composite) is not specified in 40 CFR Part 136, thus it should be specified in the discharge permit. 40 CFR Part 136 specifies that grab samples must be collected for pH, temperature, dissolved oxygen, chlorine, purgeable organics, sulfides, oil and grease, coliform bacteria and cyanide. The reason grab samples must be taken for these parameters is that they evaluate characteristics that may change during the time necessary for compositing.

A "grab" sample is a single sample collected at a particular time and place that represents the composition of the wastestream only at that time and place. When the quality and flow of the wastestream being sampled is not likely to change over time, a grab sample is appropriate. Grab samples should be used when:

- The wastewater characteristics are relatively constant.
- The parameters to be analyzed are likely to change with storage such as temperature, residual chlorine, soluble sulfide, cyanides, phenols, microbiological parameters and pH.
- The parameters to be analyzed are likely to be affected by the compositing process such as oil and grease and volatiles.
- Information on variability over a short time period is desired.
- Composite sampling is impractical or the compositing process is liable to introduce artifacts of sampling.
- The spatial parameter variability is to be determined. For example, variability through the cross section and/or depth of a stream or a large body of water.
- Effluent flows are intermittent from well-mixed batch process tanks. Each batch dumping event should be sampled.

Grab samples can measure maximum effect only when the sample is collected during flows containing the maximum concentration of pollutants toxic to the test organism.

Another type of grab sample is sequential sampling. A special type of automatic sampling device collects relatively small amounts of a sampled wastestream, with the interval between sampling either time or flow proportioned. Unlike the automatic composite sampler, the sequential sampling device automatically retrieves a sample and holds it in a bottle separate from other automatically retrieved samples. Many individual samples can be stored separately in the unit, unlike the

composite sampler which combines aliquots in a common bottle. This type of sampling is effective for determining variations in effluent characteristics over short periods of time.

A "composite" sample is a collection of individual samples obtained at regular intervals, usually based upon time or flow volume. A composite sample is desirable when the material being sampled varies significantly over time either as a result of flow or quality changes. There are two general types of composites and the permit writer should clearly express which type is required in the permit:

- Time composite samples collect a fixed volume at equal time intervals and are acceptable when flow variability is not excessive. Automatically timed composited samples are usually preferred over manually collected composites. Composite samples collected by hand are appropriate for infrequent analyses and screening.

  Composite samples can be collected manually if subsamples have a fixed volume at equal time intervals when flow variability is not excessive.
- Flow-proportional compositing is usually preferred when effluent flow volume varies appreciably over time. The equipment and instrumentation for flow-proportional compositing have more downtime due to maintenance problems.

  When manually compositing effluent samples according to flow where no flow measuring device exists, use the influent flow measurement without any correction for time lag. The error in the influent and effluent flow measurement is insignificant except in those cases where extremely large volumes of water are impounded, as in reservoirs.

There are numerous cases where composites are inappropriate. Samples for some parameters should not be composited (pH, residual chlorine, temperature, cyanides, volatile organics, microbiological tests, oil and grease, total phenols). They are also not recommended for sampling batch or intermittent processes. Grab samples are needed in these cases to determine fluctuations in effluent quality.

For whole effluent toxicity (WET), composite samples are used unless it is known that the effluent is most toxic at a particular time. Some toxic chemicals are short-lived, degrade rapidly, and will not be present in the most toxic form after lengthy compositing even with refrigeration or other forms of preservation. Grab samples should be required for bioassays to be taken under those circumstances.

If a sampling protocol is not specified in the regulations, the duration of the compositing time period and frequency of aliquot collection is established by the permit writer. Whether collected by hand or by an automatic device, the time frame within which the sample is collected should be specified in the permit. The number of individual aliquots which compose the composite should also be specified. NPDES application requirements specify a minimum of four aliquots for non-stormwater discharges lasting four or more hours.

Eight types of composite samples and the advantages and disadvantages of each are shown in **Exhibit 7-2**. As shown in Exhibit 7-2, samples may be composited by time or flow and a representative sample will be assured. However, where both flow and pollutant concentration fluctuate dramatically, a flow-proportioned composite sample should be taken because a greater quantity of pollutant will be discharged during these periods. As an alternative, time-proportioned samples may be taken with flow records used for weighing the significance of various samples.

Continuous monitoring is another option for a limited number of parameters such as flow, total organic carbon (TOC), temperature, pH, conductivity, fluoride and dissolved oxygen. Reliability, accuracy and cost of continuous monitoring vary with the parameter. Continuous monitoring can be expensive, so continuous monitoring will usually only be an appropriate requirement for the most significant dischargers with variable effluent. The environmental significance of the variation of any of these parameters in the effluent should be compared to the cost of continuous monitoring.

Technical Note

When establishing continuous monitoring requirements, the permit writer should be aware that the NPDES regulations concerning pH limits allow for a period of excursion when the effluent is being continuously monitored (40 CFR §401.17).

7.1.4 Analytical Methods

The permit writer must specify the analytical methods to be used for monitoring. These are usually indicated as 40 CFR Part 136 in the standard conditions of the permit [40 CFR §§122.41(j)(4) and 122.44(i)]. In particular, analytical methods for industrial and municipal wastewater pollutants must be conducted in accordance with

EXHIBIT 7-2
Compositing Methods

Method	Advantages	Disadvantages	Comments
Time Composite			
• Constant sample volume, constant time interval between samples	Minimal instrumentation and manual effort; requires no flow measurement	May lack representativeness, especially for highly variable flows	Widely used in both automatic samplers and manual handling
Flow-Proportional Composite			
• Constant sample volume, time interval between samples proportional to stream flow	Minimal manual effort	Requires accurate flow measurement reading equipment; manual compositing from flowchart	Widely used in automatic as well as manual sampling
• Constant time interval between samples, sample volume proportional to total stream flow at time of sampling	Minimal instrumentation	Manual compositing from flowchart in absence of prior information on the ratio of minimum to maximum flow; chance of collecting too small or too large individual discrete samples for a given composite volume	Used in automatic samplers and widely used as manual method
• Constant time interval between samples, sample volume proportional to total stream flow since last sample	Minimal instrumentation	Manual compositing from flow chart in absence of prior information on the ratio of minimum to maximum flow; chance of collecting either too small or too large individual discrete samples for a given composite volume	Not widely used in automatic samplers but may be done manually
Sequential Composite			
• Series of short period composites, constant time intervals between samples	Useful if fluctuations occur and time history is desired	Requires manual compositing of aliquots based on flow	Commonly used; however, manual compositing is labor intensive
• Series of short period composites, aliquots taken at constant discharge increments	Useful if fluctuations occur and time history is desired	Requires flow totalizer; requires manual compositing of aliquots based on flow	Manual compositing is labor intensive
Continuous Composite			
• Constant sample volume	Minimal manual effort, requires no flow measurement	Requires large sample capacity; may lack representativeness for highly variable flows	Practical but not widely used
• Sample volume proportional to stream flow	Minimal manual effort, most representative especially for highly variable flows	Requires accurate flow measurement equipment, large sample volume, variable pumping capacity, and power	Not widely used

the methods specified pursuant to 40 CFR Part 136, which references one or more of the following:

- Test methods in Appendix A of 40 CFR Part 136[33]
- *Standard Methods for the Examination of Water and Wastewater, 18th Edition*[34]
- *Methods for the Chemical Analysis of Water and Wastewater*[35]
- *Test Methods: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater.*[36]

The analytical methods contained in 40 CFR Part 136 are test methods designed only for priority and conventional pollutants, and some nonconventional pollutants. In the absence of analytical methods for other parameters, the permit writer must still specify the analytical methods to be used. An excellent source of analytical method information is the Environmental Monitoring Methods Index (EMMI). The EMMI is an official EPA database linking 50 EPA regulatory lists, 2,600 substances and 926 analytical methods on EMMI. EMMI data correlate EPA's regulated substances with their associated analytical methods, published detection limits, and regulatory limits. For more information, call NTIS at (703) 321-8547 for system requirements.

7.1.5 Other Considerations in Establishing Monitoring Requirements

The regulations do not specifically require a permit writer to evaluate costs when establishing monitoring conditions in a permit. However, as a practical matter, the permit writer should consider the cost of sampling that he/she imposes on the permittee. The sample frequency and analyses impact the analytical cost. The estimated 1994-1995 costs for analytical procedures are shown in **Exhibit 7-3**.

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[33]*Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act (40 CFR Part 136).* (Use most current version)

[34]American Public Health Association, American Water Works Association, and Water Pollution Control Federation (1992). *Standard Methods for the Examination of Water and Wastewater,* 18th Ed.

[35]USEPA (1979). *Methods for the Chemical Analysis of Water and Wastewater.* EPA-600/4-79-020. Environmental Monitoring and Support Laboratory.

[36]USEPA (1982). *Test Methods: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater.* EPA-600/4-82-057.

EXHIBIT 7-3
Estimated Costs for Common Analytical Procedures[1]

BOD_5	$30
TSS	$15
TOC	$60
Oil and Grease	$35
Odor	$30
Color	$30
Turbidity	$30
Fecal coliform	$15
Metals (each)	$15
Cyanide	$35
Gasoline (Benzene, Toluene, Xylene)	$100
Purgeable Halocarbons (EPA Method 601)	$113
Acrolein and Acrylonitrile (EPA Method 603)	$133
Purgeables (EPA Method 624)	$251
Phenols (EPA Method 604)	$160
Organochlorine Pesticides and PCBs (EPA Method 608)	$157
Polynuclear Aromatic Hydrocarbons (EPA Method 610)	$175
Dioxin (2, 3, 7, 8-TCDD (EPA Method 613))	$400
Base/Neutrals and Acids (EPA Method 625)	$434
Priority pollution scan[2]	$2,000
Acute WET	$750
Chronic WET	$1,500

[1] Based on 1994–1995 costs.

[2] Includes 13 metals, cyanide, dioxin, volatiles (purgeables), base/neutral and acids, pesticides and PCBs, and asbestos.

If simple or inexpensive indicator parameters (e.g., BOD_5 acts as an indicator for the priority pollutants in the Wood and Gum Chemicals category) or alternate parameters will produce data representative of the pollutant present in the discharge, then the indicators or surrogate pollutants or parameters should be considered. Complex and expensive sampling requirements may not be appropriate if the permit writer cannot justify the need for such analyses.

7.1.6 Establishing Monitoring Conditions for Unique Discharges

There are a variety of discharges that are regulated under the NPDES permit program that are different than traditional wastewater discharges. A permit writer needs to account for these unique discharges in establishing monitoring requirements. This section discusses several of these unique discharges including storm water, combined sewer and sanitary sewer overflows, WET, and municipal sludge.

Storm Water Monitoring Considerations

Monitoring requirements vary according to the type of permit regulating the storm water discharge and the activity. Storm water discharges may be regulated by State programs, provided the State is authorized to administer the NPDES Storm Water Program, or EPA Regions. At the Federal level, several permitting options are available; depending on the type of activity, industrial facilities may seek coverage under an individual permit, the Baseline Industrial General Permit, or the Multi-sector General Permit. In addition, construction activities that disturb 5 or more acres of land are regulated under the Baseline Construction General Permit. Municipalities serving over 100,000 people are also regulated, but on an individual permit basis. Each of these permitting mechanisms establishes different monitoring programs. Several States have used the Federal permits as models for their permit conditions.

Specific monitoring conditions for the Federal general permits are detailed in the following documents:

- "*Final NPDES General Permits for Storm Water Discharges Associated With Industrial Activity*," *Federal Register*, September 9, 1992. (Baseline Industrial General Permit).

- "*Final NPDES General Permits for Storm Water Discharges from Construction Sites*," *Federal Register*, September 9, 1992. (Baseline Construction General Permit).
- "*Final NPDES Storm Water Multi-Sector General Permit for Industrial Activities*," *Federal Register*, September 9, 1992. (Multi-Sector General Permit).

Monitoring Combined Sewer Overflows and Sanitary Sewer Overflows

EPA's CSO Control Policy (59 *FR* 18688) requires monitoring to characterize the combined sewer system, assist in developing the Long-Term Control Plan (LTCP), and illustrate compliance with permit requirements. Monitoring as part of the nine minimum controls (NMC) is done to develop an initial system characterization and includes analyzing existing data on precipitation events, on the combined sewer system and CSOs, on water quality, and conducting field inspections. As part of the LTCP, a permittee is required to develop a more complete characterization of the sewer system through monitoring and modeling. Finally, to illustrate compliance with the permit requirements, the permittee is required to conduct a post-construction compliance monitoring program. Specific monitoring requirements of this post-construction compliance monitoring program will be unique to each permittee's LTCP and should be established as specific monitoring conditions in the individual NPDES permit. These monitoring conditions should require monitoring of a representative number of CSOs for a representative number of wet weather events for certain key parameters along with ambient water quality monitoring to ascertain attainment with water quality standards. EPA is currently preparing eight guidance manuals on various aspects of the CSO Control Policy, including one on monitoring, *Combined Sewer Overflows: Guidance for Monitoring and Modeling (draft).*[37]

A facility's permit may also contain monitoring requirements for sanitary sewer overflows (SSOs). These would be developed on a case-by-case basis.

[37]USEPA (1995). *Combined Sewer Overflows–Guidance for Monitoring and Modeling.* (DRAFT). EPA-832/R-95-005.

Whole Effluent Toxicity Monitoring

The use of whole effluent toxicity (WET) testing to evaluate the toxicity in a receiving stream was discussed in Chapter 6. The biomonitoring test procedures were promulgated in 40 CFR Part 136 on October 16, 1995 (60 *FR* 53529). WET monitoring conditions included in permits should specify the particular biomonitoring test to be used, the test species, required test endpoint, and QA/QC procedures. EPA has published recommended toxicity test protocols in four manuals:

- *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.*[38]
- *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms.*[39]
- *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms.*[40]
- *NPDES Compliance Monitoring Inspector Training: Biomonitoring.*[41]

Samples for WET may be composite or grab samples. Twenty-four hour composite samples are suggested **except** when (1) the effluent is expected to be more toxic at a certain time of day; (2) toxicity may be diluted during compositing; and (3) the size of the sample needed exceeds the composite sampler volume (e.g., 5 gallons).

WET tests are relatively expensive (see Exhibit 7-3 on costs). Therefore the test frequency should be related to the probability of any discharger having whole

[38]USEPA (1991). *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*

[39]USEPA (1991). *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms.* EPA-600/4-91-003. Environmental Monitoring and Support Laboratory.

[40]USEPA (1991). *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Third Edition.* EPA-600/4-91-002. Environmental Monitoring and Support Laboratory.

[41]USEPA (1990). *NPDES Compliance Monitoring Inspector Training: Biomonitoring.* Office of Water.

effluent toxicity. Samples should be evenly spaced throughout the year so that seasonal variability can be ascertained.

Municipal Sludge Monitoring

The purpose of monitoring municipal sludge is to ensure safe use or disposal. The 40 CFR Part 503 sludge regulations require monitoring of sewage sludge that is applied to land, placed on a surface disposal site, or incinerated. The frequency of monitoring is based on the annual amount of sludge that is used or disposed by these methods. POTWs that provide the sewage sludge to another party for further treatment (such as composting) must provide that party with the information necessary to comply with 40 CFR Part 503. Sewage sludge disposed of in a municipal solid waste landfill unit must meet the requirements in 40 CFR Part 258, which is the criteria for municipal solid waste landfills.

Exhibit 7-4 shows the minimum monitoring requirements for sewage sludge prior to use and disposal established in 40 CFR Part 503. More frequent monitoring for any of the required or recommended parameters is appropriate when the POTW:

- Influent load of toxics or organic solids is highly variable
- Has a significant industrial load
- Has a history of process upsets due to toxics, or of adverse environmental impacts due to sludge use or disposal activities.

The sampling and analysis methods specified in 40 CFR §503.8 should be followed for monitoring the required parameters. In the absence of any specific methods in 40 CFR Part 503, guidance on appropriate methods is contained in *Part 503 Implementation Guidance*,[42] *Control of Pathogens and Vector Attraction in Sewage Sludge*,[43] and *POTW Sludge Sampling and Analysis Guidance Document*.[44]

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[42]USEPA (1995). *Part 503 Implementation Guidance.* EPA 833-R-95-001. Office of Water.

[43]USEPA (1992). *Control of Pathogens and Vector Attraction in Sewage Sludge.* EPA-625/R-92-013. Office of Research and Development.

[44]USEPA (1989). *POTW Sludge Sampling and Analysis Guidance Document.* Office of Water, Permits Division.

EXHIBIT 7-4
Minimum Requirements for Sewage Sludge Monitoring, Based on Method of Sludge Use or Disposal

Method	Monitoring Requirements	Frequency	Citation
Land Application	(1) Sludge weight and % total solids Metals: As, Cd, Cu, Pb, Hg, Mo, Ni, Se, and Zn Pathogen Reduction Vector Attraction Reduction	(1) 0< and < 290*, annually 290< and < 1,500, quarterly 1,500< and < 15,000, bimonthly 15,000 = or <, monthly	40 CFR Part 503.16
Co-disposal in Municipal Solid Waste Landfill	(1) Sludge weight and % total solids (2) Passes Paint-Filter Liquid Test (3) Suitability of sludge used as cover (4) Characterize in accordance with hazardous waste rules	(1), (2), (3), and (4) Monitoring requirements or frequency not specified by 40 CFR Part 503. Determined by local health authority or landfill owner/operator	40 CFR Part 258.28
Surface Disposal: Lined Sites with leachate collection and Unlined Sites	(1) Sludge weight and % total solids Pathogen Reduction Vector Attraction Reduction Metals: As, Cr, Ni (Unlined Sites Only) (2) Methane gas	(1) Based on sludge quantity (as above) (2) Continuously	40 CFR Part 503.26
Incineration	(1) Sludge weight and % total solids Metals: As, Cd, Cr, Pb, and Ni (2) Be and Hg (Nat. Emissions Standards) (3) THC or CO, O_2, moisture, combustion temperatures (4) Air pollution control device operating parameters	(1) Based on sludge quantity (as above) (2) As required by subparts C and E of 40 CFR Part 61 as may be specified by permitting authority (local air authority) (3) Continuously (4) Daily	40 CFR Part 503.46

Notes: 1. Monitoring frequencies required under 40 CFR Part 503 may be reduced after 2 years of monitoring, but in no case shall be less than once per year.

2. A successful land application program may necessitate sampling for other constituents of concern (such as nitrogen) in determining appropriate agronomic rates. This will be determined by the permit writer.

*Dry weight of sludge in metric tons per year.

7.2 Reporting and Recordkeeping Requirements

The NPDES regulations at 40 CFR §§122.41(l)(4)(j) and (l) require the permittee to keep records and periodically report on monitoring activities. Discharge Monitoring Reports (DMRs) (see form in **Exhibit 7-5**) must be used by permittees to report self-monitoring data. Data reported include both data required by the permit and any additional data the permittee has collected consistent with permit requirements. All facilities are required to submit reports (on discharges and sludge use or disposal) at least annually per 40 CFR §122.44(i)(2). POTWs with pretreatment programs are required to submit a pretreatment report at least annually per Section 403.12(i). However, the NPDES regulation states that monitoring frequency and reporting should be dependent on the nature and effect of the discharge/sludge use or disposal. Thus, the permit writer can require more frequent than annual reporting.

Records must be kept by the permittee for at least 3 years and this time may be extended by the Director upon request. An exception is for sewage sludge records which must be kept 5 years or longer if required by 40 CFR Part 503. The permit writer should designate where records should be located. Monitoring records include:

- Date, place, time
- Name of sampler
- Date of analysis
- Name of analyst
- Analytical methods used
- Analytical results.

According to 40 CFR §122.41(j), monitoring records must be representative of the discharge. Records which must be retained include continuous strip chart recordings, calibration data, copies of all reports for the permit, and copies of all data used to compile reports and applications. Sludge regulations under 40 CFR §§ 503.17, 503.27, and 503.47 establish recordkeeping requirements that vary depending on the use and disposal method for the sludge. The same recordkeeping requirements should be applied to other sludge monitoring parameters not regulated by the 40 CFR Part 503 rule.

EXHIBIT 7-5.
Discharge Monitoring Report (DMR)

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if different)*
NAME ______________________
ADDRESS ______________________
____
____
FACILITY ______________________
LOCATION ______________________

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

(2 16) PERMIT NUMBER	*(17 19)* DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	*(20-21)*	*(22 23)*	*(24-25)*	*TO*	*(26-27)*	*(28 29)*	*(30-31)*

NOTE: Read instructions before completing this form.

PARAMETER *(12 37)*		*(3 Card Only)* QUANTITY OR LOADING *(46 53)* AVERAGE	*(54 61)* MAXIMUM	UNITS	*(4 Card Only)* QUALITY OR CONCENTRATION *(38-45)* MINIMUM	*(46-53)* AVERAGE	*(54 61)* MAXIMUM	UNITS	NO. EX *(62 63)*	FREQUENCY OF ANALYSIS *(64 68)*	SAMPLE TYPE *(69 70)*
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN, AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED 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. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. *(Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)*	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE		DATE		
TYPED OR PRINTED			AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

EPA Form 3320-1 (Rev. 9-88) *Previous editions may be used.* (REPLACES EPA FORM T-40 WHICH MAY NOT BE USED.) PAGE OF

Chapter 8

Special Conditions

Special conditions in NPDES permits are designed to provide an additional measure of control (beyond numeric effluent limits) for the reduction of discharges of pollutants to waters of the United States. They are not included in the effluent limitations section of a permit because they do not contain specific numeric limits. The purpose of special conditions is to encourage the permittee to undertake activities designed to reduce the overall quantity of pollutants being discharged, or to reduce the potential for discharges of pollutants.

There are many different reasons to incorporate special conditions into a permit including the following:

- To address unique situations, such as facilities discharging pollutants for which data are absent or limited such that derivation of technology- or water quality-based effluent limits (WQBELs) is difficult or impossible
- To incorporate preventative requirements, such as requirements to install process control alarms, containment structures, good housekeeping practices, etc.
- To address foreseeable changes to discharges, such as planned changes to process, products, or raw materials that may affect discharge characteristics
- To incorporate compliance schedules to provide the time necessary to comply with permit conditions

- To incorporate other NPDES Programmatic requirements (e.g., pretreatment, municipal sewage sludge)
- To impose additional monitoring activities that provide the permit writer data to evaluate the need for changes in permit limitations
- To increase or decrease monitoring requirements, depending on the monitoring results or certain changes in processes or products, etc.
- To impose requirements to conduct special studies such as ambient stream surveys, toxicity reduction evaluations (TREs), bioaccumulation studies, sediment studies, mixing or mixing zone studies, pollutant reduction evaluations, or other such information gathering studies.

Section 8.1 of this chapter addresses the general types of special conditions for both municipal and non-municipal facilities. Special conditions for storm water discharges associated with industrial activity are explained in Section 8.2. Finally, special conditions unique to POTW/municipal permits are addressed in Section 8.3.

8.1 General Types of Special Conditions

This section discusses several general types of special conditions that could be used in any NPDES permit (i.e., municipal or non-municipal). The special conditions include:

- Special studies/additional monitoring
- Best Management Practices (BMPs)
- Pollution prevention
- Compliance schedules.

8.1.1 Special Studies and Additional Monitoring

Special studies and additional monitoring requirements imposed beyond those required under the effluent limits section of the permit are useful for collecting data that was not available to the permit writer for consideration during permit development. Special studies and additional monitoring requirements are generally used to supplement numeric effluent limits or support future permit development activities.

Examples of the types of special studies that could be required in a NPDES permit include:

- **Treatability studies**—Applicable when treatability information is lacking for a pollutant or pollutants that would prohibit a permit writer from developing defensible technology-based effluent limits. Treatability studies can also be required when the permit writer suspects that a facility may not be able to comply with an effluent limit.
- **Toxicity identification evaluation/Toxicity reduction evaluation (TIE/TRE)**—Required for facilities for which wastewater discharges are found to be toxic as a result of a whole effluent toxicity (WET) test. The purpose of these evaluations is to identify and control the sources of toxicity in an effluent. Further guidance related to EPA recommended TIE/TRE procedures and requirements can be found in the following guidance manuals:
  - *Toxicity Reduction Evaluation Protocol for Municipal Wastewater Treatment Plants.*[45]
  - *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs).*[46]
  - *Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures. Second Edition.*[47]
  - *Sediment Toxicity Identification Evaluations: Phase I (Characterization), Phase II (Identification), Phase III (Confirmation) Modifications of Effluent Procedures.*[48]
  - *Toxicity Identification Evaluations: Characterization of Chronically Toxic Effluents, Phase I.*[49]

[45]USEPA (1989). *Toxicity Reduction Evaluation Protocol for Municipal Wastewater Treatment Plants.* EPA-600/4-89-001A. Water Engineering Research Laboratory, Cincinnati, Ohio.

[46]USEPA (1989). *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs).* EPA-600/2-88-070. Water Engineering Research Laboratory, Cincinnati, Ohio.

[47]USEPA (1991). *Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures. Second Edition.* EPA-600/6-91-003. Environmental Research Laboratory, Duluth, Minnesota.

[48]USEPA (1991). *Sediment Toxicity Identification Evaluations: Phase I (Characterization), Phase II (Identification), Phase III (Confirmation) Modifications of Effluent Procedures.* EPA-600/6-91-007. Environmental Research Laboratory, Duluth, Minnesota.

[49]USEPA (1992). *Toxicity Identification Evaluations: Characterization of Chronically Toxic Effluents, Phase I.* EPA-600/6-91-005F. Environmental Research Laboratory, Duluth, Minnesota.

  - *Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity.*[50]
  - *Methods for Aquatic Toxicity Identification Evaluations: Phase III Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity.*[51]
- **Mixing or mixing zone studies**—Used to assist in determining the allowable ambient mixing that can be applied when developing WQBELs.
- **Sediment monitoring**—Used if a permit writer suspects that pollutants contained in wastewater discharges accumulate in the sediments of the receiving water.
- **Bioconcentration studies**—These biological monitoring studies are used to determine whether pollutants contained in wastewater discharges bioaccumulate in aquatic organisms (e.g., fish, invertebrates). These types of studies are usually recommended when WQBELs for pollutants that bioaccumulate are established below analytical detection levels. Additional guidance related to evaluating the bioaccumulation potential of a pollutant can be found in the EPA *Great Lakes Water Quality Initiative Technical Support Document for the Procedure to Determine Bioaccumulation Factors.*[52]

When establishing special conditions, permit writers must ensure that any particular requirements related to the study (e.g., special sampling or analytical procedures) are specified in the permit condition. In addition, permit writers must establish a reasonable schedule for completion and submission of the study or monitoring program. If the anticipated schedule is longer than 6 months to 1 year, then it is recommended that the permit writer require that the facility provide an interim progress report.

[50]USEPA (1993). *Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity.* EPA-600/R-92-080. Environmental Research Laboratory, Duluth, Minnesota.

[51]USEPA (1993). *Methods for Aquatic Toxicity Identification Evaluations: Phase III Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity.* EPA-600/R-92-081. Environmental Research Laboratory, Duluth, Minnesota.

[52]USEPA (1995). *Great Lakes Water Quality Initiative Technical Support Document for the Procedure to Determine Bioaccumulation Factors.* EPA-820/B-95-005. Office of Science and Technology.

8.1.2 Best Management Practices (BMPs)

In general, BMPs are measures to prevent or mitigate water pollution from sources ancillary to the industrial manufacturing or treatment process. The NPDES regulations, at 40 CFR §122.2, define the term "best management practices" and provide the following measures as examples of BMPs:

- Schedules of activities
- Prohibitions of practices
- Maintenance procedures
- Treatment requirements
- Operating procedures and practices to control
  - Plant site runoff
  - Spillage or leaks
  - Sludge or waste disposal
  - Drainage from raw material storage areas.

The NPDES regulations at 40 CFR §122.44(k) acknowledge that BMPs shall be included as permit conditions (when applicable) where they are authorized under Section 304(e) of the CWA; when numeric effluent limitations are infeasible; or when they are necessary to achieve limitations or carry out the purpose and intent of the CWA. Examples of when numeric effluent limitations are infeasible include:

- Regulating a pollutant for which limited treatability or aquatic impact information are available to allow development of technology-based or water quality-based effluent limits
- Regulating releases when the types of pollutants vary greatly over time.

Other circumstances when BMPs should be imposed as permit conditions include:

- When chemical analyses are inappropriate or impossible
- When a history of leaks and spills exist or when housekeeping is sloppy
- When a complex facility lacks toxic pollutant data
- When other discharge control options are prohibitively expensive.

Permit writers may include BMPs in permits in two basic ways: require the development of a general BMP plan, and/or require site-, process-, or pollutant-

specific BMPs. How BMPs are included as a permit condition, depends on the type of permit being developed. In the case of an individual permit, where a permit writer is developing permit conditions for a particular facility and has the opportunity to review the circumstances of the facility, the development of site- or pollutant-specific BMPs may be appropriate. On the other hand, including site- or pollutant-specific BMPs as conditions in a general permit may not be appropriate since they are highly dependent on the circumstances of individual facilities. As a result, discharges covered under a general permit may be required to develop a general BMP plan that allows the permittee to determine appropriate BMPs based on the circumstances of their particular facility.

The *Guidance Manual for Developing Best Management Practices (BMPs)*[53] describes the activities and materials at an industrial or municipal facility which are best addressed by BMP plans. The manual also describes how BMPs work and gives examples of the types of BMPs that can be used.

If a permit writer uses a general permit requirement for a BMP plan, it is the responsibility of the facility to plan, develop and implement, and reevaluate the success/shortfalls of its own plan. Usually, a BMP committee (group of individuals within the plant organization) is responsible for developing the BMP plan and assisting the plant management in implementing and updating the BMP plan. However, plant management, not the committee, has overall responsibility and accountability for the quality of the BMP plan.

EPA has identified several recommended components for effective BMP plans. The minimum suggested components of a general BMP plan are presented below:

- General Requirements
  - Name and location of facility
  - Statement of BMP policy and objective
  - Review by plant manager
- Specific Requirements
  - BMP committee

[53]USEPA (1993). *Guidance Manual for Developing Best Management Practices (BMPs).* EPA 833-B-93-004. Office of Water.

- Risk identification and assessment
- Reporting of BMP incidents
- Materials compatibility
- Good housekeeping
- Preventive maintenance
- Inspections and records
- Security
- Employee training.

Each of these components are discussed in more detail in the *Guidance Manual for Developing Best Management Practices* (BMPs).[54]

Site-, process-, and pollutant-specific BMPs are designed to address conditions particular to a site, process, or pollutant. The need for specific BMPs at a facility often will be discovered in conjunction with other permit-related activities, such as compliance inspections. Poor housekeeping or a history of spills, for example, indicate a need for specific BMPs to supplement the quantitative effluent limits for specific pollutants in the permit.

To select a specific BMP, the permit writer must:

- Review the industry profiles to determine the industrial processes that apply
- Evaluate whether the BMP would help to achieve the environmental objectives of the industry
- Use industry- or municipal-specific examples from other permits, pollution prevention sources, existing permits for similar processes, or EPA guidance documents.

BMP plans can be submitted for review by the regulatory agency but are usually kept onsite and made available to the permitting authority upon request. The normal compliance schedule is to require preparation of the BMP plan within 6 months, and implementation of the plan within 12 months of permit issuance.

Specific BMPs have been developed for storm water discharges and combined sewer overflows (CSOs) and are discussed in Sections 8.2 and 8.3, respectively.

[54]USEPA (1993). *Guidance Manual for Developing Best Management Practices (BMPs).* EPA 833-B-93-004. Office of Water.

Example:

The following is example language for requiring development and implementation of a BMP Plan in an NPDES permit. The language should be crafted and changed as necessary to meet the individual facility's needs and State/EPA goals for the facility. The text which is **redlined** (i.e., text between asterisks) needs special permit-specific consideration.

1. Implementation.

   If a BMP Plan does not exist:

   The permittee, shall develop and implement a Best Management Practices (BMP) Plan which achieves the objectives and the specific requirements listed below. A copy of the Plan shall be submitted to EPA **and/or State agency.** The Plan shall be implemented as soon as possible but no later than twelve months from the effective date of the permit.

   If a BMP Plan already exists:

   The permittee shall during the term of this permit operate the facility in accordance with the BMP Plan **(cite existing Plan)** or in accordance with subsequent amendments to the Plan. The permittee shall also amend this Plan, to incorporate practices to achieve the objectives and specific requirements listed below, and a copy shall be submitted to EPA **and/or State agency** The amended Plan shall be implemented as soon as possible but not later than six months from the effective date of the permit.

2. Purpose. Through implementation of the BMP Plan the permittee shall prevent or minimize the generation and the potential for the release of pollutants from the facility to the waters of the United States through normal operations and ancillary activities.

3. Objectives. The permittee shall develop and amend the BMP Plan consistent with the following objectives for the control of pollutants.

   a. The number and quantity of pollutants and the toxicity of effluent generated, discharged or potentially discharged at the facility shall be minimized by the permittee to the extent feasible by managing each influent waste stream in the most appropriate manner.

   b. Under the BMP Plan, and any Standard Operating Procedures (SOPs) included in the Plan, the permittee shall ensure proper operation and maintenance of the treatment facility.

   c. The permittee shall establish specific objectives for the control of pollutants by conducting the following evaluations.

      (1) Each facility component or system shall be examined for its waste minimization opportunities and its potential for causing a release of significant amounts of pollutants to waters of the United States due to equipment failure, improper operation, and natural phenomena such as rain or snowfall, etc. The examination shall include all normal operations and ancillary activities including material storage areas, plant site runoff, in-plant transfer, process and material handling areas, loading or unloading operations, spillage or leaks, sludge and waste disposal, or drainage from raw material storage. **note that only the area from the previous list which apply to a facility should be included**

      (2) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances to result in significant amounts of pollutants reaching surface waters, the program should include a prediction of the direction, rate of flow and total quantity of pollutants which could be discharged from the facility as a result of each condition or circumstance.

Example (continued):

4. Requirements. The BMP Plan shall be consistent with the objectives in Part 3 above and the general guidance contained in the publication entitled *Guidance Manual for Developing Best Management Practices (BMPs)* (USEPA, 1993) or any subsequent revisions to the guidance document. The BMP Plan shall:

   a. Be documented in narrative form, shall include any necessary plot plans, drawings or maps, and shall be developed in accordance with good engineering practices. The BMP Plan shall be organized and written with the following structure:

      (1) Name and location of the facility.

      (2) Statement of BMP policy.

      (3) Structure, functions, and procedures of the BMP Committee.

      (4) Specific management practices and standard operating procedures to achieve the above objectives, including, but not limited to, the following:

         (a) modification of equipment, facilities, technology, processes, and procedures,
         (b) reformulation or redesign of products,
         (c) substitution of materials, and
         (d) improvement in management, inventory control, materials handling or general operational phases of the facility.

      (5) Risk identification and assessment.

      (6) Reporting of BMP incidents.

      (7) Materials compatibility.

      (8) Good housekeeping.

      (9) Preventative maintenance.

      (10) Inspections and records.

      (11) Security.

      (12) Employee training.

   b. Include the following provisions concerning BMP Plan review:

      (1) Be reviewed by plant engineering staff and the plant manager.

      (2) Be reviewed and endorsed by the permittee's BMP Committee.

      (3) Include a statement that the above reviews have been completed and that the BMP Plan fulfills the requirements set forth in this permit. The statement shall be certified by the dated signatures of each BMP Committee member.

   c. Establish specific best management practices to meet the objectives identified in Part 3 of this section, addressing each component or system capable of generating or causing a release of significant amounts of pollutants, and identifying specific preventative or remedial measures to be implemented.

Example (continued):

d. Establish specific best management practices or other measures which ensure that the following specific requirements are met:

(1) Ensure proper management of solid and hazardous waste in accordance with regulations promulgated under the Resource Conservation and Recovery Act (RCRA). Management practices required under RCRA regulations shall be referenced in the BMP Plan.

(2) Reflect requirements for Spill Prevention, Control, and Countermeasure (SPCC) plans under Section 311 of the Act and 40 CFR Part 112 and may incorporate any part of such plans into the BMP Plan by reference.

(3) Reflect requirements for storm water control under Section 402(p) of the Act and the regulations at 40 CFR 122.26 and 122.44, and otherwise eliminate to the extent practicable, contamination of storm water runoff.

(4), etc.

Section 4.d. needs to be tailored to each facility by the permit writer. Processes or areas of the facility with housekeeping problems, noncompliance, spills/leaks, or other problems which could be remedied through a BMP should be addressed here. If a solution to the problem is known (e.g., more frequent inspections, preventive maintenance, etc.) this remedy should also be included as a part of the BMP Plan requirements. To gather ideas for such requirements, the permit writer may want to contact the permittee, compliance personnel, facility inspectors, operations office personnel, State agency counterparts. The permit writer may also want to check requirements in other permits and BMP Plans for similar facilities.

5. Documentation. The permittee shall maintain a copy of the BMP Plan at the facility and shall make the plan available to EPA **and/or State agency** upon request. All offices of the permittee which are required to maintain a copy of the NPDES permit shall also maintain a copy of the BMP Plan.

6. BMP Plan Modification. The permittee shall amend the BMP Plan whenever there is a change in the facility or in the operation of the facility which materially increases the generation of pollutants or their release or potential release to the receiving waters. The permittee shall also amend the Plan, as appropriate, when plant operations covered by the BMP Plan change. Any such changes to the BMP Plan shall be consistent with the objectives and specific requirements listed above. All changes in the BMP Plan shall be reported to EPA **and/or State agency** in writing.

7. Modification for Ineffectiveness. At any time, if the BMP Plan proves to be ineffective in achieving the general objective of preventing and minimizing the generation of pollutants and their release and potential release to the receiving waters and/or the specific requirements above, the permit and/or the BMP Plan shall be subject to modification to incorporate revised BMP requirements.

8.1.3 Pollution Prevention

Pollution prevention has been shown to reduce costs as well as pollution risks through source reduction and recycling/reuse techniques. Under Section 6602(b) of the Pollution Prevention Act of 1990, Congress established a national policy for a hierarchy of environmental management:

- Pollution should be prevented or reduced at the source, whenever feasible.
- Pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible.

- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, whenever feasible.
- Disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

The Pollution Prevention Act emphasizes that pollution prevention means source reduction and defines source reduction as any practice that:

- Reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal
- Reduces the threats to public health and the environment associated with the release of hazardous substances, pollutants, or contaminants
- Increases the efficiency of using raw materials, energy, water, or other resources, or protects natural resources by conservation.

The environmental management hierarchy—prevention, recycling, treatment, and disposal—should be viewed as establishing a set of preferences, rather than an absolute judgment that prevention is always the most desirable option. The hierarchy is applied to many different circumstances that require good judgment. Prevention includes what is commonly called in-process recycling. Recycling conducted in an environmentally sound manner shares many of the advantages of prevention (e.g., energy and resource conservation and reduction of the need for end-of-pipe treatment or waste containment).

Within the NPDES Program, BMPs are inherently pollution prevention practices. Traditionally, BMPs have focused on good housekeeping measures and good management techniques that attempt to avoid contact between pollutants and water media as a result of leaks, spills, and improper waste disposal. However, based on the authority granted under the regulations, BMPs may include the universe of pollution prevention, which encompasses production modifications, operational changes, materials substitution, materials and water conservation, and other such measures.

8.1.4 Compliance Schedules

The NPDES regulations at 40 CFR §122.47 allow permit writers to include schedules of compliance to allow permittees additional time to achieve compliance with the CWA and applicable regulations. Schedules developed under this provision must require compliance by the permittee as soon as possible, but may not extend the date for final compliance beyond compliance dates established by the Act. Examples of situations where compliance schedules may be appropriate include:

- Pretreatment program development
- Sludge use and disposal program development and/or implementation
- New/revised effluent guidelines application
- New/revised water quality standards application
- BMP plan development and/or implementation
- Storm water, CSO and/or SSO control program development and/or implementation.

While compliance schedules may be appropriate for implementation of certain NPDES Program requirements, they are not appropriate for requirements where statutory deadlines have passed. In particular, compliance schedules are not appropriate under the following scenarios:

1. Compliance with Technology-Based Effluent Limits

   Compliance schedules are not allowed at this time because statutory deadlines have passed for BPT, BAT, and BCT levels of treatment.

   - July 1, 1977 for BPT
   - March 31, 1989 for BAT and BCT.

   This applies to both existing and new dischargers. It should be noted, however, that 40 CFR §122.29(d)(4) allows a new source or new discharger up to 90 days to "start-up" its pollution control equipment and achieve compliance with its permit conditions (i.e., provides for up to a 90-day period to achieve compliance).

2. Compliance with Water Quality-Based Effluent Limits

   The determination of whether a compliance schedule to meet water quality-based permit limits is permissible depends on when the applicable State water

quality standards were initially promulgated. Because States were required to have water quality standards promulgated by July 1, 1977, and because facilities were supposed to have had the opportunity to comply with the standards, compliance schedules are not allowed if the State water quality standards were promulgated before July 1, 1977.

If a State promulgates a water quality standards after July 1, 1977, and if the State water quality regulations allow for a compliance schedule to comply with the standards, then a compliance schedule could be granted in accordance with 40 CFR 47.

If a State promulgates a water quality standards after July 1, 1977, and the State water quality regulations do not allow for a compliance schedule to comply with the standards, then a compliance schedule may not be granted.

[See: **Star-Kist Caribe, Inc.**, NPDES Appeal No. 88-5]

In situations where the permittee will be unable to meet permit conditions, and where a compliance schedule pursuant to 40 CFR §122.47 is not permitted, the practical alternative is to initiate an Administrative Order under Section 309 of the CWA (containing a schedule of compliance) concurrent with permit issuance.

8.2 Permit Conditions Addressing Storm Water Discharges Associated With Industrial Activities

As previously discussed in Chapter 2, all storm water discharges associated with industrial activity that discharge storm water through a separate municipal storm sewer system (MS4) or discharge directly to waters of the United States are required to obtain NPDES permit coverage. Following the promulgation of the November 16, 1990, storm water application regulations, EPA and NPDES authorized States were faced with providing permit coverage for storm water discharges from over 100,000 industrial facilities. Due to the nature of the discharge (i.e., storm water) and the large number of facilities requiring permit coverage, EPA and most NPDES authorized States chose to use general permits as a mechanism to provide permit coverage for facilities requiring permit coverage for their storm water discharges.

Unlike discharges of process wastewater where numerical effluent limitations (technology-based and/or water quality-based) are typically used to control the discharge of pollutants from industrial facilities, the primary permit condition used to

address discharges of pollutants in a facilities storm water is a pollution prevention plan. The development and implementation of a site-specific storm water pollution prevention plan is considered to be the most important requirement of the EPA and State issued storm water general permits. Site-specific storm water pollution prevention plans allow permittees to develop and implement "best management practices", whether structural or non-structural, that are best suited for controlling storm water discharges from their industrial facility.

Each industrial facility covered under an EPA issued storm water general permit must develop a pollution prevention plan, tailored to the site specific conditions, and designed with the goal to control the amount of pollutants in storm water discharges from the site. The special conditions component of EPA's storm water general permits identify the requirements that each facility must include in their storm water pollution prevention plan, including:

- A description of potential pollutant sources at the facility, including:
  - A map of the facility indicating the drainage areas of the site and the industrial activities which occur in each drainage area
  - An inventory of materials that may be exposed to storm water
  - A description of the likely sources of pollutants from the site and a prediction of the pollutants which are likely to be present in the storm water
  - The history of spills and leaks of toxic and hazardous materials over the last three years
- The measures and controls that will be implemented to prevent or minimize pollution of storm water, including:
  - Good housekeeping or upkeep of industrial areas exposed to storm water
  - Preventative maintenance of storm water controls and other facility equipment
  - Spill prevention and response procedures
  - Testing of outfalls to ensure that there are no illicit discharges
  - Employee training on pollution prevention measure and controls, and record keeping.

A permit writer's best source of information for developing appropriate special conditions for storm water controls are perhaps other storm water general permits. Using existing general permits as the basis for special conditions is encouraged since

this will reduce duplication of efforts. A listing of all general permits (storm water and non-storm water) issued by EPA as well as authorized States, which can be used as a permit writing resource, can be found in the EPA Point Source Information Provision Exchange System (PIPES) accessible through EPA's World Wide Web home page [http:/www.epa.gov]. In addition, EPA has developed the following guidance documents to help permit writers identify components of storm water pollution prevention plans as well as to assist permittees in developing plans:

- *Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices.*[55]
- *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.*[56]

8.3 Special Conditions for Municipal Facilities

This section explains several common special conditions that are applicable only to municipal facilities. These conditions reflect requirements for POTWs to implement and enforce local pretreatment programs for their industrial users; sludge disposal requirements; CSO requirements; SSO requirements; and MS4 requirements.

8.3.1 The National Pretreatment Program

Section 402(b)(8) of the CWA requires that POTWs receiving pollutants from significant industrial sources subject to section 307(b) standards establish a POTW pretreatment program to ensure compliance with these standards. The implementing regulations at 40 CFR 403.8(a) state, "any POTW (or combination of POTWs operated by the same authority) with a total design flow greater than 5 million gallons per day (mgd) and receiving from industrial users pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards will be required to establish a POTW pretreatment program unless the NPDES State exercises its option to assume local responsibilities as provided in 403.10(e)." EPA or a NPDES State with an approved pretreatment program may require POTWs with

[55]USEPA (1992). *Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices.* EPA 832-R-92-006. Office of Water.

[56]USEPA (1992). *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.* EPA 832-R-92-005.

design flows of 5 mgd or less to develop a POTW pretreatment program if circumstances warrant (40 CFR 403.8(a)). The requirement to develop a pretreatment program only applies to POTWs or States using the option under 403.10(e), this is primarily due to the fact that the pretreatment regulations at 40 CFR 403 only apply to POTWs and industrial users of POTWs, and the State or EPA offices that issue permits to the POTWs.

Since 1978, approximately 1,500 POTWs have been required to develop and implement pretreatment programs as special conditions of NPDES permits. The pretreatment program was developed to control industrial discharges to POTWs and to meet three objectives at the POTWs: (1) to prevent pass through, (2) to prevent interference, including interference with its use or disposal of municipal sludge, (3) to improve opportunities to recycle and reclaim municipal and industrial wastewater and sludges.

As authorized by the pretreatment regulations at 40 CFR 403.8(c),(d) and (e) and the NPDES regulations at 40 CFR 122.44(j)(2), the requirements to develop and implement a POTW pretreatment program are placed as enforceable conditions in the POTW's NPDES permit.

Pretreatment Program development and Program Implementation are done as two separate steps. Through the NPDES permit the POTW is required to develop a Pretreatment Program. The POTW is required to submit an approvable program that meets the requirements in 40 CFR 403.9(b), specifically, these requirements are the provisions of a program as laid out in 40 CFR 403.8(f). 40 CFR 403.8(f) requires the POTW to have certain legal authority (usually a municipal ordinance or set of regulations) and procedures to fully and effectively exercise and implement the legal authority and procedures. The POTW must submit a program detailing the legal authority to:

1. Deny or condition new or increased contributions of pollutants, or changes in nature of pollutants, to the POTW by industrial users;

2. Require compliance with applicable pretreatment standards and requirements by industrial users;

3. Control through permit, order, or similar means the contribution to the POTW by each industrial user to ensure compliance with applicable pretreatment standards and requirements. These control mechanisms must have certain conditions as laid out in 403.8(f)(1)(iii) and be enforceable;

4. Require the development of compliance schedules where necessary by each industrial user for the installation of technology required to meet applicable pretreatment standards and requirements, and submission of all notices and self-monitoring reports to assess and ensure compliance;

5. Carry out all inspection, surveillance, and monitoring procedures necessary to determine compliance with applicable pretreatment standards and requirements independent of information submitted by the industrial user (this will include authority to enter the premises of the industrial user);

6. Obtain remedies for noncompliance (e.g., injunctive relief, penalties);

7. Comply with confidentiality requirements.

Further at a minimum, the POTW must have procedures to:

1. Identify and locate all possible industrial users which might be subject to the POTW pretreatment program;

2. Identify the character and volume of pollutants contributed to the POTW by the industrial users;

3. Notify industrial users of applicable pretreatment standards and applicable requirements under section 204(b) and 405 of the Clean Water Act and subtitles C and D of RCRA;

4. Receive and analyze self monitoring reports;

5. Conduct sampling, inspections and other surveillance activities to determine compliance with applicable pretreatment standards and requirements independent of information supplied by the industrial user;

6. Investigate instances of noncompliance; and

7. Comply with public participation, including public notice annually of industrial users determined to be in significant noncompliance during the previous 12-month period.

Also, as part of the POTW pretreatment program, POTWs must have adequate resources and funding to implement the program, evaluate the need for local limits and develop them if the need exists, and develop an enforcement response plan.

The permit requires the POTW to submit the program documentation which details the authority and procedures to be implemented along with other information about the program as laid out in 40 CFR 403.9. The permit will allow the POTW up to one year from the time the permitting authority determines the need for a pretreatment program exists to develop and submit a program for approval. Once the permitting authority reviews and approves the program, the program is then incorporated into the permit in order to make the requirement to implement the program an enforceable part of the permit.

The incorporation of the requirement to develop a pretreatment is generally done at the time of reissuance of the permit. However, the requirement may also be incorporated through a modification of the permit if cause exists. Cause exists if "... the addition of pollutants into POTW by an industrial user or combination of industrial users presents a substantial hazard to the functioning of the treatment works, quality of the receiving waters, human health, or the environment," (40 CFR 403.8(e)(1)). A permit modification to require the development of a pretreatment program is considered a major modification and must follow the procedures in 40 CFR 122.62.

The incorporation of an approved program into the permit, thereby making the implementation of the program an enforceable part of the permit, is considered a minor modification to the permit and must follow the procedures in 40 CFR 122.63(g). During the life of the permit it may be necessary for the POTW to modify its approved pretreatment program (changes to local limits, changes to the ordinance, etc.). These changes may be brought about by the POTW's desire to change the way the program operates, or they may be the result of changes that are necessary to address deficiencies in the program found during inspections or audits done by the permitting authority. Whatever the reason for the modification, these modifications to the approved program require review and approval by the permitting authority (Approval Authority) when the modifications are considered substantial, per 40 CFR 403.18. All approved substantial program modifications to the POTW's approved pretreatment program require minor modifications to the permit.

Regulatory Update

As of December 1996, there are two proposed regulations that may impact the permitting requirements for POTWs with pretreatment programs. First is the regulation that defines a substantial pretreatment program modification. EPA is reconsidering the definition of what is a substantial modification. EPA has proposed to shorten the list and thereby reduce the need for minor permit modifications. Second, EPA has proposed a new regulation for POTWs to apply for NPDES permits. The current regulations require POTWs to submit an evaluation of the need for local limits with their NPDES permit application. The proposed regulation would require the evaluation to be submitted after the permit has been reissued. Therefore the permit will need to have language included that implements this requirement.

Most of the POTWs who need pretreatment program requirements in their permits currently have them in place. EPA Regions and approved States have developed standard pretreatment development or implementation conditions (with minor modifications made to tailor the conditions to the specific permittee) that are placed in all pretreatment POTW NPDES permits in that Region or State. The permit writer can obtain examples of these NPDES pretreatment conditions from the EPA or State pretreatment coordinators. The permit writer may need to update or modify pretreatment implementation language or initiate corrective action related to the pretreatment program.

A NPDES State or an EPA Region will often designate a pretreatment coordinator to serve as the pretreatment expert to review the annual report from the POTW and recommend any action to be taken. The State or EPA Regional pretreatment coordinator is a key resource on pretreatment issues, particularly at the time of NPDES permit reissuance. EPA has prepared a number of guidance manuals for POTWs on how to implement their local pretreatment programs.

Pretreatment program information and monitoring data obtained through the POTW's pretreatment program may be useful to the permit writer in identifying possible modifications to the pretreatment program's local limits or procedures, or the need for water quality-based controls. Although there is currently no requirement for chemical-specific toxics effluent monitoring to be submitted with the permit application, most pretreatment POTWs have performed toxics monitoring of their influent, effluent, and sludge. The permit writer should obtain such data with the aid of the pretreatment coordinator. These data can be used to determine the need for water quality-based limits.

8.3.2 Municipal Sewage Sludge

Section 405(d) of the CWA requires that EPA regulate the use and disposal of sewage sludge to protect public health and the environment from any reasonably anticipated adverse effects of these practices. In the CWA, Congress directs EPA to develop technical standards for municipal sludge use and disposal options. These standards are set out in 40 CFR Part 503. Congress also enacted strict deadlines for compliance with these standards. Within 1 year of promulgation of the standards, compliance was required unless construction of new pollution control facilities was necessary, in which case compliance was required within 2 years.

EPA promulgated the 40 CFR Part 503 Standards for the Use or Disposal of Sewage Sludge on February 19, 1993 (58 *FR* 9248) with amendments on February 19, 1994 (59 *FR* 9095) and October 25, 1995 (60 *FR* 54764). These regulations address four sludge use and disposal practices: land application, surface disposal, incineration, and disposal in a municipal solid waste landfill. The standards for each end use and disposal method consist of general requirements, numeric pollutant limits, operational standards, and management practices, as well as monitoring, recordkeeping, and reporting requirements. Unlike technology standards based on the ability of treatment technologies to reduce the level of pollutants, EPA's sewage sludge standards are based on health and environmental risks.

40 CFR Part 503 imposes requirements on four groups:

- Persons who prepare sewage sludge or material derived from sewage sludge
- Land appliers of sewage sludge
- Owners/operators of sewage sludge surface disposal sites
- Owners/operators of sewage sludge incinerators.

The regulation is largely self-implementing. This means that anyone engaged in activities covered by the regulation must comply with the appropriate requirements on or before the compliance deadlines. A person who violates 40 CFR Part 503 requirements is subject to administrative, civil, and/or criminal enforcement actions.

Section 405(f) of the CWA requires the inclusion of sewage sludge use or disposal requirements in any NPDES permit issued to a Treatment Works Treating Domestic Sewage (TWTDS) and authorizes the issuance of sewage sludge permits to non-discharging TWTDS. To provide a mechanism for this inclusion, EPA promulgated revisions to the NPDES permit regulations at 40 CFR Parts 122 and 124 on May 2, 1989 (54 *FR* 18716). These revisions expanded EPA's authority to include sewage sludge use and disposal standards in NPDES permits and to issue NPDES permits to treatment works that do not have an effluent discharge to waters of the United States, but are involved in sewage sludge use or disposal as preparers, appliers, or owners/operators. TWTDS includes all sewage sludge generators and facilities that change the quality of sewage sludge such as blenders.

EPA recognizes that implementation of 40 CFR Part 503 requirements is a source of confusion for permit writers and permittees who may already have NPDES permits with sewage sludge special conditions. The end result is that both NPDES sludge permit conditions and 40 CFR Part 503 requirements apply. EPA expects that over time, all NPDES sludge requirements will be revised to include the 40 CFR Part 503 requirements. To reduce confusion, EPA has provided several guidance documents to explain the requirements of 40 CFR Part 503.

- *Part 503 Implementation Guidance.*[57]
- *Land Application of Sewage Sludge—A Guide for Land Appliers on the Recordkeeping and Reporting Requirements of the Federal Standards for the Use and Disposal of Sewage Sludge Management in 40 CFR Part 503.*[58]
- *Surface Disposal of Sewage Sludge—A Guide for Owners/Operators of Surface Disposal Facilities on the Monitoring, Recordkeeping, and Reporting Requirements of the Federal Standards for the Use and Disposal of Sewage Sludge in 40 CFR Part 503.*[59]

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[57]USEPA (1995). *Part 503 Implementation Guidance.* EPA 833-R-95-001. Office of Water.

[58]USEPA (1994). *Land Application of Sewage Sludge—A Guide for Land Appliers on the Recordkeeping and Reporting Requirements of the Federal Standards for the Use and Disposal of Sewage Sludge Management in 40 CFR Part 503.* EPA-831/B-93-002c. Office of Water.

[59]USEPA (1994). *Surface Disposal of Sewage Sludge—A Guide for Owner/Operators of Surface Disposal Facilities on the Monitoring, Record Keeping, and Reporting Requirements of the Federal Standards for the Use and Disposal of Sewage Sludge in 40 CFR Part 503.* EPA-831/B-93-002b. Office of Water.

- *Preparing Sewage Sludge for Land Application or Surface Disposal—A Guide for Preparers of Sewage Sludge on the Monitoring, Record Keeping, and Reporting Requirements of the Federal Standards for the Use or Disposal of Sewage Sludge in 40 CFR Part 503.*[60]
- *Domestic Septage Regulatory Guidance, A Guide to the EPA 503 Rule.*[61]
- *Control of Pathogens and Vector Attraction in Sewage Sludge.*[62]

The permit writer should refer to the Part 503 Implementation Guidance[63] and EPA Region and State guidelines or policies for instructions on how to implement the applicable 40 CFR Part 503 standards into the permit. The permit writer will need to determine the type of sludge use or disposal practice(s) used by the permittee and apply the appropriate 40 CFR Part 503 standards. In general, conditions will need to be established to address:

- Pollutant concentrations or loading rates
- Operational standards (such as pathogen and vector attraction reduction requirements for land application and surface disposal and total hydrocarbons (THC) concentrations for incinerators)
- Management practices (e.g., siting restrictions, design requirements, operating practices)
- Monitoring requirements (e.g., pollutants to be monitored, sampling locations, frequency, and sample collection and analytical methods)
- Recordkeeping requirements
- Reporting requirements (e.g., contents of reports and frequency or due dates for submission of reports)
- General requirements (e.g., specific notification requirements prior to land application, submission of closure and post closure plan for surface disposal sites).

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[60]USEPA (1993). *Preparing Sewage Sludge for Land Application or Surface Disposal—A Guide for Preparers of Sewage Sludge on the Monitoring, Recordkeeping, and Reporting Requirements of the Federal Standards for the Use or Disposal of Sewage Sludge in 40 CFR Part 503.* EPA-831/B-93-002a. Office of Water.

[61]USEPA (1993). *Domestic Septage Regulatory Guidance—A Guide to the EPA 503 Rule.* EPA-832/B-92-005. Office of Water.

[62]USEPA (1992). *Control of Pathogens and Vector Attraction in Sewage Sludge.* EPA-625/R-92-013. Office of Research and Development.

[63]USEPA (1995). *Part 503 Implementation Guidance.* EPA 833-R-95-001. Office of Water.

In addition to any specific applicable 40 CFR Part 503 standards, three boilerplate conditions must be written in the NPDES permit: (1) language requiring the POTW/TWTDS to comply with all existing requirements for sludge use and disposal, including the 40 CFR Part 503 standards, (2) a reopener clause, which authorizes reopening a permit to include technical standards if the technical standards are more stringent or more comprehensive than the conditions in the permit, and (3) a notification provision requiring the permittee to give notice to the permitting authority when a significant change in the sludge use or disposal practice occurs (or is planned).

If permit conditions based on existing regulations are insufficient to protect public health and the environment from adverse effects that may occur from toxic pollutants in sewage sludge, permit conditions should be developed on a case-by-case basis using BPJ to fulfill the statutory requirement. EPA's *Part 503 Implementation Guidance*[64] contains information to assist permit writers in developing pollutant limits and management practice requirements on a case-by-case basis to protect public health and the environment from adverse effects that may occur from toxic pollutants in sewage sludge.

8.3.3 Combined Sewer Overflows (CSOs)

Combined sewer systems are designed to collect both sanitary and industrial wastewater and storm water runoff. During dry weather, combined sewers carry sanitary wastes and industrial discharges to a treatment plant. In periods of heavy rainfall, however, the combined storm water runoff and untreated sanitary sewage, including industrial wastewater, can overflow and discharge this untreated wastewater directly to a water body. These overflows are called combined sewer overflows (CSOs).

On April 19, 1994, EPA published a CSO Control Policy in the *Federal Register* (59 *FR* 18688) which represents a comprehensive national strategy to ensure that municipalities, permitting authorities, water quality standards authorities, and the public engage in a comprehensive and coordinated planning effort to achieve cost effective CSO controls that ultimately meet appropriate health and environmental objectives.

[64]USEPA (1995). *Part 503 Implementation Guidance.* EPA 833-R-95-001. Office of Water.

CSOs are point source discharges subject to both the technology-based requirements of the CWA and to applicable State water quality standards. Under the CWA, CSOs must comply with the BAT for nonconventional and toxic pollutants and BCT for conventional pollutants. However, there are no promulgated BAT/BCT effluent guidelines and limitations for CSOs. As a result, permit writers must use BPJ in developing technology-based permit requirements for controlling CSOs. In addition, permit conditions must achieve compliance with applicable water quality standards.

The 1994 CSO Control Policy contains the recommended approach for developing and issuing NPDES permits to control CSOs. In addition, EPA has developed the following guidance documents to help permit writers and permittees implement the CSO Control Policy:

- *Combined Sewer Overflows–Guidance for Long-Term Control Plan.*[65]
- *Combined Sewer Overflows–Guidance for Nine Minimum Controls.*[66]
- *Combined Sewer Overflows–Guidance for Screening and Ranking.*[67]
- *Combined Sewer Overflows–Guidance for Monitoring and Modeling.*[68]
- *Combined Sewer Overflows–Guidance for Financial Capability Assessment and Schedule Development.*[69]
- *Combined Sewer Overflows–Guidance for Funding Options.*[70]
- *Combined Sewer Overflows–Guidance for Permit Writers.*[71]

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[65]USEPA (1995). *Combined Sewer Overflows–Guidance for Long-Term Control Plan.* EPA-832/B-95-002.

[66]USEPA (1995). *Combined Sewer Overflows–Guidance for Nine Minimum Controls.* EPA-832/B-95-003.

[67]USEPA (1995). *Combined Sewer Overflows–Guidance for Screening and Ranking.* EPA-832/B-95-004.

[68]USEPA (1995). *Combined Sewer Overflows–Guidance for Monitoring and Modeling.* (DRAFT). EPA-832/B-95-005.

[69]USEPA (1995). *Combined Sewer Overflows–Guidance for Financial Capability Assessment and Schedule Development* (DRAFT). EPA-832/B-95-006.

[70]USEPA (1995). *Combined Sewer Overflows–Guidance for Funding Options.* EPA-832/B-95-007.

[71]USEPA (1995). *Combined Sewer Overflows–Guidance for Permit Writers.* EPA-832/B-95-008.

Combined Sewer Overflows–Guidance for Permit Writers contains guidance, and example permit language that the permit writer can use. Because the control of CSOs typically requires substantial long-term planning, construction, financing and continuous reassessment, the implementation of CSO controls will probably occur over several permit cycles. The *Combined Sewer Overflows—Guidance for Permit Writers* explains a phased permitting approach to CSOs. **Exhibit 8-1** depicts this phased permitting approach and the types of permitting conditions that should be developed for each phase. Depending on the particular permittee's situation, a permit may contain both Phase I and Phase II elements. The initial permit conditions for CSOs, called Phase I permit requirements, should address:

- Implementation of technology-based CSO controls as soon as possible but no later than January 1, 1997. The policy describes nine CSO control measures that may be considered minimum BAT/BCT, based on the permit writer's BPJ. **Exhibit 8-2** shows the nine minimum controls (NMC).
- Development of a CSO Long-Term Control Plan (LTCP) generally within 2 years of permit issuance. The policy describes the minimum elements which the LTCP should address. **Exhibit 8-3** shows those minimum elements.

The second round of NPDES permits to control CSOs, called Phase II, will contain specific permit conditions addressing continued implementation of the NMC and implementation of the selected long-term CSO control measures identified in the LTCP. The permit writer will need to review the permittee's LTCP and consult with other staff involved in the CSO control process and the permittee to determine the appropriate permit conditions. Water quality-based controls will be expressed as narrative requirements and performance standards for the combined sewer system. Finally, post Phase II permit conditions would address continued implementation of the NMC, long-term CSO controls, and post-construction compliance monitoring. There may also be numeric water quality-based effluent limits when sufficient data exists to support their development.

EXHIBIT 8-1
Categories of CSO Permitting Conditions

Time (yrs) 0 .....5.....10.....>			
NPDES Permit	**Phase I**	**Phase II**	**Post Phase II**
A. Technology-Based	• NMC, at a minimum	• NMC, at a minimum	• NMC, at a minimum
B. Water Quality-Based	• Narrative	• Narrative + performance-based standards	• Narrative + performance-based standards + numeric water quality-based effluent limits (as appropriate)
C. Monitoring	• Characterization, monitoring, and modeling of CSS	• Monitoring to evaluate water quality impacts • Monitoring to determine effectiveness of CSO controls.	• Post-construction compliance monitoring
D. Reporting	• Documentation of NMC implementation • Interim LTCP deliverables.	• Implementation of CSO controls (both NMC and long-term controls)	• Report results of post-construction compliance monitoring
E. Special Conditions	• Prohibition of dry weather overflows (DWO) • Development of LTCP.	• Prohibition of DWO • Implementation of LTCP • Reopener clause for water quality standards violations • Sensitive area reassessment.	• Prohibition of DWO • Reopener clause for water quality standards violations.

EXHIBIT 8-2
Nine Minimum CSO Controls

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

EXHIBIT 8-3
Elements of the Long-Term CSO Control Plan

1. Characterization, monitoring, and modeling of the combined sewer system
2. Public participation
3. Consideration of sensitive areas
4. Evaluation of alternatives
5. Cost/performance considerations
6. Operational plan
7. Maximizing treatment at the existing POTW treatment plant
8. Implementation schedule
9. Post-construction compliance monitoring program.

In developing permit requirements to meet technology-based requirements and applicable State water quality standards, the permit writer in conjunction with staff involved in water quality standards and the permittee, should identify the appropriate site-specific considerations that will determine the CSO conditions to be established in the permit. EPA believes that the following information will be particularly relevant in developing the appropriate conditions:

- CSO Discharge
  - Flow, frequency, and duration of the CSO discharge
  - Available effluent characterization data on the CSO discharge
  - Available information and data on the impacts of the CSO discharge(s) (e.g., 305(b) reports, ambient survey data, fish kills, 304(l) lists of impaired waters)
  - Compliance history of the CSO owner, including performance and reliability of any existing CSO controls
  - Current NPDES permit and NPDES permit application
  - Facility planning information from the permittee which addresses CSOs

- Technologies
  - Performance data (either from the manufacturer or from other applications) for various CSO technologies that may be employed, including equipment efficiency and reliability
  - Cost information associated with both the installation, operation and maintenance of CSO technologies
  - Reference materials on various types of CSO technologies (e.g., Water Environment Federation Manual of Practice, American Society of Chemical Engineers publications).

8.3.4 Sanitary Sewer Overflows

(RESERVED)

8.3.5 Municipal Separate Storm Sewer Systems (MS4)

The November 16, 1990 (55 *FR* 47990) storm water application regulations established requirements for a two-part permit application that allows local governments to assist in defining priority pollutant sources within the municipality and to develop and implement appropriate controls for such discharges to MS4. Part II of the application required municipal applicants to propose municipal storm water management programs to control pollutants to the "maximum extent practicable" (MEP) and to effectively prohibit non-storm water discharges to the municipal system. Municipal storm water management programs are a combination of source controls and management practices that address targeted sources within the boundaries of the municipal system. For example, a municipality that expects significant new development may focus more on proposing requirements for new development and construction. On the other hand, a municipality that does not expect significant new development may focus more on municipal activities that affect storm water quality

such as: maintenance of leaking sanitary sewers, road de-icing and maintenance, operation of municipal landfills, flood control efforts, and control of industrial contributions of storm water.

As with any NPDES permit, MS4 permits must assure compliance with applicable technology-based requirements (in this case, the MEP) as well as applicable water quality standards. However, unlike POTWs where technology-based requirements are defined by secondary treatment standards, and most industrial sources that have promulgated ELGs, there are no promulgated technology-based standards that define MEP. Therefore, permit writers must rely on application requirements specified in the regulations and the applicants proposed management program when developing appropriate permit conditions. EPA has developed the following guidance document to assist permit writers as well as permittees to implement the Municipal Storm Water Program:

- *Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications For Discharge From Municipal Separate Storm Sewer Systems.*[72]

[72]USEPA (1992). *Guidance Manual for the Preparation of Part 2 of the NPDES Permit Application for Discharges from Municipal Separate Storm Sewer Systems.* EPA-833/B-92-002. Office of Water.

Chapter 9

Standard Conditions of NPDES Permits

This chapter describes standard conditions, sometimes called "boilerplate" conditions, that consist of pre-established conditions that must be incorporated into every permit. The standard conditions set out in 40 CFR §§122.41 and 122.42 play an important supporting role to the numeric permit limits because these conditions delineate the legal, administrative, and procedural requirements of the permit. Standard conditions may be inserted verbatim from the regulations or incorporated into the permit by specific reference to the regulations. Standard conditions cover various topics, including definitions, testing procedures, records retention, notification requirements, penalties for noncompliance, and permittee responsibilities.

The use of standard conditions helps ensure uniformity and consistency of all NPDES permits issued by authorized States or EPA Regional offices. The permit writer needs to be aware of the contents of the standard conditions because it may often be necessary to explain portions of these conditions to a permittee. The permit writer should also keep abreast of any changes in EPA's standard conditions set out in 40 CFR §122.41 as statutes or regulations are revised periodically.

9.1 Types of Standard Conditions

A brief discussion of each of EPA's standard conditions for NPDES permits follows:

- **Duty to Comply [40 CFR §122.41(a)]**—The permittee must comply with all conditions of the permit. Noncompliance is a violation of the CWA and is grounds for injunctive relief, substantial monetary penalties, incarceration, changes or terminations to the permit, or denial of permit renewal.
- **Duty to Reapply [40 CFR §122.41(b)]**—If a permittee, after the expiration of its permit, desires to continue its activities, it must reapply for and obtain a new permit.
- **Need to Halt or Reduce Activity not a Defense [40 CFR §122.41(c)]**—The permittee may not use as a defense the reasoning that compliance could only be achieved by halting or reducing the permitted activity.
- **Duty to Mitigate [40 CFR §122.41(d)]**—The permittee is required to take all reasonable steps to prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.
- **Proper Operation and Maintenance [40 CFR §122.41(e)]**—The permittee must properly operate and maintain all equipment and treatment systems used by the permittee for compliance with the terms of the permit. The permittee must provide appropriate laboratory controls and quality assurance procedures. Backup systems are required when needed to ensure compliance. However, each main line unit treatment process must be operated as a minimum.
- **Permit Actions [40 CFR §122.41(f)]**—The permit may be modified, revoked, reissued, or terminated for cause. The filing of a request by the permittee for a modification, revocation, reissuance, termination, or notification of planned changes or anticipated noncompliance does not halt any permit condition.
- **Property Rights [40 CFR §122.41(g)]**—The permit does not convey any property rights of any sort, or any exclusive privilege.
- **Duty to Provide Information [40 CFR §122.41(h)]**—The permittee must transmit any information needed to determine compliance with the permit or to modify the permit.
- **Inspection and Entry [40 CFR §122.41(i)]**—The permittee must, upon presentation of valid credentials by the Director or his representative, allow entry into the premises where the regulated activity and/or records are present. The Director must have access to and be able to make copies of any required records, inspect facilities, practices, operations, and equipment, and sample or monitor at reasonable times.

- **Monitoring and Records [40 CFR §122.41(j)]**—Samples must be representative of the monitored activity. Records must be retained for 3 years (5 years for sludge activities) subject to extension by the Director. Monitoring records must identify the sampling dates and personnel, the sample location and time, and the analytical techniques used and corresponding results. Wastewater and sludge measurements must be conducted in accordance with 40 CFR Parts 136 or 503 or other specified procedures. Falsification of results is a violation.
- **Signatory and Certification Requirements [40 CFR §122.41(k)]**—Applications, reports, or information submitted to the Director must be signed and certified. Knowingly making false statements, representations, or certifications is subject to penalties.
- **Planned Changes [40 CFR §122.41(l)(1)]**—Notice must be given to the Director as soon as possible of any planned physical alterations and/or additions to the facility. This notice is required if the facility changes to meet the criteria for a new source or the nature and concentration of pollutants are affected.
- **Anticipated Noncompliance [40 CFR §122.41(l)(2)]**—The permittee must give advance notice of any conditions that may result in noncompliance.
- **Permit Transfers [40 CFR §122.41(l)(3)]**—The permit is not transferable except after written notice to the Director. The Director may require modification or revocation and reissuance, as necessary.
- **Monitoring Reports [40 CFR §122.41(l)(4)]**—Reports must be submitted on a DMR or on a Director-specified form for sludge use/disposal practices. In addition, more frequent monitoring must be reported. Calculations requiring averaging must use an arithmetic mean, except for fecal coliform. Monitoring results must be reported at the frequency specified in the permit.
- **Compliance Schedules [40 CFR §122.41(l)(5)]**—Reports required by a compliance schedule in the permit must be submitted within 14 days of the due date.
- **Twenty-Four Hour Reporting [40 CFR §122.41(l)(6)]**—The permittee must report any noncompliance that may endanger human health or the environment within 24 hours after becoming aware of the circumstance. Within 5 days, the permittee must provide a written submission containing the information outlined in 40 CFR §122.41(l)(6)(ii) unless the requirement is waived by the permitting authority.
- **Other Noncompliance [40 CFR §122.41(l)(7)]**—The permittee must report all instances of noncompliance not reported under other specific reporting requirements at the time monitoring reports are submitted.
- **Other Information [40 CFR §122.41(l)(8)]**—Where the permittee becomes aware that it failed to submit any relevant facts in its application, or submitted incorrect information in its application or other reports, it must promptly submit such information.

- **Bypass [40 CFR §122.41(m)]**—Intentional diversions of untreated waste streams from any portion of a treatment facility are prohibited unless (1) the bypass does not cause effluent to exceed limits, and (2) the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage, and there was no feasible alternatives, and the proper notification was submitted.
- **Upset [40 CFR §122.41(n)]**—An upset can be used as an affirmative defense in actions brought to the permittee for noncompliance. The permittee (who has the burden of proof) must have operational logs or other evidence that shows (1) when the upset occurred and its causes, (2) that the facility was being operated properly, (3) proper notification was made, and (4) remedial measures were taken.

9.2 Other Standard Conditions

In addition to standard conditions specified in 40 CFR §122.41, 40 CFR §122.42 sets forth additional conditions applicable to specified categories of NPDES permits. These conditions include:

- Existing manufacturing, commercial, mining, and silvicultural dischargers must notify EPA as soon as they know or have reason to believe that the discharge has or will exceed notification levels set forth in 40 CFR §122.42(a).
- POTWs must provide adequate notice to EPA for new introduction of pollutants into the POTW, for substantial changes in the volume or character of pollutants, and related information specified in 40 CFR §122.42(b).
- Large, medium or EPA-designated municipal separate storm sewer systems must submit an annual report addressing the status, and changes to, the storm water management program, water quality data and other information specified in 40 CFR §122.42(c).

Chapter 10

Variances to Permit Requirements and Other Regulatory Considerations

To address unique permitting situations, the CWA and NPDES regulations allow permit writers to grant variances under certain prescribed conditions. These variances may apply to either technology-based or water quality-based regulatory requirements. The variances available under the NPDES Program are described below.

The NPDES Program has also established certain requirements to ensure that NPDES permits address the statutory and regulatory requirements of other environmental programs. The permit writer should be aware of these other programs in developing permit conditions, and work with the regulatory agencies that oversee these programs. Section 10.3 describes these considerations.

10.1 Variances to Technology-Based Permit Requirements

In addition to specifying national goals for water pollution control, the CWA provides a mechanism for modification of the technology-based requirements of the CWA for exceptional cases. These modifications are called variances. Very specific data requirements must be met by an applicant before a variance may be granted. As

the term implies, a variance is the unusual situation, and the permit writer should not expect to routinely receive variance requests. Nevertheless, the permit writer should be aware of the major types of variances and the basic requirements for each, because the permit writer will most likely be the person to conduct the initial reviews of such requests before submitting them for review to the State Director (if applicable), the EPA Regional office, and EPA Headquarters. The permit writer should consult 40 CFR §124.62 for the procedures for decisions on the various types of variances.

With one exception (fundamentally different factors variance), a variance request must be submitted before the close of the public comment period of the permit. The following paragraphs discuss variances and the factors that should be considered in a technical review of the variance request.

10.1.1 Economic Variances

Section 301(c) of the CWA provides for a variance for nonconventional pollutants from BAT-based effluent limitations due to economic factors. Note that there are no implementing regulations for §301(c); rather, variance requests must be made and reviewed based on the statutory language in CWA §301(c). The variance may also apply to non-guideline limits in accordance with 40 CFR §122.21(m)(2)(ii). The request for the variance from effluent limitations developed from BAT guidelines is normally filed by the discharger during the public notice period for the draft permit. Other filing time periods may apply, as specified in 40 CFR §122.21(m)(2). The application must show that the modified requirements:

- Represent the maximum use of technology within the economic capability of the owner or operator; and
- Will result in further progress toward the no discharge goal.

The methodologies for determining economic capability for utilities is different than that used for other industries. Utilities should perform two financial calculations. Generally, EPA will only grant a variance if both tests indicate that the pollution control equipment is not economically achievable and the applicant can demonstrate "reasonable further progress." Other industry categories must calculate three financial tests to determine if they are eligible on economic grounds for a 301(c) variance.

Guidance for conducting these financial tests is available from EPA's Office of Wastewater Management. Generally, EPA will only grant a variance if all three tests indicate that the required pollution control is not economically achievable and the applicant makes the requisite demonstration about "reasonable further progress."

With respect to the second requirement for a 301(c) modification (reasonable further progress toward the no-discharge goal), the applicant must, at a minimum, demonstrate compliance with all applicable BPT limitations and pertinent water quality standards. In addition, the proposed alternative must provide for a reasonable degree of improvement in the applicant's discharge.

10.1.2 Variances Based on Localized Environmental Factors

Section 301(g) of the CWA provides for a variance for certain nonconventional pollutants from BAT effluent guidelines due to localized environmental factors. These pollutants include ammonia, chlorine, color, iron, and total phenols. The discharger must file a variance application that meets the following requirements:

- The modified requirements must result in compliance with BPT and water quality standards of the receiving stream.
- No additional treatment will be required of other point or nonpoint source dischargers as a result of the variance approval.
- The modified requirements will not interfere with attainment or maintenance of water quality to protect public water supplies, or with protection and propagation of a balanced population of shellfish, fish, and wildfowl, and will allow recreational activities in and on the water. Also, the modified requirements will not result in quantities of pollutants that may reasonably be anticipated to pose an unacceptable risk to human health or the environment, cause acute or chronic toxicity, or promote synergistic properties.

The permit writer should review the request to ensure that it complies with each of the requirements for this type of variance. This variance request involves a great deal of water quality assessment, including aquatic toxicity, mixing zone and dilution model analysis, and possible site-specific criterion development. In addition, many complex human health effects must be assessed, including carcinogenicity, teratogenicity, mutagenicity, bioaccumulation, and synergistic propensities. All permit

writers should use the EPA draft 301(g) technical guidance manual to assess a completed variance request. Typical industries that have applied for 301(g) variances include Iron and Steel Manufacturing, Steam Electric Power Generating, Inorganic Chemicals Manufacturing, Nonferrous Metals Manufacturing, Aluminum Forming, and Pesticides Manufacturing facilities.

10.1.3 Marine Discharge Variances

Section 301(h) of the CWA provides for variances from secondary treatment standards for POTWs that discharge into marine waters if the modified requirements do not interfere with the attainment or maintenance of water quality. EPA has promulgated specific regulations pertaining to CWA §301(h) that are provided in 40 CFR Part 125, Subpart G.

All 301(h) modified permits must contain the following specific permit conditions:

- Effluent limitations and mass loadings that will assure compliance with 40 CFR Part 125, Subpart G
- Compliance schedules for pretreatment program development, a nonindustrial toxics control program, and control of combined sewer overflows
- Monitoring program requirements that include biomonitoring, water quality, and effluent monitoring
- Reporting requirements that include the results of the monitoring programs.

Also, no new or substantially increased discharges from the point source of the affected pollutant can be released above that volume of discharge specified in the permit.

EPA has developed several guidance manuals related to 301(h) variances, including the *Revised Section 301(h) Technical Support Document.*[73]

[73]USEPA (1982). *Revised Section 301(h) Technical Support Document.* EPA-430/9-82-011. Office of Water.

10.1.4 Fundamentally Different Factors Variances

Section 301(n) of the CWA provides for variances based upon fundamentally different factors (FDF) for BAT and BCT pollutants while 40 CFR Part 125, Subpart D provides the regulatory authority for BPT variances. FDF variances for direct dischargers are available from effluent limitations guidelines for toxic, conventional, and nonconventional pollutants if the individual facility is found to be fundamentally different from the factors considered in establishing the effluent guidelines. There is no FDF variance allowed from NSPS. The FDF variance for BPT must be filed by the close of the public comment period under 40 CFR §124.10. The FDF variance for BAT or BCT must be requested by the discharger within 180 days of the guideline promulgation. Where a FDF variance request is approved, calculated alternative limits cannot be any less stringent than justified by the fundamental difference and cannot cause violations of water quality standards.

Factors needed to justify a BPT FDF variance must be related to a discharger's facilities, equipment, processes, and compliance cost that are different from those considered in the development of the guidelines. Factors for BAT and BCT variance requests are similar except that cost cannot be considered. Additional factors that cannot be considered for any FDF variance request include the feasibility of installing the necessary treatment within the given time frame, a claim that the limits cannot be achieved with the given technology (unless supported with data), the discharger's ability to pay, or the impact on local receiving water quality. The review or proposal of an FDF variance is completed on a case-by-case basis. The burden of proof lies with the entity requesting the variance.

10.1.5 Thermal Discharge Variances

Section 316(a) of the CWA provides for variances from effluent limitations for the thermal component of a discharge. Regulations for submitting and reviewing thermal discharge variance requests are promulgated at 40 CFR Part 125, Subpart H. Less stringent alternative thermal effluent limits may be included in permits if the discharger demonstrates that such effluent limits are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is

made, taking into account the cumulative impact of its thermal discharge together with all other significant impacts on the species affected.

10.1.6 Net Credits

In some cases, solely as a result of the level of pollutants in the intake water, facilities are faced with situations in which technology-based limits are difficult or impossible to meet with BAT/BCT technology. Under certain circumstances, the NPDES regulations allow credit for pollutants in intake water. The following requirements have been established in 40 CFR §122.45(g) for establishing net limitations:

- Credit for generic pollutants, such as BOD_5 or TSS, are only authorized where the constituents resulting in the effluent BOD_5 and the TSS are similar between the intake water and the discharge.
- Credit is only authorized up to the extent necessary to meet the applicable limitation or standard, with a maximum value equal to the influent concentration.
- Intake water must be taken from the same body of water into which the discharge is made.
- Net credits do not apply to the discharge of raw water clarifier sludge generated during the treatment of intake water.

Permit writers are authorized to grant net credits for the quantity of pollutants in the intake water where the applicable effluent guidelines specify that the guidelines are to be applied on a net basis or where the pollution control technology would, if properly installed and operated, meet applicable effluent guidelines limitations and standards in the absence of the pollutants in the intake waters.

10.2 Variances to Water Quality-Based Permit Requirements

Several types of variances exist that may change the fundamental basis of water quality-based effluent limitations, specifically:

- Site-specific water quality criteria modification,
- Designated use reclassification, and
- Water quality standard variance.

Each of these variances are described below.

10.2.1 Site-Specific Water Quality Criteria Modification

Section 304(a) of the CWA recommends procedures for States to develop water quality criteria. The State does have the option of modifying water quality criteria on a site-specific basis. Setting site-specific criteria may be appropriate where background water quality parameters, such as pH, hardness, temperature, and color appear to differ significantly from the laboratory water used to develop the CWA §304(a) criteria; or the types of local aquatic organisms differ significantly from those actually tested in developing the CWA §304(a) criteria. Modifications change water quality criteria permanently, while maintaining the existing designated uses.

10.2.2 Designated Use Reclassification

Once a use has been designated for a particular water body or segment, the water body or water body segment cannot be reclassified for a different use except under specific conditions. To remove a designated use, as specified in Section 101(a)(2) of the CWA, the State must perform a use attainability analysis pursuant to 40 CFR §131.10(j). The *Water Quality Standards Handbook: Second Edition*[74] discusses use attainability analyses in greater detail. Reclassifying a water body causes a permanent change in the water quality standard for that water body.

10.2.3 Water Quality Standard Variance

Water quality standard variances require similar substantive and procedural requirements as removing a designated use, but unlike use removal, variances are both discharger and pollutant specific, are time-limited, and do not forego the currently designated use of a water body. A variance is appropriate where the State believes that the standard can be ultimately attained. By maintaining the standard rather than changing it, the State will assure that further progress is made in improving the water quality and attaining the standard. State-adopted variances have been approved by EPA where, among other things, the State demonstrates, consistent with 40 CFR Part 131, that meeting the standard is unattainable based on one or more of the grounds outlined in 40 CFR §131.10(g). The variance is granted for a specified period of time

[74]USEPA (1994). *Water Quality Standards Handbook: Second Edition.* EPA 823-B-94-005a. Office of Water.

and rejustified at least every 3 years as reasonable progress is made toward meeting the standards.

Modifications of or variances to water quality standards have several effects on permit limits. Specifically, these variances change the fundamental basis of water quality-based effluent limits, potentially impacting the reasonable potential determination and possibly resulting in more or less stringent limitations. It is the permit writer's responsibility to ensure that the variance is properly reflected in the NPDES permit.

10.3 Additional Programmatic Considerations and Requirements

This section addresses additional programmatic requirements that must be considered during permit development. These requirements include anti-backsliding and compliance with other Federal laws.

10.3.1 Anti-Backsliding

In general, the term "anti-backsliding" refers to a statutory provision that prohibits the renewal, reissuance, or modification of an existing NPDES permit that contains effluents limits, permit conditions, or standards that are less stringent than those established in the previous permit. There are, however, exceptions to the prohibition—determining the applicability and circumstances of the exceptions requires a familiarity with both the statutory and regulatory language that addresses the issue of "anti-backsliding."

Section 402(o) of the Clean Water Act establishes express statutory language prohibiting the backsliding of effluent limitations. Section 402(o) consists of three main parts. **First**, section 402(o)(1) prohibits (subject to exceptions in sections 303(d)(4) and/or 402(o)(2)) the relaxation of effluent limitations for two situations:

(1) When a permittee seeks to revise a technology-based effluent limitation based on best professional judgment to reflect a subsequently promulgated effluent guideline which is less stringent, and

(2) When a permittee seeks relaxation of an effluent limitation which is based upon a State treatment standard or water quality standard.

Second, Section 402(o)(2) outlines specific exceptions to the general prohibition against establishment of less stringent effluent limitations. Codified in the NPDES regulations at 40 CFR 122.44(l), Section 402(o)(2) provided that the establishment of less stringent limits may be allowed where:

(1) There have been material and substantial alternations or additions to the permitted facility which justify this relaxation.

(2) New information (other than revised regulations, guidance, or test methods) is available that was not available at the time of permit issuance which would have justified a less stringent effluent limitation.

(3) Technical mistakes or mistaken interpretations of the law were made in issuing the permit under Section 402(a)(1)(b).

(4) Good cause exists due to events beyond the permittee's control (e.g., acts of God) and for which there is no reasonably available remedy.

(5) The permit has been modified under 40 CFR §122.62, or a variance has been granted.

(6) The permittee has installed and properly operated and maintained required treatment facilities but still has been unable to meet the permit limitations (relaxation may only be allowed to the treatment levels actually achieved).

Although the statute identified six exceptions where effluent limitations may be relaxed, the language specifically stated that exceptions 3 and 5 (as listed above) do not apply to water quality-based effluent limitations. Thus, exceptions 3 and 5 would only apply to technology-based effluent limitations derived using best professional judgment.

Third, Section 402(o)(3) prohibits the relaxation of effluent limitations in all cases if a revised effluent limitation would result in a violation of applicable effluent limitation guidelines or water quality standards, including antidegradation requirements. Thus, even if any of the backsliding exceptions outlined in either the statute or

regulations are applicable and met, Section 402(o)(3) acts as a floor and restricts the extent to which effluent limitations may be relaxed. This requirement affirms existing provisions of the CWA that require permit limits, standards, and conditions to ensure compliance with applicable technology-based limits and water quality standards.

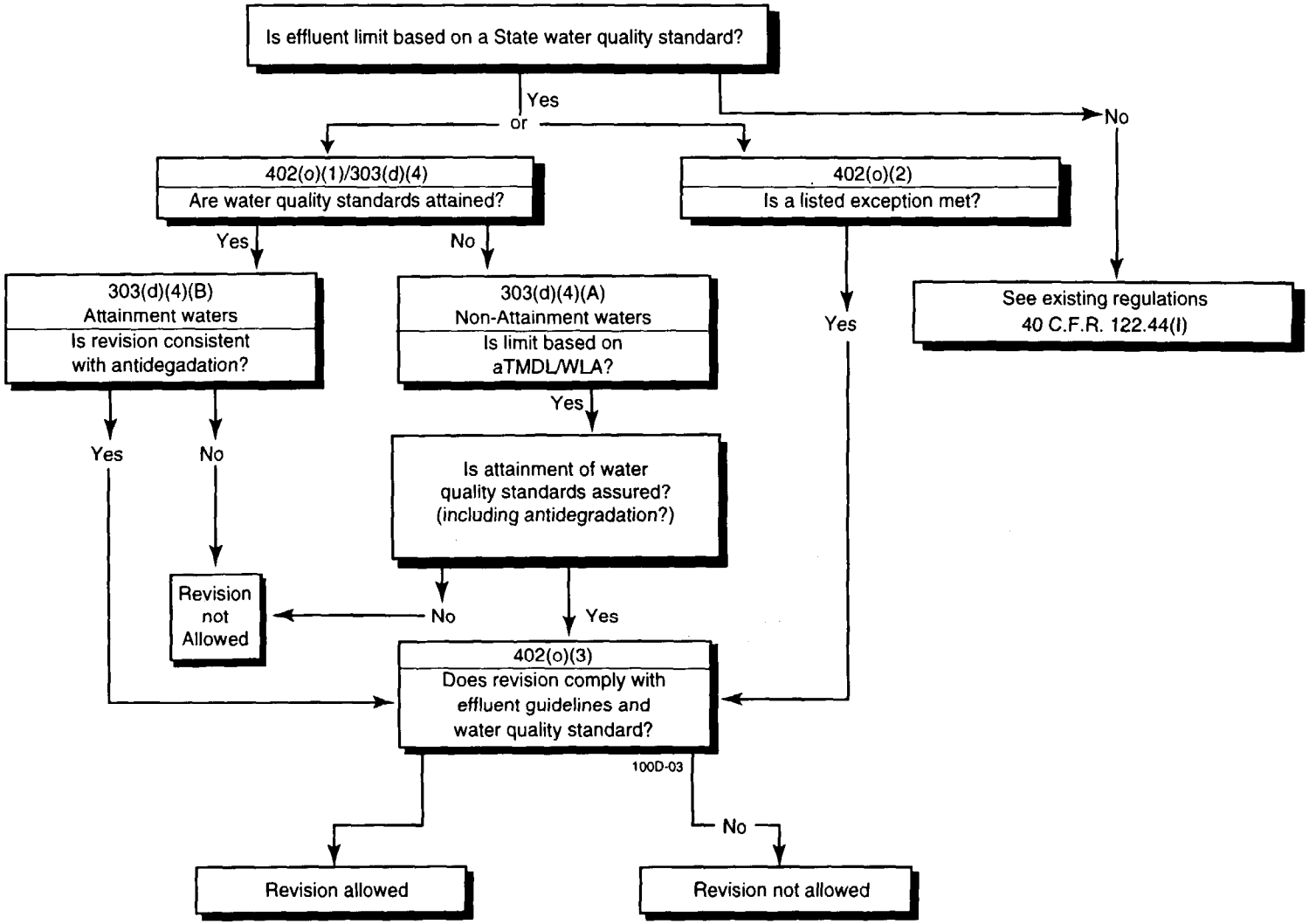
EPA's current regulations which address the issue of anti-backsliding reflect the prohibition imposed by Section 402(o) for the first situation; revision of existing BPJ-based permit limitations to reflect subsequently issued effluent guidelines (40 CFR 122.44(l)(2)). However, the regulations have not been revised to reflect the prohibition of backsliding for the second situation: relaxation of effluent limitations established on the basis of Sections 301(b)(1)(C) or 303(d) or (3). EPA believes the water quality provisions must be implemented based upon interpretation of the CWA in the meantime. As such, the remainder of the discussion on anti-backsliding provisions will focus on clarifying the intent of the statute as it relates to relaxation of water quality-based effluent limitations. In addition, **Exhibit 10-1** provides a graphical interpretation of the backsliding provisions as they related to the relaxation of WQBELs.

EPA has consistently interpreted Section 402(o)(1) of the CWA to allow relaxation of water quality-based effluent limitations (WQBELs) if either the requirements of Section 402(o)(2) or section 303(d)(4) are met. These two provisions constitute independent exceptions to the prohibition against relaxation of permit limits. If either is met, relaxation is permissible.

Section 303(d)(4) has two parts: paragraph (A) which applies to "non-attainment waters" and paragraph (B) which applies to "attainment waters."

- **Non-attainment water**—Section 303(d)(4)(A) allows establishment of less stringent WQBEL when the receiving water has been identified as not meeting applicable water quality standards (i.e., a "nonattainment water"), if the permittee meets two conditions. First, the existing WQBEL must have been based on a total maximum daily load (TMDL) or other wasteload allocation (WLA) established under Section 303. Second, relaxation of a WQBEL is only allowed if attainment of water quality standards must be ensured.
- **Attainment water**—Section 303(d)(4)(B) applies to waters where the water quality equals or exceeds levels necessary to protect the designated use, or to otherwise meet applicable water quality standards (i.e., an "attainment

EXHIBIT 10-1
Anti-Backsliding Rules Relating to Water Quality-Based Effluent Limitations



water"). Under Section 303(d)(4)(B), WQBELs may only be relaxed where the action is consistent with State's anti-degradation policy.

As previously mentioned, Section 402(o)(2) outlines specific exceptions to the general prohibition against backsliding from WQBELs. These exceptions are independent of the Section 303(d)(4) exception discussed above and are also applicable to the backsliding of BPJ limits to reflect subsequently promulgated less stringent guidelines.

Finally, all other types of backsliding [for example, backsliding from effluent guideline-derived limits, from new source performance standards, from existing BPJ limits to new BPJ limits, or from water quality-related standards or conditions (except for effluent limitations)] remain unaffected by the 1987 WQA amendments and EPA's existing regulations at 40 CFR 122.44(l)(1) will continue to govern them. This is because Section 402(o) only prohibits the backsliding of "effluent limits," not other standards or conditions such as monitoring frequency or changes in species or protocol for whole effluent toxicity (WET) testing. The relaxation of all other types of standards or conditions contained in a permit are, however, subject to EPA's existing backsliding regulations at 40 CFR 122.41(l)(1). Under these regulations, a permittee must meet a cause for modification in order to allow relaxation.

Example 1

Scenario:

- A POTW seeks to relax its WQBEL for pollutant X.
- Current permit limitation is based on the TMDL and WLA for the POTW developed in accordance with 40 CFR 130.7.
- The POTW is in compliance with its existing limitation and the applicable water quality standards for pollutant X is attained.
- The POTW has developed new models with new river flow information, which indicate that the water quality standards for pollutant X would be maintained with a relaxed permit limitation.
- May the effluent limitation for pollutant X be relaxed?

Answer:

Possibly. Under the interpretation discussed above, WQBELs may be relaxed where one of the exceptions in §402(o)(1) or 40 CFR 122.44(l)(2) are met. In this case, although new information is being relied on to request the modification, §402(o)(2) will not justify the request unless the State reduces the pollutant loadings from other point sources or non-point sources of pollution. This is because, as discussed above, paragraph §402(o)(2) restricts the use of new information to cases where there is a decrease in the amount of pollutants being discharged.

The §402(o)(1) exceptions, on the other hand, may justify the request. In this case, the paragraph (o)(1) exception that is relevant is the reference to §303(d)(4)(B). It provides that for receiving waters that where water quality standards are attained, permit limitations based on a TMDL/WLA or other permit standard may be relaxed only if a State's antidegradation policy are met.

Example 2

Scenario:

- The State has established a technology-based treatment standard for fecal coliform pursuant to §301(b)(1)(C).
- The State later relaxes this standard.
- A POTW, which has been in violation of this limit, requests a revision of its permit limit for fecal coliform to reflect the new standard.
- Water quality standards for fecal coliform are not being attained.
- Models show that attainment of water quality standards will be assured if the POTW complies with a revised, relaxed permit limitation for fecal coliform.
- There was no TMDL or WLA performed because the standard was a State technology-based standard.
- May the permit limitation be relaxed?

Answer:

No. Under §402(o)(1), the applicable provision is §303(d)(4)(A). This subsection does not authorize backsliding in this case because it only applies to permit limitations based on a TMDL/WLA. Here, the limitation in question is based on a type of State treatment standard.

Furthermore, if the permit sought to apply the §402(o)(2) exceptions, the new information provision would not allow the revision. New information does not include "revised regulations."

Example 3

Scenario:

- The State has a narrative water quality criterion of "no toxics in toxic amounts."
- On the basis of WET testing data or other information, the State finds reasonable potential to exceed the narrative water quality criterion and imposes a WET limitation under 40 CFR 122.44(d)(1)(v).
- The permittee determines that pollutant Z is the cause of the WET in its discharge.
- The permittee can demonstrate through sufficient data (including WET testing data) that an effluent limitation for pollutant Z will assure compliance with the narrative water quality standards as well as the State's numeric criteria for pollutant Z as required by 40 CFR 122.44(d)(1)(v).
- May the State modify the permit to delete the WET limitation and to add the limitation for pollutant Z?

Answer:

§303(d)(4) may justify this action. The applicable provision of §303(d)(4) is §303(d)(4)(B) because the narrative water quality standards is currently attained. (The permittee is currently complying with the existing WET limitation to attain and maintain the State's narrative water quality standards.) Under §303(d)(4)(B), the permittee may backslide so long as antidegradation requirements will be met, and the relaxed limitation will not cause a violation of any effluent limitations guidelines and water quality standards applicable to the discharge. In this case, this appears likely because the discharger can demonstrate that the new limitation for pollutant Z will assure compliance with applicable narrative as well as numeric water quality standards.

Example 4

Scenario:

- An industrial permittee seeks to revise its WQBEL of 1000 mg/L for TSS to 6000 mg/L, its actual discharge level.
- The current permit limitation is based upon a TMDL and WLA for the permittee, which were developed in accordance with 40 CFR 130.7.
- The water quality standards for TSS are not being attained.
- A permit limit of 6000 mg/L is consistent with applicable effluent guidelines.
- New modeling information shows that the water quality standards for TSS will be attained with a permit limitation of 4000 mg/L.
- May the permit limitation be revised from 1000 mg/L to 6000 mg/L?

Answer:

No. However, the permit limitation could be relaxed to 4000 mg/L under either §402(o)(1) or the §402(o)(2) exceptions.

The water quality standards for TSS is not currently being attained. Therefore, under §402(o)(1), the applicable exception is §303(d)(4)(A). In this case, the permitting authority may allow backsliding to 4000 mg/L because the existing effluent limitation is based upon a TMDL/WLA and the data shows that attainment of the water quality standards is assured with a permit limitation of 4000 mg/L (but not with a limitation of 6000 mg/L).

Alternatively, under §402(o)(2), new information can be relied on to relax permit limitations where there is a reduction in pollutant loadings and, pursuant to §402(o)(3), where water quality standards are complied with. Again, water quality standards are being met in this case, and there also will be a reduction in actual pollutant loadings since the new proposed permit level of 4000 mg/L will represent a real reduction compared with the actual discharge levels of 6000 mg/L.

10.3.2 Considerations for Other Federal Laws

This section addresses several Federal laws that impact NPDES permitting. It is noteworthy that the requirements imposed under several of these statutes (e.g., the NHPA, ESA, FWCA, and NEPA, discussed below), only apply to Federal or federally supported actions (e.g., EPA issuance of permits). Under these particular statutes, purely State actions are not regulated. However, many States may have enacted State legislation that is modeled on Federal law and, therefore, it is prudent to review State law in these areas prior to preparing a NPDES permit.

National Historic Preservation Act Amendments of 1992

The National Historic Preservation Act (NHPA) establishes Federal programs to preserve the historical and cultural foundations of the nation. Regulations under Section 106 of this Act require any Federal agency, in consultation with the Advisory Council on Historic Preservation, to take into account the effect of proposed Federal or Federally assisted undertakings on architectural, archeological, historic, or cultural resources listed, or eligible for listing, on the National Register of Historic Places. This has been interpreted (see EPA Memorandum dated March 15, 1994, from Steven A. Herman, Assistant Administrator to Carol Browner, Administrator, entitled "EPA Policy Decision of a Strategy For, and Interim Compliance with the National Historic Preservation Act Amendments") to mean that consultations must be made for direct EPA actions and for individual State actions that EPA funds under its programs. However, for State actions not directly funded by EPA under EPA-authorized programs, consultation would occur on a voluntary basis.

To date, guidance for the permit writer in considering the NHPA requirements is not available. In general, the permit writer must ensure that the proposed discharge to be authorized under the NPDES permit will not have an adverse effect on a site listed, or eligible for listing, on the National Register of Historic Places. The permit writer may want to require that the permittee show that sufficient research has been conducted to identify whether a site on the Register is located within the area. Sufficient research should include review of the National Register and information gathering from local governments, Indian tribes, public and private organizations, and the State Historic Preservation Officer (36 CFR Part 880). An evaluation of potential effects should be documented. Written documentation of the evaluation should be

submitted to the State Historic Preservation Office and included in the permit file and fact sheet.

Endangered Species Act of 1973

The goal of the Endangered Species Act (ESA) of 1973 is to provide protection and support in the conservation and recovery of threatened and endangered species and the ecosystem on which they depend. Section 7 of the ESA requires Federal agencies to ensure that any action authorized, funded, or carried out by a Federal agency not jeopardize the continued existence of a listed or candidate species or result in the destruction or adverse modification of its habitat. Since the issuance of NPDES permits by EPA is a Federal action, consideration of a permitted discharge and its effect on any threatened and/or endangered species is appropriate. Section 9 of the ESA prohibits the "taking" of any listed endangered and/or threatened species.

The ESA regulations require that consultation with the National Marine Fisheries Service (NMFS) and/or the Fish and Wildlife Service (FWS), as appropriate, occur when the Federal activity is one which may effect an endangered and/or threatened species or habitat. Effect is defined as both detrimental and beneficial. Consultations may be either informal or formal. An informal consultation determines if an action is, or is not, likely to adversely effect the species. A formal consultation is required if the findings show that there is a likelihood for adverse impacts and evaluates if the proposed action is likely to jeopardize the continued existence of the species. It is EPA's responsibility to ensure that consultation occurs, however, a non-Federal representative may be designated for the informal consultation (i.e., the permittee).

To date, EPA has not yet entered into a national agreement with NMFS or FWS on the scope of consultation requirements for NPDES permits. Until then, EPA permit writers should review the ESA consultation regulations (50 CFR §402) and coordinate with the Region's ESA coordinator (if such a position has been established in a particular Region) and the FWS/NMFS office(s) located nearest the site. In evaluating the effects of a discharge upon endangered or threatened species, the study should identify the listed and candidate species and their habitats which occur in the area of the discharge. This information can be obtained from discussions with local FWS/ NMFS biologists. The proposed permit limits can then be compared to any existing

toxicological data and/or impacts data available for the species. Cumulative, combined, and independent effects should be evaluated. Additional species-specific information can be obtained through discussions with the local wildlife and aquatic biologists who are experts on a particular species (e.g., EPA, FWS/NMFS, State Conservation, universities).

It is EPA's position that permits issued under State law are not subject to ESA consultation because they are not Federal Actions. However, State NPDES Programs should have some process in place to consider potential effects on endangered and threatened species and their habitat if they are known to occur in the area of the discharge to ensure those discharges do not result in takes of listed species.

Biological Evaluations (informal) or Biological Assessments (formal) should be submitted to the FWS/NMFS for review and approval. This documentation and any decisions from the FWS/NMFS would become part of the permit documentation.

Wild and Scenic Rivers Act

The 1968 Wild and Scenic Rivers Act protected selected rivers from construction of dams and excessive commercial development. It declared that "the established national policy of dam and other construction at appropriate section of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or section thereof in their free-flowing condition" [Section (1)(b)]. The Act defines three classes of protected river (wild river; scenic river; recreational river) and spells out in considerable detail the management restrictions to be established for these rivers. A corridor of land on each side of a protected river is also protected. The corridor is to average no more than 320 acres per linear mile of river through the protected stretch. The rights of landowners within this corridor are maintained, subject to restrictions on the type of development allowed. Rivers are "studied" and may be protected for up to three years during the study period during which a river has the status of a protected river.

Coastal Zone Management Act

The 1972 Coastal Zone Management Act (CZMA) and amendments require and encourage the coastal states of the United States to adopt and enforce land-use plans for the lands and water adjacent to their coasts. "Coastal states," according to the Act, include those adjacent to the Atlantic, Pacific or Arctic oceans, the Gulf of Mexico, or one or more of the Great Lakes. These States are required to adopt coastal management plans which designate boundaries, identify areas of particular concern, and establish an inventory of permitted uses and an enforcement mechanism. Beach access, emergency planning and erosion control also must be addressed in the plans. EPA and other Federal agencies must coordinate their activities on coastal lands with State CZMA plans.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) of 1934 requires mitigation for the loss of wildlife habitat due to the construction of Federal water resources projects. It requires designers of Federal dams, reservoirs, and irrigation works to include the costs and benefits to fish and wildlife when determining the benefit/cost ratio of a project. It requires EPA and other Federal agencies to consult with State and Federal wildlife and fisheries agencies in order to minimize the impacts of the activity on fish and wildlife. The Act specifically calls for ongoing studies by the United States Department of the Interior on the effects of waterborne sewage and industrial wastes on fish and wildlife.

National Environmental Policy Act

The 1967 National Environmental Policy Act established a Federal framework for policy decisions regarding Federal actions that will have a significant effect on the environment. "Federal" actions generally include projects undertaken by the Federal government, as well as non-Federal actions eligible for Federal assistance and non-Federal actions that require Federal permits or approvals. Thus, NEPA requirements apply to NPDES permits issued by EPA to new sources in non-delegated States. The Act's most important provision is Section 102(2)(c), requiring Federal agencies such as EPA to file an Environmental Impact Statement (EIS) on all "proposals for legislation and other major Federal actions significantly affecting the quality of the

human environment." The definition of what constitutes such actions is an ongoing discussion. The Act establishes a framework for cooperation between the United States government at all levels, and other countries on environmental matters. It also established the Council on Environmental Quality.

Chapter 11

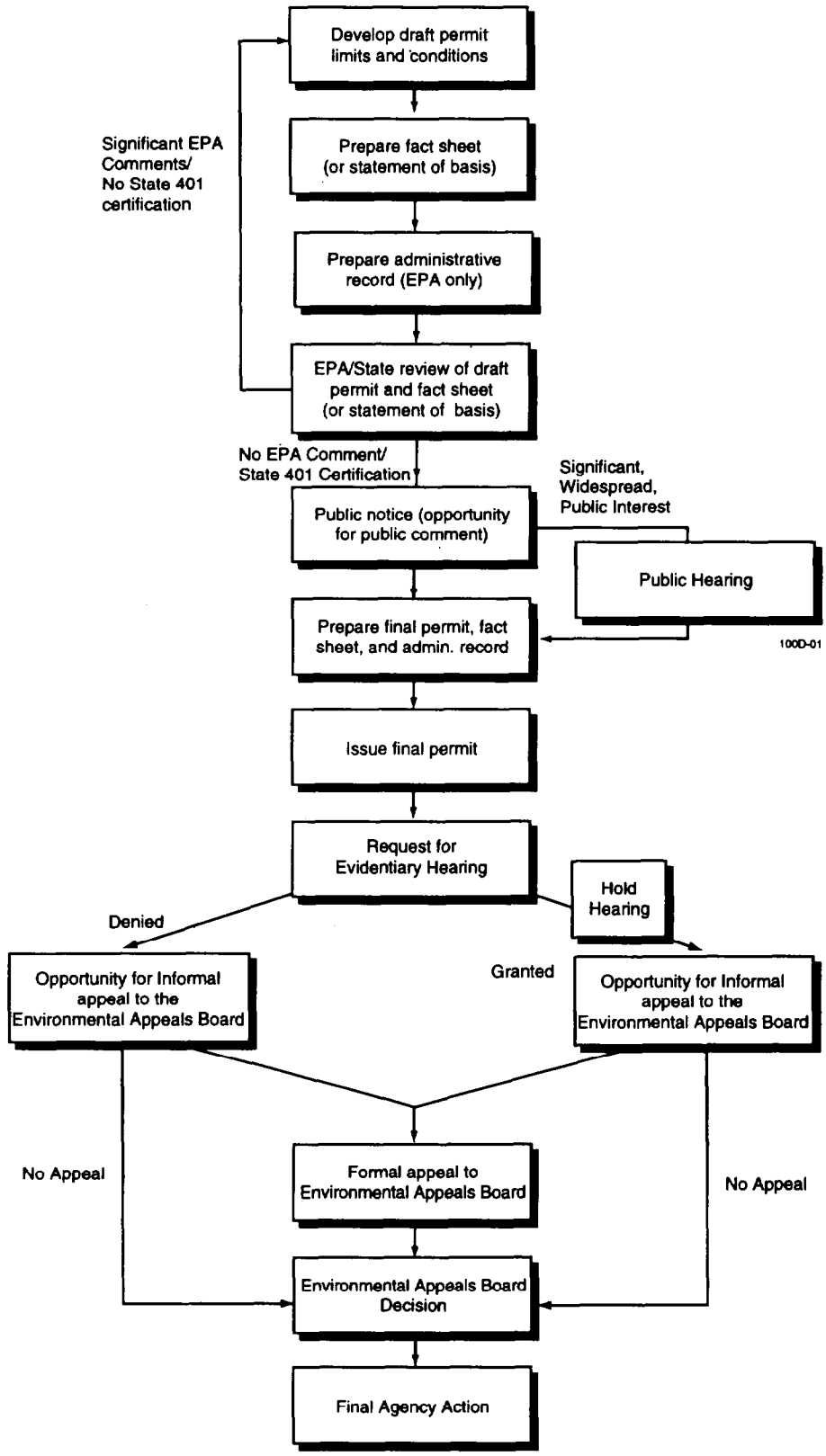
Administrative Process

Previous discussions in this manual focused on the process of developing NPDES permit conditions and effluent limits. This chapter describes the administrative process that is associated with the issuance of a NPDES permit. **Exhibit 11-1** provides a flow diagram of the NPDES permit administrative process. In general, the administrative process includes:

- Documenting all permit decisions
- Coordinating EPA and State review of the draft permit
- Providing public notice, conducting hearings (if appropriate), and responding to comments
- Defending the permit and modifying it (if necessary) after issuance.

Note that Exhibit 11-1 provides the general framework for both EPA and State NPDES permit administration. State requirements need not be identical to Federal regulatory requirements, provided they are as stringent. Therefore, some delegated States may have slightly different processes for developing and issuing NPDES permits. In addition, the evidentiary hearing and appeal process presented depicts EPA procedure. State procedures for NPDES permit hearings and appeals may vary according to State law.

EXHIBIT 11-1
NPDES Permitting Administrative Process



11.1 Documentation For Development of the Draft Permit

When the permit is issued, the fact sheet and supporting documentation (administrative record) are the primary support for defending the permit in administrative appeals and evidentiary hearings. The process of documenting the permit requires the permit writer to be organized and logical throughout the permit development process. Some of the content of the fact sheet and administrative record is directed by Federal and State regulation and the rest is dictated by good project management. Permit writers should recognize the importance of:

- Ensuring development of a thorough permit in a logical fashion
- Meeting legal requirements for preparation of an administrative record, fact sheet, and statement of basis
- Helping to substantiate permit decisions and provide a sound basis in case challenges are made to the derivation of permit terms, conditions, and limitations
- Establishing a permanent record of the basis of the permit for use in future permit actions.

The following sections describe the requirements pertaining to the development of permit documentation, particularly the administrative record and the fact sheet.

11.1.1 Administrative Record

The administrative record is the foundation for issuing permits. If EPA is the issuer, the contents of the administrative record are prescribed by regulation (see 40 CFR §§124.9 and 124.18). All supporting materials must be made available to the public, whether a State, Territory, Tribe or EPA issues the permit. The importance of maintaining the permit records in a neat, orderly, complete, and retrievable form cannot be over emphasized. The record allows personnel from the permitting agency to reconstruct the justification for a given permit. It also must be made available to the public at any time and may be examined during the public comment period and any subsequent public hearing.

The administrative record for a draft permit consists, at a minimum, of certain specific documents as shown in **Exhibit 11-2**. Materials that are readily available in the permit issuing office or published material that is generally available, does not

EXHIBIT 11-2
Elements of the Draft NPDES Permit Administrative Record

- Application and supporting data
- Draft permit
- Statement of basis or fact sheet
- All items cited in the statement of basis or fact sheet, including calculations used to derive the permit limits
- All other items in the supporting file
- For new sources, any environmental assessment, the draft/final environmental impact statement (EIS), or other such background information, such as a Findings of No Significant Impact (only applies if EPA issues the permit).

need to be physically included with the record as long as it is specifically referred to in the fact sheet or statement of basis. If EPA issues new source draft permits, the administrative record should include any EIS or environmental assessment performed in accordance with 40 CFR §122.29(c).

The administrative record should include all meeting reports and correspondence with the applicant and correspondence with other regulatory agency personnel. In addition, trip reports and telephone memos should be included in the record. All correspondence, notes, and calculations should indicate the date and the name of the writer, as well as all other persons involved. Since correspondence is subject to public scrutiny, references or comments that do not serve an objective purpose should be avoided. Finally, presentation of calculations and documentation of decisions should be organized in such a way that they can be reconstructed and the logic supporting the calculation or decisions can easily be found. The administrative record for the final permit consists of the items in **Exhibit 11-3**.

11.1.2 Fact Sheets and Statements of Basis

A fact sheet is a document that briefly sets forth the principle facts and the significant factual, legal, methodological, and policy questions considered in preparing the draft permit. When the permit is in the draft stage, the fact sheet and supporting documentation serve to explain to the permittee and the general public the rationale and assumptions used in deriving the limits.

EXHIBIT 11-3
Elements of the Administrative Records for a Final Permit

- All elements for the draft permit administrative record (see Exhibit 11-2)
- All comments received during the comment period
- The tape or transcript of any public hearing
- Any materials submitted at a hearing
- Responses to comments
- For NPDES new source permits, the draft or final EIS
- The final permit.

The NPDES regulations set forth in 40 CFR §124.8(a) require that every EPA and State-issued permit must be accompanied by a fact sheet if the permit:

- Involves a major facility or activity
- Incorporates a variance or requires an explanation under 40 CFR §124.56(b) (toxic pollutants, internal waste stream, and indicator pollutants and for privately owned waste treatment facilities)
- Is a NPDES general permit
- Is subject to widespread public interest (see 40 CFR §124.8)
- Is a Class 1 sludge management facility
- Includes a sewage sludge land application plan.

EPA permit writers are required to prepare a statement of basis for all permits that do not merit the detail of a fact sheet. Such statements briefly describe the derivation of the effluent limits and the reasons for special conditions (see 40 CFR §124.7). However, a prudent permit writer will develop a fact sheet for any permit that required complex calculations or special conditions. This will be particularly true for permit conditions based on BPJ.

With a well-documented rationale for all decisions, much of the work in reissuing a permit in the future will be done. This will avoid any conjecture and guessing concerning the development of any conditions that are being carried forward from the expired permit to the next permit. This is also true if a modification is initiated during the life of the permit. A permit rationale can be as short as two to three pages for a relatively simple permit or as long as 20 to 100 pages for an

extremely complicated permit (e.g., several discharge points, many BPJ determinations). The required contents of a fact sheet, as specified in 40 CFR §§124.8 and 124.56, include the items listed in **Exhibit 11-4**.

EXHIBIT 11-4
Required Contents of a Fact Sheet

- A brief description of the type of facility or activity that is being regulated by the NPDES permit
- The type and quantity of pollutants discharged
- A brief summary of the basis for the draft permit conditions, including references to the applicable statutory or regulatory provisions
- Name and telephone number of person to contact for additional information
- Provisions satisfying the requirements of 40 CFR §124.56:
  - Explanation of derivation of effluent limitations
  - Explanation of any conditions applicable to toxic, internal waste streams, or indicator pollutants
  - A sketch or detailed description of the location of the discharge
  - For EPA issued permits, the requirements of any State certification
- For every permit to be issued to a treatment works owned by a person other than a State or municipality, an explanation of the decision to regulate the users under a separate permit
- For every permit that includes a sewage sludge land application plan, a brief description of how each of the required elements of the land application plan are addressed in the permit
- If applicable, reasons why any requested variances do not appear justified
- A description of the procedures for reaching a final decision on the draft permit, including:
  - The dates of the public comment period and the address
  - Procedures for requesting a hearing
  - Other procedures for public participation.

A detailed discussion of the development of permit limits for each pollutant should be included in the fact sheet. For some permits, a considerable amount of time is spent within the permitting agency debating a permit issue that then becomes an assumption upon which the permit conditions are based. Documenting the

decision process may prevent a repeat of the debate in 5 years when the permit is up for reissuance. For each pollutant the following information is necessary:

- Calculations and assumptions
  - Production
  - Flow
- Type of limitations (i.e., effluent guideline-, water quality-, or BPJ-based)
- Whether the effluent guidelines used were BPT, BCT, or BAT
- The water quality standards or criteria used
- Whether any pollutants were indicators for other pollutants
- Citations to appropriate wasteload allocation studies, guidance documents, other references.

Often, it is as important to keep a record of items that were **not** included in the draft permit, such as the following:

- Why was BPJ or effluent guidelines used instead of water quality-based limitations (i.e., were the limitations checked to see that water quality considerations did not govern the setting of permit limits)?
- Why was biomonitoring not included?
- Why were pollutants that were reported as present in the permit application not specifically limited in the permit?
- Why is a previously limited pollutant no longer limited in the draft permit?

Finally, the fact sheet should address the logistics of the permit issuance process including the comment period begin and end dates, procedures for requesting a hearing, and the public involvement in the final decision.

11.2 Items to Address Prior to Issuance of a Final Permit

This section describes the public participation activities that must be conducted in the permit issuance process. These include providing public notices, collecting and responding to public comments, and holding public hearings as necessary.

11.2.1 Public Notice

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft NPDES permit or of other significant actions with respect to a NPDES permit or permit application. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or a permit. The exact scope, required contents, and methods for effecting public notices may be found in 40 CFR §124.10.

The NPDES permit-related actions that must receive public notice are shown in **Exhibit 11-5**.

EXHIBIT 11-5
Actions That Must Receive Public Notice

- Tentative denial of an NPDES permit application (not necessarily applicable to State programs)
- Preparation of a draft NPDES permit, including a proposal to terminate a permit
- Scheduling of a public hearing
- Granting of an evidentiary appeal of an EPA-issued permit under 40 CFR §124.74
- Formal appeal of permit
- New Source Determinations (EPA only)

The permit writer should be primarily concerned with the first three items in Exhibit 11-5. It is important to note that no public notice is required when a request for a permit modification, revocation, reissuance, or termination is denied.

Public notice of the various NPDES-related activities is provided by the following methods:

- For major permits, publication of a notice in daily or weekly newspaper within the area affected by the facility or activity. In addition, for general permits issued by EPA, publication in the *Federal Register* is required.

- Direct mailing to various interested parties. This mailing list should include the following:
  - The applicant
  - Any interested parties on the mailing list
  - Any other agency that is required to issue a Resource Conservation and Recovery Act, Underground Injection Control, Corps of Engineers, or PSD permit for the same facility
  - All appropriate government authorities (e.g., United States Fish and Wildlife Services, National Marine Fisheries Service, neighboring States)
  - Users identified in the permit application of a POTW.

A public notice must contain the information shown in **Exhibit 11-6**.

EXHIBIT 11-6
Contents of the Public Notice

- Name and address of the office processing the permit action
- Name and address of the permittee or applicant and, if different, of the facility regulated by the permit
- A brief description of the business conducted at the facility
- Name, address, and telephone number of a contact from whom interested persons can obtain additional information
- A brief description of the comment procedures required
- For EPA-issued permits, the location and availability of the administrative record
- Any additional information considered necessary.

Public notice of the preparation of the draft permit (including a notice of intent to deny a permit application) must allow at least 30 days for public comment. The draft permit is usually submitted for public notice after it has undergone internal review by the regulatory agency that is issuing the permit. State/Tribal issued permits will typically undergo public notice after EPA has reviewed and commented on the draft permit. In the special case of those EPA-issued permits that require an environmental impact statement (EIS), public notice is not given until after a draft EIS is issued.

11.2.2 Public Comments

Public notice of a draft permit elicits comments from concerned individuals or agencies. Frequently, such comments are simply requests for additional information. However, some comments are of a substantive nature and suggest modifications to

the draft permit or indicate that the draft permit is inappropriate for various reasons. In such cases, those parties providing comments must submit all reasonable arguments and factual material in support of their positions. If the approach is technically correct and clearly stated in the fact sheet, it will be difficult for commenters to find fault with the permit. Commenters may always suggest alternatives, however. In addition, an interested party may also request a public hearing.

To the extent possible, it is desirable to respond to all public comments as quickly as possible. In some cases it may be possible to diffuse a potentially controversial situation by providing further explanation of permit terms and conditions. It is also good public practice to inform parties who provide public comments that their comments have been received and are being considered.

The permitting agency is obliged to respond to all significant comments (in accordance with 40 CFR §124.17) at the time a final permit decision is reached (in the case of EPA-issued permits) or at the same time a final permit is actually issued (in the case of State-issued permits). The response should incorporate the following elements:

- Changes in any of the provisions of the draft permit and the reasons for the changes
- Description and response to all significant comments on the draft permit raised during the public comment period or during any hearing.

In the event that any information submitted during the public comment period raises substantial new questions about the draft permit, one of the following actions may occur:

- A new draft permit with revised fact sheet or statement of basis is prepared.
- A final permit with necessary changes explained is issued.
- The comment period is reopened but is limited only to new findings.

If any of these actions are taken, a new public notice, as described earlier, must be given.

11.2.3 Public Hearing

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. However, a request for a hearing does not automatically necessitate that a hearing be held. A public hearing should be held when there is a significant amount of interest expressed during the 30-day public comment period or when it is necessary to clarify the issues involved in the permit decision.

Thus, the decision of whether or not to hold a public hearing is actually a judgment call. Such decisions are usually made by someone other than the permit writer. However, the permit writer will be responsible for ensuring that all of the factual information in support of the draft permit is well documented.

Public notice of a public hearing must be given at least 30 days prior to the public meeting (public notice of the hearing may be given at the same time as public notice of the draft permit and the two notices may be combined). Scheduling a hearing automatically extends the comment period until at least the close of the hearing [40 CFR §124.12(c)].

The public notice of the hearing should contain the following information:

- Brief description of the nature and purpose of the hearing, including the applicable rules and procedures
- Reference to the dates of any other public notices relating to the permit
- Date, time, and place of the hearing.

A presiding officer is responsible for the hearing's scheduling and orderly conduct. Anyone may submit written or oral comments concerning the draft permit at the hearing. The presiding officer should set reasonable time limits for oral statements. The public comment period may be extended by so stating during the hearing. It should be noted that a transcript or recording of the hearing must be available to interested persons.

11.2.4 State/Tribal Roles in Reviewing Draft Permit

State/Tribal issued draft permits must be submitted to EPA for review if they relate to:

- Discharges into the territorial seas
- Discharges that may affect waters of a State other than the one in which the discharge originates
- General permits
- Discharges from a POTW with a daily average discharge exceeding 1 million gallons per day
- Discharges of uncontaminated cooling water with a daily average discharge exceeding 500 million gallons per day
- Discharges from any major discharger or from any NPDES primary industrial category
- Discharges of from other sources with a daily average discharge exceeding 500,000 gallons per day (however, EPA may waive review for non-process wastewater), and
- Class I sludge management facilities.

Permits issued by EPA require State/Tribal review and certification under Section 401 of the CWA. Such certification ensures that the permit will comply with applicable Federal CWA standards as well as with State or Tribal water quality standards. This State/Tribal certification also ensures that State and Tribal initiatives or policies are addressed in EPA-issued NPDES permits, and functions to promote consistency between State- and EPA-issued permits.

Under CWA Section 401(a)(1), EPA may not issue a permit until a certification is granted or waived. If EPA is preparing the draft permit, State certification is usually accomplished by allowing States to review and certify the application prior to draft permit preparation. Regulations in 40 CFR §124.53 [State Certification] and §124.54 [Special provisions for State certification and concurrence on applications for section CWA 301(h) variances] describe procedures a permit writer should follow to obtain State or Tribal certification. Under 40 CFR §124.53, when a draft permit is prepared by EPA, but State certification has not yet been granted, EPA must send the State a copy of the draft permit along with a notice requesting State certification. If the State does not respond within 60 days, the State is deemed to have waived its right to

certify. If the State chooses to certify the draft permit, the State may only require changes to the draft permit to incorporate more stringent State laws. If the State requires such changes, the State must send EPA a letter justifying the changes and citing State regulations that support the changes. When a permit applicant requests a CWA Section 301(h) variance, the State certification process is very similar to the process just described for permit applications and draft permits (refer to Section 40 CFR §124.54).

11.2.5 Schedule for Final Permit Issuance

The final permit may be issued after the close of the public notice period and after State/Tribal certification has been received (for permits issued by EPA). The public notice period includes:

- A 30-day period that gives notice of intent to issue or deny the permit
- A 30-day period advertising a public hearing (if applicable)
- Any extensions or reopening of the comment period.

Final EPA permit decisions are effective immediately upon issuance unless comments request changes in the draft permit, in which case the effective date of the permit is 30 days after issuance (or a later date if specified in the permit). As discussed earlier, any comments that are received must be answered at the time of final permit issuance (in the case of NPDES States or Tribes) or after a final decision is reached (in the case of EPA).

11.3 Administrative Actions After Final Permit Issuance

Once the final permit has been issued, the issuing authority should integrate the permit limitations and any special conditions into the NPDES tracking system (i.e., the permit compliance system (PCS)). This will ensure that the facility's performance will be tracked and the permitting agency will be alerted to the need for corrective action in the event of violations of permit limitations, terms, or conditions.

After final permit issuance, interested parties have other opportunities to change the permit thorough permit appeals, major/minor permit modifications, permit termination or permit transfer. These administrative procedures are described below.

11.3.1 Permit Appeals

In the process of developing a draft permit and during the public notice period, the permit writer should carefully consider the legitimate concerns of the permittee as well as the concerns of any third party who may have an interest in the permit terms and conditions. However, there will inevitably be situations in which a permit is issued in spite of the objections of the permittee or a third party. In such instances, the permittee or an interested party may choose to legally contest or appeal the NPDES permit.

Various mechanisms are available to resolve legal challenges to NPDES permits. In the case of EPA-issued permits, the administrative procedure involved is called an evidentiary hearing. Many NPDES States and Tribes have similar administrative procedures designed to resolve challenges to the conditions of a permit. These procedures involve hearings presided over by an administrative law judge. For the sake of convenience, these hearings will hereafter be referred to as evidentiary hearings. They will naturally be known by different names in different State or Tribe jurisdictions. However, permit writers will, from time-to-time, be involved in permit appeals and will need to address the types of issues discussed below.

Aside from preparation of the administrative record and notices, the permit writer may not be concerned with procedural matters relating to evidentiary hearings. All requests for evidentiary hearings are coordinated through the office of the EPA Regional Counsel or the appropriate State legal personnel. The permit writer's first involvement with the hearing process will come as a result of designation of the trial staff and his/her role will be limited to that of a witness and technical advisor to legal counsel.

A permit writer may be required to give a deposition during which the appellant attorney conducts the questioning that would otherwise occur in the hearing. The deposition is transcribed and presented as evidence. The appellant attorney may ask some of the same questions at the hearing.

To prepare for a deposition and testimony, the permit writer should be familiar with those laws, regulations, and policies that may affect the permit. The permit writer should be thoroughly familiar with the technical basis for the permit conditions. For

example, if the effluent limits are based on water quality requirements, the permit writer should thoroughly study any applicable basin plan or water quality simulation used to develop the effluent limits and be prepared to defend any assumptions inherent in the plan or simulation. If BPJ limits are based on proposed effluent guidelines, it will be necessary to carefully review not only the guidelines themselves but all applicable data, including the development document for the specific guidelines. The technical defense of other BPJ requirements is much more difficult. The permit writer should be sure that (1) the information on which BPJ limits are based are unimpeachable, (2) the limits were derived from the data in a logical manner, in accordance with established procedures, and (3) the BPJ limits so derived are technically sound and meet BCT or BAT standards for economic reasonableness.

As technical advisor to legal counsel, the permit writer's most important function is to develop direct testimony in support of contested permit conditions. No attempt should be made to support technically indefensible conditions. Contested permit conditions that are not technically defensible and are not based on any legal requirement should be brought to counsel's attention, with advice that EPA or the State agency withdraw those conditions.

The second most important advisory function of the permit writer is assisting counsel in the development of questions for cross-examination of the opposing witnesses. Questions should be restricted to the subject material covered by the witness' direct testimony and should be designed to elicit an affirmative or negative response, rather than an essay-type response. If a question must be phrased in such a way that the witness could attempt lengthy explanations, counsel should be forewarned.

Finally, the permit writer should remember that in requesting an evidentiary hearing, the permittee has declared an adversary relationship with the regulatory agency, and the permit writer must therefore refrain from discussions about the case without prior consultation with legal counsel. In the role of witness and/or te 'nical advisor, the permit writer should:

- Cultivate credibility
- Never imply or admit weakness in his or her area of expertise

- Never attempt to testify about subjects outside his or her area of expertise
- Always maintain good communication with counsel.

Where the permitee is granted relief at the evidentiary hearing, the Administrative Law Judge generally will order appropriate relief. Where a request for an evidentiary hearing is denied, the permittee may file a notice of appeal and petition for review with the Environmental Appeals Board (EAB), which may or may not grant an evidentiary hearing based on the factual and legal issues alleged. Similarly, where a permittee is denied relief at an evidentiary hearing, the permittee may appeal to the EAB to overturn the hearing decision. Finally, under certain circumstances decisions of the EAB against the permittee may be appealed in Federal court.

11.3.2 Permit Modification, Revocation, Termination, and Transfer

After the final permit is issued, the permit may still need to be modified or revoked prior to the expiration date. Modifications differ from revocations and reissuance. In a permit modification, only the conditions subject to change are reconsidered while all other permit conditions remain in effect. Conversely, the entire permit may be reconsidered when it is revoked and reissued. A permit modification may be triggered in several ways. For example, a representative of the regulatory agency may conduct an inspection of the facility that indicated a need for the modification (i.e., the improper classification of an industry), or information submitted by the permittee may suggest the need for a change. Of course, any interested person may request that a permit modification be made.

There are two classifications of modifications: major and minor. From a procedural standpoint, they differ primarily with respect to the public notice requirement. Major modifications require public notice; minor modifications do not.

Virtually all modifications that result in less stringent conditions must be treated as major modifications, with provisions for public notice and comment. Generally speaking, a permit will not need to be modified during the term of the permit if the facility can fully comply with permit conditions. Conditions that would necessitate a major modification of a permit are described in 40 CFR §122.62 and shown in **Exhibit 11-7**.

EXHIBIT 11-7
Conditions Requiring Major Modification

- Reopener—Conditions in the permit that required it to be reopened under certain circumstances.
- Technical Mistakes—To correct technical mistakes or mistaken interpretations of law made in developing the permit conditions.
- Failure to Notify—Upon failure of an approved State to notify another State whose waters may be affected by a discharge from the approved State.
- Alterations—When alterations or changes in operations occur that justify new conditions that are different from the existing permit.
- New Information—When information is received that was not available at the time of permit issuance.
- New Regulations—When standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision.
- Compliance Schedules for Innovative or Alternative Facilities—To modify the compliance schedule in light of the additional time that may be required to construct this type of facility; or when good cause for modification of a compliance schedule exists, such as an Act of God, strike, or flood.
- Pretreatment—To require that an approved program be implemented or to change the schedule for program development.
- Failed BPJ Compliance—When BPJ technology is installed and properly operated and maintained but the permittee is unable to meet its limits, the limits may be reduced to reflect actual removal; but in no case may they be less than the guideline limits. If BPJ operation and maintenance costs are totally disproportionate to the costs considered in a subsequent guideline, the permittee may be allowed to backslide to the guideline limits.
- Non-Limited Pollutants—When the level of discharge of any pollutant that is not limited in the permit exceeds the level that can be achieved by the technology-based treatment requirements appropriate to the permit.
- Variance Requests—When requests for variances, net effluent limitations, pretreatment, etc., are filed within the specified time but not granted until after permit issuance.
- Adjust limits to reflect net pollutant treatment—Upon request of a permittee who qualifies for effluent limitations on a net basis under 40 CFR §§122.45(g) and (h).
- Insert CWA §307(a) toxic or 40 CFR Part 503 sludge use/disposal requirements.
- Notification Levels—To establish notification levels for toxic pollutants that are not limited in the permit but must be reported if concentrations in the discharge exceed these levels.

Minor modifications are generally non-substantive changes (e.g., typographical errors that require more stringent permit conditions). The conditions for minor modifications, described in 40 CFR §122.63, are shown in **Exhibit 11-8**.

EXHIBIT 11-8
Conditions Requiring Minor Modification

- Typographical errors must be corrected.
- More frequent monitoring or reporting is necessary.
- An interim compliance date in the schedule of compliance needs revision, provided the new date is not more than 120 days after the date specified in the permit and does not interfere with attainment of the final compliance date requirement.
- Ownership has changed but no other change is necessary.
- The construction schedule for a new source discharger needs revision.
- A point source outfall that does not result in the discharge of pollutants from other outfalls must be deleted from the permit.
- An approved local pretreatment program must be incorporated into the permit.

11.3.3 Termination of Permits

Situations may arise during the life of the permit that are cause for termination (i.e., cancellation, revocation) of the permit. Such circumstances include the following (see 40 CFR §122.62(b)):

- Noncompliance by the permittee with any condition of the permit
- Misrepresentation or omission of relevant facts by the permittee
- A determination that the permitted activity endangers human health or the environment, either in an emergency or other situation
- A temporary or permanent reduction or elimination of a discharge (e.g., plant closure).

Once the permit is terminated, it can be placed into effect again only by the reissuance process, which requires a new permit application. All of the above situations may also be addressed through the permit modification process on a case-by-case determination.

11.3.4 Transfer of Permits

Regulatory agencies will occasionally receive notification of a change in ownership of a facility covered by a NPDES permit. Such changes require that a permit be transferred by one of two provisions:

- **Transfer by Modification or Revocation**—The transfer may be made during the process of modification, either major or minor. It may also be addressed by revoking and subsequently reissuing the permit.
- **Automatic Transfer**—A permit may be automatically transferred to a new permittee if three conditions are met:
  - The current permittee notifies the Director 30 days in advance of the transfer date.
  - The notice includes a written agreement between the old and new owner on the terms of the transfer.
  - The Director of the regulatory agency does not indicate that the subject permit will be modified or revoked.

Chapter 12

Permit Compliance and Enforcement

12.1 Overview

Achieving and maintaining a high level of compliance with environmental laws and regulations are two of the most important goals of Federal and State environmental agencies. Enforcement provides a powerful incentive for NPDES permittees to comply. How an NPDES permit is written directly affects its enforceability. Each permit must be written clearly and without ambiguities so that compliance with the permit can be tracked effectively and the permit can be enforced in the event that violations occur.

The permit writer may or may not become actively involved with the compliance monitoring and enforcement of the terms and conditions of the NPDES permits that he or she has written. The extent of the permit writer's involvement will usually depend upon the organizational structure of the regulatory agency. Larger, centrally organized agencies will typically have specialized personnel responsible for enforcing the terms of NPDES permits. In other organizations, the individual who writes the permit will also be responsible for such enforcement activities as Discharge Monitoring Report (DMR) tracking, facility inspections, and enforcement recommendations. In the event

of a judicial enforcement action, the permit writer may be called upon to testify regarding the specific requirements of the permit or its basis.

Regardless of the type of organizational structure within a regulatory agency, the permit writer should have an appreciation for the various aspects of a meaningful NPDES compliance enforcement program. The compliance monitoring reviews and inspections, and resulting data entered into the Quarterly Noncompliance Report database which provide the basis for evaluating compliance are addressed in the following section. The chapter concludes with a brief description of the enforcement actions available to facilitate permit compliance.

12.2 Compliance Monitoring

Compliance monitoring is a generic term that includes all activities undertaken by Federal or State regulatory agencies to ascertain a permittee's adherence to a NPDES permit. Compliance monitoring data collected as part of the NPDES Program are used in compliance evaluation and in support of enforcement. The process includes receiving data, reviewing data, entering data into the Permit Compliance System (PCS) data base, identifying violators, and determining an appropriate response.

A primary function of the compliance monitoring program is the verification of compliance with permit conditions, including effluent limitations and compliance schedules. Compliance monitoring may be described as comprising two elements:

- **Compliance Review**—The review of all written reports and other material relating to the status of a permittee's compliance.
- **Compliance Inspections**—Field-related regulatory activities, including sampling, conducted to determine compliance.

12.2.1 Compliance Review

Compliance and enforcement personnel use two primary sources of information to carry out their compliance review responsibilities:

- **Permit/Compliance Files**—These files include compliance schedule reports, compliance inspection reports, DMRs, enforcement actions, and

any other correspondence (e.g., summaries of telephone calls, copies of warning letters). Compliance personnel periodically review this information and use it to determine if enforcement is necessary and what level of enforcement is appropriate.

- **PCS**—PCS is a data management system used to compile all relevant facts about a facility's permit conditions, self-monitoring data, the inspections performed, and any enforcement actions taken. PCS is the national data base for the NPDES Program. As such, PCS promotes national consistency and uniformity in permit and compliance evaluations. To accomplish this goal, all required data are entered into and maintained regularly in PCS.

NPDES permits must be written so that compliance data are capable of being tracked by PCS. There may be situations where permit limits and monitoring conditions are not initially compatible with PCS entry and tracking. In these cases, States should ensure that appropriate steps are taken by the permit writer to identify difficult permits to the person responsible for entering PCS codes (either in the State or the Region) and to mutually resolve any coding issues. To assist PCS coders in accurately interpreting and coding the permit into PCS and to assist enforcement personnel in reviewing permittee self-monitoring data and reports in a timely manner, permit writers should apply the compliance inspection procedures discussed in the next section (Section 12.2.2).

12.2.2 Compliance Inspections

Compliance inspections refer to all field-related regulatory activities conducted to determine permit compliance. Such field activities may include evaluation inspections (nonsampling), sampling inspections, other specialized inspections, and remote sensing. Certain inspections, such as diagnostic inspections and performance audit inspections, aid the regulatory agency in evaluating the facility's problems in addition to providing information to support enforcement action. Biomonitoring inspections are specifically targeted at facilities with effluent suspected or identified as causing toxicity problems that threaten the ecological balance of the receiving waters.

Compliance inspections are undertaken for one or more of the following purposes:

- To establish a regulatory presence to defer violations
- To ensure that permit requirements are being met or to determine if permit conditions are adequate
- To check the completeness and accuracy of a permittee's performance and compliance records
- To assess the adequacy of the permittee's self-monitoring and reporting program
- To determine the progress or completion of corrective action
- To obtain independent compliance data on a facility's discharge
- To evaluate the permittee's operation and maintenance activities
- To observe the status of construction required by the permit.

12.3 Quarterly Noncompliance Reports

EPA Regional Offices and States that have been approved to administer the NPDES Program are required by regulation to report quarterly on major facilities that are not in compliance with the terms and conditions of their permit (i.e., effluent limitations meet the criteria for reportable noncompliance [RNC], schedules, and reporting requirements).

The regulations in 40 CFR 123.45 established requirements for listing facility violations and resulting regulatory enforcement action or quarterly noncompliance reports (QNCRs). This regulation established reporting requirements for violations that meet specific, quantifiable reporting criteria, as well as for violations that are more difficult to quantify but are of sufficient concern to be considered reportable. The regulation also specifies the format that the reports must follow and the schedule for their submission.

Only major facilities that meet RNC criteria must be reported on the QNCR. RNC consists of five general types of violations:

- **Violation of Monthly Average Effluent Limits**—Data that exceeds or equals the limit times the Technical Review Criteria (TRC) for 2 months during a 6-month period, where the TRC is 1.4 for Group I pollutants and

1.2 for Group II pollutants (Appendix A to 40 CFR Part 123 contains a list of Group I and II pollutants); and data that exceeds the limit for 4 months during a 6-month period.

- **Interim Effluent Limits Set Forth in a Formal Enforcement Action**—Any violation of any magnitude.
- **Schedule**—Missing a compliance schedule milestone date by 90 days.
- **Reporting**—Missing a report due date by 30 days.
- **Single Event**—A violation of any magnitude considered to have an adverse effect on water quality or public health (e.g., unauthorized bypass, unpermitted discharge, frequent discharges of a variety of pollutants).

A subset of instances of RNC that appear on the QNCR may be noted as significant noncompliance (SNC). This distinction is used solely for management accountability purposes as a means of tracking trends in compliance and evaluating relative timeliness of appropriate enforcement response toward priority violations. The definition of SNC is not regulatory and may change as the NPDES Program changes to encompass new initiatives. Generally, the designation of SNC indicates a violation is of sufficient magnitude and/or duration to be considered among the Agency's priorities for regulatory review and/or response. The categories of SNC are:

- Violation of enforcement action requirements (i.e., administrative effluent limits, key compliance schedule milestones, and key reports)
- Violation of permit effluent limits
- Violation of key compliance schedule milestones contained in a permit
- Violation of key reporting requirements in a permit
- Any unauthorized discharge or bypass considered significant by the NPDES Program director
- Violations associated with water quality or health impacts.

The Regions and NPDES States are expected to prioritize rapid enforcement action against all SNC violations by the time they appear on the first QNCR. Prior to a permittee appearing on the subsequent QNCR for the same instance of SNC, the permittee should either be in compliance or the administering agency should have initiated an appropriate formal enforcement action to achieve final compliance. If the facility is still considered SNC after two quarters and no formal enforcement action has been taken, the facility is placed on the Exceptions List. Although there are some legitimate justifications for facilities appearing on the Exception List, the Exceptions

List generally indicates facilities for which the administering agency failed to handle enforcement in a timely and appropriate manner.

Regulatory Update

In September 1995, EPA revised the definition of SNC to include violations of non-monthly average permit limits by major facilities. A large percentage of NPDES majors are lacking the required monthly average limits in their permit thus escaping detection as SNC and scrutiny for formal enforcement action. The new definition was effective on October 1, 1996 and is expected to result in better targeting of limited enforcement resources to violations posing the greatest risk to the environment and public health.

12.4 Enforcement

Specific enforcement actions are focused on a small subset of the total number of violators—violators at sites where frequent or serious violations have occurred. However, these actions have the effect of fostering compliance by an entire industry of facilities across the nation. By choosing the appropriate enforcement response to violations, EPA tries to achieve several goals:

- Correction of the violation as soon as possible
- Deterrence of future violations by the same permittee or other permittees
- Equal treatment of the regulated community through use of a uniform approach to selecting enforcement responses (i.e., similar violations are treated similarly)
- Punishment of serious violations
- Effective use of enforcement resources by achieving protection of human health and the environment with the least amount of staff time and funds.

Once a facility has been identified as having apparent permit violations, the EPA or the NPDES State or Tribal organization will review the facility's compliance history. Such a review includes an assessment of the magnitude, frequency, and duration of violations. Significant permit violations are identified and a determination of the appropriate enforcement response is made.

Section 309 of the Act authorizes the Agency to bring civil or criminal action against facilities which violate their NPDES permit conditions. EPA Regions and authorized States have specific procedures for reviewing self-monitoring and inspection data and for deciding what type of enforcement action is warranted. EPA

recommends an escalating response to continuing noncompliance. Typical types of enforcement actions include:

- Inspection debriefing, calling attention to deficiencies
- Telephone call
- Letter of violation
- Notice of violation
- Administrative order
- Administrative fine of up to $125,000 per proceeding
- Civil lawsuit
- Criminal prosecution.

Considerations when making determinations on the level of the enforcement response include (1) the severity of the permit violation, (2) the degree of economic benefit obtained through the violation, (3) previous enforcement actions taken against the violator, and (4) the deterrent effect of the response on similarly situated permittees. Equally important are considerations of fairness and equity, national consistency, and the integrity of the NPDES Program.

12.5 Public Participation

Citizens can participate in the enforcement process in a number of ways. Under the Freedom of Information Act, citizens have the right to request certain facility-specific compliance information from EPA's PCS database. Interested citizens can intervene in any Federal civil action to enjoin any threatened or continuing violation of any program requirement or permit conditions, and to recover civil penalties in court. Citizens also have the opportunity to review and comment on any proposed consent decree to resolve a State or Federal civil judicial enforcement action.

Section 505 of the Clean Water Act allows any citizen to commence a civil judicial enforcement action on his own behalf against: (1) any person (including the United States or any government agency) who is alleged to be in violation of an effluent standard or limitation or an enforcement order issued by EPA or a State, or (2) against EPA or the State where the regulatory authority is alleged to have failed to take appropriate action. Citizens may not commence suit if EPA or the State is

diligently prosecuting a civil or criminal action. Citizens must also give EPA, the State, and the alleged violator sixty days' notice of the alleged violation prior to commencing a citizen suit.

12.6 Compliance Assistance and Voluntary Compliance Policies

On June 8, 1994, EPA established a new Office of Enforcement and Compliance Assurance (OECA), consolidating a number of functions formerly shared among different programs at EPA. One of several new offices in OECA is the Office of Compliance (OC). The overriding mission of the Office of Compliance is to improve compliance with environmental laws. To do this, OC sets national compliance assurance and enforcement priorities through strategic planning and targeting; collects and integrates compliance data; develops effective compliance monitoring programs to support inspections and self-reporting; builds the capacity for more effective compliance assistance to the regulated community; works with Regions, States, municipalities, citizens groups and industry, and supports enforcement activity. Three of the divisions in OC are organized by economic sector (SIC Code).

As part of President Clinton's 1995 regulatory form initiative, EPA's Office of Enforcement and Compliance Assurance issued three policies to provide incentives for voluntary compliance. The first is "Incentives for Self-Policing: Disclosure, Correction and Prevention of Violations" (hereafter referred to as the "self-audit policy"), which was issued on December 22, 1995. This policy officers incentives in the form of elimination of gravity-based penalties to companies that find violations through an environmental audit or efforts that reflect due diligence, and promptly disclose and correct those violations. It also offers a 75% reduction in gravity-based penalties for violations that are voluntarily discovered and disclosed even if not found through an audit or the exercise of due diligence. The self-audit policy contains important safeguards to protect public health such as: excluding violations which may present an imminent and substantial endangerment or have resulted in serious actual harm; retaining the right to recover any significant economic benefit gained by the violator; requiring the company to remedy any environmental harm; and, excluding repeat violations.

The second policy is EPA's "Policy on Compliance Incentives for Small Businesses" (hereafter referred to as the "small business policy") which became

effective on June 10, 1996. The purpose of this policy is to promote compliance among small businesses by providing them with special incentives to participate in compliance assistance programs or to conduct environmental audits, and then to promptly correct violations. Under the small business policy, a "small business" is a person, corporation, partnership, or other entity who employs 100 or fewer individuals across all its facilities and operations. EPA will eliminate the entire civil penalty if a small business satisfies all four of the following criteria: (1) the business has made a good faith effort to comply as demonstrated by either receiving on-site governmental compliance assistance or conducting a voluntary environmental audit and promptly disclosing in writing all violations discovered as part of the audit; (2) in past three years, the business was not subject to an action for the current violation and in the past five years the small business has not been subject to two or more enforcement actions for environmental violations; (3) the business corrects the violation and remedies any harm associated with the violation within six months of discovery; and (4) the violation has not caused or does not pose actual serious harm and has not involved criminal conduct.

If the small business meets all of the above criteria except that it needs a longer corrections period or if it has obtained a significant economic benefit from the violations, EPA will waive up to 100% of the gravity component of the penalty but may seek the full amount of any economic benefit associated with the violations.

The third new policy is the "Policy on Flexible State Enforcement Responses to Small Community Violations," which was issued on November 22, 1995 (hereinafter referred to as the "small community policy"). The small community policy assures States that they have, within appropriate limits, the flexibility to design and use multi-media compliance assistance and compliance prioritization measures as alternatives to traditional enforcement responses when addressing a small community's environmental violations. Under the small community policy, State small community environmental compliance assistance programs provide (1) an adequate process to return a small community to environmental compliance; and (2) an opportunity to correct violations. States electing to provide small community environmental compliance assistance should establish and follow an adequate process for determining which communities can participate, assessing a community's good faith and environmental compliance status, determining a community's administrative,

technical, and financial capacity to comply, weighting the comparative risks associated with competing environmental mandates, and entering into an enforceable agreement establishing a risk-prioritized schedule that requires compliance with all environmental mandates as quickly as is reasonable.

A State can waive part or all of the noncompliance penalty if the community is working diligently and in good faith to achieve compliance. The small community policy does not apply to criminal violations. EPA also reserves the right to take immediate action where the community's actions create an imminent and substantial endangerment to public health and the environment.

Appendix A

Index to NPDES Regulations

CLEAN WATER ACT 40 CFR SECTION NUMBER	
301(b)	122.21(m)(1), 125 Subparts A and D
301(h)	125 Subpart G
301(i)	125 Subpart J
301(k)	125 Subpart C (Reserved)
303(c)	131 Subparts A,B,and C
304(e)	125 Subpart K
316(a)	124.66, 125 Subpart H

SUBJECT A

Administrative Procedures Act	
– Permit Continuation 122.6	
Administrative Record	
– Draft Permit	124.9
– Final Permit	124.18
Anti-Backsliding (Reissued Permits)	122.44(l), 122.62(a)(16)
Application	
– Completeness	122.21(e)
– Existing Facilities	122.21(g)
– State Program	124.3
– Time to Apply	122.21(c)
– Duty to Reapply	122.21(d)
Aquaculture	122.2, 125.10
Aquatic Animal Production Facilities	
– Application	122.21(h)(2)
– Definition	122.24
Appendix A	122
Average Monthly	
– Non-POTW	122.45(d)(1)
– POTW	122.45(d)(2)
Average Weekly Limits (POTW)	122.45(d)(2)

SUBJECT B

BAT Compliance Deadline	125.3(a)(2)(iii)(A)(v)(2)
Best Management Practices (BMP)	122.44(k), 125.100-102
Best Professional Judgment (BPJ)	125.3
Boilerplate Permit Conditions	122.41-44
Bypass	122.41(m)

SUBJECT C

Calculating NPDES Permit Conditions	122.45
Case-by-Case Limitations (See BPJ also)	122.44(a), 125.3
Case-by-Case Permits (See BPJ also)	124.52
Coast Guard	122.44(p)
Coastal Zone Management	122.49(d)
Comments During Public Notice	124.13
Compliance Schedules	122.41(l)(5), 122.47, 122.62(a)(13)
Computation of Time	124.20
Concentrated Animal Feeding Operations	122.21(h)(l), 122.23
Concentrated Aquatic Animal Production	122.21(h)(2), 122.24
Confidentiality of Information	122.7
Consolidation of Permit Processing	124.4
Continuation of Expiring Permits	122.6
Conventional Pollutants	401.16

SUBJECT D

Definitions and General Requirements	122.1
Denial of Permit	122.6(b)
Design Flow (POTWs)	122.45(b)
Dilution Prohibition	122.45(f)(1)(iii)
Discharge Monitoring Report (DMR)	122.41(l)(4)(i)
Discharge of a Pollutant (definition)	122.2
Draft Permit	124.6
Duration of Permits	122.46
Duty to Comply	122.41(a)
Duty to Mitigate	122.41(d)
Duty to Provide Information	122.41(h)
Duty to Reapply	122.41(b)

SUBJECT E

Effective Date	124.15
Endangered Species Act	122.49(c)
Environmental Impact Statement	
– Final	124.61
– New Source	122.29(c), 124.10(b)(1)
– NEPA	6
Evidentiary Hearing Procedures	124.71-91
Ex Parte Communication	124.78
Exclusions	122.3
Existing Source Definition	122.29(a)(3)
Expiration Dates (Duration of Permits)	122.46, 124.2
Extension of Public Comment Period	124.12(c)

SUBJECT F

Fact Sheets	124.8, 124.56
Filter Backwash	125.3(g)
Fish and Wildlife Coordination Act	122.49(e)
Fundamentally Different Factors (FDF)	122.21(m)(1), 122.44(d)(8), 125.30-32

SUBJECT G - H

General Permits	122.28
– Public Notice	124.10(c)(2)(i)
– Special Procedures	124.58

SUBJECT I - L

Innovative Technology (See 301(k))	
Inspection and Entry	122.41(i)
Internal Waste Streams	122.45(h)
Introduction of New Pollutants - POTW	122.42(b)
Issuance and Effective Dates	124.15, 124.20, 124.60

SUBJECT M

Mass Limitation	122.45(f)
Maximum Daily	122.45(d)(l)
Metals	122.45(c)
Minor Modifications	122.63
Modifications	122.62, 124.5
Monitoring	
– Recording	122.48
– Recordkeeping	122.48(p)
– Records	122.41(j)(2)
– Reports (DMRs)	122.41(l)(4)
– Representative	122.41(j)(1)

SUBJECT N

NPDES (Definition)	122.2
National Environmental Policy Act	122.49(g)
National Historic Preservation Act	122.49(b)
Navigation	122.44(q)
Need to Halt or Reduce Activity	
– Not a Defense	122.41(c)
Net/Gross	122.45(g)
New Discharger (Definition)	122.2
New Source	
– Application	122.21(j)
– Criteria	122.29
– Definition	122.2

– Prohibited Discharges	122.4(i)
– Public Notice	124.10(a)(1)(vi)
Non-Advisory Panel Procedures	124.111-128
Non-Continuous Discharges	122.45(e)
Non-Compliance	
– Anticipated	122.41(l)(2)
– Other	122.41(l)(7)
Notification Levels	122.42(a), 122.44(f)

SUBJECT O

Offshore Oil and Gas Facilities	122.28(c)
On-Site Construction (New Source)	122.29(c)(4)
Operations and Maintenance	122.41(e)

SUBJECT P-Q

pH Limits with Continuous Monitoring	401.17
Planned Changes	122.41(l)(1)
Pollutant (Definition)	122.2
Pollutants in Intake Water (Net/Gross)	122.45(g)
POTW (Definition)	122.2
Pretreatment	122.44(j), 403
Primary Industry	122 - Appendix A
Privately Owned Treatment Works	122.44(m)
Production-Based Limits	122.45(b)
Prohibitions	122.4
Proper Operation and Maintenance	122.41(e)
Property Rights	122.41(g)
Public Hearings	124.12
Public Notice of Permits	124.10
– Contents	124.10(d), 124.57
– Public Hearings	124.10(b)(2), 124.10(d)(2)

SUBJECT R

Reapplication	122.21(d)
Recordkeeping	22.21(p), 122.41(j)(2)
Reopener Clause	122.44(c)
Reopening of Public Comment Period	124.14
Request for Evidentiary Hearing	124.74
Response to Comments	124.17
Revocation and Reissuance	122.62, 124.5

SUBJECT S

Secondary Treatment Requirements	133
Secondary Treatment Variance	(See 301(h) of the CWA)
Sewage Sludge	122.44 (o), 503
Signatory Requirements	122.22, 122.27

Small Business Exemption	122.21(g)(8)
State Certification	124.53, 124.54, 124.55, 122.44(d)(3)
Statement of Basis	124.7
Statutory Deadlines	
– POTW	125.3(a)(l)
– Non-POTW	125.3(a)(2)
Statutory Variances and Extension	125.3(b)
Stays of Contested Permit Conditions	124.16, 124.60
Storm Water	122.26
– Application Deadline	122.21(c)(1)
– Group II Dischargers	122.21(f)(9)
– Group II Dischargers	122.21(g)(10)
SUBJECT T	
Technology Based Effluent Limits	122.44(a)
Ten Year Protection Period for New Sources and Dischargers	122.29(d)
Termination of Permit	122.64
Thermal Dischargers	(See 316(a) of the CWA)
Toxic Pollutants	122.44(e)
Toxic Pollutants List	401.15
Transfer of Permit	122.41(l)(3), 122.61
Twenty Four Hour Reporting	122.41(l)(6), 122.44(g)
SUBJECT U	
Upset	122.41(n)
SUBJECT V	
Variances	
– Non-POTWs	122.21(l)
– POTWs	122.21(m)
– Appeals	124.64
– Decisions	124.62
– Expedited procedures	122.21(n)
– Procedures	124.63
SUBJECT W,X,Y,Z	
Water Quality Standards	122.44(d)
Waters of the U.S. (Definition)	122.2
Wetlands (See "Waters of the U.S." Definition)	
Wild and Scenic Rivers Act	122.49(a)

Appendix B

Effluent Guidelines and Standards

code of federal regulations

Protection of Environment

40

PARTS 400 TO 424

Revised as of July 1, 1995

CONTAINING
A CODIFICATION OF DOCUMENTS
OF GENERAL APPLICABILITY
AND FUTURE EFFECT

AS OF JULY 1, 1995

With Ancillaries

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CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY—(Continued)

SUBCHAPTER N—EFFLUENT GUIDELINES AND STANDARDS

Part		*Page*
400	[Reserved]	
401	General provisions	4
402	[Reserved]	
403	General pretreatment regulations for existing and new sources of pollution	8
405	Dairy products processing point source category	52
406	Grain mills point source category	73
407	Canned and preserved fruits and vegetables processing point source category	88
408	Canned and preserved seafood processing point source category	106
409	Sugar processing point source category	161
410	Textile mills point source category	171
411	Cement manufacturing point source category	189
412	Feedlots point source category	194
413	Electroplating point source category	198
414	Organic chemicals, plastics, and synthetic fibers	213
415	Inorganic chemicals manufacturing point source category	235
416	[Reserved]	
417	Soap and detergent manufacturing point source category	294
418	Fertilizer manufacturing point source category	333
419	Petroleum refining point source category	347
420	Iron and steel manufacturing point source category	384
421	Nonferrous metals manufacturing point source category	448
422	Phosphate manufacturing point source category	638
423	Steam electric power generating point source category	648
424	Ferroalloy manufacturing point source category	656

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY (Continued)

SUBCHAPTER N—EFFLUENT GUIDELINES AND STANDARDS

Part		*Page*
425	Leather tanning and finishing point source category	5
426	Glass manufacturing point source category	26
427	Asbestos manufacturing point source category	47
428	Rubber manufacturing point source category	61
429	Timber products processing point source category	84
430	Pulp, paper, and paperboard point source category	102
431	The builders' paper and board mills point source category	184
432	Meat products point source category	187
433	Metal finishing point source category	213
434	Coal mining point source category BPT, BAT, BCT limitations and new source performance standards	218
435	Oil and gas extraction point source category	230
436	Mineral mining and processing point source category	245
439	Pharmaceutical manufacturing point source category	260
440	Ore mining and dressing point source category	279
443	Effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources for the paving and roofing materials (tars and asphalt) point source category	305
446	Paint formulating point source category	310
447	Ink formulating point source category	311
454	Gum and wood chemicals manufacturing point source category	312
455	Pesticide chemicals	316
457	Explosives manufacturing point source category	333
458	Carbon black manufacturing point source category	334
459	Photographic point source category	338

Part		Page
460	Hospital point source category	339
461	Battery manufacturing point source category	340
463	Plastics molding and forming point source category	373
464	Metal molding and casting point source category	379
465	Coil coating point source category	426
466	Porcelain enameling point source category	435
467	Aluminum forming point source category	444
468	Copper forming point source category	487
469	Electrical and electronic components point source category	509
471	Nonferrous metals forming and metal powders point source category	516

SUBCHAPTER O—SEWAGE SLUDGE

501	State sludge management program regulations	641
503	Standards for the use or disposal of sewage sludge	661

SUBCHAPTER P [RESERVED]

SUBCHAPTER Q—ENERGY POLICY

600	Fuel economy of motor vehicles	693
610	Fuel economy retrofit devices	770

Appendix C

List of SIC Codes

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET

STANDARD INDUSTRIAL CLASSIFICATION MANUAL

1987

Part II

Numerical List of Short Titles

Numerical List of Short Titles

The official SIC titles of the divisions and the two-digit major groups, three-digit industry groups, and four-digit industries are those shown in Part I. For various reasons, including presentation of statistical tables, it is desirable to have a standard list of short SIC titles so that all agencies may use the same short titles for the same codes as long as the titles fit the space requirements of the publication.

The standard short titles below have been limited to 36 spaces for four-digit industry codes and 38 spaces for two-digit major group and three-digit industry group codes. Where a two-digit major group or three-digit industry group contains only a single four-digit industry, the two-digit or three-digit titles are allowed 36 rather than 38 spaces. If the official SIC title falls within the short title space limitation above, it is generally used without change.

It is understood, of course, that just as a title itself is not sufficient to define an industry, so too a short title may not appear to represent the same content as the official title. Content can only be defined by reference to the official titles and descriptions for the relevant division, major group, industry group, and industry.

NUMERICAL LIST OF SHORT TITLES

A. AGRICULTURE, FORESTRY, AND FISHING

Code	*Short Title*
01	AGRICULTURAL PRODUCTION—CROPS
011	**Cash Grains**
0111	Wheat
0112	Rice
0115	Corn
0116	Soybeans
0119	Cash grains, nec
013	**Field Crops, Except Cash Grains**
0131	Cotton
0132	Tobacco
0133	Sugarcane and sugar beets
0134	Irish potatoes
0139	Field crops, except cash grains, nec
016	**Vegetables and Melons**
0161	Vegetables and melons
017	**Fruits and Tree Nuts**
0171	Berry crops
0172	Grapes
0173	Tree nuts
0174	Citrus fruits
0175	Deciduous tree fruits
0179	Fruits and tree nuts, nec
018	**Horticultural Specialties**
0181	Ornamental nursery products
0182	Food crops grown under cover
019	**General Farms, Primarily Crop**
0191	General farms, primarily crop
02	AGRICULTURAL PRODUCTION—LIVESTOCK
021	**Livestock, Except Dairy and Poultry**
0211	Beef cattle feedlots
0212	Beef cattle, except feedlots
0213	Hogs
0214	Sheep and goats
0219	General livestock, nec
024	**Dairy Farms**
0241	Dairy farms
025	**Poultry and Eggs**
0251	Broiler, fryer, and roaster chickens
0252	Chicken eggs
0253	Turkeys and turkey eggs
0254	Poultry hatcheries
0259	Poultry and eggs, nec
027	**Animal Specialties**
0271	Fur-bearing animals and rabbits
0272	Horses and other equines
0273	Animal aquaculture
0279	Animal specialties, nec
029	**General Farms, Primarily Animal**
0291	General farms, primarily animal
07	AGRICULTURAL SERVICES
071	**Soil Preparation Services**
0711	Soil preparation services
072	**Crop Services**
0721	Crop planting and protecting
0722	Crop harvesting
0723	Crop preparation services for market
0724	Cotton ginning
074	**Veterinary Services**
0741	Veterinary services for livestock
0742	Veterinary services, specialties
075	**Animal Services, Except Veterinary**
0751	Livestock services, exc. veterinary
0752	Animal specialty services
076	**Farm Labor and Management Services**
0761	Farm labor contractors
0762	Farm management services
078	**Landscape and Horticultural Services**
0781	Landscape counseling and planning
0782	Lawn and garden services
0783	Ornamental shrub and tree services
08	FORESTRY
081	**Timber Tracts**
0811	Timber tracts
083	**Forest Products**
0831	Forest products
085	**Forestry Services**
0851	Forestry services
09	FISHING, HUNTING, AND TRAPPING
091	**Commercial Fishing**
0912	Finfish
0913	Shellfish
0919	Miscellaneous marine products
092	**Fish Hatcheries and Preserves**
0921	Fish hatcheries and preserves
097	**Hunting, Trapping, Game Propagation**
0971	Hunting, trapping, game propagation

STANDARD INDUSTRIAL CLASSIFICATION

B. MINING

Code	Short Title
10	**METAL MINING**
101	**Iron Ores**
1011	Iron ores
102	**Copper Ores**
1021	Copper ores
103	**Lead and Zinc Ores**
1031	Lead and zinc ores
104	**Gold and Silver Ores**
1041	Gold ores
1044	Silver ores
106	**Ferroalloy Ores, Except Vanadium**
1061	Ferroalloy ores, except vanadium
108	**Metal Mining Services**
1081	Metal mining services
109	**Miscellaneous Metal Ores**
1094	Uranium-radium-vanadium ores
1099	Metal ores, nec
12	**COAL MINING**
122	**Bituminous Coal and Lignite Mining**
1221	Bituminous coal and lignite—surface
1222	Bituminous coal—underground
123	**Anthracite Mining**
1231	Anthracite mining
124	**Coal Mining Services**
1241	Coal mining services
13	**OIL AND GAS EXTRACTION**
131	**Crude Petroleum and Natural Gas**
1311	Crude petroleum and natural gas
132	**Natural Gas Liquids**
1321	Natural gas liquids
138	**Oil and Gas Field Services**
1381	Drilling oil and gas wells
1382	Oil and gas exploration services
1389	Oil and gas field services, nec
14	**NONMETALLIC MINERALS, EXCEPT FUELS**
141	**Dimension Stone**
1411	Dimension stone
142	**Crushed and Broken Stone**
1422	Crushed and broken limestone
1423	Crushed and broken granite
1429	Crushed and broken stone, nec
144	**Sand and Gravel**
1442	Construction sand and gravel
1446	Industrial sand
145	**Clay, Ceramic, & Refractory Minerals**
1455	Kaolin and ball clay
1459	Clay and related minerals, nec
147	**Chemical and Fertilizer Minerals**
1474	Potash, soda, and borate minerals
1475	Phosphate rock
1479	Chemical and fertilizer mining, nec
148	**Nonmetallic Minerals Services**
1481	Nonmetallic minerals services
149	**Miscellaneous Nonmetallic Minerals**
1499	Miscellaneous nonmetallic minerals

C. CONSTRUCTION

Code	Short Title
15	**GENERAL BUILDING CONTRACTORS**
152	**Residential Building Construction**
1521	Single-family housing construction
1522	Residential construction, nec
153	**Operative Builders**
1531	Operative builders
154	**Nonresidential Building Construction**
1541	Industrial buildings and warehouses
1542	Nonresidential construction, nec
16	**HEAVY CONSTRUCTION, EX. BUILDING**
161	**Highway and Street Construction**
1611	Highway and street construction
162	**Heavy Construction, Except Highway**
1622	Bridge, tunnel, & elevated highway
1623	Water, sewer, and utility lines
1629	Heavy construction, nec
17	**SPECIAL TRADE CONTRACTORS**
171	**Plumbing, Heating, Air-Conditioning**
1711	Plumbing, heating, air-conditioning
172	**Painting and Paper Hanging**
1721	Painting and paper hanging
173	**Electrical Work**
1731	Electrical work

NUMERICAL LIST OF SHORT TITLES

Code	*Short Title*
174	**Masonry, Stonework, and Plastering**
1741	Masonry and other stonework
1742	Plastering, drywall, and insulation
1743	Terrazzo, tile, marble, mosaic work
175	**Carpentry and Floor Work**
1751	Carpentry work
1752	Floor laying and floor work, nec
176	**Roofing, Siding, and Sheet Metal Work**
1761	Roofing, siding, and sheet metal work
177	**Concrete Work**
1771	Concrete work
178	**Water Well Drilling**
1781	Water well drilling
179	**Misc. Special Trade Contractors**
1791	Structural steel erection
1793	Glass and glazing work
1794	Excavation work
1795	Wrecking and demolition work
1796	Installing building equipment, nec
1799	Special trade contractors, nec

D. MANUFACTURING

Code	*Short Title*
20	**FOOD AND KINDRED PRODUCTS**
201	**Meat Products**
2011	Meat packing plants
2013	Sausages and other prepared meats
2015	Poultry slaughtering and processing
202	**Dairy Products**
2021	Creamery butter
2022	Cheese, natural and processed
2023	Dry, condensed, evaporated products
2024	Ice cream and frozen desserts
2026	Fluid milk
203	**Preserved Fruits and Vegetables**
2032	Canned specialties
2033	Canned fruits and vegetables
2034	Dehydrated fruits, vegetables, soups
2035	Pickles, sauces, and salad dressings
2037	Frozen fruits and vegetables
2038	Frozen specialties, nec
204	**Grain Mill Products**
2041	Flour and other grain mill products
2043	Cereal breakfast foods
2044	Rice milling
2045	Prepared flour mixes and doughs
2046	Wet corn milling
2047	Dog and cat food
2048	Prepared feeds, nec
205	**Bakery Products**
2051	Bread, cake, and related products
2052	Cookies and crackers
2053	Frozen bakery products, except bread
206	**Sugar and Confectionery Products**
2061	Raw cane sugar
2062	Cane sugar refining
2063	Beet sugar
2064	Candy & other confectionery products
2066	Chocolate and cocoa products
2067	Chewing gum
2068	Salted and roasted nuts and seeds
207	**Fats and Oils**
2074	Cottonseed oil mills
2075	Soybean oil mills
2076	Vegetable oil mills, nec
2077	Animal and marine fats and oils
2079	Edible fats and oils, nec
208	**Beverages**
2082	Malt beverages
2083	Malt
2084	Wines, brandy, and brandy spirits
2085	Distilled and blended liquors
2086	Bottled and canned soft drinks
2087	Flavoring extracts and syrups, nec
209	**Misc. Food and Kindred Products**
2091	Canned and cured fish and seafoods
2092	Fresh or frozen prepared fish
2095	Roasted coffee
2096	Potato chips and similar snacks
2097	Manufactured ice
2098	Macaroni and spaghetti
2099	Food preparations, nec
21	**TOBACCO PRODUCTS**
211	**Cigarettes**
2111	Cigarettes
212	**Cigars**
2121	Cigars
213	**Chewing and Smoking Tobacco**
2131	Chewing and smoking tobacco
214	**Tobacco Stemming and Redrying**
2141	Tobacco stemming and redrying
22	**TEXTILE MILL PRODUCTS**
221	**Broadwoven Fabric Mills, Cotton**

STANDARD INDUSTRIAL CLASSIFICATION

Code	*Short Title*
2211	Broadwoven fabric mills, cotton
222	**Broadwoven Fabric Mills, Manmade**
2221	Broadwoven fabric mills, manmade
223	**Broadwoven Fabric Mills, Wool**
2231	Broadwoven fabric mills, wool
224	**Narrow Fabric Mills**
2241	Narrow fabric mills
225	**Knitting Mills**
2251	Women's hosiery, except socks
2252	Hosiery, nec
2253	Knit outerwear mills
2254	Knit underwear mills
2257	Weft knit fabric mills
2258	Lace & warp knit fabric mills
2259	Knitting mills, nec
226	**Textile Finishing, Except Wool**
2261	Finishing plants, cotton
2262	Finishing plants, manmade
2269	Finishing plants, nec
227	**Carpets and Rugs**
2273	Carpets and rugs
228	**Yarn and Thread Mills**
2281	Yarn spinning mills
2282	Throwing and winding mills
2284	Thread mills
229	**Miscellaneous Textile Goods**
2295	Coated fabrics, not rubberized
2296	Tire cord and fabrics
2297	Nonwoven fabrics
2298	Cordage and twine
2299	Textile goods, nec
23	**APPAREL AND OTHER TEXTILE PRODUCTS**
231	**Men's and Boys' Suits and Coats**
2311	Men's and boys' suits and coats
232	**Men's and Boys' Furnishings**
2321	Men's and boys' shirts
2322	Men's & boys' underwear & nightwear
2323	Men's and boys' neckwear
2325	Men's and boys' trousers and slacks
2326	Men's and boys' work clothing
2329	Men's and boys' clothing, nec
233	**Women's and Misses' Outerwear**
2331	Women's & misses' blouses & shirts
2335	Women's, juniors', & misses' dresses
2337	Women's and misses' suits and coats
2339	Women's and misses' outerwear, nec
234	**Women's and Children's Undergarments**
2341	Women's and children's underwear
2342	Bras, girdles, and allied garments
235	**Hats, Caps, and Millinery**
2353	Hats, caps, and millinery
236	**Girls' and Children's Outerwear**
2361	Girls' & children's dresses, blouses
2369	Girls' and children's outerwear, nec
237	**Fur Goods**
2371	Fur goods
238	**Miscellaneous Apparel and Accessories**
2381	Fabric dress and work gloves
2384	Robes and dressing gowns
2385	Waterproof outerwear
2386	Leather and sheep-lined clothing
2387	Apparel belts
2389	Apparel and accessories, nec
239	**Misc. Fabricated Textile Products**
2391	Curtains and draperies
2392	Housefurnishings, nec
2393	Textile bags
2394	Canvas and related products
2395	Pleating and stitching
2396	Automotive and apparel trimmings
2397	Schiffli machine embroideries
2399	Fabricated textile products, nec
24	**LUMBER AND WOOD PRODUCTS**
241	**Logging**
2411	Logging
242	**Sawmills and Planing Mills**
2421	Sawmills and planing mills, general
2426	Hardwood dimension & flooring mills
2429	Special product sawmills, nec
243	**Millwork, Plywood & Structural Members**
2431	Millwork
2434	Wood kitchen cabinets
2435	Hardwood veneer and plywood
2436	Softwood veneer and plywood
2439	Structural wood members, nec
244	**Wood Containers**
2441	Nailed wood boxes and shook
2448	Wood pallets and skids
2449	Wood containers, nec
245	**Wood Buildings and Mobile Homes**
2451	Mobile homes
2452	Prefabricated wood buildings
249	**Miscellaneous Wood Products**
2491	Wood preserving
2493	Reconstituted wood products
2499	Wood products, nec
25	**FURNITURE AND FIXTURES**
251	**Household Furniture**
2511	Wood household furniture
2512	Upholstered household furniture
2514	Metal household furniture

NUMERICAL LIST OF SHORT TITLES

Code	Short Title
2515	Mattresses and bedsprings
2517	Wood TV and radio cabinets
2519	Household furniture, nec
252	**Office Furniture**
2521	Wood office furniture
2522	Office furniture, except wood
253	**Public Building & Related Furniture**
2531	Public building & related furniture
254	**Partitions and Fixtures**
2541	Wood partitions and fixtures
2542	Partitions and fixtures, except wood
259	**Miscellaneous Furniture and Fixtures**
2591	Drapery hardware & blinds & shades
2599	Furniture and fixtures, nec
26	**PAPER AND ALLIED PRODUCTS**
261	**Pulp Mills**
2611	Pulp mills
262	**Paper Mills**
2621	Paper mills
263	**Paperboard Mills**
2631	Paperboard mills
265	**Paperboard Containers and Boxes**
2652	Setup paperboard boxes
2653	Corrugated and solid fiber boxes
2655	Fiber cans, drums & similar products
2656	Sanitary food containers
2657	Folding paperboard boxes
267	**Misc. Converted Paper Products**
2671	Paper coated & laminated, packaging
2672	Paper coated and laminated, nec
2673	Bags: plastics, laminated, & coated
2674	Bags: uncoated paper & multiwall
2675	Die-cut paper and board
2676	Sanitary paper products
2677	Envelopes
2678	Stationery products
2679	Converted paper products, nec
27	**PRINTING AND PUBLISHING**
271	**Newspapers**
2711	Newspapers
272	**Periodicals**
2721	Periodicals
273	**Books**
2731	Book publishing
2732	Book printing
274	**Miscellaneous Publishing**
2741	Miscellaneous publishing
275	**Commercial Printing**
2752	Commercial printing, lithographic
2754	Commercial printing, gravure
2759	Commercial printing, nec
276	**Manifold Business Forms**
2761	Manifold business forms
277	**Greeting Cards**
2771	Greeting cards
278	**Blankbooks and Bookbinding**
2782	Blankbooks and looseleaf binders
2789	Bookbinding and related work
279	**Printing Trade Services**
2791	Typesetting
2796	Platemaking services
28	**CHEMICALS AND ALLIED PRODUCTS**
281	**Industrial Inorganic Chemicals**
2812	Alkalies and chlorine
2813	Industrial gases
2816	Inorganic pigments
2819	Industrial inorganic chemicals, nec
282	**Plastics Materials and Synthetics**
2821	Plastics materials and resins
2822	Synthetic rubber
2823	Cellulosic manmade fibers
2824	Organic fibers, noncellulosic
283	**Drugs**
2833	Medicinals and botanicals
2834	Pharmaceutical preparations
2835	Diagnostic substances
2836	Biological products exc. diagnostic
284	**Soap, Cleaners, and Toilet Goods**
2841	Soap and other detergents
2842	Polishes and sanitation goods
2843	Surface active agents
2844	Toilet preparations
285	**Paints and Allied Products**
2851	Paints and allied products
286	**Industrial Organic Chemicals**
2861	Gum and wood chemicals
2865	Cyclic crudes and intermediates
2869	Industrial organic chemicals, nec
287	**Agricultural Chemicals**
2873	Nitrogenous fertilizers
2874	Phosphatic fertilizers
2875	Fertilizers, mixing only
2879	Agricultural chemicals, nec
289	**Miscellaneous Chemical Products**
2891	Adhesives and sealants
2892	Explosives
2893	Printing ink
2895	Carbon black
2899	Chemical preparations, nec

STANDARD INDUSTRIAL CLASSIFICATION

Code	Short Title
29	PETROLEUM AND COAL PRODUCTS
291	**Petroleum Refining**
2911	Petroleum refining
295	**Asphalt Paving and Roofing Materials**
2951	Asphalt paving mixtures and blocks
2952	Asphalt felts and coatings
299	**Misc. Petroleum and Coal Products**
2992	Lubricating oils and greases
2999	Petroleum and coal products, nec
30	RUBBER AND MISC. PLASTICS PRODUCTS
301	**Tires and Inner Tubes**
3011	Tires and inner tubes
302	**Rubber and Plastics Footwear**
3021	Rubber and plastics footwear
305	**Hose & Belting & Gaskets & Packing**
3052	Rubber & plastics hose & belting
3053	Gaskets, packing and sealing devices
306	**Fabricated Rubber Products, NEC**
3061	Mechanical rubber goods
3069	Fabricated rubber products, nec
308	**Miscellaneous Plastics Products, NEC**
3081	Unsupported plastics film & sheet
3082	Unsupported plastics profile shapes
3083	Laminated plastics plate & sheet
3084	Plastics pipe
3085	Plastics bottles
3086	Plastics foam products
3087	Custom compound purchased resins
3088	Plastics plumbing fixtures
3089	Plastics products, nec
31	LEATHER AND LEATHER PRODUCTS
311	**Leather Tanning and Finishing**
3111	Leather tanning and finishing
313	**Footwear Cut Stock**
3131	Footwear cut stock
314	**Footwear, Except Rubber**
3142	House slippers
3143	Men's footwear, except athletic
3144	Women's footwear, except athletic
3149	Footwear, except rubber, nec
315	**Leather Gloves and Mittens**
3151	Leather gloves and mittens
316	**Luggage**
3161	Luggage
317	**Handbags and Personal Leather Goods**
3171	Women's handbags and purses
3172	Personal leather goods, nec
319	**Leather Goods, NEC**
3199	Leather goods, nec

Code	Short Title
32	STONE, CLAY, AND GLASS PRODUCTS
321	**Flat Glass**
3211	Flat glass
322	**Glass and Glassware, Pressed or Blown**
3221	Glass containers
3229	Pressed and blown glass, nec
323	**Products of Purchased Glass**
3231	Products of purchased glass
324	**Cement, Hydraulic**
3241	Cement, hydraulic
325	**Structural Clay Products**
3251	Brick and structural clay tile
3253	Ceramic wall and floor tile
3255	Clay refractories
3259	Structural clay products, nec
326	**Pottery and Related Products**
3261	Vitreous plumbing fixtures
3262	Vitreous china table & kitchenware
3263	Semivitreous table & kitchenware
3264	Porcelain electrical supplies
3269	Pottery products, nec
327	**Concrete, Gypsum, and Plaster Products**
3271	Concrete block and brick
3272	Concrete products, nec
3273	Ready-mixed concrete
3274	Lime
3275	Gypsum products
328	**Cut Stone and Stone Products**
3281	Cut stone and stone products
329	**Misc. Nonmetallic Mineral Products**
3291	Abrasive products
3292	Asbestos products
3295	Minerals, ground or treated
3296	Mineral wool
3297	Nonclay refractories
3299	Nonmetallic mineral products, nec
33	PRIMARY METAL INDUSTRIES
331	**Blast Furnace and Basic Steel Products**
3312	Blast furnaces and steel mills
3313	Electrometallurgical products
3315	Steel wire and related products
3316	Cold finishing of steel shapes
3317	Steel pipe and tubes
332	**Iron and Steel Foundries**
3321	Gray and ductile iron foundries
3322	Malleable iron foundries
3324	Steel investment foundries
3325	Steel foundries, nec
333	**Primary Nonferrous Metals**
3331	Primary copper
3334	Primary aluminum

NUMERICAL LIST OF SHORT TITLES

Code	Short Title
3339	Primary nonferrous metals, nec
334	**Secondary Nonferrous Metals**
3341	Secondary nonferrous metals
335	**Nonferrous Rolling and Drawing**
3351	Copper rolling and drawing
3353	Aluminum sheet, plate, and foil
3354	Aluminum extruded products
3355	Aluminum rolling and drawing, nec
3356	Nonferrous rolling and drawing, nec
3357	Nonferrous wiredrawing & insulating
336	**Nonferrous Foundries (Castings)**
3363	Aluminum die-castings
3364	Nonferrous die-casting exc. aluminum
3365	Aluminum foundries
3366	Copper foundries
3369	Nonferrous foundries, nec
339	**Miscellaneous Primary Metal Products**
3398	Metal heat treating
3399	Primary metal products, nec
34	**FABRICATED METAL PRODUCTS**
341	**Metal Cans and Shipping Containers**
3411	Metal cans
3412	Metal barrels, drums, and pails
342	**Cutlery, Handtools, and Hardware**
3421	Cutlery
3423	Hand and edge tools, nec
3425	Saw blades and handsaws
3429	Hardware, nec
343	**Plumbing and Heating, Except Electric**
3431	Metal sanitary ware
3432	Plumbing fixture fittings and trim
3433	Heating equipment, except electric
344	**Fabricated Structural Metal Products**
3441	Fabricated structural metal
3442	Metal doors, sash, and trim
3443	Fabricated plate work (boiler shops)
3444	Sheet metal work
3446	Architectural metal work
3448	Prefabricated metal buildings
3449	Miscellaneous metal work
345	**Screw Machine Products, Bolts, Etc.**
3451	Screw machine products
3452	Bolts, nuts, rivets, and washers
346	**Metal Forgings and Stampings**
3462	Iron and steel forgings
3463	Nonferrous forgings
3465	Automotive stampings
3466	Crowns and closures
3469	Metal stampings, nec
347	**Metal Services, NEC**
3471	Plating and polishing
3479	Metal coating and allied services
348	**Ordnance and Accessories, NEC**
3482	Small arms ammunition
3483	Ammunition, exc. for small arms, nec
3484	Small arms
3489	Ordnance and accessories, nec
349	**Misc. Fabricated Metal Products**
3491	Industrial valves
3492	Fluid power valves & hose fittings
3493	Steel springs, except wire
3494	Valves and pipe fittings, nec
3495	Wire springs
3496	Misc. fabricated wire products
3497	Metal foil and leaf
3498	Fabricated pipe and fittings
3499	Fabricated metal products, nec
35	**INDUSTRIAL MACHINERY AND EQUIPMENT**
351	**Engines and Turbines**
3511	Turbines and turbine generator sets
3519	Internal combustion engines, nec
352	**Farm and Garden Machinery**
3523	Farm machinery and equipment
3524	Lawn and garden equipment
353	**Construction and Related Machinery**
3531	Construction machinery
3532	Mining machinery
3533	Oil and gas field machinery
3534	Elevators and moving stairways
3535	Conveyors and conveying equipment
3536	Hoists, cranes, and monorails
3537	Industrial trucks and tractors
354	**Metalworking Machinery**
3541	Machine tools, metal cutting types
3542	Machine tools, metal forming types
3543	Industrial patterns
3544	Special dies, tools, jigs & fixtures
3545	Machine tool accessories
3546	Power-driven handtools
3547	Rolling mill machinery
3548	Welding apparatus
3549	Metalworking machinery, nec
355	**Special Industry Machinery**
3552	Textile machinery
3553	Woodworking machinery
3554	Paper industries machinery
3555	Printing trades machinery
3556	Food products machinery
3559	Special industry machinery, nec
356	**General Industrial Machinery**
3561	Pumps and pumping equipment
3562	Ball and roller bearings
3563	Air and gas compressors

STANDARD INDUSTRIAL CLASSIFICATION

Code	Short Title
3564	Blowers and fans
3565	Packaging machinery
3566	Speed changers, drives, and gears
3567	Industrial furnaces and ovens
3568	Power transmission equipment, nec
3569	General industrial machinery, nec
357	**Computer and Office Equipment**
3571	Electronic computers
3572	Computer storage devices
3575	Computer terminals
3577	Computer peripheral equipment, nec
3578	Calculating and accounting equipment
3579	Office machines, nec
358	**Refrigeration and Service Machinery**
3581	Automatic vending machines
3582	Commercial laundry equipment
3585	Refrigeration and heating equipment
3586	Measuring and dispensing pumps
3589	Service industry machinery, nec
359	**Industrial Machinery, NEC**
3592	Carburetors, pistons, rings, valves
3593	Fluid power cylinders & actuators
3594	Fluid power pumps and motors
3596	Scales and balances, exc. laboratory
3599	Industrial machinery, nec
36	**ELECTRONIC & OTHER ELECTRIC EQUIPMENT**
361	**Electric Distribution Equipment**
3612	Transformers, except electronic
3613	Switchgear and switchboard apparatus
362	**Electrical Industrial Apparatus**
3621	Motors and generators
3624	Carbon and graphite products
3625	Relays and industrial controls
3629	Electrical industrial apparatus, nec
363	**Household Appliances**
3631	Household cooking equipment
3632	Household refrigerators and freezers
3633	Household laundry equipment
3634	Electric housewares and fans
3635	Household vacuum cleaners
3639	Household appliances, nec
364	**Electric Lighting and Wiring Equipment**
3641	Electric lamps
3643	Current-carrying wiring devices
3644	Noncurrent-carrying wiring devices
3645	Residential lighting fixtures
3646	Commercial lighting fixtures
3647	Vehicular lighting equipment
3648	Lighting equipment, nec
365	**Household Audio and Video Equipment**
3651	Household audio and video equipment
3652	Prerecorded records and tapes
366	**Communications Equipment**
3661	Telephone and telegraph apparatus
3663	Radio & TV communications equipment
3669	Communications equipment, nec
367	**Electronic Components and Accessories**
3671	Electron tubes
3672	Printed circuit boards
3674	Semiconductors and related devices
3675	Electronic capacitors
3676	Electronic resistors
3677	Electronic coils and transformers
3678	Electronic connectors
3679	Electronic components, nec
369	**Misc. Electrical Equipment & Supplies**
3691	Storage batteries
3692	Primary batteries, dry and wet
3694	Engine electrical equipment
3695	Magnetic and optical recording media
3699	Electrical equipment & supplies, nec
37	**TRANSPORTATION EQUIPMENT**
371	**Motor Vehicles and Equipment**
3711	Motor vehicles and car bodies
3713	Truck and bus bodies
3714	Motor vehicle parts and accessories
3715	Truck trailers
3716	Motor homes
372	**Aircraft and Parts**
3721	Aircraft
3724	Aircraft engines and engine parts
3728	Aircraft parts and equipment, nec
373	**Ship and Boat Building and Repairing**
3731	Ship building and repairing
3732	Boat building and repairing
374	**Railroad Equipment**
3743	Railroad equipment
375	**Motorcycles, Bicycles, and Parts**
3751	Motorcycles, bicycles, and parts
376	**Guided Missiles, Space Vehicles, Parts**
3761	Guided missiles and space vehicles
3764	Space propulsion units and parts
3769	Space vehicle equipment, nec
379	**Miscellaneous Transportation Equipment**
3792	Travel trailers and campers
3795	Tanks and tank components
3799	Transportation equipment, nec
38	**INSTRUMENTS AND RELATED PRODUCTS**
381	**Search and Navigation Equipment**
3812	Search and navigation equipment

NUMERICAL LIST OF SHORT TITLES

Code	Short Title
382	**Measuring and Controlling Devices**
3821	Laboratory apparatus and furniture
3822	Environmental controls
3823	Process control instruments
3824	Fluid meters and counting devices
3825	Instruments to measure electricity
3826	Analytical instruments
3827	Optical instruments and lenses
3829	Measuring & controlling devices, nec
384	**Medical Instruments and Supplies**
3841	Surgical and medical instruments
3842	Surgical appliances and supplies
3843	Dental equipment and supplies
3844	X-ray apparatus and tubes
3845	Electromedical equipment
385	**Ophthalmic Goods**
3851	Ophthalmic goods
386	**Photographic Equipment and Supplies**
3861	Photographic equipment and supplies
387	**Watches, Clocks, Watchcases & Parts**
3873	Watches, clocks, watchcases & parts
39	**MISCELLANEOUS MANUFACTURING INDUSTRIES**
391	**Jewelry, Silverware, and Plated Ware**
3911	Jewelry, precious metal
3914	Silverware and plated ware
3915	Jewelers' materials & lapidary work
393	**Musical Instruments**
3931	Musical instruments
394	**Toys and Sporting Goods**
3942	Dolls and stuffed toys
3944	Games, toys, and children's vehicles
3949	Sporting and athletic goods, nec
395	**Pens, Pencils, Office, & Art Supplies**
3951	Pens and mechanical pencils
3952	Lead pencils and art goods
3953	Marking devices
3955	Carbon paper and inked ribbons
396	**Costume Jewelry and Notions**
3961	Costume jewelry
3965	Fasteners, buttons, needles, & pins
399	**Miscellaneous Manufactures**
3991	Brooms and brushes
3993	Signs and advertising specialities
3995	Burial caskets
3996	Hard surface floor coverings, nec
3999	Manufacturing industries, nec

E. TRANSPORTATION AND PUBLIC UTILITIES

Code	Short Title
40	**RAILROAD TRANSPORTATION**
401	**Railroads**
4011	Railroads, line-haul operating
4013	Switching and terminal services
41	**LOCAL AND INTERURBAN PASSENGER TRANSIT**
411	**Local and Suburban Transportation**
4111	Local and suburban transit
4119	Local passenger transportation, nec
412	**Taxicabs**
4121	Taxicabs
413	**Intercity and Rural Bus Transportation**
4131	Intercity & rural bus transportation
414	**Bus Charter Service**
4141	Local bus charter service
4142	Bus charter service, except local
415	**School Buses**
4151	School buses
417	**Bus Terminal and Service Facilities**
4173	Bus terminal and service facilities
42	**TRUCKING AND WAREHOUSING**
421	**Trucking & Courier Services, Ex. Air**
4212	Local trucking, without storage
4213	Trucking, except local
4214	Local trucking with storage
4215	Courier services, except by air
422	**Public Warehousing and Storage**
4221	Farm product warehousing and storage
4222	Refrigerated warehousing and storage
4225	General warehousing and storage
4226	Special warehousing and storage, nec
423	**Trucking Terminal Facilities**
4231	Trucking terminal facilities
43	**U.S. POSTAL SERVICE**
431	**U.S. Postal Service**
4311	U.S. Postal Service
44	**WATER TRANSPORTATION**
441	**Deep Sea Foreign Trans. of Freight**
4412	Deep sea foreign trans. of freight

STANDARD INDUSTRIAL CLASSIFICATION

Code	Short Title
442	**Deep Sea Domestic Trans. of Freight**
4424	Deep sea domestic trans. of freight
443	**Freight Trans. on the Great Lakes**
4432	Freight trans. on the Great Lakes
444	**Water Transportation of Freight, NEC**
4449	Water transportation of freight, nec
448	**Water Transportation of Passengers**
4481	Deep sea passenger trans., ex. ferry
4482	Ferries
4489	Water passenger transportation, nec
449	**Water Transportation Services**
4491	Marine cargo handling
4492	Towing and tugboat service
4493	Marinas
4499	Water transportation services, nec
45	TRANSPORTATION BY AIR
451	**Air Transportation, Scheduled**
4512	Air transportation, scheduled
4513	Air courier services
452	**Air Transportation, Nonscheduled**
4522	Air transportation, nonscheduled
458	**Airports, Flying Fields, & Services**
4581	Airports, flying fields, & services
46	PIPELINES, EXCEPT NATURAL GAS
461	**Pipelines, Except Natural Gas**
4612	Crude petroleum pipelines
4613	Refined petroleum pipelines
4619	Pipelines, nec
47	TRANSPORTATION SERVICES
472	**Passenger Transportation Arrangement**
4724	Travel agencies
4725	Tour operators
4729	Passenger transport arrangement, nec
473	**Freight Transportation Arrangement**
4731	Freight transportation arrangement
474	**Rental of Railroad Cars**
4741	Rental of railroad cars
478	**Miscellaneous Transportation Services**
4783	Packing and crating
4785	Inspection & fixed facilities
4789	Transportation services, nec
48	COMMUNICATIONS
481	**Telephone Communications**
4812	Radiotelephone communications
4813	Telephone communications, exc. radio
482	**Telegraph & Other Communications**
4822	Telegraph & other communications
483	**Radio and Television Broadcasting**
4832	Radio broadcasting stations
4833	Television broadcasting stations
484	**Cable and Other Pay TV Services**
4841	Cable and other pay TV services
489	**Communications Services, NEC**
4899	Communications services, nec
49	ELECTRIC, GAS, AND SANITARY SERVICES
491	**Electric Services**
4911	Electric services
492	**Gas Production and Distribution**
4922	Natural gas transmission
4923	Gas transmission and distribution
4924	Natural gas distribution
4925	Gas production and/or distribution
493	**Combination Utility Services**
4931	Electric and other services combined
4932	Gas and other services combined
4939	Combination utilities, nec
494	**Water Supply**
4941	Water supply
495	**Sanitary Services**
4952	Sewerage systems
4953	Refuse systems
4959	Sanitary services, nec
496	**Steam and Air-Conditioning Supply**
4961	Steam and air-conditioning supply
497	**Irrigation Systems**
4971	Irrigation systems

F. WHOLESALE TRADE

Code	Short Title
50	WHOLESALE TRADE—DURABLE GOODS
501	**Motor Vehicles, Parts, and Supplies**
5012	Automobiles and other motor vehicles
5013	Motor vehicle supplies and new parts
5014	Tires and tubes
5015	Motor vehicle parts, used

NUMERICAL LIST OF SHORT TITLES

Code	*Short Title*
502	**Furniture and Homefurnishings**
5021	Furniture
5023	Homefurnishings
503	**Lumber and Construction Materials**
5031	Lumber, plywood, and millwork
5032	Brick, stone, & related materials
5033	Roofing, siding, & insulation
5039	Construction materials, nec
504	**Professional & Commercial Equipment**
5043	Photographic equipment and supplies
5044	Office equipment
5045	Computers, peripherals & software
5046	Commercial equipment, nec
5047	Medical and hospital equipment
5048	Ophthalmic goods
5049	Professional equipment, nec
505	**Metals and Minerals, Except Petroleum**
5051	Metals service centers and offices
5052	Coal and other minerals and ores
506	**Electrical Goods**
5063	Electrical apparatus and equipment
5064	Electrical appliances, TV & radios
5065	Electronic parts and equipment
507	**Hardware, Plumbing & Heating Equipment**
5072	Hardware
5074	Plumbing & hydronic heating supplies
5075	Warm air heating & air-conditioning
5078	Refrigeration equipment and supplies
508	**Machinery, Equipment, and Supplies**
5082	Construction and mining machinery
5083	Farm and garden machinery
5084	Industrial machinery and equipment
5085	Industrial supplies
5087	Service establishment equipment
5088	Transportation equipment & supplies
509	**Miscellaneous Durable Goods**
5091	Sporting & recreational goods
5092	Toys and hobby goods and supplies
5093	Scrap and waste materials
5094	Jewelry & precious stones
5099	Durable goods, nec

Code	*Short Title*
51	**WHOLESALE TRADE—NONDURABLE GOODS**
511	**Paper and Paper Products**
5111	Printing and writing paper
5112	Stationery and office supplies
5113	Industrial & personal service paper
512	**Drugs, Proprietaries, and Sundries**
5122	Drugs, proprietaries, and sundries
513	**Apparel, Piece Goods, and Notions**
5131	Piece goods & notions
5136	Men's and boys' clothing
5137	Women's and children's clothing
5139	Footwear
514	**Groceries and Related Products**
5141	Groceries, general line
5142	Packaged frozen foods
5143	Dairy products, exc. dried or canned
5144	Poultry and poultry products
5145	Confectionery
5146	Fish and seafoods
5147	Meats and meat products
5148	Fresh fruits and vegetables
5149	Groceries and related products, nec
515	**Farm-Product Raw Materials**
5153	Grain and field beans
5154	Livestock
5159	Farm-product raw materials, nec
516	**Chemicals and Allied Products**
5162	Plastics materials & basic shapes
5169	Chemicals & allied products, nec
517	**Petroleum and Petroleum Products**
5171	Petroleum bulk stations & terminals
5172	Petroleum products, nec
518	**Beer, Wine, and Distilled Beverages**
5181	Beer and ale
5182	Wine and distilled beverages
519	**Misc. Nondurable Goods**
5191	Farm supplies
5192	Books, periodicals, & newspapers
5193	Flowers & florists' supplies
5194	Tobacco and tobacco products
5198	Paints, varnishes, and supplies
5199	Nondurable goods, nec

G. RETAIL TRADE

Code	*Short Title*
52	**BUILDING MATERIALS & GARDEN SUPPLIES**
521	**Lumber and Other Building Materials**
5211	Lumber and other building materials

Code	*Short Title*
523	**Paint, Glass, and Wallpaper Stores**
5231	Paint, glass, and wallpaper stores
525	**Hardware Stores**
5251	Hardware stores
526	**Retail Nurseries and Garden Stores**

STANDARD INDUSTRIAL CLASSIFICATION

Code	Short Title
5261	Retail nurseries and garden stores
527	Mobile Home Dealers
5271	Mobile home dealers
53	GENERAL MERCHANDISE STORES
531	Department Stores
5311	Department stores
533	Variety Stores
5331	Variety stores
539	Misc. General Merchandise Stores
5399	Misc. general merchandise stores
54	FOOD STORES
541	Grocery Stores
5411	Grocery stores
542	Meat and Fish Markets
5421	Meat and fish markets
543	Fruit and Vegetable Markets
5431	Fruit and vegetable markets
544	Candy, Nut, and Confectionery Stores
5441	Candy, nut, and confectionery stores
545	Dairy Products Stores
5451	Dairy products stores
546	Retail Bakeries
5461	Retail bakeries
549	Miscellaneous Food Stores
5499	Miscellaneous food stores
55	AUTOMOTIVE DEALERS & SERVICE STATIONS
551	New and Used Car Dealers
5511	New and used car dealers
552	Used Car Dealers
5521	Used car dealers
553	Auto and Home Supply Stores
5531	Auto and home supply stores
554	Gasoline Service Stations
5541	Gasoline service stations
555	Boat Dealers
5551	Boat dealers
556	Recreational Vehicle Dealers
5561	Recreational vehicle dealers
557	Motorcycle Dealers
5571	Motorcycle dealers
559	Automotive Dealers, NEC
5599	Automotive dealers, nec
56	APPAREL AND ACCESSORY STORES
561	Men's & Boys' Clothing Stores
5611	Men's & boys' clothing stores
562	Women's Clothing Stores
5621	Women's clothing stores
563	Women's Accessory & Specialty Stores
5632	Women's accessory & specialty stores
564	Children's and Infants' Wear Stores
5641	Children's and infants' wear stores
565	Family Clothing Stores
5651	Family clothing stores
566	Shoe Stores
5661	Shoe stores
569	Misc. Apparel & Accessory Stores
5699	Misc. apparel & accessory stores
57	FURNITURE AND HOMEFURNISHINGS STORES
571	Furniture and Homefurnishings Stores
5712	Furniture stores
5713	Floor covering stores
5714	Drapery and upholstery stores
5719	Misc. homefurnishings stores
572	Household Appliance Stores
5722	Household appliance stores
573	Radio, Television, & Computer Stores
5731	Radio, TV, & electronic stores
5734	Computer and software stores
5735	Record & prerecorded tape stores
5736	Musical instrument stores
58	EATING AND DRINKING PLACES
581	Eating and Drinking Places
5812	Eating places
5813	Drinking places
59	MISCELLANEOUS RETAIL
591	Drug Stores and Proprietary Stores
5912	Drug stores and proprietary stores
592	Liquor Stores
5921	Liquor stores
593	Used Merchandise Stores
5932	Used merchandise stores
594	Miscellaneous Shopping Goods Stores
5941	Sporting goods and bicycle shops
5942	Book stores
5943	Stationery stores
5944	Jewelry stores
5945	Hobby, toy, and game shops
5946	Camera & photographic supply stores
5947	Gift, novelty, and souvenir shops
5948	Luggage and leather goods stores
5949	Sewing, needlework, and piece goods
596	Nonstore Retailers
5961	Catalog and mail-order houses
5962	Merchandising machine operators

NUMERICAL LIST OF SHORT TITLES

Code	Short Title
5963	Direct selling establishments
598	Fuel Dealers
5983	Fuel oil dealers
5984	Liquefied petroleum gas dealers
5989	Fuel dealers, nec
599	Retail Stores, NEC
5992	Florists
5993	Tobacco stores and stands
5994	News dealers and newsstands
5995	Optical goods stores
5999	Miscellaneous retail stores, nec

H. FINANCE, INSURANCE, AND REAL ESTATE

Code	Short Title
60	DEPOSITORY INSTITUTIONS
601	Central Reserve Depositories
6011	Federal reserve banks
6019	Central reserve depository, nec
602	Commercial Banks
6021	National commercial banks
6022	State commercial banks
6029	Commercial banks, nec
603	Savings Institutions
6035	Federal savings institutions
6036	Savings institutions, except federal
606	Credit Unions
6061	Federal credit unions
6062	State credit unions
608	Foreign Bank & Branches & Agencies
6081	Foreign bank & branches & agencies
6082	Foreign trade & international banks
609	Functions Closely Related to Banking
6091	Nondeposit trust facilities
6099	Functions related to deposit banking
61	NONDEPOSITORY INSTITUTIONS
611	Federal & Fed.-Sponsored Credit
6111	Federal & fed.-sponsored credit
614	Personal Credit Institutions
6141	Personal credit institutions
615	Business Credit Institutions
6153	Short-term business credit
6159	Misc. business credit institutions
616	Mortgage Bankers and Brokers
6162	Mortgage bankers and correspondents
6163	Loan brokers
62	SECURITY AND COMMODITY BROKERS
621	Security Brokers and Dealers
6211	Security brokers and dealers
622	Commodity Contracts Brokers, Dealers
6221	Commodity contracts brokers, dealers
623	Security and Commodity Exchanges
6231	Security and commodity exchanges
628	Security and Commodity Services
6282	Investment advice
6289	Security & commodity services, nec
63	INSURANCE CARRIERS
631	Life Insurance
6311	Life insurance
632	Medical Service and Health Insurance
6321	Accident and health insurance
6324	Hospital and medical service plans
633	Fire, Marine, and Casualty Insurance
6331	Fire, marine, and casualty insurance
635	Surety Insurance
6351	Surety insurance
636	Title Insurance
6361	Title insurance
637	Pension, Health, and Welfare Funds
6371	Pension, health, and welfare funds
639	Insurance Carriers, NEC
6399	Insurance carriers, nec
64	INSURANCE AGENTS, BROKERS, & SERVICE
641	Insurance Agents, Brokers, & Service
6411	Insurance agents, brokers, & service
65	REAL ESTATE
651	Real Estate Operators and Lessors
6512	Nonresidential building operators
6513	Apartment building operators
6514	Dwelling operators, exc. apartments
6515	Mobile home site operators
6517	Railroad property lessors
6519	Real property lessors, nec
653	Real Estate Agents and Managers
6531	Real estate agents and managers
654	Title Abstract Offices
6541	Title abstract offices
655	Subdividers and Developers

STANDARD INDUSTRIAL CLASSIFICATION

Code	Short Title
6552	Subdividers and developers, nec
6553	Cemetery subdividers and developers
67	HOLDING AND OTHER INVESTMENT OFFICES
671	**Holding Offices**
6712	Bank holding companies
6719	Holding companies, nec
672	**Investment Offices**
6722	Management investment, open-end
6726	Investment offices, nec
673	**Trusts**
6732	Educational, religious, etc. trusts
6733	Trusts, nec
679	**Miscellaneous Investing**
6792	Oil royalty traders
6794	Patent owners and lessors
6798	Real estate investment trusts
6799	Investors, nec

I. SERVICES

Code	Short Title
70	HOTELS AND OTHER LODGING PLACES
701	**Hotels and Motels**
7011	Hotels and motels
702	**Rooming and Boarding Houses**
7021	Rooming and boarding houses
703	**Camps and Recreational Vehicle Parks**
7032	Sporting and recreational camps
7033	Trailer parks and campsites
704	**Membership-Basis Organization Hotels**
7041	Membership-basis organization hotels
72	PERSONAL SERVICES
721	**Laundry, Cleaning, & Garment Services**
7211	Power laundries, family & commercial
7212	Garment pressing & cleaners' agents
7213	Linen supply
7215	Coin-operated laundries and cleaning
7216	Drycleaning plants, except rug
7217	Carpet and upholstery cleaning
7218	Industrial launderers
7219	Laundry and garment services, nec
722	**Photographic Studios, Portrait**
7221	Photographic studios, portrait
723	**Beauty Shops**
7231	Beauty shops
724	**Barber Shops**
7241	Barber shops
725	**Shoe Repair and Shoeshine Parlors**
7251	Shoe repair and shoeshine parlors
726	**Funeral Service and Crematories**
7261	Funeral service and crematories
729	**Miscellaneous Personal Services**
7291	Tax return preparation services
7299	Miscellaneous personal services, nec
73	BUSINESS SERVICES
731	**Advertising**
7311	Advertising agencies
7312	Outdoor advertising services
7313	Radio, TV, publisher representatives
7319	Advertising, nec
732	**Credit Reporting and Collection**
7322	Adjustment & collection services
7323	Credit reporting services
733	**Mailing, Reproduction, Stenographic**
7331	Direct mail advertising services
7334	Photocopying & duplicating services
7335	Commercial photography
7336	Commercial art and graphic design
7338	Secretarial & court reporting
734	**Services to Buildings**
7342	Disinfecting & pest control services
7349	Building maintenance services, nec
735	**Misc. Equipment Rental & Leasing**
7352	Medical equipment rental
7353	Heavy construction equipment rental
7359	Equipment rental & leasing, nec
736	**Personnel Supply Services**
7361	Employment agencies
7363	Help supply services
737	**Computer and Data Processing Services**
7371	Computer programming services
7372	Prepackaged software
7373	Computer integrated systems design
7374	Data processing and preparation
7375	Information retrieval services
7376	Computer facilities management
7377	Computer rental & leasing
7378	Computer maintenance & repair
7379	Computer related services, nec
738	**Miscellaneous Business Services**
7381	Detective & armored car services

NUMERICAL LIST OF SHORT TITLES

Code	*Short Title*
7382	Security systems services
7383	News syndicates
7384	Photofinishing laboratories
7389	Business services, nec
75	**AUTO REPAIR, SERVICES, AND PARKING**
751	**Automotive Rentals, No Drivers**
7513	Truck rental and leasing, no drivers
7514	Passenger car rental
7515	Passenger car leasing
7519	Utility trailer rental
752	**Automobile Parking**
7521	Automobile parking
753	**Automotive Repair Shops**
7532	Top & body repair & paint shops
7533	Auto exhaust system repair shops
7534	Tire retreading and repair shops
7536	Automotive glass replacement shops
7537	Automotive transmission repair shops
7538	General automotive repair shops
7539	Automotive repair shops, nec
754	**Automotive Services, Except Repair**
7542	Carwashes
7549	Automotive services, nec
76	**MISCELLANEOUS REPAIR SERVICES**
762	**Electrical Repair Shops**
7622	Radio and television repair
7623	Refrigeration service and repair
7629	Electrical repair shops, nec
763	**Watch, Clock, and Jewelry Repair**
7631	Watch, clock, and jewelry repair
764	**Reupholstery and Furniture Repair**
7641	Reupholstery and furniture repair
769	**Miscellaneous Repair Shops**
7692	Welding repair
7694	Armature rewinding shops
7699	Repair services, nec
78	**MOTION PICTURES**
781	**Motion Picture Production & Services**
7812	Motion picture & video production
7819	Services allied to motion pictures
782	**Motion Picture Distribution & Services**
7822	Motion picture and tape distribution
7829	Motion picture distribution services
783	**Motion Picture Theaters**
7832	Motion picture theaters, ex drive-in
7833	Drive-in motion picture theaters
784	**Video Tape Rental**
7841	Video tape rental
79	**AMUSEMENT & RECREATION SERVICES**
791	**Dance Studios, Schools, and Halls**
7911	Dance studios, schools, and halls
792	**Producers, Orchestras, Entertainers**
7922	Theatrical producers and services
7929	Entertainers & entertainment groups
793	**Bowling Centers**
7933	Bowling centers
794	**Commercial Sports**
7941	Sports clubs, managers, & promoters
7948	Racing, including track operation
799	**Misc. Amusement, Recreation Services**
7991	Physical fitness facilities
7992	Public golf courses
7993	Coin-operated amusement devices
7996	Amusement parks
7997	Membership sports & recreation clubs
7999	Amusement and recreation, nec
80	**HEALTH SERVICES**
801	**Offices & Clinics of Medical Doctors**
8011	Offices & clinics of medical doctors
802	**Offices and Clinics of Dentists**
8021	Offices and clinics of dentists
803	**Offices of Osteopathic Physicians**
8031	Offices of osteopathic physicians
804	**Offices of Other Health Practitioners**
8041	Offices and clinics of chiropractors
8042	Offices and clinics of optometrists
8043	Offices and clinics of podiatrists
8049	Offices of health practitioners, nec
805	**Nursing and Personal Care Facilities**
8051	Skilled nursing care facilities
8052	Intermediate care facilities
8059	Nursing and personal care, nec
806	**Hospitals**
8062	General medical & surgical hospitals
8063	Psychiatric hospitals
8069	Specialty hospitals exc. psychiatric
807	**Medical and Dental Laboratories**
8071	Medical laboratories
8072	Dental laboratories
808	**Home Health Care Services**
8082	Home health care services
809	**Health and Allied Services, NEC**
8092	Kidney dialysis centers
8093	Specialty outpatient clinics, nec
8099	Health and allied services, nec
81	**LEGAL SERVICES**
811	**Legal Services**

STANDARD INDUSTRIAL CLASSIFICATION

Code	Short Title
8111	Legal services
82	EDUCATIONAL SERVICES
821	Elementary and Secondary Schools
8211	Elementary and secondary schools
822	Colleges and Universities
8221	Colleges and universities
8222	Junior colleges
823	Libraries
8231	Libraries
824	Vocational Schools
8243	Data processing schools
8244	Business and secretarial schools
8249	Vocational schools, nec
829	Schools & Educational Services, NEC
8299	Schools & educational services, nec
83	SOCIAL SERVICES
832	Individual and Family Services
8322	Individual and family services
833	Job Training and Related Services
8331	Job training and related services
835	Child Day Care Services
8351	Child day care services
836	Residential Care
8361	Residential care
839	Social Services, NEC
8399	Social services, nec
84	MUSEUMS, BOTANICAL, ZOOLOGICAL GARDENS
841	Museums and Art Galleries
8412	Museums and art galleries
842	Botanical and Zoological Gardens
8422	Botanical and zoological gardens
86	MEMBERSHIP ORGANIZATIONS
861	Business Associations
8611	Business associations
862	Professional Organizations
8621	Professional organizations
863	Labor Organizations
8631	Labor organizations
864	Civic and Social Associations
8641	Civic and social associations
865	Political Organizations
8651	Political organizations
866	Religious Organizations
8661	Religious organizations
869	Membership Organizations, NEC
8699	Membership organizations, nec
87	ENGINEERING & MANAGEMENT SERVICES
871	Engineering & Architectural Services
8711	Engineering services
8712	Architectural services
8713	Surveying services
872	Accounting, Auditing, & Bookkeeping
8721	Accounting, auditing, & bookkeeping
873	Research and Testing Services
8731	Commercial physical research
8732	Commercial nonphysical research
8733	Noncommercial research organizations
8734	Testing laboratories
874	Management and Public Relations
8741	Management services
8742	Management consulting services
8743	Public relations services
8744	Facilities support services
8748	Business consulting, nec
88	PRIVATE HOUSEHOLDS
881	Private Households
8811	Private households
89	SERVICES, NEC
899	Services, NEC
8999	Services, nec

J. PUBLIC ADMINISTRATION

Code	Short Title
91	EXECUTIVE, LEGISLATIVE, AND GENERAL
911	Executive Offices
9111	Executive offices
912	Legislative Bodies
9121	Legislative bodies
913	Executive and Legislative Combined
9131	Executive and legislative combined
919	General Government, NEC
9199	General government, nec

NUMERICAL LIST OF SHORT TITLES

Code	*Short Title*
92	**JUSTICE, PUBLIC ORDER, AND SAFETY**
921	**Courts**
9211	Courts
922	**Public Order and Safety**
9221	Police protection
9222	Legal counsel and prosecution
9223	Correctional institutions
9224	Fire protection
9229	Public order and safety, nec
93	**FINANCE, TAXATION, & MONETARY POLICY**
931	**Finance, Taxation, & Monetary Policy**
9311	Finance, taxation, & monetary policy
94	**ADMINISTRATION OF HUMAN RESOURCES**
941	**Admin. of Educational Programs**
9411	Admin. of educational programs
943	**Admin. of Public Health Programs**
9431	Admin. of public health programs
944	**Admin. of Social & Manpower Programs**
9441	Admin. of social & manpower programs
945	**Administration of Veterans' Affairs**
9451	Administration of veterans' affairs
95	**ENVIRONMENTAL QUALITY AND HOUSING**
951	**Environmental Quality**
9511	Air, water, & solid waste management
9512	Land, mineral, wildlife conservation
953	**Housing and Urban Development**
9531	Housing programs
9532	Urban and community development
96	**ADMINISTRATION OF ECONOMIC PROGRAMS**
961	**Admin. of General Economic Programs**
9611	Admin. of general economic programs
962	**Regulation, Admin. of Transportation**
9621	Regulation, admin. of transportation
963	**Regulation, Admin. of Utilities**
9631	Regulation, admin. of utilities
964	**Regulation of Agricultural Marketing**
9641	Regulation of agricultural marketing
965	**Regulation Misc. Commercial Sectors**
9651	Regulation misc. commercial sectors
966	**Space Research and Technology**
9661	Space research and technology
97	**NATIONAL SECURITY AND INTL. AFFAIRS**
971	**National Security**
9711	National security
972	**International Affairs**
9721	International affairs

K. NONCLASSIFIABLE ESTABLISHMENTS

Code	*Short Title*
99	**NONCLASSIFIABLE ESTABLISHMENTS**
999	**Nonclassifiable Establishments**
9999	Nonclassifiable establishments

Appendix D

How to Obtain Additional EPA Documents

HOW TO OBTAIN ADDITIONAL EPA PUBLICATIONS AND GUIDANCE

Throughout the NPDES Permit Writers Manual, citations to supplementary guidance materials available from U.S. EPA are provided as footnotes. Where available, these documents are distributed free of charge through the EPA Office of Water Resource Center (WRC). The WRC distributes one free copy of each publication to each customer until supplies are depleted. The address and telephone number for the WRC are provided below (see information for the Office of Wastewater Management Catalog of Publications). When the WRC's supply of documents is depleted, requestors are referred to either the National Technical Information Service (NTIS) or the Educational Resources Information Center (ERIC). Information on how to order documents from NTIS and ERIC is provided in the following pages.

Another important source of information regarding EPA publications is the National Center for Environmental Publications and Information (NCEPI). NCEPI is a central repository for all EPA documents, with over 5,500 titles in paper and/or electronic format available for distribution. In addition to NCEPI, EPA maintains numerous bulletin boards and "hotlines" which provide information on specific subjects, (e.g., Radon or Pollution Prevention).

In addition to the materials cited in the manual, EPA has developed numerous guidance and reference documents that may also support permit writers in developing NPDES permits. Although the list of available guidance is too voluminous to include in this Permit Writers' Manual, a comprehensive list of supplementary documents is available through EPA. Of particular interest to NPDES permit writers, the EPA Office of Wastewater Management (OWM), and the Office of Science and Technology (OST) publish catalogs of available publications. Information on how to obtain these catalogs is provided below.

1. **Office of Wastewater Management**
   Catalog of Publications
   EPA 830/B-96-001

   Copies of this catalog are available (at no cost) by writing, calling, faxing, or emailing:

   U.S. Environmental Protection Agency
   Office of Water Resource Center
   RC-4100
   401 M Street S.W.
   Washington, DC 20460

   (202) 260-7786 [Voice mail publication request line]
   (202) 260-0386 [Fax]
   Email: waterpubs@epamail.epa.gov

2. Office of Science and Technology
1996 Publications Catalog

Available on-line through EPA's Office of Water Homepage
[http://www.epa.gov/watrhome/pubs.html]

Or, call or write:

U.S. Environmental Protection Agency
National Center for Environmental Publications and Information (NCEPI)
11029 Kenwood Road, Bldg. 5
Cincinnati, OH 45242

Fax: (513) 489-8695
Email: OWOW-PUBS-NCEPI@epamail.epa.gov

Introductory information describing the OWM catalogs, as well as detailed information on how to go about ordering EPA documents, is provided in this appendix.

EPA's Office of Wastewater Management also maintains an electronic bulletin board system (BBS) that provides immediate access to many reference materials. The **Point Source Information Provision Exchange System (PIPES)** is a free, public, BBS and internet site (WWW compatible) designed to facilitate the exchange of Office of Water-related information among EPA, States, municipalities, industry, and the public. **A brochure describing the features of PIPES, and information on how to access the system, is provided in this appendix.**

United States
Environmental Protection
Agency

Office of Water

OFFICE OF WASTEWATER MANAGEMENT

CATALOG OF PUBLICATIONS

April 1996
Office of Wastewater Management
Office of Water
U.S. Environmental Protection Agency
Washington, DC 20460

HOW TO USE THIS CATALOG

General Information

Many publications in this catalog are distributed free of charge by the EPA's Office of Wastewater Management (OWM). The Office of Wastewater Management distributes documents through the EPA Office of Water Resource Center (WRC). The WRC distributes one free copy of each publication to each customer until supplies are depleted.

When OWM's supply of a publication is depleted, requestors are referred to either the National Technical Information Service (NTIS) or the Educational Resources Information Center (ERIC). These clearinghouses provide copies of OWM publications for a fee.

Catalog Organization

This catalog divides the documents into fifteen broad subject sections: 1) Treatment; 2) Finance; 3) Operation & Maintenance; 4) Storm Water/Combined Sewer Overflows; 5) Pretreatment; 6) Biosolids; 7) Small Communities; 8) Water Quality & Standards; 9) Permitting Issues; 10) Water Conservation & Efficiency; 11) Environmental Impact Statements; 12) Pollution Prevention & Control; 13) Needs & Assessments; 14) Construction Grants; and 15) Miscellaneous.

The Office of Wastewater Management has assigned most documents a unique EPA number to assist in tracking the document. Documents without EPA numbers are tracked by title.

Entry Format

A sample page from the catalog appears on the next page. Entries are explained by comments in italics.

WATER CONSERVATION & EFFICIENCY

This is the subject section heading.

Document Title	EPA Number	Source Call ERIC at (614) 292-6717 Call NCEPI at (513) 891-6561 Call NTIS at (800) 553-NTIS Call WRC at (202) 260-7786 *Each document is available from one of these sources. Each catalog entry lists the document source. Requestors may call the source to place an order or may mail, fax, or e-mail orders. See the Preface for more details.*
Designing a Water Conservation Program: An Annotated Bibliography of Source Materials, September 1993 *"Designing a Water Conservation Program: An Annotated Bibliography of Source Materials" is the document title, followed by the publication date of September 1993*	EPA #: 832/B-93-003 NTIS#: PB94-111432 ERIC#: 495W *The EPA document number assigned to this document is 832/B-93-003; this number should be used when ordering from WRC. NTIS can provide this document for a fee; use the NTIS document number: PB94-111432. ERIC can also provide this document for a fee; use the ERIC document number: 495W.*	WRC NTIS ERIC *Either WRC, NTIS, or ERIC can provide this document.*
Guides to Pollution Prevention: Municipal Pretreatment Programs, October 1993	EPA #: 625/R-93-006 NTIS#: PB94-144631	NTIS *This document is only available from NTIS.*
Manual: Guidelines for Water Reuse	EPA #: 625/R-92-004 NTIS#: PB93-222180	CERI NTIS *This document is available from CERI; use the EPA document number when ordering from CERI. This document is also available from NTIS.*

ORDERING DOCUMENTS FROM WRC

You may order EPA Office of Water documents from WRC the following ways:

1) Call the WRC voice mail request line at (202) 260-7786 and order the document by title and EPA number,

2) Mail your request to:

U.S. Environmental Protection Agency
Office of Water Resource Center
RC-4100
401 M St., SW
Washington, DC 20460

3) Place your order via Internet: waterpubs@epamail.epa.gov

4) Fax your request to WRC at (202) 260-0386.

Please allow 3-4 weeks for delivery.

ORDERING DOCUMENTS FROM NCEPI

You may order EPA documents from NCEPI the following ways:

1) Call NCEPI at (513) 891-6561 and order documents by EPA number,

2) Mail your request to:

National Center for Environmental Publications & Information
11029 Kenwood Rd.
Cincinnati, OH 45242

3) Fax your request to NCEPI at (513) 891-6685

Please allow 2-3 weeks for delivery. Documents may be sent by Federal Express at the requestor's expense.

ORDERING DOCUMENTS FROM CERI

You may order EPA Office of Research & Development documents from CERI the following ways:

1) Call CERI at (513) 569-7562 and order documents by EPA number,

2) Mail your request to:

U.S. EPA
Center for Environmental Research Information
26 W. Martin Luther King Dr.
Cincinnati, OH 45268

3) Fax your request to CERI at (513) 569-7566.

Please allow 3-4 weeks for delivery. Documents may be sent by Federal Express at the requestor's expense.

OFFICE OF WASTEWATER MANAGEMENT

Publications Order Form

Please Print All Information Clearly

Publication Number	Title	Office Use

You may order up to 1 copy of each available document. Please allow 3-4 weeks for delivery.

Ship to: .....

Title: .....

Organization: .....

Address: .....

City, State, Zip: .....

Daytime phone: .....

Please fax or mail this form to:

U.S. Environmental Protection Agency
Office of Water Resource Center
RC-4100
401 M St., SW
Washington, DC 20460
Fax number: (202) 260-0386

ORDERING DOCUMENTS FROM ERIC

You may order documents from ERIC the following ways:

1) Call ERIC at (800) 276-0462 and order documents by title and ERIC number,

2) Record your order on the ERIC order form on the following page and mail it to:

   Educational Resources Information Center
   1929 Kenny Road
   Columbus, Ohio 43210-1080

3) Record your order on the ERIC order form on the following page and fax it to: (614) 292-0263

Shipping and Handling
Shipping fees range from $2.00 to $10.00 Please call ERIC or see the ERIC order form on the following page for more details on shipping and handling fees.

Electronic Services
Many ERIC products, services, and directories are available electronically through the Internet. The ERIC staff can be contacted through e-mail [*ericse@osu.edu*], and ERIC offers resources through a Gopher server [*gopher.ericse.ohio-state.edu*] or World Wide Web (*Mosaic*) server [*http://gopher.ericse.ohio-state.edu*].

Ship To: (Cust. # if known) _____

Name: _____

Organization: _____

Address: _____

City/State/Zip: _____

☑ ERIC/CSMEE Federal Tax ID#: 31-602-5986

ERIC/CSMEE EPA Order Form

Phone _____

FAX _____

PO # _____

Item No.	*Qty.*	*Abbreviated Title*	*Unit $*	*Total $*

Unless exempt, any organization or individual residing in Ohio must pay 5.75% tax. To claim an exemption please provide a tax number or certificate with the order.

Subtotal	
Shipping	
Tax (Ohio Residents)	
Total Purchase	

Order Subtotal	Shipping
$2.00-$10.00	$2.00
$10.01-$25.00	$3.50
$25.01-$50.00	$6.00
$50.01-$75.00	$8.00
$75.01-$100.00	$10.00
Over $100.00	Add 10%

International Rates Apply Outside USA

To order by FAX, transmit this form with Purchase Order or credit card number to: (614) 292-0263, or send this Order Form and Check, PO, or Check to:

ERIC/CSMEE
1929 Kenny Road
Columbus, OH 43210-1080
1-800-276-0462 or 614-292-6717 (Columbus Area & International)

If you prefer to use your VISA or MasterCard, please provide the following information:

Credit Card Number: _____ ☐ VISA ☐ Master Card

Expiration Date: _____ Cardholder's Name: _____

Cardholder's Signature: _____

ORDERING DOCUMENTS FROM NTIS

Telephone Orders
Call the NTIS Sales Desk between 8:30 a.m. and 5:00 p.m., Eastern time, Monday through Friday at (800) 553-NTIS. TDD for the hearing impaired (703) 487-4639.

FAX and TELEX Orders
Record your order on the NTIS order form on the following page. Fax your order to (703) 321-8547 or (703) 321-9038. For assistance call (703) 487-4679. International Telex - 64617.

Mail or Email Orders
Record your order on the NTIS order form on the following page. Mail your order to:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
orders@ntis.fedworld.gov

Rush Service
Rush service is available for an additional fee by calling 1-800-553-NTIS; outside the U.S. call (703) 487-4650. Rush orders are usually shipped next day by overnight courier in the U.S. or by Air Mail outside the U.S. **Do not mail rush orders.**

Methods of Payment
Customers may pay for NTIS products by: 1) American Express, MasterCard, or VISA; 2) check or money order payable to NTIS in U.S. dollars drawn on a U.S. bank; or in U.S. dollars drawn on an international bank with a U.S. address on the check; or in U.S. dollars drawn on a Canadian bank; (3) an NTIS Deposit Account; or (4) purchase order - add $7.50 per order if full payment does not accompany order - U.S., Canada, and Mexico only.

Handling Fee
A $3 handling fee per total order applies to all orders except Rush Service.

Postage & Shipping
Orders are shipped First Class mail or equivalent to addresses in the U.S. For Air Mail service to Canada and Mexico, add $4 per printed report and $1 per microfiche copy.

Tracing an Order
For questions about orders, write or call the Customer Service Department at (703) 487-4660 between 8:30 a.m. and 5:00 p.m. Eastern time.

U.S. DEPARTMENT OF COMMERCE
TECHNOLOGY ADMINISTRATION

ORDER FORM

NTIS
Information is our business.

PLEASE PRINT OR TYPE

SHIP TO ADDRESS

CUSTOMER MASTER NUMBER (IF KNOWN) | DATE

ATTENTION / NAME

ORGANIZATION | DIVISION / ROOM NUMBER

STREET ADDRESS

CITY | STATE | ZIP CODE

PROVINCE / TERRITORY | FOREIGN POSTAL CODE

COUNTRY

PHONE NUMBER ( ) | FAX NUMBER ( )

CONTACT NAME

PLEASE PRINT OR TYPE

METHOD OF PAYMENT

☐ Check / Money Order enclosed for $ (PAYABLE IN U.S. DOLLARS)

☐ NTIS Deposit Account Number:

☐ VISA ☐ MasterCard ☐ American Express

CREDIT CARD NUMBER | EXPIRATION DATE

CARDHOLDER'S NAME

SIGNATURE (REQUIRED TO VALIDATE ALL ORDERS)

DTIC USERS ONLY

CODE

CONTRACT NUMBER (LAST SIX DIGITS)

ORDER BY PHONE (ELIMINATE MAIL TIME)
8:30 a.m. - 5:00 p.m. Eastern Time, M – F.
Sales Desk: (703) 487-4650
Subscriptions: (703) 487-4630
TDD (hearing impaired only): (703) 487-4639

ORDER BY FAX
24 hours/7 days a week: (703) 321-8547
To verify receipt of fax: call (703) 487-4679
7:00 a.m. – 5:00 p.m., Eastern Time, M – F.

ORDER BY MAIL
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

RUSH SERVICE (DO NOT MAIL RUSH ORDERS)
1-800-553-NTIS
RUSH service available for additional fee.

FEDWORLD®
Please call for connect information: (703) 487-4608.

BILL ME
(U.S., Canada, and Mexico only.)
DO NOT USE THIS FORM.
NTIS will gladly bill your order, for an additional fee of $7.50. A request to be billed must be on a purchase order or company letterhead. An authorizing signature, contact name, and telephone number should be included with this request. Requests may be mailed or faxed.

NTIS HANDLING FEE

Value of Order	Handling Fee
$10.00 or less	$2.00
$10.01 – $50.00	$4.00
$50.01 – $100.00	$6.00
Over $100.00	$8.00

Add $2.00 to handling fee for orders sent outside the United States, Canada, and Mexico.

PLEASE PRINT OR TYPE

PRODUCT SELECTION

☐ ORDER CONTINUED ON REVERSE

NTIS PRODUCT NUMBER (ORDERING BY TITLE ALONE WILL DELAY YOUR ORDER)	INTERNAL CUSTOMER ROUTING (OPTIONAL) UP TO 6 CHARACTERS	UNIT PRICE	QUANTITY * PAPER COPY	MICRO-FICHE	MAGNETIC TAPE *	DISKETTE	CD-ROM	OTHER	INTERNATIONAL AIRMAIL FEE (SEE BELOW)	TOTAL PRICE
		$							$	$
		$							$	$
		$							$	$
		$							$	$
		$							$	$

★ CIRCLE REQUIREMENTS	3480 CARTRIDGE	1600 BPI	6250 BPI	LABELING: STANDARD	LABELING: NONLABELED	FORMAT: EBCDIC	FORMAT: ASCII

SUBTOTAL (FROM OTHER SIDE) $

TOTAL $

HANDLING FEE PER ORDER (SEE CHART ABOVE) $

GRAND TOTAL $

PLEASE NOTE
Unless microfiche or other is specified, paper copy will be sent.

Please call the Sales Desk at (703) 487-4650 for information on multiple copy discounts available for certain documents, return policy, and price verification.

Out-Of-Print Surcharge
Effective 4/17/95, an out-of-print surcharge may apply to certain titles acquired by NTIS more than three years prior to the current calendar year; please call to verify price.

International Airmail Fees
Canada and Mexico add $4 per paper copy report; $1 per microfiche copy. Other countries add $8 per paper copy report; $1.25 per microfiche copy. (Paper copy reports and microfiche copies are shipped surface mail unless airmail is specified.)

Thank you for your order!
Prices are subject to change.

U.S. DEPARTMENT OF COMMERCE
TECHNOLOGY ADMINISTRATION

ORDER FORM

NTIS Information is our business.

PLEASE PRINT OR TYPE

PRODUCT SELECTION

SIDE 2

NTIS PRODUCT NUMBER (ORDERING BY TITLE ALONE WILL DELAY YOUR ORDER)	INTERNAL CUSTOMER ROUTING (OPTIONAL) UP TO 8 CHARACTERS	UNIT PRICE	QUANTITY						INTERNATIONAL AIRMAIL FEE (SEE REVERSE)	TOTAL PRICE
			PAPER COPY	MICRO-FICHE	MAGNETIC TAPE *	DISKETTE	CD-ROM	OTHER		
		$							$	$
		$							$	$
		$							$	$
		$							$	$
		$							$	$
		$							$	$
		$							$	$
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		$							$	$
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		$							$	$
		$							$	$
		$							$	$
		$							$	$

* CIRCLE REQUIREMENTS	3480 CARTRIDGE	1600 BPI	6250 BPI	LABELING: STANDARD	LABELING: NONLABELED	FORMAT: EBCDIC	FORMAT: ASCII

SUBTOTAL (ENTER ON OTHER SIDE) $

FREE CATALOGS AND INFORMATION

Call (703) 487-4650 and ask for any of the following free titles or check the appropriate boxes below and mail or fax form to NTIS.

- ☐ PR-827 NTIS Catalog of Products and Services
- ☐ PR-186 Published Search® Master Catalog
- ☐ PR-261 Directory of U.S. Government Software for Mainframes and Microcomputers
- ☐ PR-360-3 NTIS Price Schedule for the U.S., Canada, and Mexico
- ☐ PR-360-4 NTIS Price Schedule for Countries Outside the U.S., Canada, and Mexico
- ☐ PR-629 Directory of U.S. Government Datafiles for Mainframes and Microcomputers
- ☐ PR-746 Directory of Federal Laboratory & Technology Resources
- ☐ PR-758 Environmental Datafiles and Software Catalog
- ☐ PR-797 NTIS Alerts (formerly Abstract Newsletters) – customized current awareness bulletins
- ☐ PR-868 Environment Highlights
- ☐ PR-888 CD-ROMs & Optical Discs Available from NTIS
- ☐ PR-936 FedWorld® – Free Access to the Electronic Marketplace of U.S. and Foreign Government Information

4/95
All previous versions of this form are obsolete

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PR-OFA

United States Environmental Protection Agency
Office of Wastewater Management

September 1996

PIPES

Point Source Information Provision Exchange System

WHAT IS PIPES

The Point Source Information Provision Exchange System (PIPES) is a free, public, electronic Bulletin Board System (BBS) and internet site (WWW compatible!) designed to facilitate the exchange of Office of Water-related information among EPA, states, municipalities, industry, and the public.

PIPES was created by the Office of Wastewater Management (OWM) and is intended solely to further the mission and goals of the U.S. Environmental Protection Agency and its point source permitting programs. PIPES operates virtually 24 hours a day (shutting down for about 10 minutes every night at 3:00 a.m. EST for maintenance activities).

WHAT TO DO ON PIPES

PIPES allows users to:

- Exchange public information with hundreds of environmental professionals
- Select and download any file, or read text files online, including policy documents and guidance manuals
- Send and receive E-Mail to and from PIPES and non-PIPES users **NEW!**
- Search full text by keyword or multiple words; or manually search menus and file directories for specific files
- View and add upcoming water-related conferences, meetings, etc. to a calendar of events **NEW!**
- Download computer program utilities.

TYPES OF INFORMATION ON PIPES

The PIPES BBS includes numerous individual forum areas containing message centers and downloadable files on:

Pretreatment	Wet Weather
Storm Water	Watersheds
NPDES	Mining
Combined Sewer Overflows	Federal Advisory Committees
Sanitary Sewer Overflows	General Water Information
Sewage Sludge	BBS/WWW Utilities.

How to Contact PIPES

Modem BBS: **(703) 749-9216**

NEW! WWW address:
http://pipes.ehsg.saic.com
telnet: pipes.ehsg.saic.com

Who to Contact for Help:

Technical Support: **(703) 821-4697**

NEW! Sysop E-mail: **brad_maguire@cpqm.saic.com**

PIPES users are strongly encouraged to download (from the Utilities directory on PIPES) and install "client2.exe" which provides an interface for operating PIPES in a Windows-based environment either through modem or the internet. Non-internet and non-Windows users should download and install "riptm154.zip" which provides a graphical interface using Riptei

For more information on PIPES, please contact:

Tony Smith
U.S. EPA/OWM
401 M Street, SW
Washington, DC 20460
Telephone: (202) 260-1017
Fax: (202) 260-1156
PIPES User ID: Tony Smith

Equipment Needed to Connect to PIPES

To use the PIPES BBS, users need a computer, a modem (the faster the better) and any necessary cables and telephone jacks to connect the modem to the computer and to the telephone system, and a communications software program.

To access PIPES via the internet, users must have access to the internet (either via a dial-up service or a direct connection). PIPES can be accessed via the internet through a client/server mode (e.g., telnet or rlogin) or WWW navigational software (e.g., Mosaic).

The "Utilities" directory on PIPES contains several freeware communication software programs available for downloading that provide a user friendly interface to the PIPES BBS and are highly recommended.

☆U.S. GOVERNMENT PRINTING OFFICE:1998-623-086/93462

United States
Environmental Protection Agency
4203
Washington, DC 20460

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Penalty for Private Use
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