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Water Enforcement
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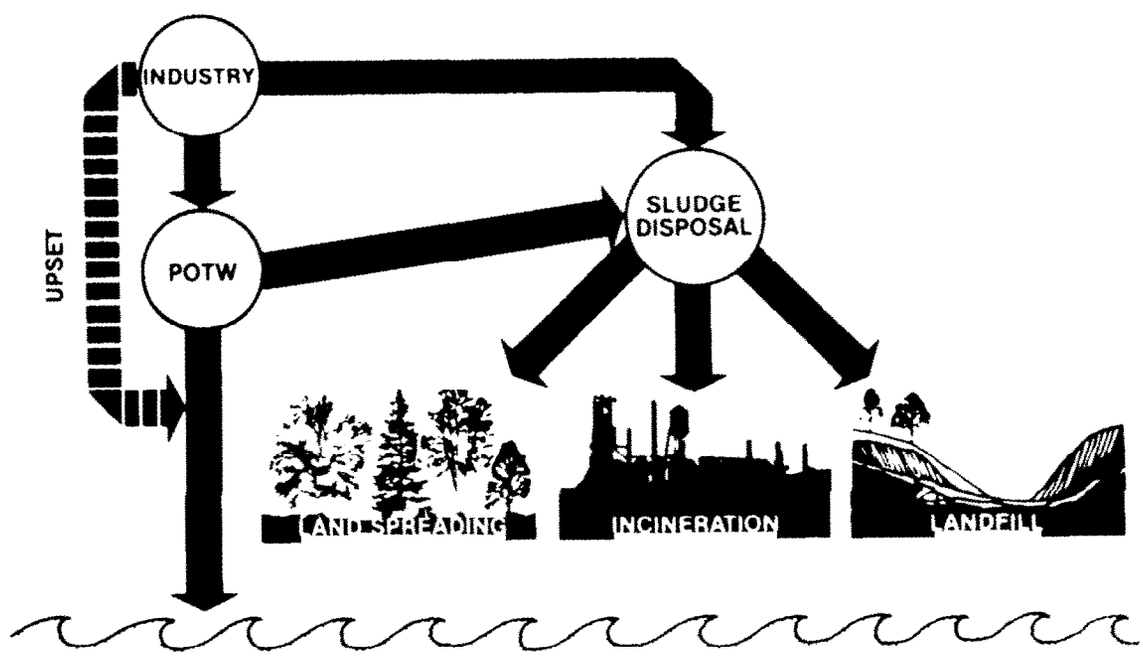
October 1983

EPA

Procedures Manual for Reviewing a POTW Pretreatment Program Submission



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

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Pretreatment Program Guidance

TO: Users of the Procedures Manual for Reviewing a POTW Pretreatment Program Submission

Rebecca W. Hanmer

FROM: Rebecca W. Hanmer
Acting Assistant Administrator for Water (WH-556)

This manual presents the procedures for EPA Regions and approved States to review local POTW pretreatment program submissions. It facilitates the determination whether the submittal contains the data and information required by the General Pretreatment Regulations (40 CFR Part 403), and whether the program is approvable. It provides the reviewers with a suggested separate checklist for reviewing each program element.

EPA Regional offices and States with approved programs must continue their efforts to review and approve local POTW pretreatment programs in their respective geographical areas. The approval of local POTW pretreatment programs is the cornerstone of the Agency's national pretreatment program.

While this approval is critical to the success of the national pretreatment program, Approval Authorities must ensure that all substantive parts of the local pretreatment program are present when the program is approved. Prematurely approving incomplete programs may cause major problems in the future. In instances where a segment of the program is not fully developed when the program is approved, then the Approval Authority and the POTW should publicly document (preferably in writing) that a segment of the program is not fully established and that it will be developed after approval in accordance with an agreed upon time table.

Approval Authorities can use this manual to review and approve any local POTW pretreatment program. However, when using the manual and its checklists, these Authorities must understand that the manual is for guidance and its use must be tailored to the complexity and size of the program under review. A program developed by a small POTW with relatively few industrial users should not be reviewed in the same manner as a program developed by a large POTW with many industrial users. The level of detail and sophistication in the former program will naturally be less than in the latter program. Approval Authorities must bear this fact in mind when using this manual.

I believe that Approval Authority personnel will find this manual to be a useful tool in reviewing local POTW pretreatment program submissions on a consistent basis. As this guidance may be revised periodically to reflect program experience or changes in program regulations, please feel free to write to the Office of Water Enforcement and Permits (EN-336) if you have suggestions on how the guidance may be improved or areas which should be addressed. Thank you.

PROCEDURES MANUAL
FOR
REVIEWING A POTW
PRETREATMENT PROGRAM SUBMISSION

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October 1983

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ACKNOWLEDGEMENTS

This document was prepared with guidance from EPA Headquarters, Office of Water Enforcement and Permits and EPA Regional Offices. The State of Maryland Water Resources Administration and New York State Department of Environmental Conservation participated as peer reviewers and provided valuable comments which have been incorporated into this document. This Procedures Manual was prepared by JRB Associates under EPA Contract No. 68-01-6514.

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1. INTRODUCTION

1.1 PURPOSE OF THIS MANUAL

This document has been prepared to assist States and EPA Regional Offices in reviewing local pretreatment program submissions. It is intended to provide a framework for the review of local programs as well as general criteria for evaluating these programs. The document can also serve as a starting point for States to develop individualized checklists for review of local programs under their jurisdiction, if such checklists have not yet been developed.

A successful pretreatment program cannot be developed without adequate legal authority, technical information, implementation procedures, and resources. Each of these elements is essential in a successful program, and the pretreatment program submission must demonstrate that all are present if it is to be approved. A separate chapter in this manual is devoted to each element. Each chapter contains:

- A summary of pertinent regulatory requirements
- A discussion of key items that should be included in the submission
- General guidelines and criteria for assessing the adequacy of the approaches proposed by the POTW
- A checklist to aid the reviewer in evaluating completeness and adequacy.

The focus of the review is to determine that the program not only meets regulatory requirements, but also that it will function well once it is implemented.

A majority of the regulatory requirements associated with a local pretreatment program are addressed in the legal authority chapter. Other chapters identify activities, staff roles, and program items that are most likely to be included in a well-planned program.

1.2 HOW TO USE THIS MANUAL

Each of the four checklists is intended to be photocopied and used in actual reviews. Agencies using these checklists may wish to separate the various sections and delegate portions of the review to individuals who have expertise in the appropriate areas. For example, a review of the technical information chapter may be assigned to an engineer. A lawyer may be assigned the task of reviewing the legal authority chapter, while someone with management or administrative experience might be responsible for reviewing the program implementation and resources sections of the submission. Each checklist allows the reviewer to indicate whether the section as a whole adequately satisfies Federal requirements, and to sign or initial this decision.

Not every item on a checklist must necessarily be included in the submission to satisfy Federal requirements for an approvable program. Optional items are recommended on the checklists for a more comprehensive pretreatment program, but these items are not required. The review must be flexible, since the features necessary to operate a pretreatment program in a large community may not be necessary or appropriate for a smaller one with few industrial users. Where tables have been included in this manual to identify levels of staff and costs associated with operating a program, they are intended to be used as general guidance for the reviewer, not as rigid requirements for the program submission. Program approval must ultimately be based on the best professional judgement of the reviewer.

To make this manual most useful, the reviewer should be familiar with its companion document, Guidance Manual for POTW Pretreatment Program Development. The Preparation Manual is intended to assist municipalities in developing their pretreatment programs and in preparing their program submissions. It is important for the reviewer to understand both the objectives that the local program is designed to achieve, and the process followed by a POTW in developing its program.

1.3 COMMENTING ON PROGRAM SUBMISSIONS

A pretreatment program submission may be inadequate in some areas. Inadequacies can be expected because the level of guidance and expertise available to POTWs developing pretreatment programs varies across the country. The reviewer should look upon weaknesses in a submission not as a problem, but as an opportunity to give constructive guidance to the POTW authorities. Comments should be designed to assist a particular POTW in preparing an approvable submission, not simply make the submission package look good or enable the POTW to comply quickly with a deadline.

The reviewer should point out specific weaknesses in the submission to the POTW and offer suggestions to correct these weaknesses. By providing clear and specific comments to the POTW, the reviewer can save the POTW time in revising its submission. Written comments should be provided to the POTW to ensure clarity, perhaps by sending a copy of the checklist with an explanatory cover letter that outlines the submission's inadequacies. The EPA Regional Offices have a number of guidance documents, such as the Preparation Manual, that contain information useful to a POTW developing its pretreatment program. These documents (or relevant portions of them) could be attached to the cover letter and sent to the POTW as additional assistance in program development. Appendix A lists several guidance documents relevant to program development.

The agency's review of a program submission should be complete before it is transmitted to the POTW. All comments and questions should be sent to the POTW at one time. The POTW should have a reasonable time period within which to respond to the comments. If better documentation only is needed to complete the submission, a few weeks will probably be sufficient. However, if major areas were not addressed (such as sampling and analysis, or local pollutant limits), as is often the case in first submissions, many months may be needed to develop the required information.

2. LEGAL AUTHORITY

The ability to develop and implement a successful pretreatment program depends upon the existence of adequate legal authority. Since program implementation and control rest with local government, it is important that legal authority be present at this level. The POTW must be able to respond to challenges by industrial users, to protect its investment in the treatment plant, to ensure the beneficial uses of its waters, and to protect the health and welfare of its citizens.

The legal authorities needed to implement a pretreatment program are listed in 40 CFR 403.8(f)(1). In summary, a POTW must be able to:

- Deny or condition new or increased contributions of pollutants, or changes in the nature of the pollutants discharged to the POTW
- Require compliance with applicable pretreatment standards and requirements by industrial users
- Control, through permit, contract, or other means, the contribution to the POTW by each industrial user
- Require the development of a compliance schedule by each industrial user, and the submission of all notices and self-monitoring reports as necessary to assure compliance
- Carry out all inspection, surveillance, and monitoring procedures to determine compliance, independent of information supplied by the industrial user
- Obtain remedies for noncompliance, including the ability to seek injunctive relief, seek civil or criminal penalties, and/or collect liquidated damages
- Comply with the confidentiality requirements and limitations on data restrictions specified in 40 CFR 403.14.

To document these authorities, the materials submitted by the POTW must include a statement from the city solicitor or comparable official, and copies of all pertinent statutes, ordinances, and related material.

Determining the adequacy of a POTW's legal authorities requires a two-part review. First, the submission must be reviewed to ensure that it is complete. Second, if the submission is complete, the individual items must be reviewed in more detail to determine that the legal authorities are adequate. The checklist for evaluating legal authority is divided into two parts to facilitate this review. The remaining sections of this chapter explain how to use the checklist, and how to evaluate each of the items on the checklist.

2.1 SUBMISSION COMPLETENESS

2.1.1 Relevant Regulations

40 CFR 403.9(b) identifies the information that must be submitted to document legal authority, including:

1. A statement from the city solicitor or a city official acting in a comparable capacity (or the attorney for those POTWs which have independent legal counsel) that the POTW has authority to carry out the program.

2. A copy of any statute, ordinance, regulation, contract, agreement, or other authority that will be relied upon by the POTW to administer the program.

3. A statement reflecting the endorsement or approval of local boards or bodies responsible for supervising and/or funding the program.

2.1.2 Evaluation of Completeness

Part I of the Legal Authority Checklist is designed to evaluate completeness. The final pretreatment program submission should be reviewed to ensure that all of the items listed above are included. If they are not, the reviewer should notify the POTW that the submission is incomplete, noting the specific deficiencies.

To determine that statements of all local boards/bodies are present, the reviewer may first refer to the organizational portion of the submission to identify the local boards/bodies involved in the program. It is also a good idea to check the technical information portion of the submission because data

from the industrial waste survey, service area description, or maps might indicate participation by other jurisdictions. In several cases, a check of the letterhead has also identified other boards/bodies.

Finally, if any of the legal authorities cited are discretionary on the part of an official, the reviewer should look for a statement endorsing the program by that official. While such an endorsement is not mandatory, it is highly desirable. This endorsement is separate and distinct from the "funding endorsement."

Having completed this review, the next and more difficult step is to review the adequacy of the documentation itself. While the documentation may be complete, even extensive, the requisite legal authority may not be present. Conversely, legal authority may be adequate, but poorly documented due to a lack of understanding.

2.2 EVALUATION OF ATTORNEY'S STATEMENT

2.2.1 Relevant Regulations

40 CFR 403.9(b)(1) requires a statement from the POTW attorney, city solicitor, or another city official acting in a comparable capacity. The individual who signs this letter should be the person who is responsible for bringing an enforcement action in court. An acceptable statement must identify:

1. The provision of the legal authority under section 403.8(f)(1), which provides a basis for each procedure under section 403.8(f)(2)

2. The manner in which the POTW will implement the program requirements set forth in section 403.8, including the means by which pretreatment standards will be applied to individual industrial users (e.g., by order, permit, ordinance, contract, etc.)

3. How the POTW intends to ensure compliance with pretreatment standards and requirements and to enforce them in the event of noncompliance by industrial users.

It is important to keep in mind the following:

- The statement must cite the provision of the POTW's legal authority that fulfills each 403.8(f)(1) requirement, be it in the sewer use ordinance, city code, or some other document
- If the legal authority for each 403.8(f)(2) procedural requirement is not clear, the statement should elaborate on where the requisite authority lies
- Whatever legal authorities exist in the permit, contract, etc., should also be cited
- The statement must specify the legal remedies that will be used to ensure compliance with pretreatment standards and to enforce against violators.

2.2.2 Evaluation of Statement

Part I of the Legal Authority Checklist is also used to evaluate the attorney's letter. In evaluating an attorney's statement, look for evidence that the attorney understands the scope of the POTW's pretreatment program. Three basic questions should be answered in the evaluation:

(1) Does the statement identify the provision of legal authority for each procedural requirement under 403.8(f)(2)?

The attorney's letter must specifically refer to the basic statutory authority for the entire program (usually a provision in State law authorizing the municipality to enact certain local ordinances or to enter into contracts), and cite particular ordinance (or contract or permit) provisions for each authority listed in 403.8(f)(1). Where this has not been done or where the cited provisions are found to be inadequate, the reviewer should note the insufficiencies and a letter asking for clarification should be sent to the attorney. Copies of this letter should also be sent to the POTW, EPA, and/or the State. Any clarification received should be reviewed for completeness and inserted into the submission package.

(2) Does the statement identify the manner in which pretreatment program requirements of 403.8 will be implemented?

The attorney must state the control mechanism(s) to be employed in applying pretreatment standards to industrial users. These include permits,

contracts, ordinance provisions, and orders, among others. Most attorneys' statements will not contain a detailed listing of 403.8 procedures, and this is not necessary. A general description of the procedures and relevant control mechanism(s) is sufficient--provided the submission contains detailed descriptions elsewhere. Often, the attorney's statement will simply refer to the appropriate portions of the submission. This is acceptable if the submission itself is found to be adequate. If it is not, the attorney, POTW, and other parties (e.g., EPA, State) should be notified of the problem with the submission.

(3) Does the statement identify how the POTW intends to ensure compliance?

A detailed explanation of compliance procedures does not necessarily have to appear in the attorney's statement as long as these procedures are described elsewhere in the submission. If the attorney's statement refers to such a description or generally describes enforcement procedures that will be followed, this portion of the statement should be judged adequate. However, if enforcement is the responsibility of more than one jurisdiction, the statement must explain how the POTW will ensure that the other jurisdictions carry out their responsibilities, typically through a joint powers agreement (see Section 2.4, Multijurisdictional Submissions, if more information is needed or desired to make a determination). The statement should specify remedies available in the event such an agreement is breached. A letter from the attorney for each jurisdiction is required.

2.3 LEGAL ADEQUACY

2.3.1 Relevant Regulations

The legal authorities required for a local pretreatment program are listed in 40 CFR 403.8(f)(1) and summarized in the introduction to this chapter (page 2-1). Each is discussed in turn below.

2.3.2 Evaluation of Adequacy

The reviewer should look first for a reference to the State law authorizing a municipality to enact an ordinance controlling use of the public sewer

system and treatment plant. In some situations, several municipalities may join in an agreement forming a new entity to operate and control a POTW and its users. The terms of such an agreement must be examined to determine the new entity's powers and to ensure that State law authorizes these powers.

Part II of the Legal Authority Checklist is used to assess the adequacy of the authorities available for a POTW's pretreatment program. The required legal authorities may be contained in a sewer use ordinance, joint powers agreement, series of contracts, local regulations, or a combination of these documents. Pretreatment programs that include many jurisdictions must contain legal documentation from each participating jurisdiction.

The submission must show that the POTW has authority to:

(1) Deny or condition new or increased contributions

A POTW must have the power to regulate the discharge of pollutants which may cause pass-through, interference, or sludge contamination problems, or may exceed Federal categorical standards. Any ordinance or other written manifestation that provides authority to effectively control such discharges by industrial users will satisfy this requirement. The reviewer should look for a general prohibition of unauthorized (unpermitted) discharges and the authority to deny or place conditions on discharges that change in character or volume (e.g., a permit that can be modified upon notice of changed discharges). It is recommended that a POTW require an industrial user to provide timely notice of any substantial change in the quantity or quality of its industrial waste discharge.

(2) Require compliance with applicable pretreatment standards

The POTW must be able to prohibit the introduction of pollutants into the system which pass through or interfere with the operation or performance of the treatment works. To accomplish this, the POTW must be able to enforce:

- General prohibitions against interference and pass-through
- The five specific prohibitions listed under 403.5(b)

- Any local limits developed to implement the general and specific prohibitions
- National categorical pretreatment standards as they are promulgated.

The POTW must be able to require compliance with national categorical pretreatment standards as they are promulgated. This prohibition should be spelled out in the ordinance. The ordinance should explicitly reference Federal pretreatment regulations and standards as an indication that these standards have been fully incorporated and made enforceable by the ordinance. Since not all of the national categorical standards have been promulgated, it is unlikely that a complete list of the standards will be included in an ordinance. Authority is adequate if the ordinance states that national categorical standards will apply to industrial users once such standards are promulgated, or that such standards will be imposed as a permit or contract condition.

When operational problems arise, POTW officials must have the legal authority to impose or revise local effluent limits to correct the problem. Any generic authority to establish specific effluent limits is adequate. Ordinance language indicating that local effluent limits may be made more stringent than prevailing Federal standards in order to meet the POTW's NPDES permit limitations or State water quality standards is recommended, but not required.

Another operational problem that must be considered is sludge contamination, which often limits disposal options. This concern stems from the Federal pretreatment regulations which define a POTW interference to encompass any discharge that prevents sludge use or disposal in accordance with Federal, State, and local laws. Accordingly, either the ordinance definition of interference or effluent limits set in the ordinance should effectively prohibit discharges which prevent proper sludge use or disposal.

Usually prohibited discharge standards are spelled out in an ordinance. If they are not, authority may be adequate so long as the prohibitions can and will be imposed as permit or contract conditions. General language is

sufficient for prohibited discharge standards. Numerical limits are not mandatory, for example, in defining explosive discharges. Since similar questions often arise in reviewing programs, a few special cases are discussed here for guidance. Where an industrial user end-of-pipe heat limitation is set at a temperature higher than 104°F (as is often the case), the POTW should demonstrate, as part of its technical submission, that the higher end-of-pipe heat limitation will not cause the treatment plant influent temperature to exceed the prohibited discharge standard of 104°F. In addition, it is preferred that the dilution prohibition and the accompanying authority to impose mass effluent limits be explicit in the POTW ordinance, and that these authorities be extended to noncategorical industrial users.

Sometimes ordinances allow POTWs to establish special agreements with industrial users to accept industrial waste discharges which otherwise do not conform to effluent limits contained in the ordinance. Such provisions must not allow the waiver of national pretreatment standards. Local standards may be waived, but national pretreatment standards may not, unless such a waiver is granted by mechanisms established under the General Pretreatment Regulations (such as removal credits, fundamentally different factors variances, or net/gross calculations).

(3) Control through permit, contract to ensure compliance

The POTW must be able to control the discharge of each industrial user. This individual control can be accomplished by a permit that allows discharges conforming to the standards set forth or by contract where the POTW provides its services subject to agreed upon terms and conditions (similar to permit provisions). An order to an industrial user is another acceptable technique. Each of these approaches establishes a legal framework that controls the volume and constitutents discharged, and establishes penalties for noncompliance.

For larger systems, the establishment of a discharge permit system to administer and enforce pretreatment standards and requirements is strongly recommended. It should be noted that the regulations imply the use of a

discharge permit, not a connection permit. A connection permit merely allows individuals to hook up to the sewer system, and is similar to a building license or construction permit. A discharge or sewer use permit regulates continuing use of the sewer system and imposes conditions on discharges to the system. Once adopted, a permitting mechanism should contain the following components:

- Permit application - used to collect pertinent data; often appended to final industrial discharge permit
- Limited duration - preferably no more than five years; allows periodic review of discharge conditions
- Non-transferability - any transfer of a discharge permit must, at a minimum, be subject to POTW approval
- Modification - allows incorporation of categorical standards and any specific effluent limits necessary to correct operational problems at the POTW; useful in dealing with noncompliance
- Conditions - conditions for discharge should be clearly stated in the discharge permit
- Revocation - excellent enforcement tool; permit system can be used effectively to enforce against detrimental activities besides illegal waste discharges (e.g., falsification of self-monitoring reports, tampering with monitoring equipment and methods, refusal to allow timely access to industrial premises, etc.).

A discharge permit system should allow adequate flexibility in altering discharge conditions to correct any operational problems at the POTW or to reflect changes in environmental regulations. An industrial discharge permit should never grant excessive legal right to pollute, as may occur, for example, if permits are issued for indefinite duration or made freely transferable without the need for POTW approval.

(4)(a) Require development of compliance schedules for installation of technology

A POTW must have the authority to establish and enforce deadlines for the installation by an industrial user of any treatment facilities needed to meet applicable pretreatment standards. "Compliance schedules" should either be

specifically mentioned in the ordinance or be imposed under some broad authority (e.g., permits). The authority to require installation of pretreatment technology and impose in a permit any conditions necessary to ensure compliance with the ordinance is adequate. These conditions should include time limits that ensure progress is being made in discrete steps.

(4)(b) Require submission of notices and self-monitoring reports

The POTW must be able to require the five reports listed in 403.12 and any reports listed separately as part of a categorical standard, including:

- Baseline monitoring reports
- Compliance schedule progress reports
- Compliance report on categorical standards deadlines
- Periodic reports on continued compliance
- Notice of slug loading.

The reviewer should look in the ordinance (or contract) for either a detailed description of the reports or a provision stating that reporting will be required at a particular official's discretion or as a permit condition. If the ordinance actually details what the reports will contain, the reviewer must ensure that the reports required by the ordinance meet the specifications listed in 403.12.

A POTW must also have the authority to require industrial users to provide prompt notification upon the discharge of any slug load or accidental discharge which may contribute to an interference at the treatment plant. In addition, it is recommended that a POTW establish penalties for any action taken by an industrial user which affects the integrity of monitoring procedures, such as falsifying self-monitoring reports or tampering with monitoring equipment and methods.

(5) Carry out inspection, surveillance, and monitoring procedures

A POTW must have the authority to enter industrial premises for the purposes of inspecting, sampling and monitoring industrial waste discharges, and

reviewing any records required to be kept onsite. POTW officials must be allowed to enter the premises at any reasonable time, not just during normal working hours. This additional flexibility may be necessary for handling emergency situations, suspected illegal nonwork hour discharges, and cases of suspected tampering with monitoring equipment. No language in a POTW ordinance shall require the POTW to afford prior notice of inspection, sampling, and monitoring activities. Although prior notice may be given to ensure cooperation, it is not always a good idea because it may enable the user to alter conditions being investigated.

The checklist identifies several items that might be included in the right to inspect. It is not important for the ordinance to specifically list these things so long as they are permissible interpretations of a given authority. The reviewer should beware of any language limiting the right of an inspector to enter any premises where effluent sources, treatment systems, or records are located (e.g., process investigation restrictions or limitations on access to records). A POTW must also have the authority to require industrial users to install, use, and maintain monitoring equipment that enables effective self-monitoring by the industrial user and compliance monitoring by the POTW.

(6)(a) Obtain remedies for noncompliance

Two remedies for noncompliance must be available: injunctive relief, and civil or criminal penalties. An injunction may be necessary to prevent irreparable harm to the treatment plant, to the health and safety of plant workers and other individuals, or to the environment--those situations where damages at law would not be an adequate remedy. Injunctive relief might not be specifically mentioned in the sewer use ordinance. It might still be available, however, as a matter of common law. In such a circumstance, the attorney should explain precisely how the POTW can seek injunctive relief.

Where a POTW has police powers, it must establish the authority to enforce civil or criminal penalties against industrial users that violate pretreatment standards or requirements. An ordinance provision granting a

POTW the authority to impose a penalty or fine of at least $300/violation/day constitutes an adequate civil or criminal penalty for the purposes of this requirement. EPA regulations specify that, where State law does not permit a municipality to impose civil or criminal penalties, the municipality must enter into contracts that provide for liquidated damages for a violation of pretreatment standards and requirements. This type of contract should be avoided if at all possible for two reasons. First, courts generally do not enforce penalty clauses in contracts. A liquidated damages clause is likely to be perceived as a penalty substitute and therefore held unenforceable. Second, even if the clause is held enforceable, most POTWs would not want to be limited in the amount recoverable for actual plant damages caused by an illegal discharge. The establishment of an administrative/adjudicative mechanism (e.g., show-cause hearing) to resolve conflicts between industrial users and the POTW is also recommended.

(6)(b) Authority to immediately and effectively halt or prevent any discharge

A POTW must be able to halt immediately any actual or threatened discharge which may present an imminent or substantial endangerment to the health and welfare of persons or the environment, or cause interference with the treatment plant's operation. An ordinance can provide this authority by allowing the POTW to suspend wastewater treatment service and/or discharge permits in such situations, and by requiring the discharger to immediately stop or eliminate the contribution upon notification of the suspension. The ordinance should further provide that if the discharger fails to comply voluntarily with a suspension order, the POTW may take any steps necessary, including severance of the sewer connection, to prevent further discharge. If the ordinance does not provide such authority, it may still be available as a valid exercise of police powers. The POTW attorney should explain emergency procedures in his statement.

(7) Comply with confidentiality requirements

While a POTW may establish procedures to protect confidential data, it must be able to release effluent data to the public. Effluent data as defined

in 40 CFR 2.302 must be available to the public without restriction. Effluent data include:

- Information necessary to determine the identity, amount, frequency, concentration, temperature, or other characteristics of any pollutant discharged
- A description of the manner or rate of operation of any source to the extent necessary to determine what was discharged under an applicable standard or limitation
- A general description of the location and nature of the source to the extent necessary to distinguish it from others.

Data or information on research, products, processes, and methods can be protected to a large extent and need only be released if necessary to disclose that a source is in or out of compliance or to allow a determination of feasibility/attainability of a standard or limitation. Information that is proprietary, a trade secret, or business confidential can be withheld provided it is not "effluent data" as defined above.

2.4 MULTIJURISDICTIONAL SUBMISSIONS

POTWs often serve more than one political jurisdiction. In these instances, the agency or entity holding the NPDES permit for the discharge of municipal wastewater has primary responsibility to enforce pretreatment standards throughout the entire geographical area served by its conveyance and treatment system. A sufficient ordinance/resolution or regulation and pretreatment program must be in place for each industrial user within the treatment plant's service area.

This requirement may or may not present a problem, depending upon how the POTW is structured. If a special sewer district encompassing the entire service area has been created, and the sewer district has rulemaking authority sufficient to implement a centralized pretreatment program, there is no problem. The typical case, however, involves municipal POTWs which service industries lying beyond the municipal boundaries and thus beyond the reach of municipal ordinances. A mechanism to control the discharges of these industries should be established. In order to control the discharges of such

industries, there must be either: (1) an agreement between the POTW and the outlying jurisdiction where the industry is located (this agreement should specify that the outlying jurisdiction will enforce the POTW's requirements or else allow the POTW itself to undertake enforcement); or (2) a contract between each industry and the POTW which conditions the industry's receipt of sewer service upon compliance with the POTW's requirements.

It is recommended that the POTW and each outlying jurisdiction with a categorical or significant industrial user enter into an interjurisdictional pretreatment agreement. This agreement should address the following:

- Ordinance or regulation
- Local discharge limit mechanism
- Pretreatment program administration
- Records transference
- Inspection and sampling authority
- Enforcement.

In its final pretreatment submission, the POTW should include:

- The ordinance/resolution or regulation for each jurisdiction involved
- The POTW's pretreatment agreements with the contributing jurisdictions.

Each ordinance should be evaluated individually for the required legal authorities discussed in Section 2.3. It will be necessary for the reviewer to complete a Legal Authority Checklist for each jurisdiction served.

2.5 LEGAL AUTHORITY CHECKLIST

The Legal Authority Checklist (Worksheet 1) is divided into two parts. Part I is designed to cover submission completeness, while Part II covers legal adequacy. Both parts reference the applicable sections of the Federal pretreatment regulations.

Worksheet 1
Legal Authority Checklist

Name of POTW
Date

	Yes	No	Section of POTW's Submission
PART I. Submission Completeness Checklist (Legal Aspects)			
A. 40 CFR 403.9(b) requirements for submission:			
(1) Does the submission contain a statement from the city solicitor, POTW attorney, or other official?	___	___	
(2) Does the submission contain a copy of every legal authority source cited in the attorney's statement or necessary for program implementation? (e.g., ordinances, contracts, statutes, joint agreements, permits, regulations, etc.)	___	___	
(3) Does the submission contain endorsements from all local boards/bodies responsible for supervising/funding the pretreatment program?	___	___	
*(4) If any of the legal authorities cited are vested in a particular official's discretion, is there a statement of endorsement from such official?	___	___	
B. 40 CFR 403.9(b)(1) requirements for attorney's statement:			
(1) Does the statement identify the provision of legal authority for each requirement under 403.8(f)(2)?	___	___	
(2) Does the statement identify the manner in which 403.8 program requirements will be implemented?	___	___	
(3) Does the statement identify how the POTW intends to ensure compliance?	___	___	
C. If the POTW service area includes more than one agency, jurisdiction, government, or body, does the submission include all ordinances, resolutions, regulations, service agreements and other legal documents relevant to the analysis of multijurisdictional issues? (Use separate Part II forms for each jurisdiction.)	___	___	
PART II. Legal Adequacy [403.8(f)(1)]			
Does the POTW have the authority to:			
A. Deny or condition new or increased contributions of pollutants? [403.8(f)(1)(i)]	___	___	
B. Require compliance with applicable pretreatment standards? [403.8(f)(1)(ii)]	___	___	
(1) General prohibitions: pass-through, interference [403.5(a)]	___	___	

Name of POTW
Date

	Yes	No	Section of POTW's Submission
(2) Specific prohibitions [403.5(b)]:			
• Fire/explosive hazard?	___	___	
• pH/corrosion?	___	___	
• Solid or viscous - obstruction/interference?	___	___	
• Flow rate or concentration to cause interference?	___	___	
• Heat - treatment plant influent 40°C (104°F)?	___	___	
(3) Locally developed limits? [403.5(c) and (d)]	___	___	
(4) National categorical standards? [403.8(f)(1)(ii)]	___	___	
C. Control through permit, contract, etc., to ensure compliance? [403.8(f)(1)(iii)]	___	___	
D. Require development of compliance schedules and submission of reports? [403.8(f)(1)(iv)]			
(1) Development of compliance schedules for installation of technology?	___	___	
(2) Submission of notices and self-monitoring reports including 403.12 requirements (baseline report, compliance schedule progress report, report on final compliance with categorical pretreatment standards, periodic reports on continued compliance, notice of slug loading)?	___	___	
E. Carry out inspection, surveillance, and monitoring procedures: [403.8(f)(1)(v)]			
(1) Right to enter premises at any reasonable time?	___	___	
(2) Right to inspect generally for compliance?	___	___	
(3) Right to sample?	___	___	
(4) Right to require installation of monitoring equipment?	___	___	
(5) Right to inspect and copy records [403.12(n)]?	___	___	
F. Remedies for non-compliance by industrial users? [403.8(f)(1)(vi)]			
(1) Obtain remedies for noncompliance:			
• Injunctive relief?	___	___	
• Are the civil or criminal penalties sufficient to bring about compliance, or act as a deterrent?	___	___	
(2) Halt immediately and effectively any actual or threatened discharge?	___	___	
G. Comply with confidentiality requirements (protection of public access to effluent data)? [403.8(f)(1)(vii)] [403.14]	___	___	

Worksheet 1
Legal Authority Checklist (Continued)

Name of POTW
Date

	Yes	No	Section of POTW's Submission
H. Form special agreements (waivers):			
(1) Does the ordinance contain a special agreement clause?	___	___	
(2) If yes, does this special agreement clause specifically exclude the waiver of Federal categorical pretreatment standards?	___	___	
I. Control extra-jurisdictional agencies, and industries which contribute industrial wastewaters to the POTW?	___	___	

*Indicates item is recommended, but not mandatory.

I have reviewed this submission in detail and have determined the legal authority to be:

(_____) Adequate (_____) Inadequate

Date: Reviewed by:

(Name)

3. TECHNICAL INFORMATION

Sound technical information is necessary to develop and implement a successful pretreatment program. Although the information available to a POTW will increase and improve in accuracy once the pretreatment program is underway, the submission should contain sufficient, valid technical data to demonstrate that:

- All industries discharging pollutants which may adversely impact the collection system or treatment works have been identified
- The pretreatment program (particularly procedures) is designed to control the number and type of industrial users discharging to the system
- Local effluent limits are adequate to protect the POTW and enable compliance with its NPDES permit.

Without this information, the ability to achieve the objectives of a pretreatment program may be questioned.

This chapter focuses on evaluating the completeness and adequacy of the technical information upon which the local program is based. Two major elements will be assessed: (1) the industrial waste survey (IWS), the method by which a POTW gathers relevant data on its industrial users, and (2) the local effluent limits developed to prevent industrial discharges that might interfere with POTW operations or cause permit violations. A checklist is provided to assist the reviewer in determining the completeness and adequacy of the documentation provided in the submission.

3.1 INDUSTRIAL WASTE SURVEY

40 CFR 403.8(f)(2) requires a POTW to identify and locate all possible industrial users that might be subject to the pretreatment program and to identify the volume and character of pollutants discharged to the treatment plant. The objective of these requirements is to ensure that the pretreatment program includes those industries which can potentially cause pass-through, interference, or sludge contamination problems. The program submission must

demonstrate that these requirements have been met. A suggested method to gather this required information involves the following steps:

- Develop a list of potential industrial users
- Eliminate industrial users that are not problems
- Survey remaining industrial users to gather pertinent data
- Follow up as necessary to ensure adequate response
- Compile and evaluate information collected.

While variations from this generic approach are acceptable, most approvable submissions will include these elements.

3.1.1 Adequacy of the Survey Master List

The pretreatment program submission should include a master list of all industrial users discharging to the treatment plant. The sources used to develop this list should be documented, such as:

- Water use and billing records
- Sewer connection permits
- Business license records
- Chamber of Commerce rosters
- Local telephone directory
- Utility company records
- Property tax records
- Other standard listings of industrial firms.

Lists based on current water use, sewer permits, and license records are usually very complete. If these are not available, several different sources may be needed to develop a comprehensive master list. In determining the adequacy of the sources, the reviewer should examine critically the type and number of sources used. A small POTW with few industrial users will often know its users well. In such a case, the sources used to develop the master list are not critical. However, for a large POTW, this would not necessarily be the case, and sources should be carefully reviewed.

Since the sources above may include insignificant industries, the POTW will often establish criteria for eliminating industries from the list. These criteria should be valid and should be documented in the pretreatment program submission. For example, valid criteria for exclusion could include:

- A manufacturing operation which does not generate wastewater (dry manufacturing process)
- A direct discharger
- A discharger of sanitary wastewater only.

In reviewing the exclusion rationale, it is important to determine which industries were eliminated from the list and why they were eliminated. The reviewer should determine (based upon experience with similar operations) whether any of the eliminated industries might potentially affect the treatment plant. If this is the case, the POTW should be notified of the concern.

3.1.2 Thoroughness of Survey Questionnaire

The POTW should gather discharge information from all industries on its master list. The submission should identify the procedure used to gather information. This procedure might include:

- Questionnaires mailed to industries
- Telephone calls
- Visits to industries
- Information already on file at POTW.

The submission should also provide the date of the industrial waste survey. Survey information should be as current as possible, and preferably no more than three years old.

It is satisfactory for a small POTW with few industries to use telephone calls or site visits to survey its industries. This is usually not feasible for a larger system with many industrial users. Most large POTWs use questionnaires to collect survey information. It is helpful for the submission to

include a copy of the questionnaire, although this is not required. If included, the questionnaire should be reviewed to determine whether it requests sufficient information to establish a basis for local limits development and the compliance monitoring program. The questionnaire should be easy to read and understand. It should require the signature of an official authorized to sign for the company, as well as the name of a company representative who can be contacted by the POTW to arrange site visits for inspection and monitoring.

Information requested from industrial users, whether by questionnaire, phone call, or visit, should be described. At a minimum, the following information must be requested:

- Name of industry
- Address of facility
- SIC code(s) or expected classification
- Wastewater flow (or water consumption rate if flow is not known)
- Quantities and concentrations of pollutants discharged
- Major products manufactured or services supplied
- Description of onsite pretreatment facilities and practices.

Although not required, it is recommended that the following information also be requested:

- Locations of discharge points
- Raw materials used or stored at the site
- Flow diagram or sewer map for the industry
- Description of current wastewater treatment practices
- Number of employees
- Operation and production schedules.

A POTW which already has an existing pretreatment program may possess files containing information normally gathered by a survey. If the information is current and includes both industrial classifications and pollutant concentration/quantities, an additional survey may not be needed.

3.1.3 Response to Survey

The submission should describe the survey's comprehensiveness by including the number and percentage of industrial users responding to the survey. It should also include a detailed description of follow-up procedures used to obtain information from industries which either failed to respond or returned incomplete surveys. Follow-up measures would most likely include letters of reminder, telephone calls, and/or site visits. A response rate of less than 80 percent will most likely hinder the establishment of an effective program. At lower rates, there would be less confidence in extrapolating survey results, since major classes of dischargers will probably be omitted or inappropriately represented.

3.1.4 Completeness of Summary Information

Unless the State or EPA specifically requests the inclusion of all responses to the industrial waste survey, it is not necessary that they be included in the submittal. It is usually more valuable to have the results of the survey summarized. Results should be tabulated in a format that includes the number of industries in specific SIC categories and the quantities of specific pollutants entering the POTW system. This format will enable the POTW to more easily identify industries which will be subject to categorical standards and industries discharging pollutants controlled by local standards.

Appendix C provides the reviewer with information concerning the 25 categorical industries. Table C-1 indicates which pollutants are commonly discharged from each category of industries. Table C-2 lists those categories or subcategories which have been excluded from regulation and Table C-3 contains a listing of SIC codes for industries affected by the categorical standards.

The summary data should be reviewed to determine whether the POTW has full knowledge of the nature and extent of pollutant discharges affecting the plant. This summary should demonstrate that sufficient information is available to provide a sound foundation for all subsequent program development activities.

3.2 LOCAL EFFLUENT LIMITS

40 CFR 403.5(c) requires the POTW to develop and enforce local effluent limits to ensure that:

- Pollutants discharged by industrial users do not pass through or interfere with the operation and performance of the treatment plant
- Prohibited discharges (i.e., heat, explosive/fire hazards, corrosive agents, etc.) are avoided.

Local effluent limits must not be developed and enforced without providing individual notice and an opportunity to respond to any affected party requesting such notification.

In order to demonstrate the adequacy of local limits, the program submission should include the technical information on which these limits are based. This information includes operation and maintenance data, a description of current sludge disposal practices, and the nature and extent of sampling activities. It is not adequate to adopt, without any rationale, literature values or values from other POTW ordinances as local limits. Unique characteristics at each POTW should preclude the uniform application of literature values.

Furthermore, it is not acceptable to have a pretreatment submission without any numerical limits. A pretreatment program is not in force in the absence of limits, since limits supply the benchmark against which all noncompliance enforcement activities will be measured. Without specific limits, monitoring will have very little meaning since the POTW will have no way of knowing whether a violation exists. If a violation does develop, there would be no basis for enforcement. As a result, limits on industrial pollutants, including those limits that can be currently met by industry without any treatment or in-plant control, are a minimum requirement.

The major steps toward establishing local effluent limits include:

- Identifying industrial pollutants entering the treatment system
- Identifying past POTW operating problems
- Sampling and analyzing to determine fate and effect
- Developing numerical limits.

The first step was discussed in Section 3.1. The remaining steps will be discussed in the following sections. The intent is to provide the reviewer with guidelines to ascertain the adequacy of the information presented.

3.2.1 Identification of Past POTW Operating Problems

It is important for the reviewer to determine whether the POTW has taken adequate steps to identify operating problems known or suspected to have been caused by industrial discharges. At a minimum, these steps would include a review of operating records to identify the frequency of treatment plant upsets and NPDES violations. The submittal should indicate the number and frequency of upsets, problems, or violations during a recent period (usually the past 18 months) and the probable cause of such incidents.

The submission should describe each known or suspected case of operating problems caused by an industrial discharge, such as:

- Reductions in removal efficiency
- Degradation of the collection system facilities
- Emergencies such as sewer plugging, excessive corrosion, unusual odors, explosion hazards, explosions or fires
- Violation of NPDES permit conditions
- Water quality degradation and fish kills at the POTW's effluent discharge point
- Sludge contamination.

These descriptions should be sufficiently detailed to determine the cause of the problem (e.g., industrial discharge, equipment failure, or improper operation and maintenance), duration of the incident, magnitude of the damage done,

and corrective actions taken. In the case of permit violations, the specific parameter(s) violated should also be identified.

Although prevention of sludge contamination is a major objective of the Federal regulations, this issue is often overlooked in preparing a local pretreatment program. The submission should include a description of the volume and characteristics of sludges produced at the treatment facility and discuss current methods of disposal. The impact industrial contributors have on current sludge disposal methods should be discussed, and any future disposal methods should be evaluated. The most stringent applicable standards, whether Federal, State, or local sludge pollutant limits (other than for conventionals), should be provided.

If the program is for a new treatment plant, information on past performance will not be available. In this case, it is important to ensure that the POTW used the pollutant information obtained from its industrial waste survey to assess: (1) the treatment system's tolerance for pollutants; (2) the effects of pollutants on proposed NPDES permit limits and/or on receiving water quality; and (3) the effect of these pollutants on the POTW's sludge disposal options.

3.2.2 Sampling and Analysis to Determine Fate and Effect

The nature and extent of the POTW sampling program should be documented in the program submission. Often, POTWs sample and analyze influent and effluent quality for parameters such as BOD, TSS, pH, fecal coliform, temperature, flow, chlorine demand or residual chlorine, and dissolved oxygen. Sometimes, parameters such as COD, ammonia, total nitrogen, and total phosphorus are also measured. Based on a review of both industries discharging to the POTW and past operational problems, additional sampling and analysis may be needed to quantify the extent of pollutant pass-through and sludge contamination, and to provide a basis for establishing local limits.

Such a sampling program should be designed to obtain quantitative information regarding the concentration, loads, and fluctuations of specific pollutants identified from the industrial waste survey. The program may include:

- Sampling of significant industries to quantify industrial pollutant loading
- Sampling of nonindustrial interceptors within the collection system to determine the background concentration and loading from nonindustrial sources
- Scan of the POTW influent, effluent, and sludge for the 126 priority pollutants
- Sampling within the treatment plant itself to determine, via mass balance calculation, the fate of the specific pollutants within the treatment plant, and to determine the areas within the system which are most heavily affected by the pollutants in question
- Sampling and analysis of POTW sludge for priority pollutants when the POTW uses land spreading or ocean dumping for sludge disposal
- Sampling and analysis of POTW sludge leachate when the POTW uses a sanitary landfill
- Sampling and analysis of ash resulting from incineration of POTW sludge.

In evaluating a pretreatment sampling program, the reviewer needs to determine if:

- The appropriate pollutants were sampled
- The appropriate sampling locations were chosen
- The appropriate type of sampling was performed (composite or grab)
- Sufficient samples were taken to acquire the necessary information to establish limits
- The data are adequate to support the limit-setting process
- The sampling and analysis procedures were adequate.

3.2.3 Development of Local Effluent Limits

Local effluent limits must be established in the following cases:

- If an industry is discharging pollutants which are harmful to the treatment system
- If categorical standards have not yet been promulgated for that industry
- If categorical standards are not sufficient to protect the treatment plant
- If significant industries are not covered by categorical standards.

The program submission should explain the basis for deciding what local limits are required. The reviewer should determine if the need for local limits has been correctly assessed based upon information in the IWS, past operational problems, and any sampling results presented.

The program submission should document the procedures used, or proposed to be used, to establish specific local limits. The procedures should have a strong scientific basis, and all industrial pollutants of concern should be covered. The reviewer should evaluate appropriateness, adequacy, and consistency with applicable national and State pretreatment standards. In no case can local limits be less stringent than existing national and State pretreatment standards for a given industry.

The reviewer should also ascertain whether local limits are applied equitably among the industries discharging the regulated pollutants. Ideally, the limits should be technically and economically achievable. The criteria for "economic" and "technical" feasibility, if used, must be stated and be consistent with applicable Federal, State, and local laws. As a general rule, limits on specific pollutants should not be lower than the detection limits of currently available standard laboratory analytical techniques. Finally, the reviewer should check to see that the procedures used to develop limits, the data supporting the limits, and the rationale for the limits have been made

available to industrial users and other interested parties. These parties must also have been given the opportunity to review and comment on the limits.

A general methodology for establishing local limits is presented in Appendix B. If the reviewer is unfamiliar with the establishment of such limitations, this Appendix may be useful in evaluating the methods and limits contained in the POTW's submission.

Worksheet 2
Technical Information Checklist

Name of POTW
Date

	Yes	No	Section of POTW's Submission
PART I. Industrial Waste Survey [403.8(f)(2)(i) and (ii)]			
A. Were the sources used sufficient to assure that all major industrial users were identified and located?	___	___	
B. Were the criteria used to eliminate industries from the inventory appropriate?	___	___	
C. Survey Questionnaire			
(1) Did the POTW obtain the following information (either through the survey or other means):			
• Name?	___	___	
• Address?	___	___	
• SIC code(s) or expected classification?	___	___	
• Wastewater flow rate or water consumption rate?	___	___	
• Loads and/or concentrations of pollutants in discharge?	___	___	
• Major products manufactured or services supplied?	___	___	
*• Residuals generated by IU's disposal methods?	___	___	
*• Locations of discharge points?	___	___	
• Description of existing pretreatment facilities and practices?	___	___	
(2) Is the information current within the last 3 years?	___	___	
*(3) Does the questionnaire require the signature of an authorized company representative?	___	___	
D. Follow-Up Procedures			
(1) Did the POTW follow up the questionnaire (with additional written requests, telephone calls or site visits) to obtain a complete and accurate response?	___	___	
E. Summary Information			
(1) Were the users classified by industrial category and/or SIC code?	___	___	
(2) Has the POTW correctly characterized the waste discharged from each industrial user or industrial type?	___	___	
(3) Does the information obtained demonstrate sufficient characterization of the IU's waste discharges to the POTW?	___	___	

Worksheet 2
Technical Information Checklist (Continued)

Name of POTW
Date

	Yes	No	Section of POTW's Submission
PART II. Methodology for Establishing Discharge Limitations [403.5(c)]			
A. POTW Operating Problems and Plant History			
(1) Did the POTW adequately document instances of:			
• Inhibition/upset?	___	___	
• Pass-through?	___	___	
• Sludge contamination?	___	___	
B. Developmental Sampling Program			
(1) Has the POTW recently sampled and analyzed:			
• Treatment plant influent?	___	___	
• Treatment plant unit operations?	___	___	
• Plant effluent?	___	___	
• Sludge?	___	___	
*• Industrial effluents?	___	___	
(2) Did this analysis include pollutants of concern identified in the survey?	___	___	
(3) Were appropriate sampling locations chosen?			
• In the treatment system?	___	___	
• In the collection system?	___	___	
• At the industries?	___	___	
(4) Was the appropriate type of sampling performed for each pollutant type (composite or grab)?	___	___	
*(5) Was the sampling frequency sufficient to give an accurate characterization?	___	___	
C. Need for Locally Developed Discharge Limitations			
(1) Did the POTW assess whether or not pollutants are present in the influent in amounts that inhibit treatment processes used by the POTW?	___	___	
(2) Did the POTW assess whether or not toxic pollutants are present in the POTW effluent in amounts known to exceed water quality criteria?	___	___	
(3) Are sludge disposal methods acceptable in view of pollutant load?	___	___	
D. Methodology for Setting Local Discharge Limits (refer to Appendix B)			
(1) Is the methodology appropriate?	___	___	
(2) Were relevant numbers used for:			
• Inhibition/upset concentrations?	___	___	
• Background concentrations?	___	___	
• Removal efficiencies?	___	___	
• Water quality criteria/standards?	___	___	
• Land application criteria?	___	___	

Name of POTW
Date

	Yes	No	Section of POTW's Submission
• Non-secured landfill disposal (including ash disposal)?	___	___	
E. Appropriateness of Locally Developed Discharge Limitations			
(1) Are local limitations at least as stringent as national pretreatment standards for the appropriate categories?	___	___	
(2) Do local limitations enable the POTW to meet NPDES permit limits?	___	___	
(3) Will State water quality standards be met once local discharge limits are complied with?	___	___	
(4) Will State sludge disposal guidelines/ regulations be complied with?	___	___	
F. Multijurisdictional Submissions			
Were data from IUs and treatment plants in all jurisdictions considered in developing this technical information?	___	___	

*Indicates item is recommended, but not mandatory.

I have reviewed this submission in detail and have determined the technical information to be:

(_____) Adequate (_____) Inadequate

Date: Reviewed by:

(Name)

4. PROGRAM IMPLEMENTATION PROCEDURES

Thorough and complete program implementation procedures are necessary components of a pretreatment program. The minimum procedures which must be documented in the pretreatment program submission are detailed in 40 CFR 403.8(f)(2). A POTW must be able to:

- Identify and locate all industrial users possibly subject to the pretreatment program
- Identify the character and volume of pollutants discharged to the treatment works by these users
- Notify industrial users of applicable standards and requirements
- Receive and analyze self-monitoring reports and other notices from industrial users
- Randomly sample and analyze industrial effluents
- Investigate instances of noncompliance
- Comply with public participation requirements.

The procedures adopted by a POTW should be well thought out and easy to understand. They should be clear enough to be followed by all users, the public, and POTW staff members. Finally, the procedures should be flexible enough to allow reaction to day-to-day operating situations. In evaluating these procedures, the reviewer needs to determine whether they are complete and responsive to the Federal requirements outlined above, and whether they can be effectively implemented.

The first two requirements have already been covered in Section 3.1, Industrial Waste Survey. Accordingly, this chapter will focus only on updating the IWS and on the remaining five procedures. As in earlier chapters, a checklist is provided at the chapter's end.

4.1 UPDATE THE INDUSTRIAL WASTE SURVEY

To adequately implement the pretreatment program, information on industrial users should be updated on a regular basis. Up-to-date information is

essential not only for determining the nature and quantity of the waste entering the system, but also for scheduling pretreatment activities and allocating resources to meet changing program needs. The submission should include procedures for identifying and gathering information on new industries moving into the POTW service area and for updating its existing user information base. There are various mechanisms through which new industrial users can be identified, including:

- A requirement that new industries fill out applications for sewer use when they apply for business licenses
- Communication with other city departments (water, utilities, health, and building departments) concerning new industries in the POTW service area
- Continual review of business license records and/or other standard listings of industrial firms, such as Chamber of Commerce rosters or the telephone directory.

In addition, the IWS should be updated on a continual basis. Several updating procedures are available, such as:

- A permit system which requires notification of changes in industrial processes, wastewater discharges, or industry ownership
- Ongoing POTW inspection and monitoring activities
- Periodic expiration of permits and subsequent reapplication by permit holders
- Periodic mailing of an IWS questionnaire to the industry accompanied by a request to update the information.

4.2 NOTIFY INDUSTRIAL USERS OF APPLICABLE STANDARDS AND REQUIREMENTS

The POTW is responsible for being up-to-date on all Federal pretreatment standards and applicable requirements under the Clean Water Act and Resource Conservation and Recovery Act. Such standards and requirements include:

- Federal categorical standards
- State standards

- Local limits
- Other pertinent requirements (e.g., user charges).

A number of techniques are acceptable for obtaining current information on the status of national categorical standards. A POTW may assign a staff member to review the Federal Register or it may rely upon an attorney to perform this function. In some instances, the POTW may obtain the information from the State pretreatment coordinator, if the State provides such a service. Periodic requests or phone calls to State or EPA officials may also be sufficient.

The POTW is also responsible for notifying any industrial user that may be affected by existing or newly promulgated standards and requirements. Ongoing procedures to do this should be identified in the program submission. Suitable procedures include:

- General mailing list
- Individual letters to industries
- Permit/contract conditions
- Permit/contract modifications
- Published notices in newspapers, circulars, etc.

If notification by mail is proposed, it is usually a good idea to require a signed acknowledgement of receipt to ensure that the notice has actually been received by the industry. Newspaper notices may be adequate if the notices appear in the same section of the paper on a fixed schedule (e.g., once a week), and if industrial users are informed of the location and time of publication. Permit and contract amendments are probably the best method of notification since acknowledgement is ensured when a company official signs the permit/contract.

4.3 UNDERTAKE COMPLIANCE MONITORING PROCEDURES

Self-monitoring, compliance sampling, and noncompliance investigations are closely related. The first two activities determine an industrial user's

compliance with pretreatment standards, limits, and other requirements. The third activity constitutes the POTW's response to potential instances of noncompliance. All three involve sampling and analysis of industrial effluents and data analyses. Under self-monitoring, the sampling and analysis are performed by the industrial user's staff or representative. Under compliance sampling and investigations, the work is carried out by the POTW's staff or authorized representative. Investigatory sampling and analysis must be performed with sufficient care to produce evidence that is admissible in court, and thus, it is normally more rigorous than compliance sampling and analysis.

4.3.1 Receive and Analyze Self-Monitoring Reports and Other Notices

The program submission must describe the POTW's procedures for receiving, analyzing, and storing self-monitoring reports, compliance schedule reports, and other reports/notices submitted by industrial users. A systematic approach to managing the data collected from these sources should be evident. The system may be manual or computerized depending upon the POTW's size and number of industrial users. The system should ensure that reports are received on time, reviewed by a technical specialist, and ultimately filed in a retrievable manner. The system should facilitate a comparison between discharge values reported by industrial self-monitoring or POTW compliance monitoring, and discharge limits specified in the industry's permit or contract or in the municipal ordinance.

Basic features of a workable system include:

- A master list or log of expected reports during a specified time frame (monthly is sufficient)
- A procedure to enter date of receipt of each report (usually on the master list or log)
- A procedure to screen and compare reported values and compliance information with discharge standards and compliance schedules
- A procedure (if the screening is done by a non-technical person) to refer problem submissions to a technical specialist for more thorough evaluation

- A filing system to ensure that the data are retrievable and maintained for an appropriate period of time (three years or longer)
- The ability to cross reference to permit, contract, and POTW monitoring files, if applicable.

It is also important to ensure that the expected volume of reports can be handled by the proposed procedures. In addition, the submission should identify by title the individual responsible for evaluating self-monitoring and compliance schedule reports.

4.3.2 Conduct Compliance Sampling and Analysis

The submission must document and describe the POTW's procedures for sampling and analyzing industrial effluents. Three basic types of compliance sampling and analysis are commonly used:

- Scheduled monitoring (sampling and analysis on a fixed schedule)
- Random monitoring (sampling and analysis--scheduled or unscheduled--that is unannounced or performed with short notice)
- Demand monitoring (sampling and analysis triggered by an event such as a public complaint or an observed POTW operating problem).

The reviewer should note that monitoring for billing purposes (e.g., surcharge for BOD or SS) is not compliance monitoring. Compliance monitoring involves a comparison of actual discharge amounts to permitted discharge amounts. Although sometimes the two types of monitoring may be combined and conducted at the same time, monitoring for billing purposes alone is not sufficient to assess compliance.

The regulations specifically call for program procedures to randomly sample and analyze industrial discharges to the treatment works. Random sampling is intended to ensure that collected samples are representative of actual operations. It is particularly useful when industries can easily and quickly alter their processes or operations to obtain more favorable results. The requirement for random sampling does not mean that the events cannot be scheduled. A POTW may schedule its random monitoring activities on a

quarterly, semi-annual, or even annual basis, provided it does not inform the industrial user of the specific time or day the sampling will take place far enough in advance to enable the user to alter its discharge. A limited amount of advance notice, such as providing indefinite information about the day or time of arrival, or telephoning the company representative just before arrival, is acceptable, and is often necessary to ensure access to the sampling point.

Besides identifying the types of monitoring that the POTW will conduct, the submission should also include:

- The minimum sampling frequency at each major industrial user (at least annually is necessary)
- A list of industries, both categorical and noncategorical, that will be included in the random sampling program (major or significant users should be noted)
- The activities or events that will trigger the demand sampling program (e.g., upsets, inhibitions, public complaints).

The reviewer should determine whether the sampling frequency assures reasonable coverage each year of all categorical and significant users.

The frequency and type of sampling (grab, composite, or flow proportional) will vary depending on the type of industry, pollutants of concern, and resources available (e.g., manpower and equipment). Each submission should identify the sampling approach, frequency, and technique as well as the pollutants to be monitored for each group of industrial users. The program's adequacy can be determined by comparing it with the results of the industrial waste survey. The reviewer should check that each industrial user that is or will be subject to national categorical standards will have its effluent monitored by the POTW at appropriate intervals. In addition, when an industrial user is known to discharge a priority pollutant in its wastewater, the POTW should sample and analyze for that pollutant. A list of priority pollutants usually present in the wastewaters of various industrial groups is included in Appendix C. POTWs will probably also monitor flow rates and measure

conventional pollutant parameters such as BOD, COD, TSS, pH, and others. Whether the samples obtained are grab samples, a grab sample series, or composite samples should also be identified.

As part of this section's review, the reviewer should evaluate the appropriateness of sampling procedures. Sampling procedures should conform with those described in the EPA NPDES Compliance Sampling Inspection Manual. Chain-of-custody procedures should be identified in the submission.

The analysis of samples, as well as the sampling itself, may be performed in-house or under contract by a commercial laboratory. The submission should describe the analytical methods to be employed and the quality assurance program that will be followed. When samples from categorical industries are analyzed, the methods used must conform to those prescribed in the applicable categorical standard. Test procedures for other pollutants should conform to one of the standard analytical methods cited in Table I of 40 CFR 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants." Other methods may be used only where they have been approved by the EPA Regional Administrator. Laboratory quality assurance procedures should conform to specifications contained in EPA's Handbook for Analytical Quality Control in Water and Wastewater. Table C.4 in Appendix C lists the detection levels and approved EPA methodologies for analysis of the priority pollutants. If commercial laboratory services are to be used, the POTW should provide the name of the laboratory or a description of its criteria for selecting a laboratory. Official certification of the laboratory is normally a good thing for the POTW to require because the certification ensures that correct procedures and equipment are used and that the appropriately trained staff are employed.

4.3.3 Investigate Noncompliance

The pretreatment program submission must describe how the POTW will investigate instances of noncompliance. These methods should be capable of handling three types of situations:

- An emergency situation when the POTW must move immediately to halt an industrial discharge that "reasonably appears to present imminent endangerment to health or welfare of persons."

- A nonemergency situation when the POTW desires to halt or prevent a discharge which "presents or may present an endangerment to the environment or threatens to interfere with the POTW's operation."

- A situation when an industrial user fails to comply with other pretreatment requirements, such as timely submission of reports, achievement of compliance schedule milestone(s), maintenance of sampling and pretreatment facilities, and maintenance of records.

The information gathered should be admissible as evidence in enforcement proceedings or judicial actions. Thus, sampling and analysis, and other data collection activities should be conducted with a greater degree of care than would otherwise be required.

Noncompliance investigation procedures may be detailed in the legal or procedural section of the program submission. If these procedures are discussed in the legal section (e.g., in the sewer use ordinance), the procedural section of the submission should cite the appropriate legal document. The procedures that will be used to investigate instances of noncompliance should include the following:

- Establish criteria for classifying situations as emergencies

- Notify industrial users of noncompliance incidents

- Provide for industry response to notification

- Take actions to correct identified problems

- Verify that violation has been corrected

- Resort to legal recourse to obtain industrial compliance and/or allow industry to challenge POTW violation determination

- Perform quick response sampling, analysis, and inspection in the event of emergency conditions such as fire, explosion, corrosive action, acute upset, or imminent danger to health and safety

- Gather data so that it is admissible in court proceedings or other enforcement actions.

Informal notice of industrial user noncompliance usually involves letters, telegrams, telephone calls, meetings, and visits. It is always a good idea for the industrial user to acknowledge receipt of the notice. Formal notification methods include cease and desist orders, injunctions, citations, and subpoenas. Industrial users can respond through letters, telephone calls, meetings, and show-cause hearings.

To abate and control the problem discharge, the user may take corrective procedures, such as process change, installation of new treatment technology, improved operating practices, repair of faulty equipment, and termination of discharge. The time frame for correcting the violation which the POTW establishes should be flexible enough to cover both emergency and less severe situations. Under emergency conditions, the POTW may need to terminate the discharge until other corrective measures are in place. The POTW should have this authority and provisions for using it. A nonemergency violation may be handled by modifying the permit, contract, or other provision. The POTW can verify corrective actions through certification by the industrial user that the violations has been corrected, increased self-monitoring requirements, and follow-up monitoring inspection by the POTW. While certification is acceptable for less serious violations, the POTW should verify corrective actions first-hand in serious cases.

Because it is impossible to predict which actions will require legal proceedings, and because the integrity of data must be proved if the case ultimately goes to trial, it should be assumed that any data collected during an investigation will end up in court. Thus, chain-of-custody and quality assurance provisions become important aspects of a POTW's noncompliance investigation. The program submission should indicate that the POTW will follow proper chain-of-custody procedures.

4.4 PUBLIC PARTICIPATION

The pretreatment program submission must describe the procedures used by the POTW to ensure public participation in the program. Specific requirements include:

- Informing the public on the compliance status of industrial users
- Individual notice and comment on proposed local effluent limits
- Public access to nonconfidential data and records.

Although usually not required by Federal regulation, it is a good idea for the POTW to hold public meetings as it develops the local program. In situations where grant assistance is being provided, full-scale public participation (citizen advisory committees, public meetings, or public hearings) may be required. If meetings were held, the results of these meetings and the resolution of any issues should be documented in the submission in the form of summaries, verbatim transcripts, or by attaching meeting notes. A description of the attendees (i.e., number, groups represented) should be included.

The POTW must publish, at least annually, a list of significant industrial violations in the largest local daily newspaper. A significant violation is one that:

- Results in the exercise of emergency authority
- Remains uncorrected 45 days after notice of noncompliance is given to the industrial user
- Involves failure to accurately report.

The name of the newspaper should be specified and the frequency of publication stated. Information other than the name of the discharger may be included in the notice, although this is not required.

The requirement for individual notice of local limits was mentioned earlier in Section 4.2. Since groups and individuals other than industrial users may request notice, it is important that the submission described procedures for accomplishing this notice.

It is recommended that public access to nonconfidential information contained in the documents and records developed in the course of the program be provided. In this case, the submission should identify the steps taken by

the POTW to provide such public access. The location or office where interested people can go to read or copy documents, permits (if a permit system is used), and monitoring records should be specified. The local library, city/town hall, public works office, or POTW are acceptable locations. The hours of operation should include convenient times for the public at large. These provisions should also allow the POTW to restrict access to confidential information about industrial users.

Worksheet 3
Program Implementation Procedures Checklist

Name of POTW
Date

	Yes	No	Section of POTW's Submission
PART I. Updating the Industrial Waste Survey [403.8(f)(2)(i) and (ii)]			
A. Are procedures identified for updating (periodically) the waste survey information for existing users?	___	___	
B. Do procedures require new industries to supply discharge information or otherwise ensure that it will be collected?	___	___	
PART II. Notification of Appropriate Federal, State, and/or Local Standards or Limitations [403.8(f)(2)(iii)]			
A. Are there procedures for keeping abreast of existing and newly promulgated standards and requirements?	___	___	
B. Is there a mechanism to identify and notify industrial users of standards, limitations, or other requirements?	___	___	
PART III. Receipt and Analysis of Self-Monitoring Reports and Other Notices [403.8(f)(2)(iv)]			
A. Are there procedures for determining what self-monitoring and other reports are due?	___	___	
B. Are values reported by industries compared to discharge standards or compliance schedules?	___	___	
C. Are problems referred to appropriate authorities for technical evaluation and follow-up?	___	___	
PART IV. POTW Compliance Sampling and Analysis [403.8(f)(2)(v)]			
A. Does the description of the monitoring program include procedures for periodic random sampling of significant industrial dischargers?	___	___	
B. Are sampling and monitoring parameters identified for each firm or group of industries?	___	___	
C. Is the POTW sampling for the significant pollutants identified by the Industrial Waste Survey or by the priority pollutant/industry matrix? (Appendix C)	___	___	
D. Do the sampling and monitoring procedures conform to EPA requirements? (40 CFR 136,"Standard Methods")	___	___	
E. Is the frequency adequate to determine compliance independent of information supplied by IUs (at least annually)?	___	___	

Worksheet 3
Program Implementation Procedures Checklist (Continued)

Name of POTW
Date

	Yes	No	Section of POTW's Submission
PART V. Noncompliance Investigations and Enforcement [403.8(f)(2)(vi)]			
A. Are follow-up activities described that include provisions to:			
(1) Cover emergency situations?	___	___	
(2) Notify industrial users of violations?	___	___	
(3) Allow for response by industrial users?	___	___	
(4) Abate and control problem discharges?	___	___	
(5) Verify that corrective actions have worked?	___	___	
(6) Obtain compliance through legal means if necessary?	___	___	
(7) Assess penalties for noncompliance?	___	___	
B. Are procedures for quick response sampling and analysis included (demand sampling)?	___	___	
C. Are chain-of-custody and quality control provisions specified?	___	___	
PART VI. Public Participation			
A. Do procedures include at least annual notice of violations published in local newspapers? [403.8(f)(2)(vii)]	___	___	
B. Is notice and opportunity to respond provided, both to the industrial users and the general public, on the process of developing local industrial effluent limitations? [403.5(c)(3)]	___	___	
*C. Are program records available to the public?	___	___	
PART VII. Multijurisdictional Submissions			
A. Are there procedures to coordinate monitoring, enforcement, and implementation activities between the jurisdictions involved?	___	___	
B. Has the NPDES permit holder assumed lead responsibility in program implementation?	___	___	

*Indicates item is recommended, but not mandatory.

I have reviewed this submission in detail and have determined the implementation procedures to be:

(____) Adequate (____) Inadequate

Date: Reviewed by:

(Name)

5. ORGANIZATION, STAFFING, EQUIPMENT, AND FUNDING

The ability to develop and implement a successful pretreatment program depends upon a number of factors. The importance of legal authority, sound technical information, and proper procedures has already been discussed. This chapter focuses on needed resources and an organization to apply them efficiently and effectively. An acceptable submission will demonstrate that the POTW has:

- A workable organization to integrate elements of the program
- A staff of appropriate size and training to carry out program requirements
- The necessary equipment to fulfill monitoring and other program needs
- Adequate funds to support the proposed program.

The above elements are closely interrelated, and all should be present in a successful program.

While the level, type, and kind of resources will vary from program to program, it is possible to establish guidelines for use in evaluating the submission's adequacy. This is the approach taken in this chapter. Rather than attempting to cover all possible solutions to the resources problem, each element is discussed generically. Key factors are identified, "rules of thumb" are provided for evaluating staffing and funding levels, and a framework for review is established. A checklist is provided to assist the reviewer.

5.1 RELEVANT REGULATIONS

40 CFR 403.8(f)(3) requires that the POTW have "sufficient" resources and qualified personnel to implement the authorities and procedures called for in the program. Although the regulations do not specify what is "sufficient," they do require that the POTW submit certain items:

- A brief description (including organization charts) of the POTW organization which will administer the program

- A description of funding levels and full- and part-time manpower available to implement the program.

If more than one agency is responsible for administering the program, each agency must be identified. The responsibilities of each participating agency must also be delineated and procedures for coordination described in the submission.

In some instances, a submission may indicate that certain equipment, staff, and/or funds are not yet available to carry out the program. Such a program can be approved conditionally pending the acquisition of complete funding, manpower, and/or equipment, provided that:

- The inadequately supported aspect(s) of the program does not need to be implemented immediately
- Adequate legal authority and procedures exist for the complete program, including the aspect(s) not being implemented immediately
- The necessary resources will be available when such aspect(s) is implemented.

This provision for conditional approval [40 CFR 403.9(c)] is designed to avoid the unnecessary costs that can result from acquiring and maintaining resources (particularly staff and equipment) before they are needed.

5.2 EVALUATION OF ORGANIZATION AND STAFFING

Organization and staffing requirements will vary according to the complexity and comprehensiveness of the local program. Whether the staff is large or small, it must be organized in a way that facilitates the successful completion of program responsibilities. The adequacy of the program's organization and staffing is based not only on whether essential functions are covered, but also on whether the number and type of staff are appropriate to implement program requirements. The following elements should be evident in the submission:

- Clear and appropriate lines of authority
- Identification of staff responsibilities

- Qualifications of staff
- Staffing levels related to required work effort
- Coordination with other departments
- Contract management (if required).

5.2.1 Clear and Appropriate Lines of Authority

A description of the POTW organization is needed, including the functional departments which will carry out the program. This description may include the titles and numbers of employees within each functional department, and the employees (or department) within the POTW that will coordinate with each service district in interjurisdictional programs. It is recommended that the functional departments identify services such as administration, engineering, sampling/inspection, laboratory analysis, legal work, accounting, and billing.

A POTW must submit either an organization chart for the entire wastewater treatment program or a chart specifically structured for the pretreatment program. If the entire POTW organization is shown, notations on the chart or an accompanying text should indicate where pretreatment responsibility rests. In particular, responsibility for procedural functions such as notifying industrial users of applicable standards, receiving and reviewing self-monitoring reports, conducting sampling and analysis of industrial effluents, and initiating enforcement actions should be clearly identified. If the pretreatment organization is provided, its relationship to the overall POTW organization is provided, its relationship to the overall POTW organization should be described.

A variety of different organizational systems and structures are approvable. The key is to determine whether the proposed structure is workable. In evaluating the program's organization, the reviewer may ask the following questions:

- Are authorities and responsibilities clearly designated?
- Do supervisors have direct responsibility for the appropriate number of employees (usually no more than six or eight staff members)?

- Is the program effectively integrated with the rest of the POTW's activities?

5.2.2 Identification of Staff Responsibilities

Text accompanying the organization chart should identify the responsibilities and duties of each staff member or department involved in the program, including:

- Technical assistance. A staff member or department should have the responsibility of evaluating data that industrial users supply on their IWS forms, self-monitoring reports, and compliance schedule reports. This person or department also should have responsibility for reviewing results of POTW monitoring and sample analyses and for industrial inspections.

- Industrial monitoring. The submission should designate a staff member or department with responsibility for staffing and supervising field monitoring personnel. It should also specify the number and qualifications of personnel who will be assigned to the field monitoring crew(s).

- Laboratory analysis. As indicated earlier, a POTW may either perform its own sample analyses or contract with a commercial laboratory for analytical services. If the work is done in-house, laboratory support staff must be identified.

- Legal assistance. The person(s) providing legal assistance to the municipality will interpret regulations and other legal documents that affect pretreatment program operations and prepare contracts or other agreements. This person also will initiate formal legal actions against violators, including injunctive relief when necessary.

- Administration. The program administrator and administrative staff should have responsibility for data management, communication with IUs, program finances and accounting, personnel, and the public participation program.

A small POTW may have the same person performing the duties associated with one or more of these five general work areas, while a large POTW may have several people assigned to each functional group. In addition, a large POTW may wish to separate functions that are grouped together under administration. Responsibility for some of the work areas may be assigned to contractors or other local agencies, but all areas of work and corresponding staff should be identified in the submission.

5.2.3 Staff Qualifications

The submission should include the qualifications for all key staff positions. The qualifications of existing and proposed staff should be reviewed to ensure that they are appropriate for the position. While there are no rigid guidelines that apply, there are several factors that can be used to evaluate the adequacy of staff qualifications. The education and experience should match the functions to be performed. Sampling and analysis functions, for example, would normally be performed by a chemist experienced in effluent monitoring (preferably industrial). Tradeoffs between education and experience are acceptable, and certification in an appropriate discipline (e.g., professional engineer) is desirable, but not required. Key disciplines that one would expect to see are engineering (environmental, civil, sanitary, chemical), chemistry (organic, inorganic, physical, analytical), public administration, business administration, and law.

5.2.4 Staffing Levels

The level of staff needed to implement a program depends on the size of the treatment plant and the number of industrial users regulated under the pretreatment program. Small POTWs with few industrial users may be able to implement a pretreatment program satisfactorily using only one or two person-years of effort. Large POTWs with many industrial users may need a pretreatment program staff with as many as 30 to 50 people, depending on the number of samples and measurements to be obtained, the frequency of monitoring, and the number and complexity of analyses to be performed. POTW staff requirements will also vary significantly if work is performed by outside personnel (e.g., contract support). These outside resources should be included when assessing the adequacy of staffing levels.

A quantitative estimate of the level-of-effort, including outside support, should be provided in the submission for each staff position or function. Such estimates may be in the form of labor hours per year, person-years, or percent involvement of a person in pretreatment program activities. The amount of work required to perform necessary sampling and analysis, technical reviews, and administrative tasks should be compared to the proposed

staffing levels. Generalized estimates of personnel requirements as a function of POTW size and number of industrial users are shown in Table 5-1. More refined and detailed personnel estimates for a POTW having a flow of 5 mgd and 10 industrial users are shown in Tables 5-2 and 5-3. These figures can be used to gauge the adequacy of staffing levels for individual functions, although they should not be treated as rigid requirements.

5.2.5 Coordination with Other Departments

Interaction between groups within the pretreatment program and other POTW departments in order to facilitate the program's smooth operation should be clear in the submission. A flow chart for routine program operations may be included. For example, the chart would show who receives and reviews self-monitoring reports, what happens when the reports are acceptable, and what happens when they indicate violations.

5.3 EVALUATION OF EQUIPMENT

The major items of equipment necessary to implement a successful pretreatment program may include sampling gear, analytical instruments, vehicles, office furniture and accessories, and data processing devices. The type and amount of equipment needed will vary as a function of program size, complexity, and structure (i.e., contract or other outside services). The pretreatment program submission should list the major equipment to be used in the program, including any commercial services or outside capabilities. This list should be reviewed for completeness and adequacy. At a minimum, the POTW should show that it has the capability to sample and analyze industrial wastewaters for all pollutants of concern identified in the technical information section of the submission (e.g., metals, priority pollutants, or special pesticides).

Some of the specific capabilities that the program submission should demonstrate include grab and flow composite sampling, gas and liquid chromatography, atomic absorption, and mass spectroscopy. The equipment needed may be available in-house or from external sources. It is a good idea for all analytical work to be performed by a certified laboratory to ensure the

TABLE 5-1

POTW PRETREATMENT PROGRAM
PERSONNEL REQUIREMENT RANGES

Ranges presented in this table are estimates based on anticipated averages for typical programs. Individual program personnel requirements may vary significantly from the ranges shown here.

POTW Flow Range (MGD)	Relative Number of Indirect Dischargers	Range of Personnel Requirements for Pretreatment Program
5	small	1-3
	large	2-5
5-25	small	2-4
	large	4-8
25-50	small	4-6
	large	8-10
50	small	6-8
	large	10-15
100	large	15-50*

*Special cases, such as large metropolitan systems, require more in-depth review.

Source: Local Pretreatment Program Requirements and Guidance. Environmental Technology Consultants, Inc.: September 1979.

TABLE 5-2

ESTIMATED POTW PERSONNEL REQUIREMENTS FOR A POTW PRETREATMENT PROGRAM BY PERSONNEL CATEGORIES

POTW AVERAGE DESIGN FLOW: 5 MGD

NUMBER OF INDUSTRIAL USERS IN PROGRAM: 10

PERSONNEL		NUMBER REQUIRED
1. Supervisor	- For delegating the responsibilities and running the program	1
2. Engineer	- To review reports and assist the Supervisor	1
3. Field Crew	- To take samples and do all field investigations	2
4. Laboratory Technician	- For analyzing samples	part-time
5. Lawyer	- For all legal action and proceedings	part-time
	TOTAL FULL-TIME PERSONNEL REQUIRED	5.0

TABLE 5-3

ESTIMATED POTW PERSONNEL REQUIREMENTS FOR A POTW PRETREATMENT PROGRAM BY PROGRAM ACTIVITY

Estimates presented in this table are based on anticipated averages for typical programs. Individual program personnel requirements may vary significantly from the estimates shown here.

POTW AVERAGE DESIGN FLOW: 5 MGD
NUMBER OF INDUSTRIAL USERS IN PROGRAM: 10

	Program Activity	Frequency of Activity per POTW or IU	Number of Activities	Workdays per Activity	Total Workdays
	Program Development				
1.	Develop Pretreatment Program	once	1	15-25	25
2.	Conduct Industrial Waste Survey	once[1]	1	15-25	25
3.	Determine POTW Removal Allowance	once[2]	1	10-20	20
4.	Review IU Pretreatment Facility Proposal	once	10	0.5-2	20
		TOTAL WORKDAYS = 90 90 ÷ 220 WORKDAYS/PERSON/YEAR = .41 Person-years			
	Program Operation				
1.	Review IU Compliance Schedule Reports	3/year	30	0.5-1	30
2.	Review IU Final Compliance Schedule Report	once	10	0.5-2	20
3.	Review IU Self-Monitoring Report	2/year	20	0.1-0.5	10
4.	Sample IU (spot-check)	1/year	10	2-4	40
5.	Investigate IU Non-compliance	----	5	1-5	25

TABLE 5-3 (Continued)

ESTIMATED POTW PERSONNEL REQUIREMENTS FOR A POTW PRETREATMENT PROGRAM BY PROGRAM ACTIVITY

Program Activity	Frequency of Activity per POTW or IU	Number of Activities	Workdays per Activity	Total Workdays
6. Administrative Enforcement Action	----	3	3-10	30
7. Legal Enforcement Actions	----	1	15-20	20
8. Comply with Public Notice Requirements	1/year	1	1-3	3
9. Sample POTW Influent, Effluent, and Sludge	1/year	1	5-10	10
10. Prepare Self-Monitoring Report for Approval Authority	2/year	2	5-10	20
11. Laboratory Analysis of Required Sampling	1/year	13	1-2	26

TOTAL WORKDAYS = 234
234 ÷ 220 WORKDAYS/PERSON/YEAR = 1.06 Person-years

[1] IWS is periodically updated during program implementation procedures.

[2] Annual monitoring and reporting by the POTW is required during program implementation to maintain any removal credit allowance.

Source: Local Pretreatment Program Requirements and Guidance. Environmental Technology Consultants, Inc.: September 1979.

quality of results. Other equipment that may or may not be necessary depending upon the size and complexity of the program includes vehicles for sampling and inspection, computer terminals, software and hardware for data reduction and analysis as well as for program administration, and office accessories, such as word processing, duplication, and production devices.

5.4 EVALUATION OF FUNDING

An itemized estimate of pretreatment program costs must be included. The submission must contain either projected costs for the first year of program operation or the actual costs for the most recent operating year if the pretreatment program was fully implemented in that year. These costs should be itemized in the following areas:

- Labor (salaries, benefits)
- Annualized capital costs
- Operation and maintenance costs (travel, supplies, etc.)
- Overhead (rent, phones, etc.)
- Debt service
- Other applicable costs.

The submission should also provide an account of the revenue sources to be used to cover the annual costs of the pretreatment program. This account may be descriptive, or may be an itemization of each revenue source and amount. In addition, a system for continuous revenue generation (e.g., user charges) should be discussed. It is helpful if the POTW submits its most recent annual financial statement showing actual expenditures and revenues so that the reviewer can assess the POTW's financial base. However, submitting the financial statement is not a Federal requirement.

In reviewing the funding section of the submittal, it will be necessary to evaluate whether cost estimates are appropriate, and to determine whether costs will be adequately met by the proposed sources of revenue. Where shortfalls exist, the program may still be approvable if the inadequately funded

program element need not be implemented immediately and future funding will be available when needed.

5.4.1 Implementation Costs

A POTW program submission should provide an estimate of the annual cost of implementing its pretreatment program. The two types of costs involved are capital costs and operating costs. The capital cost of purchasing equipment represents a single cash outlay, while labor, O&M, and the other items represent operating expenses that must be recovered yearly. Equipment may be purchased directly out of the POTW's budget if sufficient reserve cash is available; its may also be financed or leased and then repaid annually as an ongoing cost in the operating budget.

Capital Costs

A major financial decision for a POTW implementing a program involves the procurement of sampling and analysis equipment. A POTW has the choice of purchasing equipment, leasing equipment, contracting services, or any combination of these. Depending on the level of monitoring required for the program, a POTW should determine which of these options is the most cost-effective. It may be most feasible for small or medium-sized plants to buy equipment for sampling and conventional pollutant analyses, while using a commercial laboratory for metals and organics analyses. Larger POTWs, conducting more toxics analyses, may choose to buy equipment for full in-house capability. Since sampling/analysis equipment can be expensive to purchase and maintain, the POTW should determine what the impact of these costs would be on sewer and monitoring charges to industries and whether purchase is warranted. Typical costs for sampling and analysis equipment for nonconventional pollutants are shown in Table 5-4. Typical analytical costs of a commercial laboratory are shown in Table 5-5.

Operating Costs

Annual operating costs will generally be based on the level of effort estimated to conduct various tasks within the program. While the majority of operating costs may be attributed to labor, other significant costs may result

TABLE 5-4

TYPICAL EQUIPMENT FOR A TWO-MAN FIELD SAMPLING CREW

EQUIPMENT	PURCHASE PRICE
- Van with two-way radio	$12,000
- Gas Detector	450
- 2 self-contained breathing units	1,500
- 4 portable samplers with bottles	8,200
- 1 portable pH meter	800
- 2 flow meters	3,000
- Flumes and weirs	1,600
- Velocity meter	600
- Safety equipment	400
- Miscellaneous tools and equipment	200
TOTAL	$28,750

ADDITIONAL LABORATORY EQUIPMENT FOR SAMPLE ANALYSIS

EQUIPMENT	ESTIMATED PURCHASE PRICE
- Atomic absorption spectrometer (basic)	$ 25,000
- Supplies for AA	3,000
- Gas chromatograph mass spectrometer (GC/MS)	120,000
- Accessories and glassware for GC/MS (including a yearly service contract)	15,000
- Reagents and other chemicals	15,000
TOTAL	$178,000

Source: Odeal, Erwin J. "Economics of Local Pretreatment Program Administration." Proceedings: National Pretreatment Symposium. Duluth, Minnesota: August 22-24, 1979. Cost information updated, 1983.

TABLE 5-5

TYPICAL COMMERCIAL LABORATORY COSTS[1]

Parameter	Price per Analysis
Conventional Analysis	
Acidity/alkalinity	$ 9
BOD_5	20
COD	20
Chloride	15
Nitrogen (total)	20
Oil & grease	20
Suspended solids	8
Toxics Analysis	
Metals (typical)	$10 - 18/metal
Organics by GC	60/compound
NPDES Analysis (scans)	
Base neutrals	$350
Acid extracts	200
Pesticide/PCBs	225
13 metals	300
Total 126 Compounds	800-1200[2]

[1] Based on 1983 estimated costs from commercial laboratories

[2] Includes $300 for asbestos

from equipment O&M, overhead, and debt repayment. For simplicity, some POTWs estimate labor hours for each program task and then convert these to total cost by multiplying by a gross factor that represents overhead and other costs. Table 5-6 lists program tasks and various factors affecting the level of effort for each. By combining labor costs with other direct and indirect costs, the total annual budget for the program can be calculated. See Table 5-7 for estimated operational costs of a POTW pretreatment program.

5.4.2 Financing Sources and Cost Recovery Systems

The means for recovering program costs should be presented in the submission. Major capital expenditures, such as equipment purchase, may be financed by municipal bonds or with surplus capital improvement revenues, if available. As mentioned earlier, leasing and contract services are viable options that avoid large cash outlays.

Continuous revenue sources from fees, charges, or interest are necessary to recover annual operating costs, which include debt service payments if loans are outstanding. Ideally, revenues should be generated from the industries serviced by the program in proportion to their relative use. However, any means of generating continuous revenues adequate to recover costs is acceptable.

A cost allocation scheme should be used to recover pretreatment costs from various groups or classes of users according to some basis, such as monitoring. There are many types of charges or fees that may be used to generate revenues from users. The most appropriate types for a pretreatment program include a service or monitoring charge, an industry surcharge, and a pollutant strength surcharge. The POTW should choose a justifiable and equitable allocation basis when applying pretreatment charges to industrial users.

TABLE 5-6

FACTORS AFFECTING POTW LEVELS OF EFFORT FOR PRETREATMENT PROGRAM OPERATING TASKS

Activities	Factors
Sampling and Inspection	-Total number of IUs -Frequency of sampling
Laboratory Analysis	-Number of samples -Type of analysis -Pollutants analyzed (i.e., toxics, conventionals, metals, etc.)
Technical Assistance (including permitting process and report review)	-Treatment plant capabilities -POTW influent and effluent characteristics -Total number of IUs -Number of IUs with pretreatment
Legal Assistance	-Number and seriousness of violations -Availability of in-house counsel -Burden of proof created by ordinance
Financial/ Administrative	-Total number of IUs -Frequency of monitoring -Size of service area

TABLE 5-7

HYPOTHETICAL POTW PRETREATMENT PROGRAM OPERATIONAL COSTS[1]

	Cost Component	Size of POTW Small	Medium	Large
(1)	Sampling & Industrial Review	$13,500	$ 26,000	$ 47,000
	Labor	11,000	---	---
	Non-Labor	2,500	---	---
(2)	Laboratory Analysis	$28,000	$ 51,000	$105,000
	Labor	---	20,000	84,000
	Non-Labor	28,000	31,000	21,000
(3)	Technical Assistance	---	$ 27,000	$ 54,000
	Labor	---	---	---
	Non-Labor	---	---	---
(4)	Legal Assistance	$ 7,320	$ 13,300	$ 36,000
	Labor	---	---	---
	Non-Labor	---	---	---
(5)	Program Administration	$25,000	$ 28,000	$ 31,000
	TOTAL	$76,820	$142,300	$273,000

[1]Assumptions

(1) Size is defined in terms of "significant" industrial users. Small is assumed to include 40, medium 130, and large 300 industrial users.

(2) Major metropolitan areas are excluded from this analysis. They are considered special cases and should be evaluated on an individual basis.

(3) A 33% overhead rate is assumed for municipal employees.

(4) Sampling & Industrial Review. Small POTW: 1 person half-time, medium POTW: 2 persons half-time, large POTW: 2 persons full-time.

(5) Laboratory Analysis. Small POTWs contract out all lab analysis. Medium size POTWs possess AA capabilities. Large POTWs possess both AA and GC-MS capabilities.

(6) Technical Assistance. For small POTWs, this service is performed by the program manager who is accounted for in program administration. Assume senior and junior engineers part-time for medium-sized POTWs and full-time for large POTWs.

(7) Legal Assistance. Small POTWs obtain part-time assistance from municipal lawyer. Medium-sized POTWs use one-third time of in-house legal counsel. Large POTWs have one person full-time.

(8) Program Administration. Includes program management and coordination as well as clerical support.

Source: Odeal, Erwin J. "Assessing Administrative and Financial Needs of a Local POTW Pretreatment Program." Proceedings: National Pretreatment Symposium. Duluth, Minnesota: August 22-24, 1979.

Worksheet 4
Resources Checklist

Name of POTW
Date

	Yes	No	Section of POTW's Submission
PART I. Organization and Staffing [403.8(f)(3) and 403.9(b)(3)]			
A. Is the description of the POTW organization clear and appropriate?	___	___	
B. Are mechanisms identified for delegating pretreatment tasks to other local government agencies?	___	___	
C. Are personnel or positions identified that are responsible for:			
(1) Technical review?	___	___	
(2) Monitoring?	___	___	
(3) Laboratory analysis?	___	___	
(4) Legal assistance and enforcement?	___	___	
(5) Administration?	___	___	
D. Have appropriate staffing levels been determined based on the program description?	___	___	
PART II. Equipment			
A. Does the POTW have adequate sampling equipment or other provisions to conduct necessary sampling?	___	___	
B. Does the POTW have adequate analytical capabilities to perform analyses for:			
(1) Nutrients and other nonconventionals?	___	___	
(2) Metals?	___	___	
(3) Toxic organics?	___	___	
C. If not, are other arrangements made to do so (e.g., contract with private laboratory, other agency)?	___	___	
PART III. Funding Estimates and Sources			
A. Does the POTW present an itemized estimate of pretreatment implementation costs?	___	___	
B. Is there an account of revenue sources that will cover the annual costs of the pretreatment program?	___	___	

Worksheet 4
Resources Checklist (Continued)

Name of POTW
Date

	Yes	No	Section of POTW's Submission
PART IV. Multijurisdictional Submissions			
A. Does each jurisdiction participate in funding the pretreatment program?	___	___	
B. Are the relationships between the staff (personnel) of the participating jurisdictions adequately described and documented?	___	___	

I have reviewed this submission in detail and have determined the resources to be:

(____) Adequate (____) Inadequate

Date: Reviewed by:

APPENDICES

APPENDIX A

BIBLIOGRAPHY OF PRETREATMENT REFERENCES

APPENDIX A

BIBLIOGRAPHY OF PRETREATMENT REFERENCES

Association of Metropolitan Sewerage Agencies, Pretreatment Resource Reader. Washington, DC: Association of Metropolitan Sewerage Agencies, 1982. (NTIS Order No. PB82-181629).

Dyer, J., Feiler, H., and Bernick, A., Handbook of Industrial Waste Pretreatment (Water Management Series). New York: Garland Publishing, Inc., 1981.

U.S. Environmental Protection Agency, Fate of Priority Pollutants in Publicly Owned Treatment Works, Volumes I and II (EPA Publication No. 440/1-82-303). Washington, DC: U.S. Environmental Protection Agency, September 1982. (NTIS Order No. PB83-122788).

U.S. Environmental Protection Agency, Guidance Manual for POTW Pretreatment Program Development. Washington, DC: U.S. Environmental Protection Agency, October 1983.

U.S. Environmental Protection Agency, Handbook For Sampling and Sample Preservation of Water and Wastewater. (EPA Publication No. 600/4-82-029). Washington, DC: U.S. Environmental Protection Agency, September 1982. (NTIS Order No. PB83-124503).

U.S. Environmental Protection Agency, Industrial Residuals Manual, Volumes I, II, and III. Washington, DC: U.S. Environmental Protection Agency, November 1981. (Available from EPA Office of Water Enforcement and Permits).

U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Wastes. (EPA Publication No. 600/4-79-020). Washington, DC: U.S. Environmental Protection Agency, March 1979. (NTIS Order No. PB-297686).

U.S. Environmental Protection Agency, Treatability Manual, Volumes I, II, III, IV, and V. (EPA Publication No. 600/8-80-042c). Washington, DC: U.S. Environmental Protection Agency, July 1980. (NTIS Order Nos. PB80-223050, PB80-223068, PB80-223076, PB80-223084, and PB80-223092).

Water Pollution Control Federation, Industrial Wastewater Control Program for Municipal Agencies. Washington, DC: WPCF, 1982. (WPCF Order No. MOP OM-4).

Water Pollution Control Federation, Joint Treatment of Industrial and Municipal Wastewaters. Washington, DC: WPCF, 1976. (WPCF Order No. MO021).

Water Pollution Control Federation, Pretreatment of Industrial Wastes. Washington, DC: WPCF, 1981. (WPCF Order No. MOP FD-3).

Sources listed with an NTIS Order Number are available from:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

Sources listed with a WPCF Order Number are available from:

Water Pollution Control Federation
2626 Pennsylvania Avenue, N.W.
Washington, DC 20037

APPENDIX B

DEVELOPMENT OF DISCHARGE LIMITATIONS TO CONTROL INCOMPATIBLE POLLUTANTS

APPENDIX B

DEVELOPMENT OF DISCHARGE LIMITATIONS TO CONTROL INCOMPATIBLE POLLUTANTS

1.0 INTRODUCTION

A critical part of a municipality's task in developing a local pretreatment program is the development of defensible numerical effluent limitations for the discharge of incompatible pollutants. These limitations are often incorporated directly into a municipal ordinance or are applied through individual permits issued to nondomestic users of the sewerage system. Such limits are needed to enforce the prohibited discharge standards of the General Pretreatment Regulations and to implement the three fundamental objectives of the National Pretreatment Program:

- To prevent the introduction of pollutants into the POTW which could interfere with its operation
- To prevent the pass-through of untreated pollutants which could violate a POTW's NPDES permit limitations and applicable water quality standards
- To prevent the contamination of a POTW's sludge which would limit selected sludge uses or disposal practices.

Locally developed limits are also necessary in cases where categorical standards have not yet been promulgated for an industry, the industry is not covered by categorical standards, or categorical standards are not adequate to protect the municipal treatment plant, receiving stream, or sludge.

This Appendix is intended to assist POTWs in calculating limits to implement these three objectives. The first section of the Appendix outlines the general methodology for determining allowable pollutant loadings, choosing the appropriate level of protection, and allocating these loadings to dischargers. Sections 2, 3, and 4 present equations and guideline data that can be used to calculate the limiting pollutant concentrations at the influent of the municipal treatment plant which will protect the wastewater treatment processes, the receiving water, and sludge disposal options. Section 5 discusses

considerations for allocation of pollutant loadings to individual industrial users. Section 6 demonstrates the calculation of a discharge limit for one pollutant, copper, using a hypothetical example.

The methodology described here for determining allowable influent concentrations and setting industrial effluent limits is widely known and accepted. The basis for some of the material that appears in this Appendix is a document originally prepared by the State of Indiana and the EPA Region V Office. The original document has been reorganized and expanded to facilitate a better understanding of the material.

1.1 GENERAL METHODOLOGY

An incompatible pollutant's effect on a POTW must be evaluated simultaneously from three perspectives -- impact on the treatment plant, impact on the receiving water, and impact on sludge described above. The limit for that pollutant can then be set to ensure that all pretreatment program objectives are met. It should be pointed out that the limiting factor which meets the most restrictive of the three objectives may vary from pollutant to pollutant. For example, at a particular POTW, constraints on the land application of sludge may limit the allowable influent concentration of cadmium, while the effects on the receiving water may limit the influent concentration of copper. The hypothetical example provided at the end of this document will demonstrate the effect of these limiting factors on the influent pollutant limit for copper.

As a general procedure, influent concentration limits should be calculated for a particular pollutant based on each of the three factors (i.e., treatment processes, water quality, and sludge). The most stringent of the three will determine the influent limit to be used for that pollutant. The POTW will then have to translate that influent limit into discharge limits for its industrial users that discharge the pollutant into its sewage system.

Although this document provides some specific data on only cyanide and nine metallic pollutants, a POTW may receive other industrial pollutants with

toxic characteristics. Industrial waste surveys and/or POTW sampling, if done properly, should identify the existence of such pollutants. Calculation of limits for such pollutants would follow the same general methodology discussed in this Appendix, although inhibition and removal data would have to be developed from other sources. It should be noted that this methodology does not account for any cumulative, synergistic, or antagonistic effects that may occur when several toxic pollutants are present simultaneously. Figure 1 shows an overview of the steps used in developing pollutant discharge limitations. Table 1 presents the two basic formulae used to determine local discharge limitations. The back calculation formula is used to calculate allowable POTW influent concentrations based on threshold concentrations from various in-plant criteria. The mass conversion formula allows for the determination of a mass loading (in lbs/day) if the flow and concentration of the wastewater are known.

FIGURE 1

BASIC STEPS IN DEVELOPING
POLLUTANT DISCHARGE LIMITATIONS

Influent to POTW

↓

Activated Sludge	Anaerobic Digestion	NPDES Limitations or Water Quality Standards	Sludge Disposal
1. Determine Inhibitory Concentration Value	1. Determine Inhibitory Concentration Value	1. Calculate Influent Concentration which will allow POTW to comply with its NPDES permit and/or protect water quality	1. Determine Sludge Disposal Method
2. Calculate Influent Concentration that is not Inhibitory to this Process	2. Calculate Influent Concentration that is not Inhibitory to this Process		2. Calculate Influent Concentration that will allow Disposal Option

↓ ↓ ↓ ↓

↓

Select Most Stringent Value

↓

Calculate Load Available for Industrial Dischargers

↓

Allocate Load to Industries By Permit or Order

TABLE 1

BACK CALCULATION FORMULA

$$Lp = \frac{Li}{1-Ep}$$

Where: Lp = Allowable POTW influent concentration (in mg/l)

Li = Threshold concentration for the appropriate unit operation or appropriate permit limitation (in mg/l)

Ep = Reduction in upstream unit processes (expressed as a decimal)

****

MASS CONVERSION FORMULA

$$L = Q \times C \times 8.34$$

Where: L = Mass loading (in lbs/day)

Q = Wastewater flow (in MGD)

C = Concentration (in mg/l)

8.34 = Conversion factor $\left(\frac{\text{lbs/day}}{(\text{mg/l})(\text{MGD})}\right)$

2.0 PREVENTION OF INHIBITION OF TREATMENT PROCESSES

One of the primary objectives of the National Pretreatment Program is to prevent the discharge to a POTW of incompatible pollutants that would interfere with or inhibit the POTW's operation. In the case of cyanides, "heavy" metals, and other toxic pollutants, treatment plant upsets could result if the pollutant's toxicity is great enough to inhibit the microbial activity of the biological treatment system and cause a decrease in the pollution removal efficiency of the municipal treatment facility. Pollutant discharge limits should be set to maintain the concentration of each toxic pollutant below the inhibition threshold of the treatment unit.

2.1 ACTIVATED SLUDGE PROCESS

To calculate a discharge limit that will prevent inhibition of an activated sludge process, it is necessary to determine if an inhibition or upset condition exists. This determination can be made by examining POTW operating records for disruptions or changes (e.g., settling characteristics of secondary sludge, bacterial species populations in the mixed liquor of the aeration basin, etc.). If, after examining various operating parameters, no inhibition or upset conditions can be found, but a POTW protection criteria is desired, current levels of pollutants of concern should be used as threshold concentrations to determine maximum allowable influent loadings based on prevention of activated sludge inhibition. If, however, inhibition or upset conditions are found, the POTW must first determine the concentration of each pollutant of concern entering the activated sludge process. Care should be taken to include all recycle and return lines which may be sources of these pollutants, e.g., return activated sludge (RAS).

After this concentration has been determined, it should be compared with various inhibitory concentration values that can be found in the technical literature. Table 2 lists threshold concentrations for inhibitory effects of several metallic pollutants and cyanide on activated sludge processes, nitrification processes, and anaerobic sludge digestion. These inhibitory values are taken from technical literature and the experience of States and municipalities.

TABLE 2

THRESHOLD CONCENTRATIONS* OF TOXIC POLLUTANTS
THAT COULD INHIBIT BIOLOGICAL TREATMENT PROCESSES

Toxic Pollutant	Threshold of Inhibitory Effect on Activated Sludge	Threshold of Inhibitory Effect on Nitrification	Threshold of Inhibitory Effect on Anaerobic Sludge Digestion
Arsenic	0.05 mg/l	---	1.5 mg/l
Cadmium	1.0 mg/l	---	0.02 mg/l
Chromium (total)	10.0 mg/l	---	100.0 mg/l
Chromium (hex)	1.0 mg/l	---	50.0 mg/l
Copper	1.0 mg/l	0.1 mg/l	10.0 mg/l
Cyanide	0.1 mg/l	0.5 mg/l	4.0 mg/l
Lead	0.1 mg/l	0.5 mg/l	---
Mercury	0.1 mg/l	---	---
Nickel	1.0 mg/l	0.5 mg/l	10.0 mg/l
Zinc	1.0 mg/l	0.1 mg/l	20.0 mg/l

*Concentrations are specified at influent of the unit process in dissolved form.

References: (1), (3), and (5)

Some qualifications to the data in Table 2 should be noted. The concentrations reported in Table 2 are for the dissolved form of each metal and should be used only for comparison purposes and preliminary calculations if the actual proportion of dissolved to total metal is unknown. In addition, concentrations reported in this table reflect the minimum concentration which showed an inhibitory effect for all bench-scale and full-scale studies regardless of test conditions. The result is that many of the values are contradictory, with the same concentration having no inhibitory effects, some inhibitory effects, or total upset effects. Thus, in using the data in Table 2, it should be noted that these inhibitory concentrations are not absolute and all other possibilities should be examined prior to adopting a value from this table as a threshold concentration.

Using an established threshold concentration, a maximum allowable influent concentration to the POTW (Lp) is calculated for each pollutant of concern using the back calculation formula from Table 1, as follows:

$$Lp = \frac{Li}{(1-Ep)}$$

Where: Lp = Maximum allowable influent concentration to the POTW (in mg/l)

Li = Established threshold concentration for the pollutant of concern (in mg/l)

Ep = Reduction of the pollutant of concern through the primary treatment processes (expressed as a decimal)

Table 3 presents typical removal rates through primary and secondary treatment processes for several metals, but should only be used for comparison purposes and preliminary calculations. Plant-specific data are more valid and should always be used by the POTW for final calculations.

If, after maximum allowable influent concentrations have been calculated for all possible in-plant criteria, the activated sludge is selected as a controlling in-plant criteria (i.e., having the lowest maximum allowable influent concentration), the maximum allowable influent concentration for

TABLE 3

TYPICAL POTW REMOVAL RATES
FOR INCOMPATIBLE POLLUTANTS

Toxic Pollutant	Percent Removal Through Primary Treatment	Percent Removal Through Primary and Secondary Units
	Median Value[1]	Median Value[2]
Cadmium	7	50
Chromium	16	71
Copper	18	82
Cyanide	--	56
Lead	20	57
Mercury	22	51
Nickel	6	32
Zinc	26	76

[1]Reference: (1)

[2]Reference: (2)

sludge is converted to a mass loading (L) prior to the allocation procedure (see Section 5.0), using the mass conversion formula from Table 1 as follows:

$$L = Q \times C \times 8.34$$

Where: L = Maximum allowable mass loading to the POTW (in lbs/day)

Q = Design flow (in MGD) of the POTW

C = Maximum allowable influent concentration (in mg/l)

8.34 = Conversion factor

2.2 ANAEROBIC DIGESTION

To calculate a discharge limit that will prevent inhibition of anaerobic sludge digestion, the same basic procedure utilized for the activated sludge process is followed. First, it must be determined if an inhibition or upset condition exists by examining POTW operation records for disruption or changes in such operating parameters as digester supernatant volume and methane gas production. If no inhibition or upset conditions are found, a POTW can adopt current concentration levels of pollutants of concern entering the digestor as threshold concentrations, if a POTW protection criteria is desired. If an inhibition condition does exist, the POTW must determine the concentration of the pollutant of concern entering the digester, and only then compare the actual value to the data contained in Table 2, being sure to take into account all limitations of these literature data.

After establishing a threshold concentration, the POTW must determine the maximum allowable mass loading to the digester, using the mass conversion formula, as follows:

$$L = Q \times C_X \times 8.34$$

Where: L = Maximum mass loading to the digestor (in lbs/day)

Q = Sludge flow to the digester (in MGD)

C_X = Established threshold concentration for the anaerobic digestion process (in mg/l)

8.34 = Conversion factor

After a maximum allowable loading to the digester is determined, the maximum allowable influent concentration to the POTW (C) is calculated, using another form of the mass conversion formula, as follows:

$$C = \frac{L}{Q \times 8.34}$$

Where: C = Maximum allowable influent concentration (in mg/l)

L = Maximum allowable mass loading to digester (in lbs/day)

Q = Design wastewater flow of the POTW (in MGD)

8.34 = Conversion factor

However, the amount of a pollutant of concern in the sludge is limited by the amount of pollutant removed from the wastewater. In the case of metals, all metals removed from the wastewater are generally deposited in the sludge. Therefore, the maximum allowable influent concentration for metals must be adjusted for the amount of metals which remain in the final effluent as follows:

$$C^* = \frac{C}{Ep}$$

Where: C* = Adjusted maximum allowable influent concentration (in mg/l)

C = Unadjusted maximum allowable influent concentration (in mg/l)

Ep = Reduction of pollutant of concern through the entire POTW (expressed as a decimal)

The final result is that the POTW maximum allowable influent concentration is allowed to increase by a factor of (1-Ep) to account for the pollutant of concern (metal) in the final effluent. For other types of pollutants, other removal mechanisms such as air stripping of volatile pollutants (which would reduce the amount of pollutant in the sludge) must be similarly considered. Assuming that anaerobic digestion is selected as the controlling in-plant criteria, the adjusted maximum allowable influent concentration to the POTW is converted to a mass loading prior to the allocation procedure.

This is performed using the mass conversion formula found in Table 1 as follows:

$$L = Q \times C^* \times 8.34$$

Where: L = Maximum allowable influent mass loading (in lbs/day)

Q = Design wastewater flow of POTW (in MGD)

C* = Adjusted maximum allowable influent concentration (in mg/l)

8.34 = Conversion factor

3.0 PREVENTION OF POLLUTANT PASS-THROUGH

The second objective of the National Pretreatment Program is to prevent the pass-through of incompatible pollutants, which could violate a POTW's NPDES permit requirements and applicable water quality standards. Two procedures are presented below. The first assists the POTW in developing pollutant discharge limits to ensure that NPDES permit limitations or any applicable State or local discharge limits are not violated. The second provides the POTW with a methodology for developing pollutant discharge limits to protect water quality criteria if desired, in the absence of specific national, State, or local discharge limitations.

3.1 COMPLIANCE WITH THE POTW NPDES PERMIT

There is only a single step involved in determining the maximum allowable influent concentration to the POTW required for that POTW to comply with its NPDES permit requirement for a particular pollutant of concern. Using the back calculation formula, the maximum allowable influent concentration is determined as follows:

$$Lp = \frac{Li}{1-Ep}$$

Where: Lp = Maximum allowable influent concentration (in mg/l)

Li = NPDES permit limitation for the pollutant of concern (in mg/l)

Ep = Reduction of pollutant of concern through the entire POTW (expressed as a decimal)

If the NPDES compliance in-plant criteria controls, the maximum allowable influent concentration is converted to a mass loading prior to the allocation procedure, as shown in previous sections.

3.2 PROTECTION OF RECEIVING STREAM'S WATER QUALITY

EPA and State publications contain information on the effects of toxic pollutants on receiving water quality. The main problems caused by toxic pollutants are the restriction of domestic and industrial uses of surface

water, toxicity to aquatic organisms, and the accumulation of toxics in the food chain. Also, there has been recent concern about trace organics that are carcinogenic to humans. For these reasons, a POTW can, in the absence of specific toxic pollutant effluent discharge limitations, develop specific local discharge limitations to protect the receiving stream's quality by using established national water quality criteria. However, it should be noted that the establishment of water quality standards for a particular receiving stream is the responsibility of the NPDES authority and the POTW is under no obligation to develop these standards. In addition, any effluent discharge limitations based on water quality criteria that are developed by a POTW would still be subject to revision by the NPDES authority and would require corresponding revisions to a POTW's local discharge limitations.

Exhibit A summarizes water quality criteria for 21 priority pollutants contained in EPA's Ambient Water Quality Criteria, Series (1), as published in the November 28, 1980, Federal Register. These new criteria have replaced those formerly established in the 1976 edition of Quality Criteria for Water (the "Red Book"). The criteria were derived by using "guidelines," which, theoretically, would ensure protection of aquatic health and human health. Officially, the criteria are only recommended values; they are not enforceable as water quality standards. However, they do provide useful documentation in the interpretation of State water quality standards.

To calculate the maximum allowable pollutant loading to the POTW's treatment plants that will protect the receiving water quality from degradation, the POTW has to determine the in-stream water quality standard (C_{wq}) for the pollutant of interest. This may be available from the State water quality agency. Otherwise, data from Exhibit A may need to be used even though they are not specific and may be too stringent. The maximum allowable pollutant concentration in the POTW's effluent (C_{eff}) can then be calculated, taking into account the dilution factor of the receiving stream, as follows:

$$C_{eff} = (C_{wq})(\text{Dilution factor})$$

Where: C_{eff} = Maximum allowable pollutant concentration (in mg/l) at the POTW effluent to protect receiving stream's water quality

C_{wq} = In-stream water quality standard (in mg/l)

$$\text{Dilution Factor} = \frac{Q_{str} + Q_{eff}}{Q_{eff}}$$

Where: Q_{str} = Critical low flow of receiving stream (in mgd)

Q_{eff} = POTW actual effluent flow (in mgd)

Calculation of the dilution factor involves determining the total volume of effluent discharged by the POTW into the receiving stream, either by actual flow measurement or by estimation, using the actual POTW influent flow and subtracting other sources of wastewater leaving the POTW, such as sludge flow. Once the maximum allowable pollutant effluent concentration (C_{eff}) is determined, the maximum allowable influent concentration to the POTW based on protection of water quality is calculated using another version of the back calculation formula, as follows:

$$Lp = \frac{C_{eff}}{1-Ep}$$

Where: Lp = Maximum allowable influent concentration to the POTW (in mg/l)

C_{eff} = Maximum allowable pollutant concentration at the POTW effluent (in mg/l)

Ep = Reduction of pollutant of concern through the entire POTW (expressed as a decimal)

If water quality is selected as a controlling in-plant criteria, the maximum allowable influent concentration is converted to a mass loading prior to the allocation procedure, as shown in previous sections.

4.0 PROTECTION OF SLUDGE QUALITY

The last major objective of the National Pretreatment Program is the generation of sludge that is compatible with the overall sludge management program and consistent with the selected disposal option of the POTW. Pollutant discharge limits should be calculated so that the POTW sludge remains compatible with the selected disposal option. There are three basic methods which POTWs utilize for sludge disposal at the present time:

- Incineration
- Landfilling
- Land application.

Each of these methods has different costs and benefits associated with its use. For this reason, the required sludge quality and degree of pretreatment needed will also vary.

4.1 INCINERATION

Incineration of sludges with high concentrations of priority pollutants can volatilize organics and metals. Little information exists on the release of these pollutants into the air during incineration. What is known about incineration is that it is very expensive to operate and requires an air pollution control permit. If incineration is the disposal option used, the POTW should sample and analyze the resulting ash to determine if the ash quality is compatible with its disposal method.

4.2 LANDFILL DISPOSAL

The determining factor for landfill disposal is whether the sludge is classified as a hazardous waste. To ensure that a particular sludge is not a hazardous waste, the EP (extraction procedure) toxicity test must be performed. When landfill disposal is used by the POTW, the sludge leachate should be sampled and analyzed when there is a possibility that the leachate may contaminate or degrade groundwater or surface water resources.

4.3 LAND APPLICATION

To predict the sludge quality needed for land application, plant operational data should be analyzed, and land quality and quantity should be determined. The POTW should know the general soil type and Cation Exchange Capacity (CEC) of the land application site. Table 4 provides Federal guidelines on loading limitations for land application of metal-bearing sludges. In addition, each State may have its own land application limitations. Both Federal and State rules should be evaluated to determine necessary sludge quality and allowable pollutant loads to the municipal treatment plant. These limitations should be utilized by the POTW to find the maximum cumulative pollutant loading (L) for a specific contaminant. Two procedures are described below. The first procedure is designed to assist the POTW in assessing sludge disposal impacts while the second will help in establishing local discharge limitations which will allow the POTW to dispose of its sludge properly and economically.

4.3.1 Procedure to Assess Sludge Disposal Impacts

In order to evaluate the impacts of possible sludge contamination, a POTW must first analyze its final sludge product for each pollutant of concern. Units of this analysis are generally in terms of milligrams of pollutant per kilogram of sludge on a dry weight basis. (If data are provided on a wet weight basis, be sure to convert to dry weight using the sludge percent solids.) After converting from mg/kg dry to lbs/dry ton (by multiplying by 0.002), a maximum cumulative loading (L) for the appropriate pollutant of concern is chosen based on the particular characteristics of the soil (Table 4 or applicable State or local loading limitations). Using these two values, the maximum amount of sludge which can be applied per acre is determined, as follows:

$$AR = \frac{L}{C}$$

Where: AR = Maximum allowable amount of sludge applied per acre (in dry tons/acre)

TABLE 4

REQUIREMENTS FOR SLUDGE APPLICATION TO AGRICULTURAL LAND

PRIMARY REQUIRMENT - NITROGEN

1. Sludge application rates should provide total plant available nitrogen fertilizer requirement of the crop growth, and the requirement to prevent nitrate pollution of groundwater.

ADDITIONAL REQUIREMENTS - TRACE METAL ELEMENTS

1. Maximum annual Cd loading:

   - Jan. 1, 1981 to Dec. 31, 1985 1.25 kg/ha
   - Beginning Jan. 1, 1986 0.50 kg/ha

2. Soil/sludge pH control

   - pH of sludge amended soil should be maintained at 6.5 or greater

3. Total cumulative metal loadings (kg/ha)

Element	Cation Exchange Capacity (meq/100 gm) 0-5	5-15	>15
Pb	500	1000	2000
Zn	250	500	1000
Cu	125	250	500
Ni	50	100	200
Cd	5	10	20

4. Cd/Zn ratio of sludge applied should be less than 0.015 in naturally acidic soils.

Derived from Reference (7).

L = Maximum cumulative loading (in lbs/acre)

C = Pollutant concentration in sludge (in lbs/dry ton)

Using the maximum amount of sludge which can be applied per acre and the available acreage for sludge application, the total amount of sludge that can be applied is calculated as follows:

$$TA = AR \times A$$

Where: TA = Total amount of sludge allowable for disposal on available acreage (in dry tons)

AR = Maximum allowable amount of sludge applied per acre (in dry tons/acre)

A = Available acreage for sludge disposal (in acres)

This total amount of sludge allowable for disposal on available acreage is next divided by the POTW's current sludge generation rate to determine the lifetime of the available acreage based on the amount of pollutant in the sludge, as follows:

$$T^* = \frac{TA}{SG}$$

Where: T* = Adjusted site lifetime (in years)

TA = Total amount of sludge allowable for disposal on available acreage (in dry tons)

SG = POTW's current sludge generation rate (in dry tons/yr)

This adjusted site lifetime can then be compared to the original lifetime of the available acreage. If the site lifetime is not reduced significantly, the POTW may decide to set a threshold concentration at current pollutant levels as a POTW protection criteria. However, if the site lifetime is reduced significantly, the POTW must establish a local discharge limitation which will allow an acceptable disposal site lifetime.

4.3.2 Procedure to Establish Local Discharge Limitations to Protect POTW Sludge Disposal Options

The maximum cumulative pollutant loading per acre (L, previously determined using the soil characteristics of the sludge disposal site), the amount of available site acreage (A), and the original site lifetime (T) are used to calculate the maximum allowable pollutant mass loading in the sludge to comply with the maximum cumulative pollutant loading per acre and still maintain the original site lifetime, as follows:

$$ML = \frac{L \times A}{T \times 365}$$

Where: ML = Maximum allowable pollutant mass loading (in lbs/day)

L = Maximum cumulative pollutant loading per acre (in lbs/acre)

A = Available acreage (in acres)

T = Original site lifetime (in years)

365 = Conversion factor (in days per year)

Next, the maximum allowable pollutant mass loading (ML^*) to the influent of the treatment plant, to ensure appropriate sludge quality for land application, can be calculated by adjusting ML for removal through the entire plant, as follows:

$$ML^* = \frac{ML}{Ep}$$

Where: ML* = Adjusted maximum allowable pollutant mass loading (in lbs/day)

ML = Unadjusted maximum allowable pollutant mass loading (in lbs/day)

Ep = Pollutant reduction through the entire POTW treatment system

The maximum allowable pollutant concentration at the influent of the plant (C) can be found by converting the adjusted maximum allowable influent pollutant mass loading using the mass conversion formula, as follows:

$$C = \frac{ML^*}{Q \times 8.34}$$

Where: L = Maximum allowable pollutant concentration (in mg/l)

ML* = Adjusted maximum allowable influent mass loading (in lbs/day)

Q = POTW design flow (in MGD)

8.34 = Conversion factor

This concentration is used as the sludge disposal in-plant criteria in determining which in-plant criteria controls. If the sludge disposal criteria controls, the adjusted maximum allowable influent mass loading (ML*) is used to begin the allocation procedure.

5.0 ALLOCATION OF THE POLLUTANT LOAD TO INDUSTRY

The final step in the process of setting effluent limitations is to allocate the maximum pollutant loading to the treatment plant to the individual industrial dischargers. This may be accomplished in several ways, as discussed below.

5.1 ALTERNATIVE METHODS

- Single concentration or mass limit: A single concentration or mass limitation can be established, which no industrial user (IU) can exceed, and, when domestic contribution is taken into account, will not exceed the allowable influent loading. This method corresponds to the example calculation shown in Section 6 of the Appendix. A single limit for all users may be easier to regulate and enforce.

- Proportionate: Allocation can be accomplished proportionately, using various IU characteristics such as mass loading or flow rate to divide up the allowable pollutant discharge. The preferred method of allocation is the one based on mass loadings. However, if concentration data is not available for each IU, the mass loading ratio may not be used, and proportionality will have to be based on another characteristic such as IU flow. However, if the flow is based on water usage, this method penalizes the industrial user that recycles or reuses some portion of its wastewater. This method may be desirable when there are only a few dischargers of a given pollutant in the entire industrial community.

- Technology-based: Technology-based limitations are developed by considering wastewater treatment systems for each particular industrial user that are best suited to that IU's wastewater. Information on state-of-the-art treatment system performance can be obtained from EPA Development Documents supporting effluent limitations guidelines and standards.

5.2 OTHER CONSIDERATIONS

- Growth: Expansion should also be considered in the POTW service area when allocating pollutant loading. Expansion can include domestic contributions where future population growth can cause overloads of compatible pollutants, as well as future industrial contribution. If land has been zoned for industrial parks or other developments, POTWs must allocate a certain portion of the allowable influent loading to this planned expansion.

- Design: Proposed or planned design changes in the municipal treatment plant should be taken into account when developing and setting industrial effluent limitations. For example, nitrification is a more

sensitive process than activated sludge for some pollutants. A POTW planning to upgrade would need to develop protection criteria for this process if it is the limiting factor for some pollutants. Industrial discharge limits might then have to be made more stringent to protect the new design. Industrial users should be kept informed of such plans and developments so that pretreatment technologies are appropriate over time.

5.3 PROCEDURE FOR ALLOCATION OF POLLUTANT LOADINGS TO INDUSTRY

After determining the controlling in-plant criteria and converting the maximum allowable influent concentration to mass (lbs/day), the uncontrollable fraction of the maximum allowable influent loading should be subtracted prior to allocation. For most POTWs, the uncontrollable fraction will be the pollutants contributed by domestic wastewaters, and is determined by sampling a typical domestic sewer interceptor where no industry exists. Table 5 presents data on typical background concentrations of various pollutants found in raw sewage and other nonindustrial sources, but should only be used for comparison purposes and preliminary calculations.

Once the uncontrollable fraction of a pollutant is subtracted from the maximum allowable influent loading, the controllable or allocatable fraction remains. After considerations such as expansion have been considered, allocation of the controllable fraction is performed using one of the three methods specified. Procedures for single concentration and proportionate allocation method follow.

Single concentration allocation is performed by adding together the flows of all current and future IUs contributing a specified pollutant of concern and then applying the mass conversion formula, as follows:

Single Concentration Limitation

$$C\ (mg/l) = \frac{\text{Allocatable Fraction (lbs/day)}}{(Q_1 + Q_2 + Q_3 \ldots) \times 8.34}$$

Where: $(Q_1 + Q_2 + Q_3)$ = Sum of all IUs' flows which discharge the specific pollutant of concern

TABLE 5

TYPICAL BACKGROUND CONCENTRATIONS OF
TOXIC POLLUTANTS IN NONINDUSTRIAL SEWAGE
(INCLUDES DOMESTIC AND COMMERCIAL SEWAGE)*

Toxic Pollutant	"Background" Concentration
Arsenic	0.003 mg/l
Cadmium	0.003 mg/l
Chromium (total)	0.05 mg/l
Copper	0.061 mg/l
Cyanide	0.041 mg/l
Lead	0.050 mg/l
Nickel	0.021 mg/l
Zinc	0.175 mg/l

*Concentrations are total pollutants except where otherwise indicated.

References: (9)

Proportionate allocation is based on a particular characteristic of each industrial user. For example, using each IU's mass loading or wastewater flow to establish the appropriate proportion, the allocation is performed as follows:

Proportionate Allocation Method 1 (Mass):

$$\text{Proportionate Concentration Limitation For IU \#1} = \text{Allocatable Fraction (lbs/day)} \times \frac{(L_1)}{(L_t)}$$

$$Q_1 \times 8.34$$

Where: L_1 = Current mass loading from IU #1 for a specific pollutant (lbs/day)

L_t = Total mass loading from all industrial users for a specific pollutant (lbs/day)

Q_1 = Wastewater flow of IU #1 (MGD)

8.34 = Conversion factor

This is the preferred method of proportionate allocation, if industrial user's pollutant concentrations are known. If they are not, the next method may be used.

Proportionate Allocation Method 2 (Flow):

$$\text{Proportionate Concentration Limitation For IU \#1} = \text{Allocatable Fraction (lbs/day)} \times \frac{(Q_1)}{(Q_t)}$$

$$Q_1 \times 8.34$$

Where: Q_1 = Wastewater flow of IU #1 (MGD)

Q_t = Sum of wastewater flows for all IUs which discharge a specific pollutant of concern

8.34 = Conversion factor

The above procedures would be repeated for all industrial users discharging that particular pollutant of concern.

6.0 A HYPOTHETICAL POTW EXAMPLE

For reasons of brevity and simplicity, this example calculation of allowable influent loading to a POTW addresses only one pollutant, copper. The methodology presented here, however, will be equally applicable for calculating limits for other pollutants discharged by electroplaters or other industries. Our hypothetical POTW utilizes an activated sludge unit for secondary treatment and anaerobic digestion of sludge. POTW sludge is applied on nearby farmland.

The treatment plant has a design flow of 10.0 MGD (9.9 MGD average). The POTW is required to develop a pretreatment program because it has an electroplating facility manufacturing printed circuit boards contributing copper to its system. The POTW pumps 0.2 MGD of raw sludge, thickens it from 1 percent to 5 percent solids, and then pumps to anaerobic digesters.

For the purpose of this example calculation, we will assume that the electroplating facility discharges only copper. The POTW has determined, through its sampling program, that the average removal of copper through the activated sludge portion of the treatment system is 83 percent with primary treatment achieving an average of 25 percent removal. The POTW has an NPDES effluent limitation for copper of 1.0 mg/l.

The POTW has documented upset and inhibition conditions at its treatment plant caused by high copper concentrations. The threshold copper concentrations at the influent to each appropriate unit operation for this example are as follow:

Activated sludge - 1.0 mg/l
Anaerobic digestion - 10.0 mg/l

6.1 CALCULATING MAXIMUM ALLOWABLE POLLUTANT LOAD TO THE POTW FOR COPPER

6.1.1 Preventing Inhibition of Treatment Plant Processes

To determine the influent concentration of copper that will not inhibit treatment plant process, the POTW must calculate in-plant criteria for both the activated sludge process and the anaerobic digestion process to find the controlling in-plant criteria concentration.

(1) Activated Sludge

Using the back caluclation formula presented in Table 1, the in-plant criteria for the activated sludge process can be determined, as shown below:

$$Lp = \frac{1.0 \text{ mg/l}}{1-0.25} = 1.3 \text{ mg/l}$$

Where: Activated sludge copper threshold concentration = 1.0 mg/l
POTW % removal through primary treatment = 25% (or 0.25)

(2) Anaerobic Digestion

Determining the allowable influent copper concentration for proper anaerobic digestion is slightly more complicated. The allowable amount of copper, in lbs/day, in the anaerobic digester is determined by first calculating the flow of sludge to the anaerobic digester, and then applying the mass conversion formula shown in Table 1, using the anaerobic digestion copper threshhold concentration and the calculated flow rate, as follows:

$$\frac{0.2 \text{ MGD}}{5} = 0.04 \text{ MGD (concentrated by extracting water from 1\% to 5\%)}$$

Allowable Cu mass loading to digester = (0.04 MGD)(10 mg/l)(8.34)
= 3.34 lbs/day

Using the allowable amount of copper to the digester, an allowable influent concentration can be calculated, using another form of the mass conversion formula and the POTW design flow, as follows:

$$\text{Allowable influent Cu concentration} = \frac{3.34 \text{ lbs/day}}{(10 \text{ MGD})(8.34)} = 0.04 \text{ mg/l}$$

However, only 83 percent removal of copper is achieved through the entire treatment system and, therefore, only this portion of the influent copper reaches the digester. Consequently, the allowable influent concentration is adjusted using another form of the back calculation formula as follows:

$$\text{Allowable influent Cu concentration} = \frac{0.04 \text{ mg/l}}{0.83} = 0.048 \text{ mg/l}$$

6.1.2 NPDES Permit Compliance

Using the back calculation formula presented in Table 1, the in-plant criteria to meet the POTW NPDES permit requirement is calculated as follows:

$$Lp = \frac{1.0 \text{ mg/l}}{1-0.83} = 5.88 \text{ mg/l}$$

Where: NPDES permit limitation = 1.0 mg/l
Reduction of copper through the entire POTW = 83% (or 0.83)

6.1.3 Determination of Possible Sludge Disposal Impacts

In addition to the possible impacts mentioned above, sludge disposal options may be limited for this hypothetical POTW because of the amount of copper in its digested sludge, which it intends to apply to surrounding farmland. In order to evaluate this possibility, the POTW has analyzed its digested sludge and found it to contain 525 mg/kg (dry weight) of copper. Converting to pounds per ton:

Copper content of digested sludge = 525 mg/kg (dry weight) x 0.002 = 1.05 lbs/dry ton

Using the most stringent total cumulative metal loading option from Table 4 (125 kg/ha), and converting to lbs/acre:

$$\frac{\text{Total cumulative metal loading}}{\text{Copper content of digested sludge}} = \frac{111 \text{ lbs/acre}}{105 \text{ lbs/ton}} = 106 \text{ dry tons/acre}$$

yields the maximum amount of sludge which can be applied in dry tons/acre.

The hypothetical POTW applies approximately 45 dry tons/month of dewatered digester sludge to about 410 acres of surrounding pasture and farmland. Using the maximum amount of sludge which can be applied per acre and the land available for application, the total amount of sludge which can be applied for the lifetime of the sites can be calculated:

$$\text{Total sludge allowable for disposal on available acreage} = \frac{106 \text{ dry tons}}{\text{acre}} \times 410 \text{ acres} = 43{,}460 \text{ dry tons}$$

Using this total site lifetime application and the current sludge disposal rate (45 dry tons/month), the lifetime of the sites available for application is calculated:

$$\text{Lifetime of available acreage for sludge disposal} = \frac{43{,}460 \text{ dry tons}}{45 \text{ dry tons/months}} = 966 \text{ months or } 80 \text{ years}$$

Therefore, unless the original lifetime expectancy of the sludge disposal sites is well over 80 years, this POTW's sludge disposal options will not be affected by the current amount of copper in its sludge. In addition, any reduction of the POTW plant influent copper concentration due to other local limitations will further lower the amount of copper in the sludge and extend the useable lifetime of the sludge disposal sites.

6.1.4 Determination of Controlling In-Plant Criteria

Reviewing the in-plant criteria for each condition:

Activated sludge - 1.3 mg/l
Permit conditions - 5.88 mg/l
Anaerobic digestion - 0.048 mg/l

It can be seen that anaerobic digestion is the controlling in-plant criteria. Therefore, it is possible that a POTW can be substantially below its permit condition for a toxic pollutant and still experience inhibition and interference severe enough to prevent proper plant operation from that same pollutant.

6.2 ALLOCATION OF LOCAL LIMITS FOR COPPER

After calculating an allowable influent concentration of 0.048 mg/l of copper as an in-plant criteria for proper anaerobic digestion, the POTW must allocate the required reduction to attain this concentration among its industrial users. The POTW has identified an electroplating facility as the only major industrial user discharging copper to its system. This facility has a flow of 0.050 MGD and currently averages 7.0 mg/l copper in its effluent.

Using the allowable influent concentration, the allowable pollutant mass loading is calculated:

$$\text{Allowable lbs/day} = (10.0\ \text{MGD})(0.048\ \text{mg/l})(8.34) = 4.0\ \text{lbs/day}$$

After sampling at a number of domestic interceptors, the POTW has determined the copper concentration in domestic wastewater to be 0.025 mg/l. Calculating the current domestic copper mass loading:

$$\text{Domestic lbs/day} = (9.85\ \text{MGD})(0.025\ \text{mg/l})(8.34) = 2.1\ \text{lbs/day}$$

The allowable copper which can be allocated to industry is then calculated by subtracting the domestic background loading:

$$\text{Allowable lbs/day} = 4.0 \text{ lbs/day} - 2.1 \text{ lbs/day} = 1.9 \text{ lbs/day}$$

The current electroplating mass discharge is:

$$\text{Electroplating lbs/day} = (0.050 \text{ MGD})(7.0 \text{ mg/l})(8.34) = 2.92 \text{ lbs/day}$$

This particular electroplating facility is subject to a categorical standard of 4.8 mg/l for copper. When compliance with this categorical standard is achieved, the electroplating mass discharge will be:

$$\text{Electroplating lbs/day} = (0.050 \text{ MGD})(4.8 \text{ mg/l})(8.34) = 2.00 \text{ lbs/day}$$

The POTW has two future contributions to its system planned. One is a housing project which will house approximately 500 people. At an estimate of 150 gallons per person daily, the total wastewater flow increase is 0.075 MGD. However, because of the high cost of copper, builders are planning to use PVC pipe instead of copper pipe, which the POTW believes is the major source of domestic copper contribution. Therefore, the POTW is assuming a negligible amount of copper in this additional flow. The second future addition is a brass plating operation, which will be a major discharger of copper. This facility will have a design flow of 0.025 MGD and is also subject to a categorical standard for copper of 4.8 mg/l. Knowing that the existing facility already exceeds the allocatable loading using the categorical standard, a more stringent single concentration local limitation is established:

$$\text{Allowable electroplating concentration} = \frac{1.90 \text{ lbs/day}}{(0.050 + 0.025 \text{ MGD})(8.34)} = 3.0 \text{ mg/l}$$

Therefore, a single concentration local limitation of 3.0 mg/l for both the existing and future electroplating facilities will allow the POTW to meet its allowable influent concentration and will not violate the controlling in-plant criteria.

REFERENCES

1. U.S. Environmental Protection Agency. Federal Guidelines - State and Local Pretreatment Programs. Vols. I, II, and III. EPA-430/9-76-017a, b, and c. January 1977.

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6. U.S. Environmental Protection Agency. Ambient Water Quality Criteria. EPA-440/5-80. October 1980.

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8. JRB Associates. "How to Set Local Limits." Handout prepared for Pretreatment Seminars, sponsored by U.S. Environmental Protection Agency under Contract No. 68-01-5052. May 1982.

9. JRB Associates. "Assessment of the Impacts of Industrial Discharges on Publically Owned Treatment Works." Prepared for U.S. Environmental Protection Agency under Contract No. 68-01-5052. November 1981.

EXHIBIT A

This Exhibit presents a summary of national water quality criteria that have been generated by EPA. These numbers do not have any regulatory status; they are intended to serve as general guidelines for the preservation of the intended uses of water. The criteria numbers on this table are organized under two major headings: aquatic life and human health. The first heading is further subdivided into acute and chronic criteria. These two numbers represent pollutant concentrations which, if not exceeded, should protect most, but not necessarily all, aquatic life and its uses. The aquatic life criteria specify both acute (maximum) and chronic (24 hour average) concentrations. The combination of the two numbers is designed to provide adequate protection of aquatic life and its uses from acute and chronic toxicity and bioconcentration while being more flexible than a one number criterion.

The human health criteria are divided into two categories. The first group of numbers under water and organisms was generated assuming consumption of both drinking water and aquatic organisms (i.e., fish) by humans. The second group of criteria was derived assuming the consumption of aquatic organisms only. The criteria for human health are based on the carcinogenic, toxic or organoleptic (taste and odor) properties of the pollutants. The meanings and practical uses of these criteria values vary accordingly.

For carcinogenic substances, no scientific basis exists for estimating "safe" levels. Therefore, the criteria are expressed as ranges of values corresponding to incremental cancer risks of 10^{-7} to 10^{-5} (one additional case of cancer in a population ranging from ten million to 100,000, respectively). A detailed discussion of these criteria, how they were developed and qualifications regarding their use can be found in Reference 6.

Exhibit A
(Ref. 6)

PARAMETER	FRESHWATER AQUATIC LIFE TOXICITY ACUTE (Maximum)	CHRONIC (24. Hr. Ave.)	HUMAN HEALTH WATER & ORGANISMS 10^{-5}	10^{-6}	10^{-7}	ORGANISMS 10^{-5}	10^{-6}	10^{-7}
Acenapthene	1,700 ug/1	520 ug/1	(20 ug/1 objectionable taste & odor)					
Acrolein	68 ug/1	21 ug/1	320 ug/1			780 ug/1		
Acrylonitrile	7,550 ug/1	2,600 ug/1	.58 ug/1	.058 ug/1	.0058 ug/1	6.5 ug/1	.65 ug/1	.065 ug/1
Aldrin/	(3 ug/1)	--	.74 ng/1	.074 ng/1	.0074 ng/1	.79 ng/1	.079 ng/1	.0079 ng/1
Dieldrin	(2.5 ug/1)	(.0019 ug/1)	.71 ng/1	.071 ng/1	.0071 ng/1	.76 ng/1	.076 ng/1	.0076 ng/1
Antimony	9,000 ug/1	1,600 ug/1	146 ug/1			45,000 ug/1		
Arsenic	(440 ug/1)	--	22 ng/1	2.2 ng/1	.22 ng/1	175 ng/1	17.5 ng/1	1.75 ng/1
Asbestos	--	--	300,000 fibers/1	30,000 fibers/1	3,000 fibers/1			
Benzene	5,300 ug/1	--	6.6 ug/1	.66 ug/1	.066 ug/1	400 ug/1	40 ug/1	4 ug/1
Benzidine	2,500 ug/1	--	1.2 ng/1	.12 ng/1	.012 ng/1	5.3 ng/1	.53 ng/1	.053 ng/1
Beryllium	130 ug/1	5.3 ug/1	68 ng/1	6.8 ng/1	.68 ng/1	1170 ng/1	117 ng/1	11.7 ng/1
Cadmium	$(e^{(1.05(\ln(\text{hardness}))-3.73)})$ ug/1)	$(e^{(1.05(\ln(\text{hardness}))-8.53)})$ ug/1)	10 ug/1			--		
Carbon Tetrachloride	35,200 ug/1	--	4 ug/1	.4 ug/1	.04 ug/1	69.4 ug/1	6.94 ug/1	.694 ug/1
Chlordane	(2.4 ug/1)	(.0043 ug/1)	4.6 ng/1	.46 ng/1	.046 ng/1	4.8 ng/1	.48 ng/1	.048 ng/1
Chlorinated Benzenes	250 ug/1							
Hexachlorobenzene			7.2 ng/1	.72 ng/1	.072 ng/1	7.4 ng/1	.74 ng/1	.074 ng/1
1,2,4,5-Tetrachlorobenzene				.38 ug/1		48 ug/1		
Pentachlorobenzene				74 ug/1		85 ug/1		
Trichlorobenzene				--		--		
Monoclorobenzene				(20 ug/1 objectionable taste & odor)				

Exhibit A
(Ref. 6) (Continued)

PARAMETER	FRESHWATER AQUATIC LIFE TOXICITY ACUTE (Maximum)	CHRONIC (24. Hr. Ave.)	HUMAN HEALTH WATER & ORGANISMS 10^{-5}	10^{-6}	10^{-7}	ORGANISMS 10^{-5}	10^{-6}	10^{-7}
Chlorinated Ethanes								
1,2-Dichloroethane	118,000 ug/l	20,000 ug/l	9.4 ug/l	.94 ug/l	.094 ug/l	2430 ug/l	243 ug/l	24.3 ug/l
-Trichloroethane	18,000 ug/l	9,400 ug/l						
1,1,2 Trichloroethane			6 ug/l	.6 ug/l	.06 ug/l	418 ug/l	41.8 ug/l	4.18 ug/l
1,1,1 Trichloroethane				18.4 mg/l			1,030 mg/l	
-Tetrachloroethane	9,320 ug/l	2,400 ug/l						
1,1,2,2-Tetrachloroethane			1.7 ug/l	.17 ug/l	.017 ug/l	107 ug/l	10.7 ug/l	1.07 ug/l
Pentachlorethane	7,240 ug/l	1,100 ug/l						
Hexachloroethane	980 ug/l	540 ug/l	19 ug/l	1.9 ug/l	.19 ug/l	87.4 ug/l	8.74 ug/l	.874 ug/l
Chlorinated Napthalenes	1,600 ug/l							
Chlorinated Phenols								
4-Chloro-3-Methylphenol	30 ug/l							
2,4,6-Trichlorophenol		970 ug/l						
3-Monochlorophenol				(.1 ug/l objectionable taste and odor)				
4-Monochlorophenol				(.1 ug/l objectionable taste and odor)				
2,3-Dichlorophenol				(.4 ug/l objectionable taste and odor)				
2,5-Dichlorophenol				(.5 ug/l objectionable taste and odor)				
2,6-Dichlorophenol				(.2 ug/l objectionable taste and odor)				
3,4-Dichlorophenol				(.3 ug/l objectionable taste and odor)				
2,3,4,6-Tetrachlorophenol				(1.0 ug/l objectionable taste and odor)				
2,4,5-Trichlorophenol				(1.0 ug/l objectionable taste and odor)			12 ug/l	
2,4,6-Trichlorophenol			12 ug/l	1.2 ug/l (2.0 ug/l objectionable taste and odor)	.12 ug/l	36 ug/l	3.6 ug/l	.36 ug/l

Exhibit A
(Ref. 6) (Continued)

PARAMETER	FRESHWATER AQUATIC LIFE TOXICITY ACUTE (Maximum)	CHRONIC (24. Hr. Ave.)	HUMAN HEALTH WATER & ORGANISMS 10^{-5}	10^{-6}	10^{-7}	ORGANISMS 10^{-5}	10^{-6}	10^{-7}
2-Methyl-4-chlorophenol				(1,800 ug/l objectionable taste and odor)				
3-Methyl-4-Chlorophenol				(3,000 ug/l objectionable taste and odor)				
3-Methyl-6-Chlorophenol				(20 ug/l objectionable taste and odor)				
Chloroalkyl Ethers	238,000 ug/l							
bis-(chloromethyl)-ether			.038 ng/l	.0038 ng/l	.00038 ng/l	18.4 ng/l	1.84 ng/l	.184 ng/l
bis-(2-chloroethyl) ether			.3 ug/l	.03 ug/l	.003 ug/l	13.6 ug/l	1.36 ug/l	.136 ug/l
bis-(2-chloroisopropyl)-ether				34.7 ug/l			4.36 mg/l	
Chloroform	28,900 ug/l	1,240 ug/l	1.9 ug/l	.19 ug/l	.019ug/l	157 ug/l	15.7 ug/l	1.57 ug/l
2-Chlorophenol	4,380 ug/l			(.1 ug/l objectionable taste and odor)				
Chromium								
Hexavalent Chromium	(21 ug/l)	(.29 ug/l)		50 ug/l			--	
Trivalent Chromium	$(e^{(1.08(\ln(hardness))+3.48)}$ ug/l)	44 ug/l		170 mg/l			3,433 mg/l	
Copper	$(e^{(.94(\ln(hardness))-1.23)}$ ug/l)	(5.6 ug/l)		(1 mg/l objectionable taste & ordor)				
Cyanide Free Cyanide ($HCN+CN^-$, as CN)	(52 ug/l)	(3.5 ug/l)		200 ug/l				
DDT and Metabolites	(1.1 ug.l)	(.001 ug/l)	.24 ng/l	.024 ng/l	.0024 ng/l	.24 ng/l	.024 ng/l	.0024 ng/l
TDE	.6 ug/l							
DDE	1,050 ug/l							
Dichlorobenzenes	1,120 ug/l	763 ug/l		400 ug/l			2.6 mg/l	

Exhibit A
(Ref. 6) (Continued)

PARAMETER	FRESHWATER AQUATIC LIFE TOXICITY ACUTE (Maximum)	CHRONIC (24. Hr. Ave.)	HUMAN HEALTH WATER & ORGANISMS 10^{-5}	10^{-6}	10^{-7}	ORGANISMS 10^{-5}	10^{-6}	10^{-7}
Dichloro-benzidines			.103 ug/1	.0103 ug/1	.00103 ug/1	0.204 ug/1	.0204 ug/1	00204 ug/1
Dichloro-ethylenes 1,1-Dichloro-ethylene	11,600 ug/1		.33 ug/1	.033 ug/1	.0033 ug/1	18.5 ug/1	1.85 ug/1	.185 ug/1
2-4-Dichloro-phenol	2,020 ug/1	365 ug/1		(3.09 mg/1 for protection of public health)				
Dichloropro-panes	23,000 ug/1	5,700 ug/1						
Dichloropro-penes	6,060 ug/1	244 ug/1		87 ug/1			14.1 mg/1	
2-4-Dimethyl-phenol	2,120 ug/1			(400 ug/1 objectionable taste & ordor)				
2-4-Dinitro-toluene	330 ug/1	230 ug/1	1.1 ug/1	.11 ug/1	.011 ug/1	91 ug/1	9.1 ug/1	.91 ug/1
1,2-Diphenyl-hydrazine	270 ug/1		422 ng/1	42 ng/1	4 ng/1	5.6 ug/1	.56 ug/1	.056 ug/1
Endosulfan	(.22 ug/1)	(.056 ug/1)		74 ug/1			159 ug/1	
Endrin	(.18 ug/1)	(.0023 ug/1)		1 ug/1				
Ethylbenzene	32,000 ug/1			1.4 mg/1			3.28 mg/1	
Fluroanthene	3,980 ug/1			42 ug/1			54 ug/1	
Haloethers	360 ug/1	122 ug/1						
Halomethanes	11,000 ug/1		1.9 ug/1	.19 ug/1	.019 ug/1	157 ug/1	15.7 ug/1	1.57 ug/1
Heptachlor	(.52 ug/1)	(.0038 ug/1)	2.78 ng/1	.278 ng/1	.0278 ng/1	2.85 ng/1	.285 ng/1	.0285 ng/1
Hexachloro-butadiene	90 ug/1	9.3 ug/1	4.47 ug/1	.447 ug/1	.045 ug/1	500 ug/1	50 ug/1	5 ug/1

Exhibit A
(Ref. 6) (Continued)

PARAMETER	FRESHWATER AQUATIC LIFE TOXICITY ACUTE (Maximum)	CHRONIC (24. Hr. Ave.)	HUMAN HEALTH WATER & ORGANISMS 10^{-5}	10^{-6}	10^{-7}	ORGANISMS 10^{-5}	10^{-6}	10^{-7}
Hexachloro-cyclohexane								
Lindane	(2 ug/1)	(.08 ug/1)						
BHC	100 ug/1							
alpha-BHC			92 ng/1	9.2 ng/1	.92 ng/1	310 ng/1	31 ng/1	3.1 ng/1
beta-BHC			163 ng/1	16.3 ng/1	1.63 ng/1	547 ng/1	54.7 ng/1	5.4 ng/1
tech-BHC			123 ng/1	12.3 ng/1	1.23 ng/1	414 ng/1	41.4 ng/1	4.14 ng/1
gamma-BHC			186 ng/1	18.6 ng/1	1.86 ng/1	625 ng/1	62.5 ng/1	6.25 ng/1
Hexchloro-cyclopentadiene	7 ug/1	5.2 ug/1		(206 ug/1 for protection of public health)				
Isophorone	117,000 ug/1			5.2 mg/1			520 mg/1	
Lead	$(e^{(1.22(\ln(\text{hardness}))-.47)}\text{ug/1})$	$(e^{(2.35(\ln(\text{hardness})-9.48)}\text{ug/1})$		50 ug/1				
Mercury	(4.1 ug/1)	(.2 ug/1)		144 ng/1			146 ng/1	
Napthalene	23,000 ug/1	620 ug/1						
Nickel	$(e^{(.76(\ln(\text{hardness}))+4.02)}\text{ug/1})$	$(e^{(.76(\ln(\text{hardness}))+1.06)}\text{ug/1})$		13.4 ug/1			100 ug/1	
Nitrobenzene	27,000 ug/1			(19.8 mg/1 for protection of public health)				
Nitrophenols	230 ug/1							
4,6-Dinitro-o-cresol				13.4 ug/1			765 ug/1	
2,4-Dinitrophenol				70 ug/1			14.3 mg/1	
Nitrosamines	5,850 ug/1							
n-Nitroso-dimethylamine			14 ng/1	1.4 ng/1	.14 ng/1	160,000 ng/1	16,000 ng/1	1600 ng/1
n-Nitros-odiethylamine			8 ng/1	.8 ng/1	.08 ng/1	12,400 ng/1	1,240 ng/1	124 ng/1
n-Nitrosodi-n-butylamine			64 ng/1	6.4 ng/1	.64ng/1	5,868 ng/1	586.8 ng/1	58.68 ng/1
n-Nitrosodi-phenylamine			49,000 ng/1	4,900 ng/1	490 ng/1	161,000 ng/1	16,100 ng/1	1,610 ng/1
n-Nitrosopyr-rolidine			160 ng/1	16 ng/1	1.6 ng/1	919,000 ng/1	91,000 ng/1	9190 ng/1

Exhibit A
(Ref. 6) (Continued)

PARAMETER	FRESHWATER AQUATIC LIFE TOXICITY ACUTE (Maximum)	CHRONIC (24. Hr. Ave.)	HUMAN HEALTH WATER & ORGANISMS 10^{-5}	10^{-6}	10^{-7}	ORGANISMS 10^{-5}	10^{-6}	10^{-7}
Pentachloro-phenol	55 ug/1	3.2 ug/1		(1.01 mg/1 for protection of public health)				
Phenol	10,200 ug/1	2,560 ug/1		(3.5 mg/1 for protection of public health)				
Phthalate	940 ug/1	3 ug/1						
Dimethyl-phthalate				313 mg/1			2.9 g/1	
Diethyl-phthalate				350 mg/1			1.8 g/1	
Di-n-butyl-phthalate				34 mg/1			154 mg/1	
Bis-2-ethyl-hexyl-phthalate				15 mg/1			50 mg/1	
Polychlorinated Biphenyls		(.014 ug/1)	.79 ng/1	.079 ng/1	.0079 ng/1	0.79 ng/1	.079 ng/1	.0079 ng/1
Polynuclear Aromatic Hydrocarbons			28 ng/1	2.8 ng/1	.28 ng/1	311 ng/1	31.1 ng/1	3.11 ng/1
Selenium	(260 ug/1)	(35 ug/1)		10 ug/1				
Silver	$(e^{(1.72(\ln(\text{hardness}))-6.52)}\ \text{ug/1})$			50 ug/1				
Trichloro-ethylene	45,000 ug/1		27 ug/1	2.7 ug/1	0.27 ug/1	807 ug/1	80.7 ug/1	8.07 ug/1
Tetrachloro-ethylene	5,280 ug/1	840 ug/1	8 ug/1	.8 ug/1	.08 ug/1	88.5 ug/1	8.85 ug/1	.885 ug/1
Thallium	1,400 ug/1	40 ug/1		13 ug/1			48 ug/1	
Toluene	17,500 ug/1			14.3 mg/1			424 mg/1	
Toxaphene	(1.6 ug/1)	(.013 ug/1)	7.1 ng/1	.71 ng/1	.071 ng/1	7.3 ng/1	.73 ng/1	.073 ng/1
Vinyl Chloride			20 ug/1	2 ug/1	.2 ug/1	5246 ug/1	524.6 ug/1	52.46 ug/1
Zinc	$(e^{(.83(\ln(\text{hardness}))+1.95)}\ \text{ug/1})$	(47 ug/1)		(5 mg/1 objectionable taste and odor)				

APPENDIX C

PRIORITY POLLUTANTS
AND
CATEGORICAL INDUSTRY
INFORMATION

TABLE C.1

MATRIX OF PRIORITY POLLUTANTS POTENTIALLY DISCHARGED FROM INDUSTRIAL CATEGORIES

Table C.1 lists the 25 categorical industries and the potential priority pollutants that can occur in significant amounts in the wastewater discharged from each group. This does not mean that every facility within a specific group discharges that pollutant; it does mean that there is a high probability that it will be discharged, based on a national survey of the industries conducted by USEPA. In addition, it does not mean that other priority pollutants will not be found in significant quantities, but that, in general, the manufacturing process and raw materials involved do not lead to the discharge of these pollutants.

NOTE: The information in the table was developed from Industry Summaries prepared by the USEPA, dated March 1979, from the published development documents for effluent limitations from industrial point source categories. This information is subject to change, and, as shown in Tables C.1 and C.2, some industry groups may not be regulated.

TABLE C.1

MATRIX OF PRIORITY POLLUTANTS POTENTIALLY DISCHARGED FROM INDUSTRIAL CATEGORIES

• POLLUTANT FOUND IN SIGNIFICANT QUANTITY

PRIORITY POLLUTANTS / CATEGORICAL INDUSTRY	ADHESIVE	ALUMINUM FORMING	BATTERY MANUFACTURING	COAL MINING	COIL COATING	COPPER FORMING	ELECTRICAL PRODUCTS	ELECTROPLATING	FOUNDRIES	INORGANIC CHEMICALS
1. acenaphthene										
2. acrolein										
3. acrylonitrile										
4. benzene				•						
5. benzidine										
6. carbon tetrachloride	•									
7. chlorobenzene				•						
8. 1,2,4-trichlorobenzene										
9. hexachlorobenzene										
10. 1,2-dichloroethane				•			•			
11. 1,1,1-trichloroethane				•			•			
12. hexachloroethane										
13. 1,1-dichloroethane										
14. 1,1,2-trichloroethane										
15. 1,1,2,2-tetrachloroethane										
16. chloroethane										
17. bis(2-chloroethyl) ether										
18. 2-chloroethyl vinyl ether (mixed)										
19. 2-chloronaphthalene										
20. 2,4,6-trichlorophenol										
21. parachlorometa cresol										
22. chloroform (trichloromethane)	•	•		•			•			
23. 2-chlorophenol							•			
24. 1,2-dichlorobenzene							•			
25. 1,3-dichlorobenzene							•			
26. 1,4-dichlorobenzene							•			
27. 3,3-dichlorobenzidine										
28. 1,1-dichloroethylene										
29. 1,2-trans-dichloroethylene				•						
30. 2,4-dichlorophenol										
31. 1,2-dichloropropane										
32. 1,2-dichloropropylene (1,3-dichloropropene)										
33. 2,4-dimethylphenol										
34. 2,4-dinitrotoluene										
35. 2,6-dinitrotoluene				•						
36. 1,2-diphenylhydrazine										
37. ethylbenzene	•			•			•			
38. fluorathene										
39. 4-chlorophenyl phenyl ether										
40. 4-bromophenyl phenyl ether										
41. bis(2-chloroisopropyl) ether										
42. bis(2-chloroethoxy) methane										
43. methylene chloride (dichloromethane)	•	•		•			•			
44. methyl chloride (chloromethane)										
45. methyl bromide (bromomethane)										
46. bromoform (tribromomethane)										
47. dichlorobromomethane										
48. chlorodibromomethane				•						
49. hexachlorobutadiene										
50. hexachlorocyclopentadiene										
51. isophorone										
52. naphthalene							•			
53. nitrobenzene										
54. 2-nitrophenol										
55. 4-nitrophenol										
56. 2,4-dinitrophenol										
57. 4,6-dinitro-o-cresol										
58. N-nitrosodimethylamine										
59. N-nitrosodiphenylamine										
60. N-nitrosodi-n-propylamine										
61. pentachlorophenol	•									
62. phenol	•	•					•		•	
63. bis(2-ethylhexyl) phthalate	•	•		•						
64. bucyl benzyl phthalate	•									

TABLE C.1 (Continued)

MATRIX OF PRIORITY POLLUTANTS POTENTIALLY DISCHARGED FROM INDUSTRIAL CATEGORIES

POLLUTANT FOUND IN SIGNIFICANT QUANTITY

PRIORITY POLLUTANTS / CATEGORICAL INDUSTRY	ADHESIVE	ALUMINUM FORMING	BATTERY MANUFACTURING	COAL MINING	COIL COATING	COPPER FORMING	ELECTRICAL PRODUCTS	ELECTROPLATING	FOUNDRIES	INORGANIC CHEMICALS
65. di-n-butyl phthalate	●	●		●						
66. di-n-octyl phthalate										
67. diethyl phthalate	●			●						
68. dimethyl phthalate	●									
69. benzo(a)anthracene (1,2-benzanthracene)										
70. benzo(a)pyrene (3,4-benzo-pyrene			●							
71. 3,4-benzofluoranthene (benzo(b)fluoranthene)										
72. benzo(k)fluoranthane (11,12-benzofluoranthene)										
73. chrysene										
74. acenaphthylene										
75. anthracene				●						
76. benzo(ghi)perylene (1,12-benzoperylene)										
77. fluorene										
78. phenanthrene										
79. dibenzo(ah)anthracene (1,2,5,6-dibenzanthracene)										
80. indeno (1,2,3-cd)pyrene (2,3-o-phenylenepyrene)										
81. pyrene										
82. tetrachloroethylene						●				
83. toluene				●						
84. trichloroethylene	●	●								
85. vinyl chloride (chloroethylene)										
86. aldrin										
87. dieldrin										
88. chlordane (technical mixture & metabolites)										
89. 4,4-DDT										
90. 4,4-DDE (p,p-DDX)										
91. 4,4-DDD (p,p-TDE)										
92. Alpha Endosulfan										
93. Beta Endosulfan										
94. endosulfan sulfate										
95. endrin										
96. endrin aldehyde										
97. heptachlor										
98. heptachlor epoxide (BHC-hexachlorocyclohexane)										
99. Alpha-BHC										
100. Beta-BHC										
101. Gamma-BHC(lindane)										
102. Delta-BHC (PCB-polychlorinated biphenyl)										
103. PCB-1242 (Arochlor 1242)										
104. PCB-1254 (Arochlor 1254)										
105. PCB-1221 (Arochlor 1221)										
106. PCB-1232 (Arochlor 1232)										
107. PCB-1248 (Arochlor 1248)										
108. PCB-1260 (Arochlor 1260)										
109. PCB-1016 (Arochlor 1016)										
110. toxaphene										
111. antimony (total)	●			●						●
112. arsenic (total)				●			●			●
113. asbestos (fibrous)										●
114. beryllium (total)										
115. cadmium (total)			●			●	●	●	●	●
116. chromium (total)	●	●		●	●	●	●	●	●	●
117. copper (total)	●	●		●		●	●	●	●	●
118. cyanide (total)	●				●			●		●
119. lead (total)	●	●	●	●		●	●	●		●
120. mercury (total)	●		●	●						●
121. nickel (total)		●	●	●				●		●
122. selenium (total)										●
123. silver (total)			●							●
124. thallium (total)				●						●
125. zinc (total)	●	●	●	●	●	●	●	●	●	●
126. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)										

TABLE C.1 (Continued)

MATRIX OF PRIORITY POLLUTANTS POTENTIALLY DISCHARGED FROM INDUSTRIAL CATEGORIES

POLLUTANT FOUND IN SIGNIFICANT QUANTITY

PRIORITY POLLUTANTS / CATEGORICAL INDUSTRY	IRON & STEEL	LEATHER TANNING & FINISHING	METAL FINISHING	NON-FERROUS METALS	ORE MINING & DRESSING	ORGANIC CHEMICALS, PLASTICS AND SYNTHETICS	PESTICIDES	PETROLEUM REFINING	PHARMACEUTICALS	PLASTICS PROCESSING
1. acenaphthene				●						
2. acrolein										
3. acrylonitrile										
4. benzene			●	●		●			●	
5. benzidine										
6. carbon tetrachloride			●			●				
7. chlorobenzene						●				
8. 1,2,4-trichlorobenzene				●						
9. hexachlorobenzene				●						
10. 1,2-dichloroethane			●	●						
11. 1,1,1-trichloroethane			●							
12. hexachloroethane										
13. 1,1-dichloroethane			●	●		●				
14. 1,1,2-trichloroethane			●							
15. 1,1,2,2-tetrachloroethane										
16. chloroethane										
17. bis(2-chloroethyl) ether										
18. 2-chloroethyl vinyl ether (mixed)										
19. 2-chloronaphthalene										
20. 2,4,6-trichlorophenol		●								
21. parachlorometa cresol										
22. chloroform (trichloromethane)		●				●			●	
23. 2-chlorophenol										
24. 1,2-dichlorobenzene		●								
25. 1,3-dichlorobenzene										
26. 1,4-dichlorobenzene		●								
27. 3,3-dichlorobenzidine										
28. 1,1-dichloroethylene			●							
29. 1,2-trans-dichloroethylene			●							
30. 2,4-dichlorophenol										
31. 1,2-dichloropropane										
32. 1,2-dichloropropylene (1,3-dichloropropene)										
33. 2,4-dimethylphenol										
34. 2,4-dinitrotoluene										
35. 2,6-dinitrotoluene										
36. 1,2-diphenylhydrazine										
37. ethylbenzene		●	●			●				
38. fluorathene			●	●						
39. 4-chlorophenyl phenyl ether										
40. 4-bromophenyl phenyl ether										
41. bis(2-chloroisopropyl) ether										
42. bis(2-chloroethoxy) methane			●							
43. methylene chloride (dichloromethane)		●		●		●			●	
44. methyl chloride (chloromethane)										
45. methyl bromide (bromomethane)										
46. bromoform (tribromomethane)										
47. dichlorobromomethane				●		●				
48. chlorodibromomethane										
49. hexachlorobutadiene										
50. hexachlorocyclopentadiene										
51. isophorone										
52. naphthalene		●	●							
53. nitrobenzene										
54. 2-nitrophenol										
55. 4-nitrophenol										
56. 2,4-dinitrophenol										
57. 4,6-dinitro-o-cresol										
58. N-nitrosodimethylamine										
59. N-nitrosodiphenylamine			●							
60. N-nitrosodi-n-propylamine										
61. pentachlorophenol		●	●							
62. phenol	●	●	●		●	●	●	●	●	
63. bis(2-ethylhexyl) phthalate		●	●	●		●				
64. butyl benzyl phthalate			●	●						

TABLE C.1 (Continued)

MATRIX OF PRIORITY POLLUTANTS POTENTIALLY DISCHARGED FROM INDUSTRIAL CATEGORIES

POLLUTANT FOUND IN SIGNIFICANT QUANTITY

PRIORITY POLLUTANTS / CATEGORICAL INDUSTRY	IRON & STEEL	LEATHER TANNING & FINISHING	METAL FINISHING	NON-FERROUS METALS	ORE MINING & DRESSING	ORGANIC CHEMICALS, PLASTICS AND SYNTHETICS	PESTICIDES	PETROLEUM REFINING	PHARMACEUTICALS	PLASTICS PROCESSING
65. di-n-butyl phthalate				●		●				
66. di-n-octyl phthalate				●						
67. diethyl phthalate			●	●						
68. dimethyl phthalate										
69. benzo(a)anthracene (1,2-benzanthracene)										
70. benzo(a)pyrene (3,4-benzo-pyrene				●						
71. 3,4-benzofluoranthene (benzo(b)fluoranthene)										
72. benzo(k)fluoranthane (11,12-benzofluoranthene)										
73. chrysene				●						
74. acenaphthylene										
75. anthracene			●							
76. benzo(ghi)perylene (1,12-benzoperylene)										
77. fluorene				●						
78. phenanthrene						●				
79. dibenzo(ah)anthracene (1,2,5,6-dibenzanthracene)										
80. indeno (1,2,3-cd)pyrene (2,3-o-phenylenepyrene)										
81. pyrene				●						
82. tetrachloroethylene			●	●		●				
83. toluene		●				●			●	
84. trichloroethylene										
85. vinyl chloride (chloroethylene)										
86. aldrin										
87. dieldrin										
88. chlordane (technical mixture & metabolites)										
89. 4,4-DDT										
90. 4,4-DDE (p,p-DDX)										
91. 4,4-DDD (p,p-TDE)										
92. Alpha Endosulfan										
93. Beta Endosulfan										
94. endosulfan sulfate										
95. endrin										
96. endrin aldehyde										
97. heptachlor										
98. heptachlor epoxide (BHC-hexachlorocyclohexane)										
99. Alpha-BHC										
100. Beta-BHC										
101. Gamma-BHC(lindane)										
102. Delta-BHC (PCB-polychlorinated biphenyl)										
103. PCB-1242 (Arochlor 1242)										
104. PCB-1254 (Arochlor 1254)				●						
105. PCB-1221 (Arochlor 1221)										
106. PCB-1232 (Arochlor 1232)										
107. PCB-1248 (Arochlor 1248)				●						
108. PCB-1260 (Arochlor 1260)										
109. PCB-1016 (Arochlor 1016)										
110. toxaphene										
111. antimony (total)				●						
112. arsenic (total)				●					●	
113. asbestos (fibrous)										
114. beryllium (total)				●						
115. cadmium (total)			●	●		●			●	●
116. chromium (total)	●	●	●	●		●		●	●	
117. copper (total)		●	●	●	●	●				●
118. cyanide (total)	●	●		●	●		●	●	●	
119. lead (total)		●	●	●	●	●			●	●
120. mercury (total)				●		●			●	
121. nickel (total)		●	●	●					●	
122. selenium (total)				●						
123. silver (total)				●						
124. thallium (total)										
125. zinc (total)	●	●	●	●	●			●	●	
126. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)							●			
							●			

TABLE C.1 (Continued)

MATRIX OF PRIORITY POLLUTANTS POTENTIALLY DISCHARGED FROM INDUSTRIAL CATEGORIES

POLLUTANT FOUND IN SIGNIFICANT QUANTITY

PRIORITY POLLUTANTS / CATEGORICAL INDUSTRY	PORCELAIN ENAMELING	PULP, PAPER, AND FIBERBOARD	STEAM ELECTRIC	TEXTILE MILLS	TIMBER PRODUCTS PROCESSING					
1. acenaphthene										
2. acrolein										
3. acrylonitrile										
4. benzene										
5. benzidine										
6. carbon tetrachloride										
7. chlorobenzene										
8. 1,2,4-trichlorobenzene										
9. hexachlorobenzene										
10. 1,2-dichloroethane										
11. 1,1,1-trichloroethane										
12. hexachloroethane										
13. 1,1-dichloroethane										
14. 1,1,2-trichloroethane										
15. 1,1,2,2-tetrachloroethane										
16. chloroethane										
17. bis(2-chloroethyl) ether										
18. 2-chloroethyl vinyl ether (mixed)										
19. 2-chloronaphthalene										
20. 2,4,6-trichlorophenol										
21. parachlorometa cresol										
22. chloroform (trichloromethane)		●								
23. 2-chlorophenol										
24. 1,2-dichlorobenzene										
25. 1,3-dichlorobenzene										
26. 1,4-dichlorobenzene										
27. 3,3-dichlorobenzidine										
28. 1,1-dichloroethylene										
29. 1,2-trans-dichloroethylene										
30. 2,4-dichlorophenol										
31. 1,2-dichloropropane										
32. 1,2-dichloropropylene (1,3-dichloropropene)										
33. 2,4-dimethylphenol										
34. 2,4-dinitrotoluene										
35. 2,6-dinitrotoluene										
36. 1,2-diphenylhydrazine										
37. ethylbenzene										
38. fluorathene										
39. 4-chlorophenyl phenyl ether										
40. 4-bromophenyl phenyl ether										
41. bis(2-chloroisopropyl) ether										
42. bis(2-chloroethoxy) methane										
43. methylene chloride (dichloromethane)										
44. methyl chloride (chloromethane)										
45. methyl bromide (bromomethane)										
46. bromoform (tribromomethane)										
47. dichlorobromomethane										
48. chlorodibromomethane										
49. hexachlorobutadiene										
50. hexachlorocyclopentadiene										
51. isophorone										
52. naphthalene										
53. nitrobenzene										
54. 2-nitrophenol										
55. 4-nitrophenol										
56. 2,4-dinitrophenol										
57. 4,6-dinitro-o-cresol										
58. N-nitrosodimethylamine										
59. N-nitrosodiphenylamine										
60. N-nitrosodi-n-propylamine										
61. pentachlorophenol					●					
62. phenol				●	●					
63. bis(2-ethylhexyl) phthalate				●						
64. butyl benzyl phthalate										

TABLE C.1 (Continued)

MATRIX OF PRIORITY POLLUTANTS POTENTIALLY DISCHARGED FROM INDUSTRIAL CATEGORIES

POLLUTANT FOUND IN SIGNIFICANT QUANTITY

PRIORITY POLLUTANTS / CATEGORICAL INDUSTRY	PORCELAIN ENAMELING	PULP, PAPER, AND FIBERBOARD	STEAM ELECTRIC	TEXTILE MILLS	TIMBER PRODUCTS PROCESSING					
65. di-n-butyl phthalate										
66. di-n-octyl phthalate										
67. diethyl phthalate										
68. dimethyl phthalate										
69. benzo(a)anthracene (1,2-benzanthracene)										
70. benzo(a)pyrene (3,4-benzo-pyrene										
71. 3,4-benzofluoranthene (benzo(b)fluoranthene)										
72. benzo(k)fluoranthane (11,12-benzofluoranthene)										
73. chrysene										
74. acenaphthylene										
75. anthracene										
76. benzo(ghi)perylene (1,12-benzoperylene)										
77. fluorene										
78. phenanthrene										
79. dibenzo(ah)anthracene (1,2,5,6-dibenzanthracene)										
80. indeno (1,2,3-cd)pyrene (2,3-o-phenylenepyrene)										
81. pyrene										
82. tetrachloroethylene				●						
83. toluene				●						
84. trichloroethylene				●						
85. vinyl chloride (chloroethylene)										
86. aldrin										
87. dieldrin										
88. chlordane (technical mixture & metabolites)										
89. 4,4-DDT										
90. 4,4-DDE (p,p-DDX)										
91. 4,4-DDD (p,p-TDE)										
92. Alpha Endosulfan										
93. Beta Endosulfan										
94. endosulfan sulfate										
95. endrin										
96. endrin aldehyde										
97. heptachlor										
98. heptachlor epoxide (BHC-hexachlorocyclohexane)										
99. Alpha-BHC										
100. Beta-BHC										
101. Gamma-BHC(lindane)										
102. Delta-BHC (PCB-polychlorinated biphenyl)										
103. PCB-1242 (Arochlor 1242)										
104. PCB-1254 (Arochlor 1254)										
105. PCB-1221 (Arochlor 1221)										
106. PCB-1232 (Arochlor 1232)										
107. PCB-1248 (Arochlor 1248)										
108. PCB-1260 (Arochlor 1260)										
109. PCB-1016 (Arochlor 1016)										
110. toxaphene										
111. antimony (total)				●						
112. arsenic (total)				●	●					
113. asbestos (fibrous)										
114. beryllium (total)										
115. cadmium (total)	●			●						
116. chromium (total)	●			●	●					
117. copper (total)	●		●	●	●					
118. cyanide (total)				●						
119. lead (total)	●			●						
120. mercury (total)				●						
121. nickel (total)	●		●	●						
122. selenium (total)				●						
123. silver (total)				●						
124. thallium (total)										
125. zinc (total)	●		●	●						
126. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)										

TABLE C.2

STATUS REPORT OF CATEGORIES TOTALLY OR PARTIALLY EXCLUDED FROM PRETREATMENT REGULATION

40 CFR Part	Industrial Category as listed in the EGD / NRDC Settlement Agreement	CATEGORY/SUBCATEGORY AFFECTED: PARAGRAPH 8 EXCLUSION Total	PARAGRAPH 8 EXCLUSION Partial	PROJECT DEFERRED Total	PROJECT DEFERRED Partial
456	Adhesive and Sealants				
467	Aluminum Forming		X		
444	Auto and Other Laundries	X			
461	Battery Mfg.		X		
458	Carbon Black	X			
434	Coal Mining		X		
465	Coil Coating		X		
468	Copper Forming		X		
469	Electrical and Electronic Products		X		X
413	[2]Electroplating		X		
457	Explosives Mfg.	X			
464	Foundry		X		
454	Gum and Wood Chemicals	X			
447	Ink Formulation	X			
415	Inorganic Chemicals		X		X
420	Iron and Steel Mfg.		X		
425	Leather Tanning and Finishing		X		
	[2]Mechanical Products				
433	[2]Metal Finishing		X		
421	Nonferrous Metals Manufacturing		X		
471	Nonferrous Metals Forming				
440	Ore Mining and Dressing		X		
414	[1]Organic Chemicals		X		
446	Paint Formulation	X			
443	Paving and Roofing Materials	X			
455	Pesticides		X		
419	Petroleum Refining				
439	Pharmaceutical Mfg.		X		
459	Photographic Equipment and Supplies	X			
416	[1]Plastics and Synthetics		X		
463	Plastics Molding and Forming				
466	Porcelain Enameling		X		
448	Printing and Publishing	X			
430	Pulp, Paper, and Paperboard		X		
428	Rubber Mfg.	X			
470	Shipbuilding	X			
417	Soap and Detergent Mfg.	X			
423	Steam Electric Powerplants		X		
410	Textile		X		
429	Timber		X		

[1]The *Organic Chemicals and the Plastics and Synthetics Categories* have been combined for BAT rulemaking under the Organic/Plastic Category.

[2]The Electroplating and the Mechanical Products Categories have been combined for BAT rulemaking under the Metal Finishing Category.

Source: This table is an update of the July 1981 Summary of Paragraph 8 Exclusions prepared by the Office of Quality the Effluent Guidelines Division, Office of Water Regulations and Standards, Office of Water, EPA. It was at memorandum from Jeffrey Denit, dated August 18, 1981. This information is subject to change.

TABLE C.3

REGULATED INDUSTRIAL SUBCATEGORIES WITH ASSOCIATED SIC CODES

Industry Category	SIC Code
Adhesives and Sealants	2891
Aluminum Forming	
• Rolling with Emulsions	3353, 3355
• Rolling with Neat Oils	3353, 3355
• Extrusion	3354
• Drawing with Neat Oils	3353, 3355
• Forging	3463
• Drawing with Emulsions or Soaps	3353, 3355
Coal Mining	
• Coal Preparation	1111, 1112, 1211, 1213
• Acid/Ferrugenous Mine Drainage	1111, 1112, 1211, 1213
• Alkaline Mine Drainage	1111, 1112, 1211, 1213
• Areas under Reclamation	1111, 1112, 1211, 1213
• Western Coal Mines	1211, 1213
Coil Coating	
• Steel Basis Material Coating	3479
• Galvanized Basis Material Coating	3479
• Aluminum Basis Material Coating	3479
Copper Forming	
• Hot Rolling	3351
• Cold Rolling	3351
• Extrusion	3351
• Drawing	3351
• Pickling	3351
• Alkaline Cleaning	3351
• Forging	3351
• Copper Foil Production	3497, 3351
Electroplating (Metal Finishing)	3471 & 3479
• Electroplating of Common Metals	(Some industries within
• Electroplating of Precious Metals	these subcategories may
• Electroplating of Speciality Metals	not be subject to regu-
• Anodizing	lations)
• Coatings	
• Chemical Etching & Milling	
• Electroless Plating	
• Printed Circuit Board	
• Chemical Matching	
• Immersion Plating	
• Pickling	
• Bright Dipping	
• Alkaline Cleaning	

Source: Summarized from (1) "Summary of Paragraph 8 Exclusions," EGD, OWRS, EPA, July, 1981; (2) Standard Industrial Classification Manual, Executive Office of the President, Office of Management and Budget, 1972.

TABLE C.3 (Continued)

REGULATED INDUSTRIAL SUBCATEGORIES WITH ASSOCIATED SIC CODES

Industry Category	SIC Code
Foundries	
• Iron and Steel	3322, 3324, 3325
• Copper	3362
• Aluminum	3361
• Zinc	3369
• Lead	3369
• Magnesium	3369
Inorganic Chemicals	
• Chlorine & Na or K Hydroxide	2812
• Hydrofluoric Acid Production	2819
• Na Dichromate & Sulfate Production	2819
• Titanium Dioxide	2816
• Aluminum Fluoride Production	2819
• Chrome Pigment	2816
• Copper Sulfate Production	2819
• Hydrogen Cyanide Production	2819
• Nickel Sulfate Production	2819
• Sodium Bisulfite Production	2819
• Sodium Silicofluoride Production	2819
Iron and Steel Manufacturing (BAT subcategorization scheme)	
• Cokemaking	3312
• Sintering	3312
• Ironmaking	3312
• Steelmaking	3312
• Vacuum Degassing	3312
• Continuous Casting	3312
• Hot Forming	3312, 3315, 3317[1]
• Scale Removal	3312, 3315, 3317[1]
• Acid Pickling	3312, 3315, 3317[1]
• Cold Forming	3316
• Alkaline Cleaning	3312, 3315, 3316, 3317[1]
• Hot Coating	3312, 3315, 3317[1]
Leather Tanning and Finishing	
• Hair Pulp Unhairing with Chrome Tanning and Finishing	3111
• Hair Save Unhairing with Chrome Tanning or Finishing	3111
• Unhairing with Vegetable or Alum. Tanning and Finishing	3111
• Finishing of Tanned Hides	3111
• Vegetable or Chrome Tanning of Unhaired Hides	3111
• Unhairing with Chrome Tanning and No Finishing	3111
• Shearing	3111

TABLE C.3 (Continued)

REGULATED INDUSTRIES SUBCATEGORIES WITH ASSOCIATED SIC CODES

Industry Category	SIC Code
Metal Finishing/Mechanical Products	Large number of subcategories including: 3411-29; 3432-66; 3482-3599; 3613-23; 3629-39
Nonferrous Metals Manufacturing	
• Bauxite Refining	2819
• Primary Aluminum Smelting	3334
• Secondary Aluminum Smelting	3341
• Primary Copper Smelting	3331
• Primary Copper Refining	3331
• Secondary Copper	3341
• Primary Lead	3332
• Primary Zinc	3333
• Metallurgical Acid Plants	3331, 3332, 3333
• Primary Columbium Tantalum	3339
• Secondary Silver - Photographic	3341
• Secondary Silver - Nonphotographic	3341
• Primary Tungsten	3339
• Secondary Lead	3341
Ore Mining and Dressing	
• Base and Precious Metals (Cu, Pb, Zn, Ag, Au, Pt, Mo)	1021, 1031, 1041, 1044, 1061
• Ferroalloy Ores	1061
• Uranium, Radium, Vanadium Ores	1094
• Tungsten Ore	1061
• Nickel Ores	1061
• Vanadium Ore (non-radioactive)	1094
• Antimony Ore	1099
Organic Chemicals, Plastics and Synthetic Materials	2865, 2869
• Processes with Process Water, Contact as Steam Diluent Quench or Vent Gas Absorbent	
Pesticides Chemicals	
• Organic Pesticide Mfg.	2869, 2879
• Metallo-Organic Pesticides	2869, 2879
• Pesticide Chemicals Formulating	2869, 2879
Petroleum Refining	
• Topping	2911
• Cracking	2911
• Petrochemicals	2911
• Lube	2911
• Integrated	2911

TABLE C.3 (Continued)

REGULATED INDUSTRIES SUBCATEGORIES WITH ASSOCIATED SIC CODES

Industry Category	SIC Code
Pharmaceutical Manufacturing	
• Fermentation Products	2833, 2831
• Extractions	2831, 2833
• Chemical Synthesis Products	2833
• Mixing/Compounding - Formulation	2834
• Research	2831, 2833, 2834
Plastics and Synthetics (Organic Chemicals, Plastics, Synthetic Materials)	
• Polyvinyl Chloride	2821
• Polyvinyl Acetate	2821
• Polystyrene	2821
• Polypropylene	2821
• Polyethylene	2821
• Cellophane	2821
• Rayon	2823
• ABS and SAN Resin - Copolymers	2821
• Polyester	2821
• Nylon 6	2821
• Cellulose Acetate	2823
• Acrylics	2821
• Ethylene - Vinyl Acetate	2821
• Polytetrafluoroethylene	2821
• Polypropylene Fiber	2823
• Alkyds & Unsaturated Polyester Resins	2821
• Cellulose Nitrate	2821
• Polyamide (Nylon 6/12)	2821
• Polyester Resins (Thermoplastics)	2821
• Silicones	2821
Porcelain Enameling	
• Steel	3631, 3632, 3633, 3639, 3469, 3479, 3431
• Cast Iron	Mainly 3631, 3431
• Aluminum	Mainly 3469, 3479, 3631
• Copper	Mainly 3479, Limited use in 3469 and 3631
Pulp, Paper and Paperboard	
• Unbleached Kraft	2611
• Sodium Based neutral Sulfite Semi-Chemicals	2611
• Ammonia Based Neutral Sulfite Semi-Chemical	2611
• Unbleached Kraft-Neutral Sulfite Semi-Chemical	2611
• Paperboard from Wastepaper	2631
• Dissolving Kraft	2611

TABLE C.3 (Continued)

REGULATED INDUSTRIAL SUBCATEGORIES WITH ASSOCIATED SIC CODES

Industry Category	SIC Code
Pulp, Paper and Paperboard (Continued)	
• Market Bleached Kraft	2611
• OCT Bleached Kraft	2611
• Fine Bleached Kraft	2611
• Papergrade Sulfite	2611, 2621
• Dissolving Sulfite Pulp	2611
• Groundwood - Thermo - Mechanical	2611, 2621
• Groundwood - CMN Papers	2611, 2621
• Groundwood - Fine Papers	2611, 2621
• Soda	2611, 2621
• Unbleached Kraft & Semi-Chemical	2611
• Semi-Chemical	2611
• Wastepaper - Molded Products	2646
• Nonintegrated - Lightweight Paper	2621
• Nonintegrated - Filter and Nonwoven Papers	2621
• Nonintegrated - Paperboard	2631
• Deink	2611, 2621
• Nonintegrated Fine Paper	2621
• Nonintegrated Tissue Papers	2631
• Tissue from Wastepaper	2647
• Papergrade Sulfite (Drum Wash)	2611, 2621
Steam Electric Power Generating	
• Generating Unit	4911, 4931
• Small Unit	4911, 4931
• Old Unit	4911, 4931
• Area Runoff	4911, 4931
Textile Industry	
• Wool Scouring	2299
• Wool Finishing	2231
• Woven Fabric Finishing	2261, 2262, 2269
• Knit Fabric Finishing	2251-59
• Carpet Mills	2271, 2272, 2279
• Stock and Yarn Dyeing & Finishing	2269
• Nonwoven Manufacturing	2297
• Felted Fabric Processing	2291
Timber Products	
• Wood Preserving - Boultonizing	2491
• Wood Furning and Fixtures (with and Without Water Wash Spray Booths or Laundry Facilities)	2511, 2512, 2517, 2521 2531, 2541

[1]Mainly Zero Dischargers
[2]Low Flow or Zero Discharge

TABLE C.4

DETECTION LEVELS FOR PRIORITY POLLUTANTS

	PRIORITY POLLUTANT[a]	Detection Level (ug/L)	EPA Method
1.	acenaphthene	1.8	610
2.	acrolein	0.6	603
3.	acrylonitrile	0.5	603
4.	benzene	0.2	602
5.	benzidine	0.08	605
6.	carbon tetrachloride	0.12	601
7.	chlorobenzene	0.25	601
8.	1,2,4-trichlorobenzene	0.05	612
9.	hexachlorobenzene	0.05	612
10.	1,2-dichloroethane	0.03	601
11.	1,1,1-trichloroethane	0.03	601
12.	hexachloroethane	1.6	625
13.	1,1-dichloroethane	0.07	601
14.	1,1,2-trichloroethane	0.02	601
15.	1,1,2,2-tetrachloroethane	0.03	601
16.	chloroethane	0.52	601
17.	bis (2-chloroethyl) ether	0.3	611
18.	2-chloroethyl vinyl ether (mixed)	0.13	601
19.	2-chloronaphthalene	1.9	625
20.	2,4,6-trichlorophenol	0.64	604
21.	parachlorometa cresol	0.36	604
22.	chloroform (trichloromethane)	0.05	601
23.	2-chlorophenol	0.31	604
24.	1,2-dichlorobenzene	0.15	601
25.	1,3-dichlorobenzene	0.32	601
26.	1,4-dichlorobenzene	0.24	601
27.	3,3-dichlorobenzidine	0.13	605
28.	1,1-dichloroethylene	0.13	601
29.	1,2-trans-dichloroethylene	0.1	601
30.	2,4-dichlorophenol	0.39	604
31.	1,2-dichloropropane	0.04	601
32.	1,2-dichloropropylene (trans 1,3-dichloropropene)	0.34	601
33.	2,4-dimethylphenol	0.32	604
34.	2,4-dinitrotoluene	0.02	609
35.	2,6-dinitrotoluene	0.01	609
36.	1,2-diphenylhydrazine	b	b
37.	ethylbenzene	0.2	602
38.	fluoranthene	0.21	610
39.	4-chlorophenyl phenyl ether	3.9	611
40.	4-bromophenyl phenyl ether	2.3	611

DETECTION LEVELS FOR PRIORITY POLLUTANTS (Continued)

	PRIORITY POLLUTANT[a]	Detection Level (ug/L)	EPA Method
41.	bis (2-chlorisopropyl) ether	0.8	611
42.	bis (2-chloroethoxy) methane	0.5	611
43.	methylene chloride (dichloromethane)	0.25	601
44.	methyl chloride (chloromethane)	0.08	601
45.	methyl bromide (bromomethane)	1.18	601
46.	bromoform (tribromomethane)	0.2	601
47.	dichlorobromomethane	0.1	601
48.	chlorodibromomethane	b	601
49.	hexachlorobutadiene	0.34	612
50.	hexachlorocyclopentadiene	-	-
51.	isophorone	5.7	609 FID[c]
52.	naphthalene	1.8	610
53.	nitrobenzene	3.6	609 FID
54.	nitrophenol	0.45	604
55.	4-nitrophenol	2.8	604
56.	2,4-dinitrophenol	13.0	604
57.	4,6-dinitro-o-cresol	16.0	604
58.	N-nitrosodimethylamine	0.15	607
59.	N-nitrosodiphenylamine	0.81	607
60.	N-nitrosodi-n-propylamine	0.46	607
61.	pentachlorophenol	7.4	604
62.	phenol	0.14	604
63.	bis (2-ethylhexyl) phthalate	2.0	606
64.	butyl benzyl phthalate	0.34	606
65.	di-n-butyl phthalate	0.36	606
66.	di-n-octyl phthalate	3.0	606
67.	diethyl phthalate	0.49	606
68.	dimethyl phthalate	0.29	606
69.	benzo (a) anthracene (1,2-benzanthracene)	0.013	610 HPLC[d]
70.	benzo (a) pyrene (3,4-benzopyrene)	0.023	610 HPLC
71.	3,4-benzofluoranthene	0.018	610 HPLC
72.	benzo (k) fluoranthane (11, 12-benzofluoranthene)	0.017	610 HPLC
73.	chrysene	0.15	610 HPLC
74.	acenaphthylene	2.3	610 HPLC
75.	anthracene	0.66	610 HPLC
76.	benzo (ghi) perylene (1, 12-benzoperylene)	0.076	610 HPLC
77.	fluorene	0.21	610 HPLC
78.	phenanthrene	0.64	610 HPLC
79.	dibenzo (a,h) anthracene (1,2,5,6-dibenzanthracene)	0.03	610 HPLC
80.	indeno (1,2,3-cd) pyrene (2,3-o-phenylenepyrene)	0.043	610 HPLC
81.	pyrene	0.27	610 HPLC
82.	tetrachloroethylene	0.03	601

DETECTION LEVELS FOR PRIORITY POLLUTANTS (Continued)

	PRIORITY POLLUTANT[a]	Detection Level (ug/L)	EPA Method
83.	toluene	0.2	602
84.	trichloroethylene	0.12	601
85.	vinyl chloride (chloroethylene)	0.18	601
86.	aldrin	0.004	608
87.	dieldrin	0.002	608
88.	chlordane (technical mixture & metabolites)	0.014	608
89.	4, 4'-DDT	0.012	608
90.	4, 4'-DDE (p, p'-DDX)	0.004	608
91.	4, 4'-DDD (p, p'-TDE)	0.011	608
92.	Alpha-endosulfan	0.014	608
93.	Beta-endosulfan	0.004	608
94.	endosulfan sulfate	0.066	608
95.	endrin	0.006	608
96.	endrin aldehyde	0.023	608
97.	heptachlor	0.003	608
98.	heptachlor epoxide	0.083	608
99.	Alpha-BHC	0.003	608
100.	Beta-BHC	0.006	608
101.	Gamma-BHC (lindane)	0.004	608
102.	Delta-BHC	0.009	608
103.	PCB-1242 (Arochlor 1242)	0.065	608
104.	PCB-1254 (Arochlor 1254)	b	608
105.	PCB-1221 (Arochlor 1221)	b	608
106.	PCB-1232 (Arochlor 1232)	b	608
107.	PCB-1248 (Arochlor 1248)	b	608
108.	PCB-1260 (Arochlor 1260)	b	608
109.	PCB-1016 (Arochlor 1016)	b	608
110.	toxaphene	0.24	608
111.	antimony (total)	10	FUR[e]
112.	arsenic (total)	10	FUR
113.	asbestos (fibrous)	b	
114.	beryllium (total)	1	FLAME[f]
115.	cadmium (total)	1	FUR
116.	chromium (total)	5	FUR
117.	copper (total)	1	FUR
118.	cyanide (total)	20	DIST[g]
119.	lead (total)	10	FUR
120.	mercury (total)	0.2	CV[h]
121.	nickel (total)	10	FUR
122.	selenium (total)	5	FUR
123.	silver (total)	1	FUR

DETECTION LEVELS FOR PRIORITY POLLUTANTS (Continued)

PRIORITY POLLUTANT[a]	Detection Level (ug/L)	EPA Method
124. thallium (total)	10	FUR
125. zinc (total)	1	FUR
126. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)	0.003	

[a] This numbering does not correspond with numbers on EPA's list of priority pollutants.

[b] No detection limit determined.

[c] Flame ionization detection (FID).

[d] High pressure liquid chromatography (HPLC).

[e] Furnace (FUR).

[f] Flame (FLAME).

[g] Distillation (DIST).

[h] Cold vapor (CV).

Source: "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater," Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268. EPA-600/4-82-057. July 1982.

Table C.4 lists the analytical methods and appropriate detection limits for the EPA priority pollutants. The information contained in "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater" represents an effort to provide procedures that are as uniform and cost effective as practical for a wide cross-section of chemical compound classes. Due to the variable chemical and physical properties of the parameters, some compromises had to be made. Therefore, in some of the methods, the extraction procedures, cleanup procedures and determinative steps are not optimum for all parameters.

☆U.S. GOVERNMENT PRINTING OFFICE: 1983-421-545/3078