United States
Environmental Protection
Agency

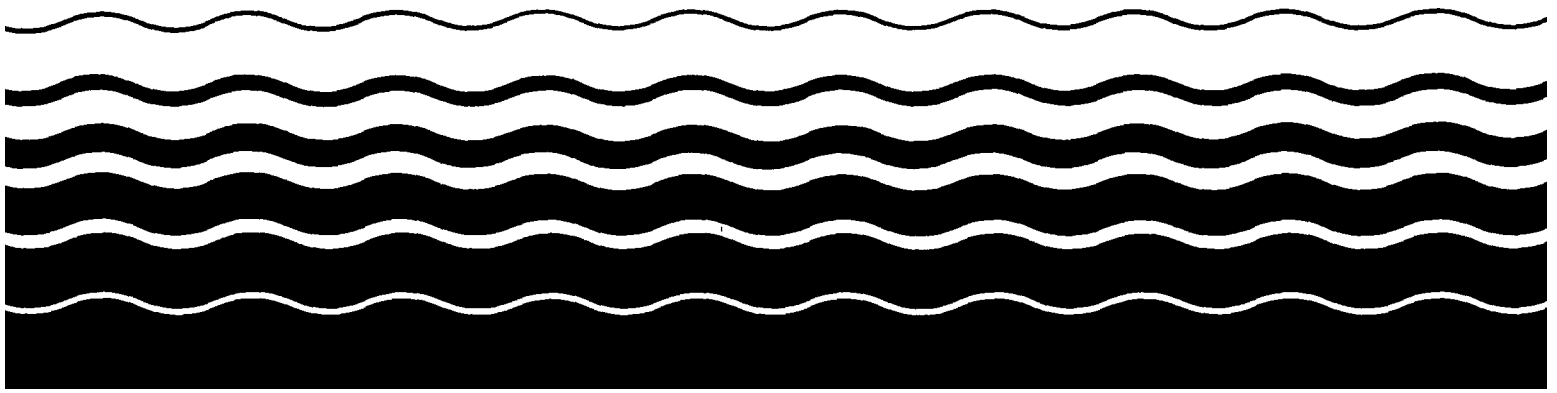
Office Of Water
(EN-336)

21W-4001
February 1991

EPA

Control Of Slug Loadings To POTWs

Guidance Manual



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

JAN 3 1991

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Pretreatment Program Guidance: Slug Loadings to POTWs

FROM: James R. Elder, Director
Office of Water Enforcement and Permits (EN-335)

TO: Users of the Guidance Manual for Control of Slug Loadings to POTWs

The Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works (known as the Domestic Sewage Study, or DSS) documented the widespread existence of slug loadings of toxic pollutants and hazardous constituents to publicly owned treatment works (POTWs) from industrial users (IUs). Slug loadings (spills and batch discharges) present special challenges to POTWs, leading to problems such as worker illness, actual or threatened explosions, biological upset or inhibition, toxic fumes, corrosion, and contamination of sludge and receiving waters.

The DSS found that categorical pretreatment standards, locally derived numeric limits, and reporting requirements were not always effective in handling accidental spills or irregular high strength batch discharges. The DSS therefore recommended that EPA consider expanding pretreatment controls on these discharges (as well as expanding controls on other discharges of hazardous wastes). In September, 1988, EPA made a preliminary distribution of its Guidance Manual for Control of Slug Loadings to POTWs.

On July 24, 1990, the Agency promulgated amendments to the general pretreatment and NPDES regulations to enhance control of toxic pollutant and hazardous waste discharges to POTWs (55 FR 30082). One of these amendments, 40 CFR 403.8(f)(2)(v), specifically addresses slug discharges. It provides that POTWs with approved pretreatment programs shall evaluate, at least once every two years, whether each significant industrial user (defined in 40 CFR 403.3(t)) needs a plan to control slug discharges. For purposes of this provision, a slug discharge is any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge. If a POTW decides that a slug control plan is needed, 40 CFR 403.8(f)(2)(v) provides that the plan shall contain, at a

minimum, the following elements:

- Description of discharge practices, including non-routine batch discharges;
- Description of stored chemicals;
- Procedures for immediately notifying the POTW of slug discharges, including any discharge that would violate a prohibition under 40 CFR 403.5(b), with procedures for follow-up written notification within five days;
- If necessary, procedures to prevent adverse impact from accidental spills, including inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site run-off, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants (including solvents), and/or measures and equipment for emergency response.

This provision sets forth only the minimal federal requirements for slug control plans. All POTWs (not just those required to establish federally-approved pretreatment programs) may require such plans of any industrial user (not just significant industrial users) as necessary.

Pursuant to the new amendments, we are now making a wider distribution of our slug control guidance. The guidance provides detailed information on how to evaluate industrial users to determine whether they need slug control plans. It will also help POTWs decide which measures are necessary for different industrial users and which kinds of response measures are useful in particular situations. By supplementing existing or future categorical standards and numerical local limits, slug control measures will help reduce influent loadings overall, including loadings of toxic pollutants and hazardous constituents. In addition, slug controls can be useful to help POTWs comply with NPDES effluent limitations on specific chemicals or whole effluent toxicity.

Further information about the national pretreatment program can be obtained by writing to the Permits Division (EN-336), U.S. EPA, 401 M St., S.W., Washington, D.C. 20460.

GUIDANCE MANUAL FOR CONTROL OF SLUG LOADINGS TO POTWS

January 1991

Office of Wastewater Enforcement and Compliance
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

Acknowledgements

This document was prepared under the guidance of EPA's Office of Water Enforcement and Permits by Science Applications International Corporation (SAIC) under EPA Contract Number 68-01-7043. The EPA Work Assignment Manage. was Katharine Wilson. The following participated as peer reviewers and provided valuable comments:

Office of Water Enforcement and Permits: William F. Brandes, John Cannell, Marilyn Goode, Richard Kinch, Ephraim King, Denise Scott;

EPA Region IV: Bob McCann, EPA Region V: David Rankin and Carol Staniec, EPA Region VIII: Patrick Godsil and Dana Allen, EPA Region IX: Keith Silva, EPA Region X: Robert Robichaud;

Office of Research and Development: Dolloff F. Bishop;

Office of Solid Waste and Emergency Response: Barbara Hostage and Hubert Watters;

Association of Metropolitan Sewerage Agencies.

In addition, acknowledgement is given to those POTWs whose programs provided examples for this manual.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

APPENDICES

LIST OF TABLES AND FIGURES

1. INTRODUCTION

1.1 PURPOSE OF THIS MANUAL

This manual provides guidance to publicly owned treatment works (POTWs) on how to develop and implement programs to control slug loadings to POTWs. The manual discusses the two ways to control impacts of slugs on POTWs: prevention and remediation. The first and preferable way is to prevent slugs at their source by imposing controls on industrial users. The second approach, where prevention fails, is remedial response by the POTW.

This guidance is intended to help POTWs implement POTW-wide Slug Control Programs, and evaluate each of their industrial users to determine whether they need individual Slug Control Plans. The manual presents a range of Slug Control Program development options. The recommendations should be useful to all POTWs interested in controlling slug loadings. A POTW may review the sections contained in this manual and adapt one of the simplified example Slug Control Programs in Appendix D to its own needs, or select from among the recommended procedures to develop or augment its own Slug Control Program.

1.1.1 Control of Slug Loadings

Categorical industrial pretreatment standards and locally-derived numerical limits generally are used to limit industrial user (IU) pollutant discharges. However, such controls are often ineffective in addressing accidental spills or irregular high strength batch discharges, either of which may be received by the POTW as a "slug loading."

The General Pretreatment regulations define slug loading as any pollutant discharge violating the specific prohibitions under 40 CFR 403.5(b). These currently include: (1) fire or explosion, (2) corrosion, (3) obstruction, (4) interference, or (5) heat [40 CFR 403.5(b)]. The regulations require that: "All categorical and noncategorical Industrial Users shall notify the POTW immediately of all discharges that could cause problems to the POTW, including any slug loadings, as defined by 403.5(b), by the Industrial User" [40 CFR 403.12(f)].

Slug prevention may help IUs implement not only the specific prohibitions above, but also the general prohibition against pass through and interference [40 CFR 403.5(a) and (b)]. Slug control can supplement existing or future numerical local limits and may be necessary to help POTWs comply with National Pollutant Discharge Elimination System (NPDES) effluent limitations on specific chemicals or whole effluent toxicity.

1.1.2 Elements of a Slug Control Program

The basic elements in developing a comprehensive POTW Slug Control Program include:

- Evaluating the Need for a Slug Control Program
  - Identifying potential IU slug sources and their risk categories
  - Evaluating and/or improving the legal authority to regulate slugs
- Developing an IU Control Program
  - Requiring designated IUs to develop Slug Control Plans
  - Inspecting and monitoring designated IUs
- Developing a POTW Slug Response Program
  - Monitoring for slugs
  - Developing emergency response procedures and resources.

Chapter 2 discusses how to evaluate the need for a Slug Control Program and how to develop prevention procedures. Chapter 3 discusses remedial response procedures.

1.2 SCOPE OF THE SLUG LOADING PROBLEM

The 1985 EPA Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works contained information on the types, sizes, and number of generators that dispose of hazardous constituents to sewers, and the types and quantities of constituents disposed of in this manner. The report was required by Section 3018(a) of the Resource Conservation and Recovery Act (RCRA). A 1985 survey undertaken by the Association of Metropolitan Sewerage Agencies (AMSA), an organization of some of the larger POTWs, was one of the sources of the Report to Congress. The survey indicated:

- **Sixty percent of POTW respondents to the AMSA survey have received hazardous wastes as a result of spills** to public sewers

- **Fifty percent report receiving batch discharges** from connected industries.

Among other things, the survey documented discharges around the country and their impacts on the sewer collection system and treatment plant. These discharges had caused a variety of POTW operational problems, including worker illness, actual or threatened explosion, biological upset/inhibition, toxic fumes, corrosion, and contamination of sludge and receiving waters. Table 1-1 lists some of the potential adverse impacts of slug discharges to the POTW, its workers, and the environment. Table 1-2, drawn from the AMSA survey as well as a survey undertaken by Busch (Operations Forum, Journal of the Water Pollution Control Federation, April 1986), provides examples of actual damage to the collection system and treatment plant resulting from slugs.

In Gloucester County, New Jersey, an electroplating company and corporate official were indicted in connection with the batch discharge of 1,1,1 trichloroethane which allegedly killed a sewer worker. Elsewhere, solvent and organic discharges have caused symptoms such as nausea, skin irritation, shortness of breath, and headaches among sewer workers, sometimes requiring evacuation of collection systems and treatment facilities.

Slugs have also caused harm to the environment, particularly to water and sludge quality. Preventing these impacts will be of increasing concern to POTWs as EPA and the States impose more stringent water and sludge quality limitations. Some slug loadings limit a POTW's sludge disposal options. For example:

- A small chemical plant was identified as a significant contributor (120 lbs/day) of mercury to the Passaic Valley Wastewater Treatment Plant (Passaic, NJ). The concentration of mercury in the sludge limited the municipality's disposal options.

- The Sioux City Waste Treatment Plant (SCWTP) experienced isolated slugs of zinc in March and again in April of 1984. Levels as high as 16 mg/l Zn were observed in the treatment plant influent and both slugs resulted in an upset of the activated sludge process and violations of the NPDES discharge limits. In addition to the process upsets, sludge held in storage lagoons at the facilities became contaminated with zinc.

TABLE 1-1. POTENTIAL ADVERSE IMPACTS OF SLUG LOADINGS

Impact Category	Subcategory
To the POTW	Collection System: explosions, corrosion, obstruction
	Headworks: explosion, corrosion
	Primary Plant: obstruction, corrosion
	Secondary Plant: inhibition, upset
	Sludge Handling: inhibition
	Nitrification: interference, upset
	Operation and Maintenance Costs
	Sludge Disposal Problems
To the Worker	Exposure to fumes and explosions resulting in illness, injury or death
To the Environment	Violations of NPDES Permits (Water Quality, Sludge Quality)
	Air Quality Impacts

TABLE 1-2. INDUSTRIAL SPILLS OF HAZARDOUS MATERIALS

IMPACT ON SEWER COLLECTION SYSTEM

City	Industry	Pollutants	Impact
Akron, OH	Rubber Mfg.	Naphtha, Acetone Isopropyl Alcohol	Explosion
Bayville, NJ	Pharmaceutical	Sulfides from high BOD	Corrosion
Bergen County, NJ	Water Treatment	High and low pH	Corrosion
Bloomington, IN	Grain Processing	Hexane	Explosion
Dayton, OH	Electroplating Food Processor	Acids	Corrosion
Forth Worth, TX	Gasoline Station	Gasoline	Explosion
Hillborough, FL	Battery Salvaging	Acids	Corrosion
Jacksonville, FL	Organic Chemicals	Solvents	Corrosion, Odors
Los Angeles County, CA	Petroleum Refining	Sulfides	Corrosion
St. Paul, MN	Metal Finishing	Acids	Corrosion
Toledo, OH	Adhesives	Glue	Plugged Sewers
WSSC, MD	Photofinishing	Sodium Bisulfide, low pH	Corrosion

IMPACT ON TREATMENT PLANT

City	Industry	Pollutants	Impact
Boise, ID	Electroplating	Cu, Ni, Zn	Reduced treatment efficiency
Camas, WA	Pulp Mill	Chlorine	Biological upset (2 days)
Camden County, NJ	Dye Manufacturing	Aniline	Biological upset, sludge contamination
Dallas, TX	Organic Chemicals	Xylene, Toluene	Fouled carbon scrubbers
Depue, IL	Fertilizer Manufacturing	Sulfuric Acid	Biological process wiped out

Despite the potential harm from slugs, EPA's pretreatment program audits and program reviews indicate that less than half of all POTWs subject to the pretreatment program have spill containment and prevention programs. Problems in developing such programs include lack of information on materials stored onsite and inability to identify potential toxic dischargers. POTW system size and inadequate sampling procedures often make prevention and detection of slugs difficult.

Nonetheless, some industries and POTWs do have strict slug control and prevention measures. According to a January, 1987 AMSA membership survey, virtually all AMSA members require notification of spills, roughly two-thirds implement comprehensive spill prevention programs, and three-quarters report that they require industries to take spill prevention measures.

1.3 BENEFITS OF A SLUG CONTROL PROGRAM

By identifying and categorizing potential slug sources and implementing a program to prevent slugs, POTWs can minimize risks associated with slugs, often in a cost-effective manner. Implementation of a Slug Control Program can be a form of pollutant "source reduction." Moreover, continuation of the Domestic Sewage Exclusion under RCRA will increase the need for better control of hazardous wastes to POTWs. Slug Control Programs can help reduce loadings of these wastes to POTWs.

EPA is now aggressively pursuing its policy of imposing whole effluent toxicity limits on many NPDES dischargers ("Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants," 49 FR 9016). Control of IU slug loadings may reduce POTW noncompliance with toxicity limits or be a part of a toxicity reduction evaluation (TRE). In addition, slug control may reduce the need for increasing treatment capacity to meet toxicity limits when slugs contribute to effluent toxicity.

An industrial user can also benefit from a slug discharge control plan. Worker safety can be maximized by preventing spills or by safe handling of hazardous materials if a spill does occur. In many cases, the economics of spill cleanup alone can justify preventive measures. Good housekeeping prac-

tices, employee education, and timely notification to the POTW may be all that are needed to eliminate or reduce slugs. An industrial user could spend far less on slug discharge prevention than he would to remedy the effects of an accidental spill which resulted in a sewer explosion.

Slug control can also help protect IUs' capital investments and prevent chemical contamination of the site. For example, a well-implemented plan can protect pipes, valves, treatment and process equipment, floors, and other structures. The plan may also avoid costly soil and ground-water clean-up costs should pipes or other structures fail to convey or contain hazardous wastes.

Finally, through preventive measures an IU may maintain a more accurate inventory, recycle or reclaim process materials which would otherwise be lost via slugs to the sewer system. For example, one dairy product manufacturer in Raleigh, North Carolina regularly discharged stainless steel tanker cleaning wastes directly to the sewer. Average BODs of 10,000 mg/l, with occasional slug values in the 30,000 to 40,000 mg/l range, were typical. To solve the BOD slug problem, the IU, working with North Carolina State University, developed a vacuum recovery system and successfully identified a market for collected whey waste.

1.4 RELEVANT CONTROL EFFORTS

Slug control is not a new concept in pretreatment. In many cases, dischargers to POTWs are already subject to some slug controls as a result of existing Federal, State, or local, self-imposed efforts. These efforts may serve as a reasonable starting point for a POTW's Slug Control Program development efforts although they may not cover all IUs or all wastes of concern, or may not be intended primarily to protect the POTW, its workers, or the environment. A summary of existing Federal programs relevant, or potentially relevant, to slug control appears in Table 1-3.

TABLE 1-3. SUMMARY OF RELEVANT EXISTING FEDERAL PROGRAMS

Authority	Applicable Sections/Program	Affected Regulatory Community	Requirements
Federal Clean Water Act (CWA)	• General Pretreatment Regulations - 40 CFR 403.12(f)	• Industrial Users	• IUs must notify POTW of any slug loading which may violate the specific prohibitions.
	- 40 CFR 403.5(a) and (b)		• Prohibits IU violation of general and specific prohibitions.
	• Toxic Organic Management Plans (TOMP) 40 CFR Parts 413, 433, and 469	• Electroplating, metal finishing, and electrical and electronic component industrial categories	• Provides option to develop plan in lieu of routine monitoring for total toxic organics. Plan must include: - List of toxic organic components - Disposal method used in lieu of discharge - Procedures to assure that toxic organic compounds do not spill or leak to wastewater.
	• Spill Control and Countermeasures 40 CFR Part 112 (Oil Handling Facilities)	• Facilities that have potential to discharge oil to surface waters	• Preparation and implementation of spill prevention control and countermeasure plan (40 CFR Part 112)
		• Indirect and direct dischargers	• Specify minimum requirements for oil handling facilities with potential for spills to surface waters
		• Applies to oil handling facilities	• Imposes additional requirements depending on specific operations

TABLE 1-3. SUMMARY OF RELEVANT EXISTING FEDERAL PROGRAMS (Continued)

Authority	Applicable Sections/Program	Affected Regulatory Community	Requirements
	o 40 CFR 125.100 to 125.104 - National Pollutant Discharge Elimination System (NPDES)	o Direct dischargers who use, manufacture, store, handle or discharge pollutants listed as 307(a)(1) toxic or as hazardous under Section 311 of the Clean Water Act	o Imposes Best Management Practices (BMP) for all activities which may result in the release of pollutants to surface waters
Resource Conservation and Recovery Act (RCRA)	o 40 CFR 264 and 265* - Preparedness and Prevention Requirements (Subpart C) and Contingency Plan and Emergency Procedures (Subpart D)	o Hazardous waste generators and interim status treatment, storage, and disposal facilities (TSDFs)	o Facility design, operation, equipment, maintenance and waste handling requirements o Description of actions to be taken in the event of an emergency (including slug discharge) o Description of wastestream constituents must be provided

*Generators are subject to Subparts C and D of the interim status (40 CFR 265) requirements. TSDFs are subject to interim status requirements until permitted, then they are subject to 40 CFR 264 requirements. Small quantity generators need only comply with 40 CFR Part 265, Subpart C.

TABLE 1-3. SUMMARY OF RELEVANT EXISTING FEDERAL PROGRAMS (Continued)

Occupational Safety and Health Act (OSHA)	• 29 CFR Part 1910	• All Employers required to meet OSHA standards	• Written Emergency Action Plan (EAP) • Escape routes and procedures • Instructions for employees on critical plant operations • Reporting requirements • Alarm system • Employee Training identifying responsibilities under EAP • Material Safety Data Sheets (MSDS)
Superfund Amendments and Reauthorization Act (SARA)		• Industries required to complete MSDS under OSHA must comply with SARA Title III, Community-Right-to Know requirements	• Submit MSDS, to develop hazardous chemical inventories • Certain toxic chemical releases must be reported

1.4.1 Federal Programs

Clean Water Act

Under authority of the Clean Water Act (CWA), slugs are regulated by various programs. POTW operators are most familiar with NPDES and pretreatment program requirements. However, the CWA also provides EPA with specific authority to address oil and hazardous substance spills. These authorities are explained below.

Pretreatment

Section 403.12(f) of the General Pretreatment Regulations requires that industrial users immediately notify POTWs to which they are discharging of any slug loading which would violate the specific prohibitions. Toxic Organic Management Plans (TOMPs) are also relevant to slug control.

TOMPs are addressed in 40 CFR Parts 413, 433 and 469. Three industrial categories (electroplating, metal finishing, electrical and electronic components) subject to categorical pretreatment regulations have the option of developing TOMPs and submitting them to the POTW in lieu of routine monitoring for total toxic organics. A TOMP must include:

- List of toxic organic compounds used
- Method of disposal used in lieu of discharge
- Procedures for assuring that toxic organics do not spill or leak into wastewater.

While the applicability and requirements of TOMPs are fairly limited, such plans may be appropriate for additional IUs. EPA's Guidance Manual for Implementing Total Toxic Organics (TTO) Pretreatment Standards provides guidance on the development of TOMPs by IUs.

Best Management Practices (BMPs)

Direct dischargers are subject to the requirements of the NPDES permitting program. Under 40 CFR 125.100-125.104, all direct dischargers who

use, manufacture, store, handle, or discharge pollutants listed as toxic under 307(a)(1) or as hazardous under 311 of the CWA must follow BMPs for all activities which may result in the release of "significant" amounts of pollutants to waterbodies. Such activities include:

- Material storage
- In plant transfer
- Process and material handling
- Loading and unloading operations
- Plant site runoff
- Sludge and waste disposal.

The concept of BMPs may be helpful in developing IU slug controls. BMPs address eight items: (1) material inventories; (2) material compatibility; (3) employee training; (4) reporting and notification procedures; (5) equipment inspections; (6) preventive maintenance; (7) housekeeping; and (8) security. EPA's manual, NPDES Best Management Practices Guidance Document describes more fully the elements of BMPs.

Oil and Hazardous Substances

Under Section 311 of the CWA, EPA has the authority to develop regulations to prevent spills of oil and hazardous substances. Section 311 also requires immediate notification to the Federal Government of discharges to U.S. waters; see 40 CFR Parts 110, 116 and 117. To date, EPA has promulgated final regulations to prevent spills from oil handling facilities. These regulations (40 CFR 112) apply to facilities that handle oil and have the potential for discharging oil to surface waters in the event of a spill. While these regulations apply to indirect and direct dischargers, the regulations are not specifically designed to prevent spills from reaching POTWs.

Besides requiring immediate notification to the Federal Government of discharges to U.S. waters, the regulations also require the preparation and implementation of spill prevention control and countermeasures, specify minimum requirements for all onshore and offshore facilities with the potential for spills to surface waters, and impose additional requirements depending on the specific operation (e.g., onshore bulk storage tanks, facility tank

car and tank truck loading). As these regulations apply only to spills from oil handling equipment and operations, many elements are too specific to be used to develop general requirements for IUs, although some measures are potentially applicable to control of POTW slug discharges.

The Resource Conservation and Recovery Act

While RCRA requirements specifically exempt the discharge of hazardous waste when mixed with domestic sewage, some RCRA requirements may apply to IUs which are hazardous waste handlers. Three major groups of hazardous waste handlers are regulated under the Resource Conservation and Recovery Act (RCRA): generators, transporters, and treatment, storage and disposal facilities (TSDFs). Two of these groups, generators and TSDFs, are subject to the spill prevention and response procedures in both Subparts C (Preparedness and Prevention) and D (Contingency Plan and Emergency Procedures) of 40 CFR 265 and 40 CFR 264. These 40 CFR 265 and 264 requirements are similar, and no distinction needs to be made between the two for purposes of this manual. Moreover, POTW personnel should be aware that generators are subject to 40 CFR 265, whereas TSDFs are subject to either 40 CFR 265 or 40 CFR 264 depending on permitted status (facilities solely classified as hazardous waste generators not subject to RCRA permitting requirements). As implied by the term "treatment, storage and disposal facilities", TSDFs are those facilities that either treat, store or dispose of hazardous wastes. Generators on the other hand, are not authorized to treat or dispose of hazardous wastes, although they may store hazardous wastes in containers for less than 90 days. A special subset of RCRA generators, commonly known as small quantity generators (i.e., those that generate between 100 and 1000 kg/m of RCRA hazardous wastes) are only subject to the Subpart C Preparedness and Prevention requirements of 40 CFR 265. Subpart C and D requirements are summarized below.

As stated above, RCRA generators and TSDFs are subject to Preparedness and Prevention Plan Requirements. The Preparedness and Prevention Plan requirements have been designed to minimize the possibility and effect of an explosion, spill, or fire at a RCRA facility. Generally, the facility must have the following equipment:

- An internal alarm or communications systems
- A device capable of summoning emergency assistance from local agencies
- Fire and spill control equipment
- Decontamination equipment.

These regulations also specify other requirements such as maintaining equipment in proper operating condition, routine testing of equipment, and providing adequate aisle space to allow unrestricted movement of emergency equipment to any area of the facility.

Facilities must attempt to make arrangements with local authorities (e.g., police and fire departments) to familiarize them with the layout of the facility, the properties of the hazardous wastes handled there, and the places where facility personnel would normally be working. In addition, local hospitals should be informed of the properties of the hazardous wastes handled at the facility, and the types of injuries or illnesses that could result from a fire, explosion, or accidental release.

Large quantity generators and TSDFs are subject to Contingency Plan and Emergency Procedures Requirements. The contingency plan is a prepared set of responses to an emergency. It should list facility personnel who will serve as emergency coordinators and the emergency equipment that will be available. If an evacuation could be necessary for the facility, an evacuation plan must be included. The plan must describe the arrangements agreed to by the local police and other government (e.g., fire and hospital) officials pursuant to the preparedness and prevention requirements discussed above.

Copies of the plan must be maintained at the facility and submitted to all local governmental units that might be called upon in the event of an emergency. The plan must also be available to EPA personnel during on-site inspections. If the facility already has prepared a Spill Prevention, Control and Countermeasures (SPCC) plan under the Clean Water Act, the SPCC plan may be amended to incorporate the hazardous waste provisions".

An employee of the facility designated as the Emergency Coordinator must be on call at all times to coordinate implementation of the contingency plan in the event of an emergency threatening human health or the environment. The Emergency Coordinator must file a written report with the EPA Regional Administrator within 15 days after an incident.

While EPA has stated that it does not intend the contingency plan to be triggered when an insignificant amount of waste is released by small spills or leaking valves, EPA did not include such a de minimis provision in the regulations.

Occupational Safety and Health Act

The Occupational Safety and Health Act (OSHA) [29 CFR, Chapter XVII (1980)] is also relevant. Under OSHA, an employer has a general duty to "furnish to each of his employees a place of employment which is free from recognized hazards that are causing or likely to cause death or serious physical harm." Exposure to or contact with slug loadings may be one of the "imminent dangers" prohibited by OSHA standards.

It should be noted, however, that the employer is also required to develop and implement Emergency Action Plans* that identify the safe means of escape from fire or other emergencies (29 CFR §1910.36)". These plans may not rely solely on a single safeguard; the employer must provide numerous alternatives for minimizing the hazard to ensure employee safety. Employees must also be trained in emergency plant operation and evacuation procedures. If spills create an imminent danger, they can be controlled by a number of alternative methods of hazard minimization, as established in The Emergency Action Plan. Discharge into local sewers or POTW trunk lines may be necessary when there is no other option or as a last resort to prevent employee death or serious physical injury.

---

*For employers that employ more than 10 workers, the plan must be written; for employers with 10 or fewer workers the plan may be communicated orally. 29 CFR Section 1910.38(a)(5)(iii).

Superfund Amendments and Reauthorization Act

Section 303 of Title III of the Superfund Amendments and Reauthorization Act (SARA) requires industries to report three kinds of information:

1. Material Safety Data Sheet (MSDS) for each hazardous chemical found at the facility, as defined by the OSHA Hazard Communication Standard.

2. A hazardous chemical inventory containing data on the quantity and location of specified categories of hazardous chemicals.

3. Facilities within Standard Industrial Codes 20-39 are required to report on releases into the environment of "toxic chemicals".

In addition, Title III provisions require the Governor of each State to appoint a State emergency response commission to designate emergency planning districts. Each district is responsible for developing an emergency response plan (these plans are similar to preplans developed in the fire service) which describes procedures to be followed should an emergency release occur.

1.4.2 State Programs

States must adopt environmental control programs as stringent as those of EPA as a condition of program authorization or delegation under RCRA, CWA and other relevant statutes. Some States have adopted requirements more stringent than applicable Federal requirements. These programs may help POTW personnel design or supplement POTW Slug Control Programs. For example, some States have response teams or advisory personnel to assist localities in responding to spills. California requires counties to prepare "Hazardous Waste Management Programs" to achieve "source reduction" for hazardous materials. Each plan establishes market or regulatory-based incentives for industry to reduce its generated quantities of hazardous waste (i.e., source reduction). Industrial waste inspectors may help enforce plans through industry audits. Other States may have contingency funds that can be activated to pay for the initial cleanup costs before identification of a responsible party.

1.4.3 POTW Programs

Most POTWs have not developed formal programs specifically for slug control. Instead, many POTWs rely on issuance of industry-specific discharge permits. Permit systems have the advantage of being able to include individual slug control provisions tailored to the needs of a particular facility. These provisions typically include special control, monitoring, and reporting requirements.

A January 1987 AMSA membership survey on existing slug discharge control programs shows that while many major POTWs have instituted some degree of slug discharge control, these controls vary in terms of approach and comprehensiveness (Table 1-4). For example:

- While the vast majority (86 percent) of the POTWs define the term "slug discharge" for regulatory purposes, POTWs indicated no clear preference for either narrative or quantitative definitions (Question 1). (See Table 2-6 for some example definitions.)
- Only one-half of the respondents specify minimum quantities of toxic pollutants which would trigger notification requirements (Question 2).
- Nearly 3/4 of respondents restrict batch discharges, but less than half of the respondents use either regulations, ordinances, or policies defining concentrations, amounts or acceptable timing of batch discharges (Question 3).
- Spills are regulated by nearly all respondents, (96 percent), and most of these have ordinances/regulations requiring preventive, containment or response measures. In addition, 84 percent of respondents require the IU to notify the POTW of a spill (Question 4).
- Sixty-eight percent of respondents require spill prevention control plans from IUs beyond those contemplated in Federal regulations (Question 5).

TABLE 1-4. AMSA SLUG CONTROL PROGRAM SURVEY RESULTS

	# of POTW Responses
1. How do you define the term "slug discharge" for regulatory purposes?	
a. Narrative definition	45
b. Quantitative definition	36
c. No definition	9
d. Other	4
2. Do your requirements specify minimum reportable quantities for toxic pollutant discharges which, if exceeded, require emergency notification to the POTW?	
a. Yes	35
b. No	35
3. Do you regulate or otherwise restrict industrial user "batch" discharges to sewers?	
a. Yes	52
b. No	19
If yes,	
a. Local regulation or ordinance defining concentrations, amounts, and/or acceptable timing of batches, etc.	26
b. Local policy or guidelines as in a. above	14
c. Industrial user notification of batch discharge practices required to POTW	27
d. Other mechanism	23
4. Do you regulate or otherwise restrict spills to sewers?	
a. Yes	68
b. No	3
If yes,	
a. Local regulation or ordinance requiring preventive measures by industrial users	50
b. Local regulation or ordinance requiring containment or response measures by industrial users	44
c. Local policy or guidelines as in a. above	10
d. Local policy or guidelines as in b. above	4
e. Industrial user notification to POTW required after spill	57
f. POTW standard operating procedures or other response measures for handling spills	24
g. Other mechanism	11
5. Does your POTW require spill prevention, control, and countermeasures (40 CFR Part 112); Toxic Organic Management Plans (40 CFR Part 403.6); or Best Management Practices (40 CFR Part 125.100) from industrial users which are otherwise not required categorical standards?	
a. Yes	48
b. No	23
6. Do you use practices against slug discharges of hazardous materials that are not contemplated by the questionnaire?	
a. Yes	21
b. No	48

2. PREVENTION OF IU SLUG LOADINGS

2.1 INTRODUCTION

The key elements to a successful Slug Control Program are: (1) IU slug control plans and procedures for controlling batch discharges & spills, and (2) procedures for the POTW to follow in IU permitting and enforcement and in responding to IU slug loadings which escape prevention. This chapter discusses the three steps in developing and implementing a POTW Slug Control Program:

- Evaluate the Need for a Slug Control Program (Section 2.2): Determine IUs and pollutants of concern, and potential risks associated with those sources.
- Develop an IU Control Program (Section 2.3): Evaluate or improve legal authority to regulate IUs. Develop requirements (based on slug potential) for designated IUs to develop slug control plans, and inspect and monitor these sources.
- Implement the Slug Control Program (Section 2.4): Approve IU slug control plans and monitor & inspect IUs for compliance with the plans. Develop and implement POTW slug response procedures.

Figure 2-1 outlines the organization of this chapter. First, ways to identify high risk IUs and characterize the entire IU community are provided. Methods to evaluate IU characteristics to determine slug potential and to obtain and evaluate relevant information on slug potential are presented. Second, technical guidance is provided on regulating potential slug dischargers. The section describes controls that may be imposed on industrial users to reduce the potential for slugs. Third, implementation of the Slug Control Program is discussed. The fourth aspect of the Slug Control Program, slug response, appears in Chapter 3.

2.2 EVALUATE THE NEED FOR A PROGRAM

While some POTWs already have Slug Control Programs in effect, others may not simply because they have not yet experienced problems with slug discharges. Despite a lack of problems from slug loadings, development of a Slug Control Program may still be a good idea. Slug problems may arise in the future, due to changes in IU practices, or as a result of spills. The need

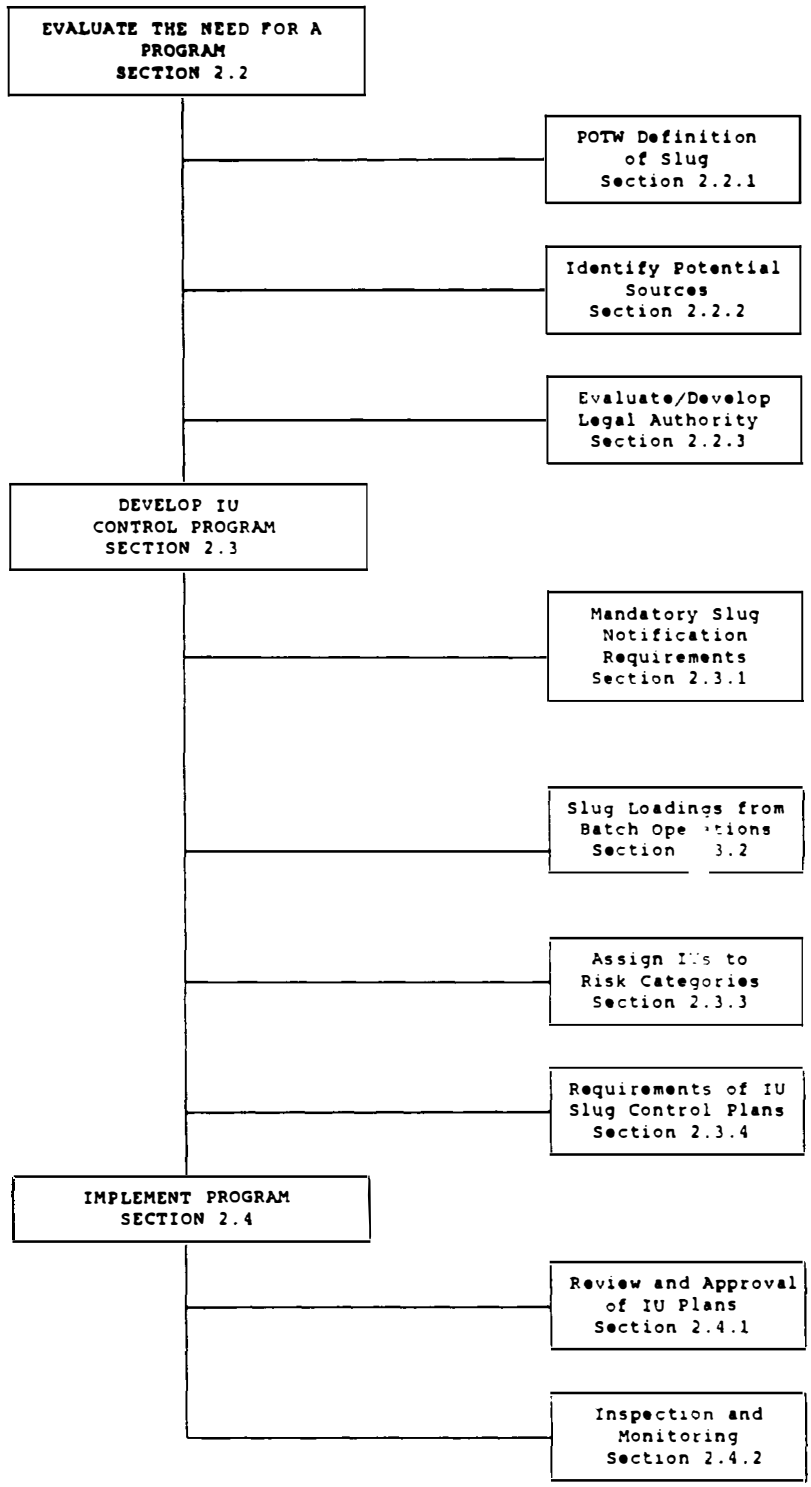


FIGURE 2-1. ORGANIZATION OF CHAPTER 2

for a slug control program also may be identified as a result of a toxicity reduction evaluation (TRE). In addition, the Slug Control Program may help a POTW comply with whole effluent toxicity limits. The following subsections describe how to determine whether new or revised Slug Control Programs may be warranted.

In determining whether a POTW should adopt a new or revised Slug Control Program, the POTW should assess:

- Whether there are historical slug loading problems which need to be addressed
- Which individual chemicals (stored or discharged) need to be controlled, based upon potential to cause POTW problems, and for chemicals to reach the POTW
- Which IUs, and IU practices, are actual or potential sources of slug loadings
- Whether existing programs or practices sufficiently address any actual or potential threats.

2.2.1 POTW Definition of Slug

Because of site-specific variables, POTWs may wish to develop quantitative or more specific qualitative definitions of the term "slug loading" to supplement the definition in 40 CFR 403.5. Many POTWs have adopted fixed quantitative definitions. Other POTWs prefer flexible, qualitative definitions, especially for addressing mixtures of individual pollutants of concern. A quantitative definition of what constitutes a "slug" should be consistent with local limits. For example, a POTW can use the PRELIM model local limits calculations to determine the concentrations of specific chemicals which would cause POTW problems. A slug loading may be defined by the POTW as any amount exceeding the local limits (in addition to the definition at 40 CFR 403.5). A qualitative definition can be used as a complementary "catch all" should any adverse impacts occur as a result of discharges at volumes or concentrations less than those prescribed in the numeric local limits or for all chemicals not addressed by local limits.

Another way to define a slug loading is with reportable quantities (RQs) as defined under Section 311 of the CWA and Section 102(b) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Whenever one of these substances is released into the environment in an amount equal to or greater than the RQ, the release must be reported to the National Response Center (NRC). RQs are assigned to each substance based on aquatic and mammalian toxicity, ignitability, reactivity, chronic toxicity, and carcinogenicity (for example, the RQ for aldrin is one pound whereas the RQ for calcium chromate is 1,000 pounds, and an RQ of 5,000 pounds is assigned to aluminum sulfate). A current list of RQs appears in Appendix B.

RQs are applicable to spills from IUs as they are to any facility. EPA has proposed that certain releases from IUs to POTWs be exempt from NRC reporting if they are "federally permitted releases", i.e., if the release is (1) in compliance with applicable categorical pretreatment standards and local limits developed in accordance with 40 CFR 403.5(c), and (2) discharged into a POTW with an approved local pretreatment program or a 40 CFR 403.10(e) State-administered local program [53 FR 27268, July 19, 1988].

Several POTWs have adopted RQs into their ordinances as the functional definition of slug loading. Other POTWs have adopted the "reportable quantities" concept, but have established their own quantities based on local, site-specific concerns, such as previous problems associated with high concentrations of certain pollutants in effluents or sludges, or problems experienced in the treatment or collection systems. One POTW has adopted the following quantities to protect its collection and treatment system:

- 10 lbs. or more heavy metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc, cyanide) in solution
- 1 gallon or more of any toxic organic substances listed in the Ordinance (which includes 46 base/neutral extractibles, 10 acid extractibles, 28 volatile organics and 25 pesticides)
- All flammable liquids above 1 gallon
- 60 gallons or more of acidic solution (defined as pH less than 6.0)
- Any other liquid material determined to have adverse effects on the sewerage system and wastewater treatment plants (including alkalies or alkaline substances, oils, foam generating wastes, highly colored wastes, pesticides and solvents not listed previously).

Note that this POTW's ordinance provides quantitative definitions in some instances, e.g., 10 lbs of heavy metals, but allows regulation of other wastes for which no quantitative limit has been set, e.g., "any other liquid material determined to have adverse effects." This phrase provides the POTW with the opportunity to hold industrial users responsible for adverse impacts that may result from slug loadings from other pollutants or mixtures of pollutants. Three other examples that are fairly representative of those that appear in many ordinances appear below:

- "...any waste discharge which, in concentration of any given constituent or quantity of flow, exceeds four times the average 24-hour concentration or flow during normal operation"
- "The discharge of water or wastewater from any IU into a public sewer which results in any of the following conditions:
  - a surcharge higher than the crown of a normally constructed sewer
  - a volume more than five (5) times the maximum normal daily discharge volume
  - a concentration which causes the user to violate maximum discharge limitations
  - an adverse effect on wastewater facilities"
- "Any discharge of water or wastewater concentration of any given constituent or in quantity of flow for any period longer than fifteen (15) minutes, more than five times the average twenty-four (24) hour concentration or flow of normal operations of the user in question."

In developing a functional definition of slug loadings, POTWs should concentrate on quantitative limits for those pollutants which are most likely to cause adverse impacts. A list of classes of pollutants that may commonly result in slug loadings appears in Table 2-1.

2.2.2 Identify Potential Sources

The next step in determining the need for a Slug Control Program is for the POTW to identify whether any of its IUs has a history of, or the potential for, slug loadings. The results from the IU survey conducted to identify significant industrial users should be evaluated. After this, other information from pretreatment program development can be used to identify and

TABLE 2-1. POLLUTANTS OF CONCERN

BIOLOGICAL WASTES (e.g., whey solids or antibiotics)

CHEMICAL FEEDSTOCKS (e.g., nitrobenzene, aniline, phenol, cumene phthalic anhydride, cyclohexane, etc.)

CORROSIVES:

STRONG ACIDS (e.g., hydrochloric acid, sulfuric acid, nitric acid, chromic acid, etc.)

STRONG BASES (e.g., caustic soda, lye, ammonia, etc.)

DETERGENTS

EXPLOSIVE CHEMICALS (e.g., TNT, nitroglycerin, metallic sodium, ammonium nitrate, picric acid, lead azide, etc.)

FLAMMABLE CHEMICALS (e.g., phosphorous pentasulfide, acetone, naphtha, methyl isobutyl ketone, sodium sulfide, hexane, cyclohexane, etc.)

HALOGENATED SOLVENTS (e.g., freon, perchloroethylene, trichloroethane, etc.)

METAL SLUDGES (e.g., metal hydroxide sludges from pretreatment operations)

NONHALOGENATED SOLVENTS (e.g., alcohols, methyl ethyl ketone, benzene, etc.)

NOXIOUS/FUMING CHEMICALS (e.g., phosphorous pentachloride or oxychloride, hydrofluoric acid, cyanide, chloroform, etc.)

OILS AND FUELS (e.g., diesel oil, bunker fuel oil, gasoline, cottonseed oil, linseed oil, etc.)

OXIDANTS (e.g., chlorine dioxide, phosphorous pentoxide, potassium permanganate, sodium chlorate, etc.)

PAINTS, PIGMENTS, DYES, INKS AND THINNERS

PESTICIDES

PLATING BATHS AND PICKLING LIQUORS

RADIOACTIVE MATERIALS.

REDUCTANTS (e.g., sodium borohydride, phosphine, methyl hydrazine, etc.)

RESINS (e.g., ABS resins, phenolic resins, vinyl resins, etc.)

TARS, CREOSOTES, AND PITCH

VARNISHES, LACQUERS, AND WAXES

characterize IUs for slug potential. Standard industrial classification (SIC) codes may be useful for locating IU types which can be potential sources of particular slugs (e.g., photo-processors)".

Among industrial users that may occasionally discharge spent chemicals, oils, solvents, and contaminated wastewater, and which merit inclusion in a survey of slug discharge potential, are: major printing and publishing firms; radiator shops; major automobile repair shops; industrial laundries; dry cleaners; commercial pesticide and agriculture suppliers; railroad tank car cleaning facilities (railroad yards); and commercial truck washing facilities. IUs that store, but do not normally discharge toxic or otherwise hazardous chemicals should also be briefly evaluated, even if they discharge relatively small amounts of wastewater or only a sanitary wastewater discharge (so called "dry" IUs). Examples of such facilities include the following: industrial and commercial chemical warehouses; pesticide and lawn services; bulk oil and fuel supply facilities; and paint and ink formulators. Sources of conventional wastes that should be evaluated include: food processors, breweries, meat packagers, and concentrated groups of restaurants discharging fats, oils and greases. There may be other industries with intermittent or seasonal batch discharges or a history of slug problems or surcharges that could result in future slugs to the wastewater treatment systems.

The above discussion identifies industrial categories with slug potential. However, similar industrial operations may differ from plant-to-plant. One industrial plant within a SIC category may pose a risk, and another of the same type may not. Therefore, a plant by plant review may be necessary. POTWs should consider the types and quantities of chemicals stored at each IU, and the types of products and wastes generated to determine slug potential (Table 2-1).

Existing Information

Records readily available to the POTW should be among the first evaluated to determine potential risk of slug loadings. In addition to the industrial waste survey conducted during pretreatment program development, the following sources should or may be available to POTWs:

- Baseline Monitoring Reports
- IU pretreatment permit applications
- Industrial user inspection reports
- Surcharge records
- Fire Department or other response agency records
- RCRA regulated facility lists or Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III, Community Right-to-Know data
- POTW effluent biomonitoring results and any information generated under a TRE.

IUs may already have information which can be made available to the POTW. Industrial users are generally aware that slugs can mean losses of raw material, products, fuels, and production time, as well as liability for damage to the POTW and the environment. POTWs will find some IUs may have some form of slug loading control such as an inventory control plan. Although the purpose of these plans might not be to protect the POTW or the environment, the plans can provide valuable information, and with some modifications may form the basis of a slug control plan acceptable to the POTW. For example, existing IU inventory control plans can be used to locate potential problem processes or storage areas.

The POTW should also take note of any safety information from an IU as industry personnel are likely to be well-informed about the dangers of chemicals handled on-site. Fire departments that routinely inspect industrial and commercial facilities to assess fire hazards or respond to emergencies will also generally have records of emergency response calls or a listing of chemicals utilized and stored at local industrial users.

Additionally, information may be available on the industrial and commercial users regulated under RCRA and SARA. RCRA information is discussed in Section 1.4.1. SARA's Section 311 requires that facilities which must prepare or have available material safety data sheets (MSDS) under OSHA regulations must submit either copies of MSDS or a list of MSDS chemicals to the local emergency planning committee, state emergency response commission and the

local fire department. MSDS are made available to IUs from manufacturers, and include a listing of chemical constituents, precautions for product use, and health effects data from exposure to the product. This information can be used to help evaluate slug risk of IUs.

Collecting Additional Data

After reviewing all available information, POTWs also may choose to gather additional information on IUs to supplement existing information, or to independently verify any existing IU information that appears questionable. Information gathering should proceed in an organized fashion. Many POTWs may have initially excluded IUs without process discharges from the original industrial user survey. Even if the survey was comprehensive in its coverage of all users, the effort may not have requested information on such items as:

- Storage and disposal of chemicals
- Existence of control or contingency plans
- Presence of floor drains in process areas
- Potential for accidental spills or other slug loadings
- Existence and adequacy of IU spill control or contingency plans.

If such gaps do exist in the original industrial survey, a follow-up of the survey may be required. The POTW may choose to mail a survey to industrial users similar to that which appears in Figure 2-2. Survey responses may then be compared to existing information to fill data gaps and check for consistency. Alternatively, POTWs may wish to require chemical storage inventories, or other slug loading-related information on IU sewer permit application forms.

In the first step, the POTW should request, (or require through ordinance provisions, or as a permit condition), that certain information be provided to the POTW to make an initial determination of slug potential. The second step should be inspection of the facility. A POTW inspector can determine the adequacy of the IU's housekeeping practices, storage and containment procedures, and general conditions to assess the IU's slug potential.

FIGURE 2-2. INDUSTRIAL USER SLUG POTENTIAL SURVEY

Facility Name: _____
Facility Address: _____
SDPC Plan/Emergency Contact: _____ Title: _____
Work Phone: _____ Emergency Phone: _____
Secondary Contact: _____ Title: _____
Work Phone: _____ Emergency Phone: _____

If extra space is needed, attach a separate page and indicate the item number.

1. Does your company have a Spill Control or Slug Control Plan? If so, attach copy and fill out only information not found in attached Plan.

2. Workdays: M _____ T _____ W _____ T _____ F _____ S _____ S _____

3. Shift Per Workday 1. _____ 2. _____ 3. _____
Number of Employees Per Shift _____ _____ _____
Shift Start Time _____ _____ _____
Shift End Time _____ _____ _____

If shift information varies between workdays, please indicate: _____

3. Give a brief description of all operations at this facility:

4. Identify all categorical pretreatment standards applicable to this facility:

5. WASTEWATER DISCHARGES:

Process Description: _____

6. Is Process: Continuous Discharge _____ Batch Discharge _____

7. If Batch Discharge, List Frequency of Batches per Time Period (e.g., 1/wk) _____
List Volume Per Batch _____

8. List Constituents of Continuous Discharge and Daily Discharge Volumes of Each:

FIGURE 2-2. INDUSTRIAL USER SLUG POTENTIAL SURVEY (continued)

9. List Constituents of Batch Discharge and Volume of Each Per Event: _____

10. Describe any previous spill events for this facility and corrective actions taken to prevent future occurrences: _____

11. Check all security provisions and warning signs used at this facility:

___ Lighting
___ Fencing
___ Security Personnel
___ Controlled Access
___ Guard House
___ Visitor Passes
___ Locked Entrances to Facility
___ Locks on Drain Valves and Pumps for Chemical Storage Tanks
___ Television Monitoring in Areas Susceptible to Spills

12. Describe procedures to be followed in response to a spill at the facility and for modifying the Slug Control Plan when necessary. (Attach any Forms Used) _____

13. Describe any spill prevention and response training given to employees: _____

14. List any materials stored including quantities: _____

15. List constituents of stored materials: _____

16. Do drains exist in proximity to the storage area? Yes _____ No _____

17. Describe adequacy of containment structures around storage and transportation areas: _____

18. Attach drawings showing the facility layout and process flow diagrams.

The POTW may inspect IUs to independently verify both IU survey responses and existing information. Inspection priorities may be developed based on the existing inspection schedule, degree of confidence in previously provided information, facility size, perceived slug potential, or any other related factor. In preparing for these inspections, the inspector should review all available information, familiarizing himself with the facility's operation and potential problem areas. Additional discussion on methods to evaluate IUs appears in Section 2.3.3.

Summary information to aid in evaluating the potential risks from slugs should include:

- General Data:
  - The industry's name and location
  - Contact person(s) name and phone number
  - Emergency phone number(s)
  - Listing of products manufactured
  - Analytical data on wastewater discharges
  - Operation and production schedules
  - Number of employees
  - Description of pretreatment practices.
- Data on Slug Potential:
  - Raw materials inventories and storage locations (i.e., chemical utilization)
  - Locations of wastewater discharge points
  - Site drainage patterns
  - Location of floor drains, sumps, etc.
  - Slug discharge prevention plans or control measures currently adopted
  - Chemical inventory, including maximum and average storage volumes
  - Comments/observations regarding existing control requirements and physical conditions such as floor drains, improper storage practices, improper/inadequate containment of stored materials, operational data, general process information
  - Slug risk classification.

- Data on Response Measures:
  - Recommendations for equipment, structures, facility modifications, and procedures for improving slug discharge prevention and response at the facility.

2.2.3 Evaluate Existing Slug Controls: Legal Authority and Enforcement

As discussed earlier, the need for a new or revised Slug Control Program often depends on the adequacy of existing controls. IUs may be self-motivated to avoid slug loadings or other State or Federal requirements may have resulted in adequate slug controls. But perhaps the most important factor in determining whether existing controls are sufficient is the adequacy of the POTW's own control program, especially its current legal and enforcement authority. POTWs have often found it helpful to adopt a formal written Slug Control Program outlining procedures for regulating slugs from IUs and for POTW response to slugs which escape prevention at the IU source.

2.2.3.1 Legal Authority

All POTWs required to develop local pretreatment programs should possess general legal and enforcement authority to deal with slug loadings. All POTW programs should be consistent with 40 CFR Part 403, including:

- Compliance requirements with applicable pretreatment standards including the general and specific prohibitions, categorical pretreatment standards, and locally developed limits
- Requirements for IUs to submit reports, including notice of slug loadings under 40 CFR 403.12(f)
- Remedies for noncompliance by IUs.

Some POTWs may wish to add to existing legal authority to require installation of IU slug control equipment and structures via their sewer use ordinance or user permits. Samples of sewer use ordinance language addressing IU slug discharge control requirements are presented below.

Example Slug Control Clauses:

- Each User shall provide protection from slug discharges of restricted materials or other substances regulated by this Ordinance. No User who commences contribution to the sewerage system after the effective date of this Ordinance shall be permitted to introduce pollutants into the system until the need for slug discharge control plans or procedures has been evaluated by the POTW. Facilities to prevent slug discharges of restricted materials shall be provided and maintained at the owner and User's own cost and expense.

- Certain Users will be required to prepare Slug Discharge Prevention and Contingency Plans (SDPC) showing facilities and operating procedures to provide this protection. These Plans shall be submitted to the Industrial Pretreatment Division (IPD) for review and approval. All existing Users required to have SDPC Plans shall submit such a Plan within three months and complete implementation within six months. Review and approval of such Plans and operating procedures shall not relieve the User from the responsibility to modify the User's facility as necessary to meet the requirements of this ordinance.

- In the case of a slug discharge, it is the responsibility of the User to immediately notify the POTW of the incident. The notification shall include location of discharge, type of waste, concentration and volume, and corrective action.

  Within five (5) days following a slug discharge, the User shall submit a detailed written report describing the cause of the discharge and the measures being taken by the User to prevent similar future occurrences. Such notification shall not relieve the User of any expense, loss, damage, or other liability which may be incurred as a result of damage to the sewerage system, fish kills, or any other damage to person or property, nor shall notification relieve the User of any fines, civil penalties, or other liability which may be imposed by the ordinance or other applicable law".

- A notice shall be permanently posted on the User's premises advising employees whom to call in the event of a slug discharge. The User shall ensure that all employees who may cause, or allow such slug discharge to occur, are advised of the emergency notification procedure.

2.2.3.2 Enforcement

POTWs must take appropriate action whenever a slug loading occurs. The POTW should define its enforcement strategy and range of appropriate actions to be taken in cases of slug loading violations. The strategy must provide immediate and consistent response to slug loadings which cause violations of prohibitions and to IUs who fail to notify the appropriate authorities of a

slug loading. To formulate this enforcement strategy, the POTW should first identify the types of non-compliance which may arise under its particular Slug Control Program. These may include: (1) failure to implement required control measures to prevent slug loadings; (2) failure to prepare or submit industrial user slug control plans on time; (3) failure to implement industrial user slug control plan provisions (e.g., acquiring equipment, providing training, altering facilities etc.); (4) failure to immediately report slugs under 40 CFR 403.12(f); (5) failure to submit detailed follow-up reports; and (6) submittal of fraudulent information.

The POTW should then determine its potential enforcement responses should non-compliance occur. These options may be formal or informal actions including, for example: (1) telephone calls or meetings; (2) warning letters; (3) notices to show cause; (4) administrative fines or orders; (5) permit suspension, revocation or modification; (6) civil suits; (7) criminal actions; and (8) termination of service. The type of enforcement response may depend on the severity of the violation, the violator's history of noncompliance, the length of time the violation continues, and the violator's "good faith" actions to mitigate damage or return to compliance. Generally, the POTW should rely on the same enforcement strategy it employs to obtain compliance with effluent limits or other Pretreatment Standards. EPA's Pretreatment Compliance Monitoring and Enforcement Guidance identifies the factors to consider when developing enforcement strategies and for determining the appropriate enforcement response.

2.3 DEVELOP AN IU CONTROL PROGRAM

The most important part of the Slug Control Program is the requirements that the POTW imposes upon its IUs. After the POTW determines for its own program any additions to the regulatory slug definition (40 CFR 403.5), evaluates the entire industrial user community for slug potential and identifies the need for a Slug Control Program, the POTW can then determine what will be required from each IU. As part of this evaluation, the POTW should consider the adequacy of existing IU slug controls, both as written and, more importantly, as implemented.

While the POTW may choose to subject sources to varying levels of control dependent on the slug "risk" they pose, the requirement for IUs to inform the POTW of a slug or changed conditions affecting slug risk potential should apply to all IUs. All IUs should also be made aware of the POTW's right to inspect the industrial user, reevaluate slug risk classification, and to impose more stringent slug control requirements as necessary.

2.3.1 Mandatory Notification Requirements

Currently, 40 CFR 403.12 (f) requires all IUs to immediately notify the POTW of any slug loading. This requirement should be made known to all industrial users. EPA suggests that IU permits and/or municipal ordinances prescribe slug notification requirements as follows:

- Procedures to inform the POTW of slug loadings, including requirements for posted notices of appropriate POTW contact names and phone numbers
- The substantive information to be provided, such as nature of contaminants released, quantities of contaminants, any response action taken
- Post-discharge reporting requirements such as follow-up reports and documentation of the events and its causes and effects
- Changed in-plant conditions affecting slug risk potential.

IUs should be required in the event of fire or explosion hazards to immediately notify the appropriate local agencies, such as the fire department, in addition to the POTW. If required, local, State and Federal agencies should also be made aware of slugs (i.e., SARA Title III reporting requirements). The POTW contacts and phone numbers should be clearly posted for all workers. Some POTWs provide names of alternate contact persons or install a 24-hour hotline for use in reporting slugs.

IUs should provide the following information upon the occurrence of a slug loading (a sample POTW notification log sheet is provided in Appendix C):

- Date and time of the discharge
- Discharge location
- Concentration, volume, waste type, chemical name, and harmful characteristics or effects of the material (e.g. explosive, flammable)

- Response measures being taken
- Other agencies or contractors contacted.

Post-Discharge Reporting Requirements

Within five days after the slug the IU should prepare a written report. (A sample report sheet appears in Appendix C.) The items that should be discussed in the follow-up report include:

- Cause of the incident
- Specific details of the incident (time, volume and concentration of pollutants released, damage, etc.)
- Remedial measures undertaken
- Preventive mechanisms to avoid a recurrence of similar incidents
- Other information as required by POTW's spill response system.

The POTW should use this report to evaluate the effectiveness of the IU's slug prevention and response capabilities, and to determine the need for revising the IU's slug control plan.

2.3.2 Slug Loadings from Batch Operations

Slug loadings from batch operations may harm the treatment plant, its workers, and/or the environment. Regular discharges from batch operations that could result in slug loadings should be regulated via IU sewer use permits or other similar control mechanisms. IUs can be required to equalize flows, neutralize pH, or take other appropriate steps to ensure that batch discharges do not result in slug loadings. Several POTWs have found that prior notice of a batch discharge by an IU, including the constituent concentrations of those discharges, can allow POTW influent flow equalization, or other special treatment, and can prevent damage from batch operation slug loadings. High risk IUs can be required to notify the POTW in advance of an irregular batch discharge and to keep records of the discharge.

For example. the POTW may require the IU to contact the Water Quality Lab supervisor at least one week before discharging wastes from its batch process

tanks which could result in a slug loading, as determined by the POTW. The IU is then required to satisfy all pretreatment requirements of its permit, such as neutralization of the wastewater to meet permitted pH, and to sample and analyze the process tank(s) for all parameters items listed in the permit. Lab results are forwarded to the Water Quality Lab Supervisor for review. If the pollutants are within allowable ranges, and the lab results demonstrate that pretreatment requirements are satisfied, the POTW approves the batch discharge request. This approval procedure is documented on a form which is signed and dated by the discharger and the POTW representative.

Some batch discharges are routine. For example, pH swings can result from regular cleaning operations. Requirements that may be appropriate for routine batch discharges include:

- Use of continuous pH and temperature monitoring with recording tapes while discharging
- Specific allowable discharge times, i.e. during POTW operator shift, or at time of maximum daily flow
- Notification by phone followed by a letter and analytical report
- IU retention of records regarding all batch discharges.

These approaches are most useful for IUs with consistent wastes which have been characterized by routine POTW and IU monitoring. IUs with a highly variable pollutant loading in the wastes to be discharged, or industries that are not part of a routine monitoring and inspection program, should be regulated more stringently.

Another aspect of the program should address IUs not covered by pretreatment permits. In some instances, nonpermittees whose discharge could contain industrial waste, or wastes from spill or ground-water cleanup operations (or other nonroutine discharge events), may request permission to dispose of a batch discharge. The POTW should determine whether to accept the waste depending on the potential for interference or pass through of the discharge. Sampling and inspections of all IUs, even those not currently regulated via a sewer use permit or similar mechanism, may be appropriate.

2.3.3 Assign IUs to Slug Risk Categories

POTWs may choose to adopt varying levels of control on IUs based on the slug risk potential they pose (see Table 2-2). The determination of the risk posed by any single facility can be evaluated by looking at many different factors. The most important factors in determining the IU's slug load risk potential are:

- The quantity and types of materials used or stored at an IU and their potential for causing violation of local limits or the general or specific prohibitions
- The potential for such materials to enter the sewer system and cause damage (i.e., whether control measures are in place)
- The adequacy of existing controls to prevent any potential slug loading.

Potential to cause harm may be based upon knowledge of previous slug impacts, local limits calculation, or other means. Many POTWs have developed different IU categories, and associated regulatory requirements, for each risk category (i.e., high risk, medium risk and low risk facilities)". Industrial users may be re-assigned to higher or lower risk categories if IU practices change. For example, if a POTW learns of a slug discharge, new operating procedures or other changes at an IU which could affect slug potential, that IU may be reassigned to a different risk category.

Risk categories may be based on quantitative or qualitative criteria. Risk categories based on quantitative criteria include, for example:

- Significant industrial users
- IUs discharging greater than 25,000 gallons or more per average work day
- Specific SIC codes using RCRA-listed or characteristic hazardous materials
- Each discharger who stores 1,000 gallons or more of liquid substances identified in the POTW's sewer use Ordinance or in Section 311 of the CWA".

TABLE 2-2. GENERAL ATTRIBUTES OF RISK CATEGORIES AND ASSOCIATED RECOMMENDATIONS FOR SLUG CONTROLS

IU Slug Discharge Risk Category	Sample Attributes	Recommendations for Slug Discharge Control
Low	• No, or significantly less than reportable quantities, local limits, etc. • No process discharge • No discernible pathways to sewer system	• Notification Requirements (Section 2.3.1)
Medium	• Stores, uses, batch discharges, or generates somewhat less than reportable quantities of constituents, local limits, etc. • Stores, uses, or generates significant quantities of reportable constituents	• Notification Requirements (Section 2.3.1) • Dependent on site-specific situation, select one or more elements of Slug Control Plan (see Section 2.3.4)
High	• Stores, uses, batch discharges, or generates significantly greater than reportable quantities, local limits, etc. • History of slugs or surcharges • Poor housekeeping practices • No Slug Control Plan in existence	• Notification Requirements (Section 2.3.1) • Batch Discharge Requirements (Section 2.3.2) • Slug Control Plan Required (Section 2.3.4)

Other qualitative criteria may include any discharge of RCRA hazardous wastes or past slug loading problems.

Another approach that may serve to supplement, or supplant, the use of objective criteria is the use of subjective criteria associated with risk. For example, a POTW may require "designated IUs" to implement comprehensive slug control and prevention plans. "Designated IUs" could be those IUs "whose wastewaters include, or could include, pollutants capable of causing interference. This includes all categoricals, and those IUs found by the POTW, State or EPA to, singly or in combination, have a significant impact on the treatment system, sludge quality, effluent quality, or air emissions."

Alternatively, facilities may be categorized as "low", "medium" or "high" risk. Table 2-2 summarizes the characteristics of each risk category.

Low-Risk Facilities

- Low risk IUs may receive this designation due to a lack of sewer connection, handling practices, presence of control devices, or absence of potentially harmful levels of toxic or hazardous materials.
- No slug controls are necessary because these IUs present little risk of discharging slugs in quantities/concentrations capable of adversely affecting the POTW, its workers, or the environment.
- The IU should be notified of its low-risk classification, and required to notify the POTW if the plant conditions change.

Medium-Risk Facilities

- Medium risk IUs may use or store less than harmful quantities of toxic or hazardous materials of concern, and need to take some corrective measures to prevent spills or regulate batch discharges of materials which, if discharged as a slug, would create a problem. These IUs can be assumed to have some direct connections (floor drains included) to the POTW collection system.
- The IU should be required to undertake specific preventive measures. For example:
  - Protect floor drains from spills and eliminate cross connections
  - Improve housekeeping practices
  - Construct diversionary berms

- Post signs advising employees not to dump material down the drain
- Modify existing storage and handling of chemicals and hazardous waste
- Conduct preventive maintenance on valves and piping
- Employee training program
- Maintain in-house pretreatment, diversion, or containment capability".

- The POTW should notify the IU of its medium-risk classification, and be required to notify the POTW if plant conditions change so the classification can be changed to low or high risk".

High-Risk Facilities

- High-risk facilities include IUs classified as significant under the POTW pretreatment program, plus additional facilities discovered through the POTW Slug Control Program evaluation process. Such facilities use, store or discharge at or above significant quantities of constituents of concern (e.g., the RQs) or have a history of slug loadings, and present a high risk of discharging materials known from experience or local limits, etc. to cause interference or pass through.

- High-Risk Facilities facilities should be required to develop and implement a facility-specific Slug Discharge and Prevention Contingency Plan. The IUs pretreatment permit or other type of control agreement should include":
  - Details of the specific requirements for development of a Slug Control plan
  - A schedule for submittal to the POTW for approval
  - A requirement for the IU to implement the plan once approved by the POTW".

- The IU should be notified of its high-risk classification and required to notify the POTW if plant conditions and risk decrease".

The process of classifying facilities into risk categories may be simplified by using a slug potential data form. Tables 2-3 and 2-4 are examples of slug potential data sheets containing summary information for conventional waste dischargers (Table 2-3) and IUs that store, use, or discharge materials of concern to the POTW which could result in slug loadings (Table 2-4)". POTWs can adapt these forms for summarizing IU and inspection

SAMPLE

TABLE 2-3. SLUG POTENTIAL DATA SHEET (IU DISCHARGES STRICTLY CONVENTIONAL POLLUTANTS)

GENERAL DATA

Industry Name:	Wills" Ice Cream Plant	Industry Contact:	Cher E. Sherbert, Plant Manager
Industry Address:	30 Wonka Drive Funtown, CA 67870	Work Phone":	(101) 212-3243
		Emergency Phone:	(101) 212-7685

Number of Employees: 21

Waste Materials, Stored Chemicals, and Discharge Type

Type Materials & Average Stored Quantity	Discharge Type and Volume	Potential Pollutants of Concern
• Whey waste	Continuous up to 10,'000 gpd	BOD
• Process tank wash down	Intermittent batch discharge max 1,'000 gal	Low or high pH
• Corn syrup/liquid sugar, 6,900 gal	None". Potential for spillage exists.	BOD
• Ice Cream, 35-40,'000 #s	None	BOD
• Cleansers, 600 #s (see list)	Intermittent batch, 500 gals	pH

Inspection Observations of Process Areas and Pretreatment Systems/Potential for Slug Loadings

1. Very clean plant.
2. Preventive maintenance performed on all valves. Flow equalization tanks, pH monitoring and neutralization in place for batch cleaning discharges.
3. Developed slug control plan. Needs to be reviewed by POTW.

TABLE 2-3. SLUG POTENTIAL DATA SHEET (IU DISCHARGES STRICTLY CONVENTIONAL POLLUTANTS) (Continued)

4. Floor drains -- potential exists for spill of corn syrup, sugar, and cleanser stored nearby.

5. Slug Potential: Medium

Analytical Data

1. Periodic Discharge of high concentrations of BOD.

2. Periodic slugs of washwater with a low pH.

Recommendations

1. Review existing control plan and modify as necessary.

2. Should seal floor drain or build a containment structure around corn syrup/sugar and cleansers storage in case of an accidental spill.

3. Should require the Plant to test pH of process tank wash prior to discharge, then neutralize via permit conditions.

SAMPLE

TABLE 2-4. SLUG POTENTIAL DATA SHEET (IU DISCHARGES OTHER THAN CONVENTIONAL POLLUTANTS)

Industry Name:	ABC Circuits	Industry Contact:	Chip Smith, Plant Manager
Industry Address:	10 Circuit Drive Circuit Town, IN 12345	Work Phone: Emergency Phone:	(111) 222-3338 (111) 123-4321

Number of Employees: 75

Chemical Inventory

Chemical	Quantity Stored Maximum/Average	Chemical Hazard Classifications*
• Copper plating bath plating bath (Sulfuric acid, copper sulfate)	2000 gals max./ 1000 gals avg.	T, I
• Electroless Copper Solution (copper salts, formaldehyde, methanol)	500 gals max./ 350 gals avg.	T, I
• Etchant	750 gals max./ 315 gals avg.	T, I
• Methylene Chloride	1500 gals max./ 1000 gals avg.	T, I
• Nickel Plating Solution (nickel sulfamate)	110 gals max./ 110 gals avg.	T, I
• Screen wash (toluene, acetone)	800 gals max./ 400 gals avg.	T, I
• Sulfuric Acid	1000 gals max./ 1000 gals avg.	T, R, I, N
• Trichloroethane	500 gals max./ 500 gals avg.	T. R, I, N

TABLE 2-4. SLUG POTENTIAL DATA SHEET (IU DISCHARGES OTHER THAN CONVENTIONAL POLLUTANTS) (Continued)

*Chemical Classifications":

F = Flammable	I = Inhibitory to POTW operation
E = Explosive	Fl = Floatable
C = Corrosive	S = Soluble
Re = Reactive	Se = Settleable
N = Noxious/Fuming	
T = Toxic	
Ra = Radioactive	

Inspection Observations of Process Areas and Pretreatment Systems/Potential for Slug Discharges

1. Sloppy operations. Frequent spills.
2. Floor drains to the sanitary sewer in process area.
3. Chemicals not stored properly.
4. No bermed areas around plating tanks to contain spills.
5. Slug Potential: High

Analytical Data

1. Continuously in violation of pH limits.
2. In significant noncompliance of copper standards".

Recommendations

Prepare slug control plan. Include: good housekeeping practices, sealing floor drains in process areas, proper chemical storage, secondary storage for plating tanks. In permit require batch pH neutralization, equalization and pH monitoring.

data. The quantities included in Tables 2-3 and 2-4 are provided in units of volume (gallons) rather than weight (pounds). Volume data may be more useful than mass loading data when responding to spill situations.*

For facilities capable of discharging high-strength conventional wastes of concern, the POTW should list the type of conventional wastes and describe the industry's type of discharge (batch, continuous), industry operation (seasonal, yearly), and normal production figures (Table 2-3).

A POTW hazard classification system can be used to indicate hazards associated with a slug of each chemical at a facility and can provide valuable information concerning appropriate control and cleanup techniques. POTW hazard classification information should be based upon the expected impact of a slug loading of a chemical or material upon the POTW. MSDSs or the National Fire Protection Association (NFPA) Classification Scheme can be used to help determine the POTW hazard. The POTW should evaluate the MSDS information and NFPA classifications to determine the applicability for slug control.

If necessary, the POTW should seek the assistance of industry personnel and the local fire department in identifying IU sources and quantities and classifying chemicals by hazard code. IU representatives should have the MSDSs for many chemicals. The POTW inspector should also note all RCRA-listed or characteristic hazardous wastes that may be stored at the IU prior to disposal, such as pretreatment sludges.

EPA recommends that POTWs summarize all of the IU data provided by the industrial users or obtained during inspections. Data storage and retrieval

---

*Methods for conversion (from weight measurements, where volume is unknown) follow:

- For pure or nearly pure chemical liquids, the chemical's specific gravity should be obtained from the chemical literature, such as the Handbook of Chemistry and Physics or Lange's Handbook of Chemistry (see reference list). The weight data can then be converted as follows:

$$\text{Volume, gallons} = \frac{\text{weight, pounds}}{(\text{specific gravity}) \times (8.3454)}$$

- For dilute aqueous mixtures, the above formula can be used, with specific gravity = 1.0.

- Weights of solids (e.g., salts), sludges, and/or complex chemical mixtures may not be convertible to a volume basis. In these cases, inventory volumes should be estimated from tank size, bag or drum size and count, and/or other measures of existing storage facilities.

will aid in evaluating slug loading potential and tracking and identifying slug sources. This summary data can be stored in a computer database or a summary data table such as the one presented in Table 2-5. The data storage and retrieval system should incorporate:

- A list of all industries within the POTW's jurisdiction.
- The Sewer Service Area for each facility. Industries may be assigned a sewer service area number based on geographic location. When a slug occurs in a specific area, the POTW can identify industries discharging to that location.
- Chemical hazard classifications (from Table 2-4 or 2-5) applicable to each facility
- Major materials of concern stored, used, or produced at the facility
- Regular batch discharge schedule
- Potential for spills
- Classification of slug risk
- Status of IU-specific Slug Control Plan
- Comments/observations.

In the event of a slug, Table 2-5 helps POTW staff quickly locate the source of a slug based on chemicals of concern and sewer service area. The POTW can then refer to the IU-specific slug potential data sheets (Tables 2-3 and 2-4) to obtain more detailed information. Efficient data collection and retrieval can facilitate slug identification procedures, thus accelerating response time and reducing the damages incurred by each incident.

2.3.4 Requirements of IU Slug Control Plans

This section outlines the recommended contents of an IU Slug Control Plan. As discussed in Section 2.3.1, notification requirements apply to all dischargers. In addition, POTWs should select from among the control measures described in this section and require medium- and high-risk facilities to implement appropriate control measures. POTWs may also require high-risk facilities to develop IU Slug Control Plans, where necessary". Plans should be reviewed by the IU on a regular basis or when changes in design, construction,

TABLE 2-5. SAMPLE SUMMARY OF SLUG POTENTIAL DATA

Industry Name	Sewer Service Area Number	Chemical Hazard Classification F	E	C	Re	N	T	Ra	I	Materials of Concern Stored, Used or Produced	Batch Discharges	Spill Potential	Slug Risk	Control Plan Status	Comments
ABC Circuits	1			X	X		X		X	H_2SO_4, Cu, Cr, Ni, pH	No	High	High	Needs Plan	Poor housekeeping and management
Will's Ice Cream Plant	4						X		X	BOD, pH	Yes	Med.	Med.	Has Plan	Plan needs to be reviewed by City for adequacy
Fix-it Radiators	3			X			X		X	Cu, Pb, Zn, acidic wastes, ethylene glycol	No	Med.	Med.	Needs Plan	Needs some improvement in housekeeping and understanding of waste disposal
Railroad Tank Car Cleaning, Inc.	4						X		X	BOD, O&G, phenols, methylene chloride, pesticides	Yes	Med.	Mod.	Needs Plan	Has an inoperative oil/water separator and poor chemical storage practices
ABC Restaurant	3								X	Fats, oil and grease	No	Low	Low	Does not need plan	Needs to be advised of ordinance requirements for oil and grease
Pesticides Applicator Inc.	2						X		X	Pesticides, fertilizers	Yes	Low	Med.	Needs Plan	No washing of mix or application tanks onsite, floordrains in storage area

Chemical Classification

F - Flammable
E - Explosive
C - Corrosive
Re - Reactive
N - Noxious/fuming
T - Toxic
Ra - Radioactive
I - Inhibitory to POTW
Fl - Floatable
S - Soluble
Se - Settleable

operation, and maintenance at the facility warrant modification. A schedule for plan review and procedures for plan modification should also be described in the Plan". The Plan should also be reviewed when new conditions require changes in the emergency response procedures and any time a slug has occurred.

The general elements of IU Slug Control Plans are as follows:

- GENERAL INFORMATION: IU Name and Address, IU Contact, Discharge Practices, Security Provisions and Employee Training (Section 2.3.4.1)
- FACILITY LAYOUT FLOW DIAGRAMS: General layout including mapping of manufacturing, storage, transportation, and disposal areas (Section 2.3.4.2)
- MATERIAL INVENTORY: Types, volumes, containers, etc. (Section 2.3.4.3)
- SPILL AND LEAK PREVENTION EQUIPMENT AND OPERATIONS AND MAINTENANCE PROCEDURES: Definition of available equipment, plans to obtain equipment (Section 2.3.4.4)
- EMERGENCY RESPONSE EQUIPMENT AND PROCEDURES: Inventory and location of equipment; and procedures (Section 2.3.4.5)
- SLUG REPORTING: Description of procedures for notifying POTW (Section 2.3.4.6)
- TRAINING PROGRAM: Assurances that the Plan is implemented by providing for employee training (Section 2.3.4.7)
- CERTIFICATION: A certification by a professional that the Plan is adequate to prevent and control slugs (Section 2.3.4.8)".

Two sample plans appear in Appendix D.

2.3.4.1 General Information

An IU Slug Control Plan must include sufficient general information to enable the POTW to: (1) categorize and restrict the IU's potential for a slug discharge; and (2) respond promptly and effectively in an emergency. General information should include a brief description of the IU, discharge practices, applicable pretreatment standards, and description of previous slugs and corrective actions. The information requested in the Industrial User Slug Potential Survey (Figure 2-2) is an outline of the kinds of information generally required in this element of a Slug Control Plan.

2.3.4.2 Facility Layout Flow Diagrams

Each Plan should include detailed drawings of the facility showing the following:

- General layout of the facility
- Areas occupied by manufacturing or commercial activities; property boundaries, drainage of rainwater, and connections to the city's sanitary sewer and storm drains
- Hazardous materials process and storage areas; waste handling, storage, and treatment facilities
- Loading and unloading areas
- Direction of drainage from hazardous materials and waste handling, process, storage, and treatment areas
- Floor drains, pipes, and channels which lead away from potential leak or spill areas [identify by coding footnotes, or narratives describing drainage patterns]
- Flow diagram(s) showing chemical and wastewater flow including piping and instrumentation, flow rates, tanks and capacities, treatment systems, and final destinations of flows.

2.3.4.3 Material Inventory

The facility should provide sufficient data on all materials of concern used and stored at the facility. This may include those materials for which the POTW has established local limits (see Section 2.2.1). This information is useful in determining the origin of a slug, potential hazards and appropriate slug response procedures. Descriptions of the material handled, the location of these materials, descriptions of containment, transfer and transport, as well as any additional comments should be provided as follows:

- Materials - Both chemical and trade names should be listed in the inventory (OSHA MSDSs may be used). This information may help minimize confusion over the constituents of a compound and facilitate proper response procedures to a slug.
- Location in Plant - Knowing the location of (RQ) materials will assist plant employees and emergency response personnel in locating areas initially affected by a spill.
- Maximum Volume/Container Volume - This information is useful in determining the potential impact of a slug.

- Container Description - The description should include the type of container (e.g., steel drum", fiberglass tank, etc.") and the presence of container attachments such as valves, pumps, transfer pipes, etc. The description of a container will help determine potential origins of a slug load.

- Transfer and Transport Areas - The condition of containers and transfer equipment is useful in assessing the potential for accidental spills or slug discharges of high strength wastes and possible effects on the treatment plant.

- Additional Comments - Additional comments should include information on the physical, chemical, and toxicological effects of each material, and special precautions that should be taken when handling these materials. A discussion should also be provided on the procedures to prevent contact between incompatible materials. Each facility must demonstrate that the following three compatibility aspects have been considered: (1) the construction of the container; (2) other materials in the immediate vicinity; and (3) the surrounding environment.

2.3.4.4 Spill and Leak Prevention Equipment and Procedures

This subsection is divided into a discussion of equipment and procedures. It provides information on the data an IU Slug Control Plan could contain. It also provides technical information that may be used to evaluate the adequacy of the equipment and procedures detailed in an IU Plan. The POTW's review and evaluation of the IU Plans should use, but not be limited to the information provided here. Additional references, including those listed in Appendix E, should be reviewed and a thorough understanding of the IU operations should be achieved prior to evaluating the IU Plan.

Existing and Proposed Spill Prevention and Containment Equipment

Equipment required to control spills falls into two categories:

- Equipment to prevent spills
- Equipment to contain spills.

This section of the IU's Slug Control Plan should identify all existing equipment and/or systems that the IU nas in place or plans to obtain to implement the Plan. If equipment needs to be purchased, the expected purchase dates should be provided.

The Plan should describe current and projected inventories of both types of equipment. Equipment to prevent spills consists of appropriately selected chemical storage and process equipment, as well as built-in safeguards to prevent chemicals from being spilled such as secondary containment structures. Spill containment equipment consists of equipment or apparatus to keep a spill from spreading and to remove the spill. Examples of prevention and containment equipment are listed below:

- Equipment to Prevent or Detect Spills
  - Chemical Storage and Process Tanks: holding tanks, pumping equipment (compatible material); shell and bottom construction (compatible material); underground seepage protection; cathodic protection of underground tanks; liquid level sensing devices; overflow, temperature, pressure alarms; heating coils; collision protection support construction; secondary containment; diversionary structures in quench tanks
  - Drums: drum construction; storage areas; secondary containment; diversionary structures; collision protection; drum handling equipment; drip pans
  - Pipes, Valves, Fittings, Pumps, Electrical and Mechanical Equipment: seals; valve stem packing; gaskets; cathodic protection; vehicular traffic warning signs
  - Loading Stations: fill safeguards; curbs and drains; warning signs/improper disconnect protection; secondary containment
  - Alarm Systems: to detect unauthorized discharge flows, pH excursions, etc.
- Equipment to Contain Spills: booms, barriers, sweeps, and fenders; surface collecting agents; absorbent materials; skimmers; oil/water separators; sumps; sewer plugs.

Once spill potential reduction measures have been addressed, secondary containment systems should be considered. An IU which has the potential for a slug discharge should provide secondary containment systems, wherever possible, that will control the spread of a spill of toxic wastes or slug discharges of high-strength wastes at or near a potential spill source (e.g., storage tanks, processing equipment and piping). Several forms of secondary containment systems may be used including diking, diversion, holding tanks, or quick drainage. These methods are described below.

Diking is the most effective form of secondary containment for bulk chemical storage. Dikes can be constructed from concrete, cinder blocks, or earth. Bulk storage tanks and/or drum storage should be surrounded with an impervious dike that will hydrostatically contain 110 percent of the capacity of the largest tank or the capacity of the largest tank plus water from a maximum 24 hour/10 year rainfall event, whichever is greater. Accumulated rainwater from diked areas should be drained with a manually operated pump or siphon system. If a valve pipe has been installed through the dike wall, the drainage valve should be kept locked in the closed position when not in use. Flapper valves should not be used.

Design of the dike should account for the containment of a spraying leak from the side of the tank. Where this design is not feasible, baffles could be installed at the top of the dike that would deflect potential leaks and cause them to drop within the containment area.

Diversion of flow of potentially spilled material away from its naturally expected path can also be an effective means of secondary containment. Diversionary structures consist of curbs, sumps, and/or gutters which divert spilled material to a collection tank. A quick drainage system is frequently employed in small volume storage and loading areas. It consists of an impervious curbed or below gradient pad that slopes into a drain that is connected to an impervious sump. Spilled volumes of liquid are collected in the impervious sump and then removed and appropriately treated, discharged, or disposed of. These structures should be used in areas where diking is impractical or unsafe.

For example, chemicals which emit noxious fumes might be diverted to a closed tank in the event of a spill, rather than left in an open diked area. Diversionary structures can include quench tanks, which serve to simultaneously collect and treat chemicals. Many industrial facilities possess process quench tanks to control runaway chemical reactions.

Procedures

The operation and maintenance procedures designed to minimize spills at a facility are as important as the selection and installation of the

equipment. Many operation and maintenance procedures are common-sense, however, and should be adequately included in every Plan. For example, incompatibility of materials with the container can result in leaks or explosion of the container. Elements of good housekeeping include neat and orderly storage of chemicals and prompt cleanup of spilled liquids or powders to prevent them from reaching the sewer collection system. An effective preventive maintenance should include periodic inspections and testing of equipment systems, appropriate adjustment, repair, or replacement of valves and other parts. Also, a security system to prevent accidental or intentional entry to the IU site would reduce the risk of vandalism, theft, sabotage, or other illegal use of the plant facility that could possibly cause a slug loading.

Simple operating and maintenance procedures directed at eliminating spills and leaks include, but are not limited to, the following:

- Inspect All Chemical Storage Vessels, as Well as All Process Vessels and Fittings (Pumps, Valves, Piping): The items must be constructed of material compatible with the chemicals passing through them. In particular, tanks and drums used to store corrosive chemicals should be constructed of stainless steel or of a corrosion resistant plastic. The plan should discuss all routine operation and maintenance (including housekeeping and replacement of worn-out equipment) performed to minimize spills. The frequency of inspections and monitoring for leaks or other conditions that could lead to spills should also be indicated. Any pumps or valves used to process these chemicals must possess corrosion-resistant seals and packings. Similarly, pumps or valves through which organic chemicals pass must contain seals and packings which are dissolution-resistant. The IU should indicate in its Plan that appropriate materials of construction have been used, and are compatible with the chemicals being processed.

- Inspect Foundations and Supports of Large Storage Tanks, Process Vessels, and Piping. These must also meet compatibility and integrity requirements: All above ground vessels should be protected from vehicular damage through the use of truck guards. Underground vessels and pipes should be well marked and weight limits placed on roadways that may cross these underground vessels. All underground vessels should be cathodicly protected to prevent damage due to corrosion. Underground piping should be double-walled at vehicle crossings.

- Equip Open Storage and Process Tanks with Liquid Level Control Devices, and Grounding Apparatus (where necessary): In addition, overflow alarms should be installed to warn personnel of tank overfilling. Similarly, temperature and pressure alarms should be installed on closed chemical processing equipment, to alert industry personnel to runaway reactions or other factors resulting in excessive

temperatures and pressures. Such extreme conditions can otherwise result in the automatic opening of relief valves, subsequently spilling the process vessel's contents.

- Use Proper Drum Handling Equipment: The practice of scooping drums with the forks of a forktruck should be eliminated. Pallets should be used to aid handling and inspection. Oil dispensing racks should be provided with drip pans.

- Secure Loading/Unloading Pump Station Controls: In a manner to prevent the pumps from being turned on by unauthorized personnel. Warning signs or physical obstructions, such as crossing gates, should be used to prevent trucks from driving away while the loading hose is connected.

- Eliminate All Unnecessary Cross Connections: All unnecessary floor drains should be plugged, especially those in high-risk areas.

- Utilize Automatic Stormwater and/or Sewer Sampling Systems to Monitor for Spills: These sampling systems can be tied into automatic shutoff devices that will prohibit discharge from a plant effluent system.

2.3.4.5 Emergency Response Equipment and Procedures

Equipment

Information that should appear in this section of the IU Plan includes an inventory of available IU emergency response equipment and a detailed description of emergency response procedures. The emergency response equipment inventory should also contain the equipment location on the facility layout diagram and a physical description of each piece of equipment. A summary of the information that should appear in this part of the plan follows:

- Communication Equipment and Alarms: A communication system should be established for reporting emergencies and providing immediate emergency instruction to facility personnel with the use of a telephone. intercom, radio, alarm, etc.

- Spill Containment and Control Equipment and Tools: Examples of this type of equipment include sorbent materials and dry chemicals which are often used for containing spills of small volumes.

- Spilled Material Storage Containers: Chemical spills must be contained and removed as soon as possible to prevent materials from spreading into other areas.

- Protective Clothing and Respirators: In responding to an emergency hazardous spill, employees should take precaution to ensure that as

much skin is covered as possible. Flameproof protective clothing will not only prevent chemical burns, but will also protect skin during a fire. Other examples of protective clothing include:

- Rubber Gloves
- Apron
- Goggles/Face Mask
- Hard Hat.

In addition, depending on the nature of the emergency, the use of self-contained breathing apparatus may be necessary. All employees involved in response procedures should have access to the breathing apparatus and be adequately trained in the use of this equipment.

- First Aid Kits: A well equipped first aid kit should be immediately available for use if necessary. The plan should indicate the location of the kit, and the items that it contains. Items that are essential to a first aid kit include: antiseptic solutions and bandages for application of wounds; artificial respiration devices, and eyewashing solutions and cups.

- Ventilation Equipment: Before entering an area where a potentially explosive spill has occurred, tests should be made for explosive atmosphere, the presence of toxic gases and oxygen deficiency. Whenever an adverse atmosphere is encountered, forced ventilation, such as powered explosion-proof ventilators, blowers, or fans, can be used to create safe conditions. Ventilation should be continued as long as recurrence of the hazard is possible.

- Decontamination Equipment: The appropriate protective clothing and monitoring equipment should be used in responding to a spill of radioactive material.

- Fire Extinguishing Systems: A list of fire extinguishers and their locations should be posted throughout the plant. In addition, a map that shows both fire extinguisher location and fire hose connections should be submitted to local response agencies.

Procedures

Each IU Plan should contain a detailed description of procedures to be followed in responding to a hazardous spill at the facility. The established procedures should be designed to eliminate danger to human health and to facilitate containment and clean-up of a spill. A description of the procedures should contain the following items: notification of responsible personnel, chain of command, evacuation procedures, notification of response agencies, and spill assessment and response procedures. A fuller description of each of these elements follows:

- Notification of Facility Personnel Responsible for Responding to Spills: Each facility should have a person(s) who is qualified to respond to a spill at the facility. There should be at least one person available at all times to carry out appropriate response procedures. This person(s) should be familiar with all aspects of the Plan and have the authority to commit the resources necessary to initiate emergency response procedures. All Employees should be aware of which person(s) to contact if a spill takes place. It is recommended that a sign indicating who to contact and the appropriate phone number(s) be posted in all areas where a spill may occur.

- Chain-of-Command: Proper chain-of-command procedures should be followed when responding to an accidental spill or slug to ensure that all necessary personnel and response agencies are notified. A description of these procedures should be included in the Plan.

- Evacuation Procedures: An evacuation plan should be posted throughout the facility and discussed in safety training sessions. The plan should contain: (1) a map of evacuation routes; (2) a map of alternative evacuation routes; and (3) a description of signals used to begin and conduct an evacuation. A copy of the evacuation plan should be submitted to the local police department; fire department; and hospitals for their records.

- Notification of Response Agencies and Contractors: A list of spill response agencies and their numbers should be available to each employee assigned to coordinate spill response activities. In the event of potential or actual emergency situations, the appropriate response agency should be notified immediately.

- Spill Assessment and Response Procedures: The person(s) designated to carry out spill response procedures should begin by assessing the spill. A determination should be made on the origin of the spill and what impact the spill will have. Based on this assessment, the coordinator will initiate proper response procedures. Spill response procedures that should be included in the plan include:

  - Notification of facility personnel by activating the communication and/or alarm system

  - Begin evacuation procedures if necessary

  - Notification of appropriate local, State, and Federal agencies

  - Stop the flow by shutting off pumps or closing valves

  - Prevent contact between incompatible materials

  - Commence clean up activities

  - Submit necessary reports

- Procedures for Clean-up, Treatment, and or Disposal of Spilled Materials: Once a spill has been contained, clean-up of the waste

material begins. The material should be immediately treated or disposed of to eliminate health and safety hazards and to prevent the dispersion of the material". The objectives of treating the material prior to disposal are to reduce the potential impact of the waste on water quality and to recover valuable materials. Several methods of disposal are available, however, the facility should choose the proper method based on the nature of the material. If waste generated from a spill is determined to be hazardous, the facility must meet RCRA requirements. Information pertaining to treatment and disposal methods used by the facility should be included in the Plan.

In addition, if it is anticipated that outside contractors and/or consultants may be utilized in clean-up, treatment, or disposal methods, the plan should include the name of the company; contact person and phone number; and the available equipment and manpower necessary for the job, if possible.

These procedures should be consistent with the ones established in the facility's OSHA Emergency Action Plan, as required by 29 CFR §1910.38.

2.3.4.6 Slug Reporting

Procedures for reporting and documenting spills and slug discharges should be described in the Plan. At a minimum, the IU follow-up report should include: (1) the time, date, and cause of the incident; (2) the impact of the spill on the POTW and the environment; (3) extent of injury and/or damage; and (4) how other incidents of this type can be avoided in the future. A description of clean-up, treatment, and disposal procedures must be included where applicable. The report should also evaluate the adequacy of the IU's response procedures. In particular, the investigator's reports should address the following questions:

- Was the safety of industry personnel and the surrounding community ensured throughout the incident?
- Were personnel working close to the incident provided adequate access to breathing apparatus, protective clothing, etc.?
- Was the spill confined quickly?
- Was fire extinguishing equipment adequate and readily available when needed?

- Did secondary containment structures remain intact throughout the spill response? Were these structures of adequate volume to confine the spill or slug discharge?

- Were appropriate POTW, fire department, or other officials immediately notified of the incident?

Recommendations for improving operational, inspection, maintenance, and/or spill response procedures based upon the incident should be included. The investigation report should then be made available to the POTW, fire department, and insurance firms if applicable, to assist these agencies in their own investigations. In addition to reporting procedures, copies of forms used for reporting and a list of appropriate response agencies and phone numbers should be incorporated into the Plan.

2.3.4.7 Training Program

More important than establishing the IU Slug Control Plan is the effective implementation of that plan by IU employees". The IU's Plan should contain an outline of the training program given to employees. An employee training program can provide employees at all levels of responsibility with a complete understanding of the processes and materials used, the safety hazards, the practices for preventing discharges, and the procedures for responding properly and rapidly to hazardous materials spills and slugs. Specialized training should also be provided to each employee or group of employees that handle potentially hazardous chemicals".

Periodic training sessions are essential and should be conducted at appropriate intervals to assure complete understanding of the IU's Plan, goals and objectives. New employees should be trained immediately upon employment. Employees should also be notified and retrained when their responsibilities or functions under the plan change. Training records should be maintained by the plant manager as long as a person is employed at the facility and for at least three years from the date the employee last worked at the facility. Periodic drills should be instituted to evaluate employee knowledge and understanding of the Plan. The purpose and frequency of such drills should be indicated in the Plan. Training to implement the OSHA-required Emergency Action Plan should also be coordinated with the Plan training, especially when the

procedures and responsibilities are uniform. To the extent the procedures differ, Emergency Action Plan training should be conducted periodically as well to ensure worker safety in the event of a slug or any other emergency.

2.3.4.8 Certification

A qualified professional should certify the adequacy of the measures described in the Plan. Table 2-6 shows an example of what this certification should include.

2.4 IMPLEMENT THE PROGRAM

Upon completion of the development of a Slug Control Program, including the identification of the IU community, development of appropriate legal/enforcement authority, assignment of risk categories and controls to address those risks, the program should be implemented. There are three activities in the implementation of a Slug Control Program:

- The review and approval process of IU Plans (Section 2.4.1)
- An IU inspection and monitoring program (Section 2.4.2)
- POTW Slug Response (Chapter 3).

POTWs may find it useful to develop a Procedures Manual to provide a written record of the POTW's Slug Control Program. It should address all aspects of the POTW's Program in summary form, including review of IU Plans, POTW inspection and monitoring of IUs, and slug response procedures.

2.4.1 POTW Review and Approval of IU Slug Control Plans

EPA recommends that POTWs review the Plan of all applicable industrial facilities to ensure that all pertinent slug discharge control issues are addressed. Appendix B includes a review checklist which can aid the POTW in reviewing the IU implementation of required procedures.

The IU should submit a Slug Control Plan to the POTW within three months of notification and complete implementation of the Plan within six months of approval. The Plan should detail facilities and procedures to eliminate or minimize the slug discharge of pollutants into the sewer system which could

TABLE 2-6. CERTIFICATION OF THE SLUG CONTROL PLAN

BASED ON MY INQUIRY OF THE PERSON OR PERSONS DIRECTLY RESPONSIBLE FOR MANAGING COMPLIANCE WITH THE SLUG CONTROL MEASURES IN THE SLUG CONTROL PLAN, I CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS FACILITY IS IMPLEMENTING THE SLUG CONTROL PLAN SUBMITTED TO THE [POTW].

NAME/TITLE OF AUTHORIZED REPRESENTATIVE OF THE IU RESPONSIBLE FOR THE SLUG CONTROL PLAN	DATE

I CERTIFY THAT THE SLUG PREVENTION AND CONTROL EQUIPMENT INSTALLED BY THE INDUSTRY WILL PROVIDE ADEQUATE PROTECTION FROM SLUG LOADING WHEN USED AND MAINTAINED PROPERLY.

NAME	DATE

harm the treatment plant, workers, sludge, or cause an NPDES violation. The Plan should meet the requirements and follow a format specified by the POTW. Once approved by the POTW, the Plan will become an enforceable part of the pretreatment permit. The POTW should reserve the right to inspect the IU to ensure that it is adequately implementing its Plan.

The POTW should also consider meeting with company officials as part of its review process. Site visits to confirm the equipment and procedures described in the Plan, and follow-up inspections where development of procedures or installation of or replacement of equipment were promised are also important. In meeting with the industry officials, the POTW may consider providing a tour of the POTW plant and/or the collection systems to increase IU awareness of slug impacts (for example, actual evidence of previous problems such as sewer line corrosion).

2.4.2 Inspection and Monitoring of IUs for Slug Control Implementation

IUs should be inspected to verify compliance with slug control requirements or plans and to ensure IU's slug risk classifications are correct and do not need to be revised. Low- to medium-risk IUs should be inspected randomly and infrequently. High-risk facilities should be inspected more frequently, and regularly to determine adherence to Slug Control Plans. Many of the facilities posing the highest slug risk are probably already significant industries that come under the POTW's pretreatment monitoring program. Consequently, these facilities will normally be visited often and their wastewaters will be sampled frequently. There will, however, be high-risk facilities which were not originally classified as significant IUs and which should be inspected.

Before conducting inspections, it is important that the POTW inspector be familiar with the IU's slug discharge control requirements and the Control Plan on file at the POTW. The inspectors should seek to verify all Plan information during the inspections. In particular, during a compliance monitoring inspection of a significant user already covered by pretreatment requirements, the POTW inspector should be observing the slug control practices. The following items should be reviewed during a compliance inspection:

- Verifying or updating information on facility contact, phone number, address, chemical inventory, and slug control equipment and procedures
- Identifying any relevant process changes, modifications to the facility or to the discharge location
- Evaluating the condition of materials storage, transfer, and transport equipment
- Revising facility sketches to include changes or modifications
- Continuing evaluation of evidence or potential for spills
- Evaluating progress of work for any compliance schedule
- Checking for good housekeeping and chemical handling procedures
- Evaluating containment structures.

The inspector should ascertain the IU's status with regard to compliance with the Plan, report any deficiencies observed in the IU's current Plan, and suggest alternatives or modifications. If an IU facility has a compliance schedule, the inspector should visit the facility during construction and upon completion of construction activity. Information gathered during the inspections should be used to modify the IU's Plan as necessary.

3. POTW SLUG RESPONSE PROGRAM

Slugs may occur despite the implementation of a well-designed Industrial User Slug Control Plan*. This chapter describes four elements of a response action designed to mitigate the impacts of slugs which escape prevention:

- Detect and Identify Slugs (Section 3.1): through IU notification or POTW monitoring and tracking systems.
- Coordinate response activities (Section 3.2): through an appointed response coordinator responsible for directing a response and calling upon local agencies for assistance (such as police and fire departments).
- Develop appropriate responses (Section 3.3): including emergency measures such as POTW and collection system worker evacuations, containment of slugs, as well as subsequent treatment or disposal techniques.
- Follow-up measures (Section 3.4): such as full documentation and evaluation of response effort, enforcement actions and SDC Program review and modification.

Figure 3-1 depicts the organization of this Chapter.

3.1 SLUG DETECTION AND SOURCE IDENTIFICATION

While identification of a slug discharge event may come from any of several sources (e.g., remote early warning system, notification from the IU source, an individual or agency, or by visual or other observations of

---

*Additional information on the development and implementation of a spill response program can be found in the following materials:

- Guidelines for the Development and Implementation of Preparedness, Prevention, and Contingency (PPC) Plans
- Hazardous Chemicals, Spill Cleanup
- Hazardous Materials and Natural Disaster Emergencieso Incident Action Guidebook
- Hazardous Materials Spills and Responses for Municipalities
- Oil and Hazardous Substances Response Manual.

More information concerning the author and publication date of these materials can be found in Appendix E.

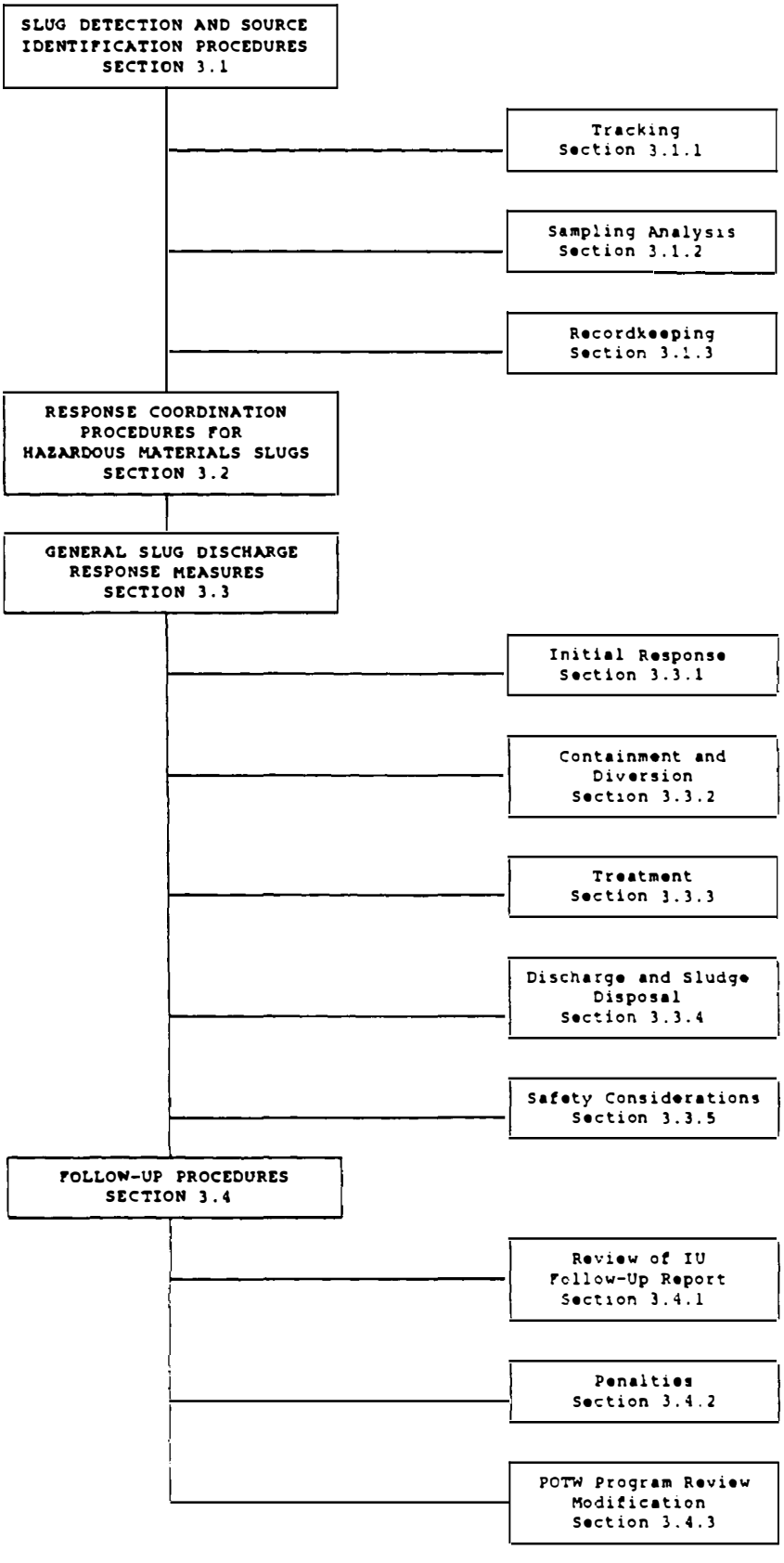


FIGURE 3-1. ORGANIZATION OF CHAPTER 3

influent wastewaters), notification from the responsible IU is the best means of identification as IU personnel are most knowledgeable about the nature of the slug. As discussed in Chapter 2, notification responsibilities and procedures should be imposed on all potential slug dischargers. Nonetheless, the POTW may not be notified in all cases.

In the absence of slug discharge notification from the IU source, the POTW will have to rely on other methods to detect slug loadings. In large part, detection of slugs by POTWs can be a chance occurrence, resulting in ineffective responses. Detection methods often do not provide sufficient warning to undertake mitigating measures or enough information to identify the responsible party, for example, workers in the collection system or treatment plant detecting a change in the appearance or smell of the influent, actual upset of the treatment plant, or an explosion in a pump station, or receiving water impacts (i.e., fish kills, etc.).

Where slugs are a potential or existing problem the POTW should implement a systematic means of slug detection, such as:

- Regular and random monitoring in the collection system and at Industrial Users (IUs) using instruments that provide an immediate analysis (e.g., pH, lower explosive limit (LEL) and collection system monitoring stations equipped with recording devices and remote alarms). Unusual readings may be indicative of slug discharges.
- Instruments for measuring wastewater parameters register concentration variations at the headworks or other points within the treatment plant.

Some POTWs may find that budget constraints and administrative procedures limit their ability to advance funds to pay for analytical work to identify the responsible IU. POTWs may wish to set up a contingency fund to pay for analytical work prior to identification of the responsible IU. Once the responsible IU was identified, the money could be collected from the IU via fines or fees.

3.1.1 Tracking

A continuous monitoring and surveillance system can provide documentation of the variations in influent character that will result from certain slug

loadings. Based on the location of the sensing apparatus, the time of the arrival of the slug at the plant can be estimated. However, a continuous monitoring system can be expensive. If the IUs in a community are centralized (such as in an industrial park), monitoring costs may be reduced.

Upon detection, and once any necessary response measures are underway, the slug loading source may be tracked by checking pump stations and manholes upstream from the first detection point up to the discharge point. Tracking the slug is not always successful because the slug may cease before the source is found. However, if the collection area where the slug originated can be determined, and the discharged material can be identified, then records of IUs and the types of materials used by each can be checked to identify the slug source. EPA's Guidance Manual for Preventing Interference at POTWs provides additional information on methods for tracking slug discharge sources.

The Toxicity Reduction Evaluation Protocol for Municipal Wastewater Treatment Plants also may help the POTW identify slug sources of toxicity. Methods are presented in the manual for collection system tracking and toxicity treatability tracking when a substance (known or unknown) is producing POTW effluent toxicity and for toxicity identification evaluation. These methods may be useful in identification of individual causative agents in slugs, including components of mixtures received as slugs.

Following are some examples of POTW programs: the Hampton Roads Sanitation District (HRSD) in Southeastern Virginia maintains a comprehensive tracking system of industrial wastes generated from over 300 sources, including military installations, manufacturers, and food processors. IU discharges may be tracked in one of two ways:

- HRSD employs field teams, supplied with radio-equipped vehicles and extensive field and laboratory sampling equipment. These stand-by personnel check pump stations and sewer lines in a downstream to upstream fashion to isolate the pollutant source. Collected samples are preserved as evidence.
- HRSD also sets up automatic sampling equipment at key locations throughout a service area. The samples are collected and analyzed daily. Once pollutant concentration trends are determined, the samplers are moved upstream repeatedly until the problematic source is located.

In either case, once the source is located, the industry in violation is contacted and is required to pay all costs associated with the investigation and cleanup. HRSD has determined that while use of a highly visible industrial waste investigative team has deterred IUs from unauthorized discharges, it has been most effective in tracking chronic discharges. It is estimated that the rate of such unauthorized discharges has decreased by more than 40 percent in the past 8 years.

The City of Baltimore, Maryland, has established a data management system as part of its industrial waste control program. The system generates monthly listings, called "Daily Average Mass Discharge Reports," of IU discharges. The report groups companies by sewer service area, chemicals used, stored, and/or discharged. If a chemical compound (such as a solvent) slug is identified by a tracking team or through sample analysis techniques, a search of the data management system can locate potential industrial sources of the compound in question. Again, this type of system is most useful for tracking chronic discharges, but may be beneficial for addressing isolated slugs.

3.1.2 Sampling Analysis

The investigation of a slug should include sampling and analysis of the discharged material in the collection system or at the plant site. The POTW should have adequate sampling equipment that can be used during a slug. Identifying the slug material is essential to identify the slug source, determining the need for clean-up, or determining whether additional control measures are needed to prevent a recurrence.

The personnel taking samples should be knowledgeable about the appropriate sampling techniques, methods of preservation and chain-of-custody procedures. Analyses of samples may be performed in the POTW laboratory or at a commercial laboratory. If the POTW routinely uses a commercial laboratory to perform analysis of wastewater samples, the POTW should establish a contract with the laboratory to provide emergency analytical services.

Sampling can be conducted either manually or through the use of automatic devices. Normally a grab sample or multiple grab samples will be appropriate

for the analysis of slug material. If possible, samples should be taken of the virgin material, of the flow immediately downstream of the slug discharge, and at the POTW. Extreme care must be exercised in selecting sampling devices and procedures to avoid the potential for sampling error. A good reference for sampling procedures is the EPA document, NPDES Compliance Sampling Inspection Manual (USEPA, 1984) available through the National Technical Information Services (NTIS).

Once an accurate sample has been obtained, several steps should be taken to ensure that the validity and objectivity of the monitoring operations are maintained. The sample should be properly preserved and promptly delivered to the laboratory to prevent sample degradation. Proper chain-of-custody procedures should be used where such procedures will not hinder response to a slug discharge. Sample preservation techniques and holding times are outlined in various analytical handbooks, such as the EPA Manual of Methods for Chemical Analysis of Water and Wastes, available through NTIS, and Standard Methods for the Examination of Water and Wastewater, 16th Edition.

3.1.3 Recordkeeping

Good recordkeeping is an important element of the response program since documentation of the events surrounding the slug discharge and its cleanup may be important in cost recovery or reimbursement. The records may provide useful information for future slug situations. It is good practice after completing a slug discharge response action to evaluate the response measures taken to identify possible improvements. It is also important to establish procedures and forms to simplify recordkeeping during response to a slug discharge to ensure that safety, liability, or other important issues are not overlooked. Recordkeeping can be postponed during emergency response periods, where infeasible or hindering response actions.

The POTW Emergency Response Coordinator (see Section 3.2) should keep a permanently bound book, log, or diary, documenting the chronological events (from notification to cleanup). All events and actions of any significance should be recorded in the log as soon as possible with notations of the date and time, including records of flow, operation, personnel involved.

maintenance sampling, problems encountered, telephone conversations", meetings held, orders, issues, and weather observations".

Forms indicating all of the information needed for appropriate documentation of a slug discharge event can be used to supplement the log book. Sample forms are provided in Appendix C. The forms address documentation of the initial report on the incident, listings of all key events pertaining to slug loading response and cleanup, and a recommended format for a final report. The forms also include the names of national, regional or local organizations that can assist during a slug incident.

3.2 RESPONSE COORDINATION PROCEDURES FOR SLUGS OF HAZARDOUS MATERIALS

Generally, POTWs have the expertise and resources to respond to non-explosive or nonreactive slug loadings. For example, influent flow equalization can be one means of handling a high BOD slug. However, for spills of explosive or reactive materials, the POTW may require assistance from other agencies. It should be up to the POTW to ensure that the groundwork for coordination is put in place during its POTW slug control program development. This section discusses emergency coordination for response to hazardous material spills. Section 3.3 discusses POTW response measures relevant to a wider variety of slugs.

The POTW should designate an Emergency Response Coordinator (hereinafter referred to as the Coordinator) who will direct the response effort or represent the POTW in assisting an IU or primary local agency responsible for response efforts. The POTW personnel receiving information concerning a hazardous material slug should call the Coordinator, who will evaluate the information and direct the further actions of the POTW and IU personnel. A suggested format for notification is shown in Appendix C.

During Slug Control Program development, the Coordinator should meet with local industries, local emergency planning committees under SARA Title III, fire, police and public health departments, State Emergency Response Teams, etc.", to identify available resources and efficient coordination of response equipment and personnel". The purpose of the meetings is to inform public

agencies of the adverse effects of slugs and the need to coordinate response efforts to prevent additional harm or duplication of effort.

The POTW should develop a listing of all agencies that may respond to slugs. The contact names, addresses, telephone numbers, and the available services (i.e., manpower, equipment) provided by each source should be listed. Neighboring jurisdictions or industries with specialized equipment may be willing to help when accidental spills occur. A listing of national organizations that may be of assistance is included in Appendix C.

Response procedures should be drawn up with detailed instructions designating the lead agency and contact persons, provisions for notification of other agencies, access to equipment, and follow-up review procedures. If possible, these procedures can be written in a formal agreement (such as a Memorandum of Understanding) and signed by all of the participants.

In addition, communication equipment will assist the POTW in response efforts. The equipment may include telephones, CBs, and short wave radios, which will keep key individuals involved in the response in contact with each other and will facilitate coordination of slug loading response efforts. Cooperation also yields the benefits of additional resources and expertise.

The local police and fire departments may already have personnel specially trained in handling materials spills. For example, Los Angeles County has a Toxic Strike Force which serves to coordinate enforcement by the POTW, fire, police, and public health departments. Many fire and police departments have a Hazardous Materials Unit staffed 24 hours a day with specialized personnel available for response anywhere in the city, or county or neighboring jurisdictions. These units may be equipped with positive pressure breathing apparatus, acid gas suits, explosives meter, radiological markers, kits for stopping leaks, absorbent material, recovery drums, and manuals for identification and handling of hazardous materials. The fire department may be able to train the POTW staff in the proper response procedures, and may help contain explosive materials or toxic air releases at the POTW.

In an emergency, other responders, such as the fire department, may determine that the easiest solution is to flush a spill down the sewer. This is particularly prevalent when responding to spills of flammable materials, such as a tank truck accident where gasoline and chemicals could be discharged into a combined sewer. Continued flushing could occur until the concentration of combustible gas in the sewer system reaches 100 percent of its lower explosive limit (LEL). Once this condition has been reached, there is an adequate concentration of gas to support combustion. Volatile compounds could accumulate at pump stations and be hazardous to workers there. In these situations, the knowledge and experience of the POTW officials is critical in determining the best course of action, and if the spill is to be flushed, or has been flushed, what action is needed to protect the workers, collection system, and the treatment plant. Knowledge of this danger might lead to the evacuation of the pump station)".

In many POTWs, the treatment plant itself and the collection system, or parts of the collection system, are maintained by separate crews (of the city or county, or by other cities)". In such instances, the POTW may not be directly responsible for the collection system, and coordination between the responsible agencies becomes extremely important. In responding to a slug discharge that has reached the collection system, the POTW personnel should contact the agency responsible for the maintenance of the collection system. Additionally, if the collection system staff identifies unusual corrosion of a pipe or wastewater with unusual characteristics, the staff should be aware of the notification procedures developed to alert the POTW.

3.3 GENERAL POTW SLUG RESPONSE MEASURES

Once dangerous slug materials enter the collection system, there may be several potential effects:

- Hazardous vapors resulting from the slug may back up the sewer lines into residences, or other industrial facilities, creating additional hazardous situations
- POTW personnel may be endangered, or the collection system or plant facilities may be damaged
- Materials may pass through the treatment plant unaltered and be discharged to the receiving water

- Biological treatment processes may be upset, and the time required to re-establish maximum efficiency may be considerable, resulting in discharge of poorly treated wastewater

- Biological treatment processes may remove or reduce the quantity of discharged materials entering the receiving stream; however, floatable or settleable solids may need to be disposed of, and sludges may be contaminated.

These effects will be a function of the type and quantity of released material, contingency reactions, and types of treatment processes at the POTW. The following sections define initial response measures, containment and diversion, treatment, waste disposal, and associated safety concerns to prevent the adverse effects caused by slug loadings.

3.3.1 Initial Response

Monitoring, venting, dilution of the material in the collection system, or containing the material should come first. Which of these is the appropriate response actions will be dependent on the type and quantity of the released material and how quickly the POTW learns of the incident.

If the POTW is notified soon after a slug, the collection system should be reviewed to determine where the slug will travel in the collection system. A crew can then be dispatched to locate the leading edge of the slug. Sites downstream from the slug can then be identified and utilized as possible containment areas. Another crew can monitor the site of the slug and work downstream to mitigate damage to the collection system.

If the flow is flammable or explosive and is expected to go through any metering installation, the appropriate officials should be directed to put the facility out of electrical service. Additionally, all downstream industrial facilities, commercial establishments, or residences that could be endangered should be notified and the necessary precautions taken. Proper venting and any necessary dilution of flow in the collection system should be handled by appropriate maintenance crews along the discharge route. If the flow of the slug will enter any sewage pumping station, all personnel stationed at the pump station (or people sent to the facility in response to the slug) should be advised of any potential danger.

Depending on the quantity and type of material involved in the slug, a decision should be made whether to attempt to capture and remove the material from the collection system or to let it flow to the treatment plant. Approximate flow rates through the collection system should be established beforehand through the use of dye studies conducted by the POTW throughout the system to determine the high and low flow rates from particular industries to the treatment plant. This will allow for the selection of containment locations based on these flow rates. The decision to contain the slug, and where the discharge should be contained, should be made by the Coordinator based upon the hazards involved.

A monitoring and surveillance system can help with implementation of slug discharge countermeasures at the plant or in the collection system. Test dye runs throughout the collection system during nonemergency times can be used to calculate estimated flow rates through the sewer from specific industries or areas. These flow rates can be used to calculate travel time from the source of the slug to a pump station, another industry, a residential area, or the treatment plant. This effort can result in a better response during a slug loading by providing the necessary information to decide on evacuation, containment, and cleanup actions.

If the slug material has reached the treatment plant, all available information concerning the material type and quantity discharged should be provided to plant operating personnel who will be able to advise the response team whether containment and subsequent removal of the material is possible. If removal is not possible, the plant personnel can bypass the material around specific unit processes rather than allowing the slug to go through the normal treatment process. The agency administering the NPDES permit program (State or EPA) should be notified of potential problems and engaged in discussions of any need to bypass, if possible.

3.3.2 Containment and Diversion

Measures to contain the spilled material near its source and prevent it from reaching the collection system can include:

- Changing position of the ruptured container or tank
- Repairing or rebuilding the container, tank, or containment structure
- Building a substitute tank or containment structure
- Enclosing the container, tank, or containment structure.

A substitute containment structure may be made by:

- Forming dikes from earth, sand bags, or inflatable water bags
- Erecting temporary tanks or containment structures
- Digging a pit or sump, preferably lined.

Sewer drains should be blocked when they present an avenue of continued spreading of the spilled or discharged material". In the absence of high-expansion foam systems, materials at hand should be used to form dikes (e.g., sand bags). In-sewer means of control include inflatable plugs, "pipestoppers,"" or dams usually used in sewer maintenance.

Within the treatment plant, the operator may be able to divert and contain the discharged material", provided he has been forewarned and is adequately prepared. Consequently, the POTW should obtain or have access to all necessary containment and diversion equipment that is likely to be used during response to a slug. For example, a treatment plant containing several units (primary clarifiers or activated sludge) can allow the flow with discharged material to enter specific units. By operating appropriate valves, the flow to the units with captured material can be turned off and contained material can be removed or processed, if possible. The EPA Guidance Manual For Preventing Interference at POTWs discusses diversion and process modifications that can be conducted at the treatment plant to mitigate the effects of slug discharges.

Other types of equipment that may be required for slug response efforts include fire-fighting equipment, decontamination equipment, and spill control and cleanup equipment". To ensure the availability of this equipment, the POTW should consider agreements with local fire and police departments, neighboring POTWs, and nearby industries to borrow appropriate response equipment when needed. The POTW also should be familiar with suppliers of such equipment and

local contractors equipped to clean up spills. Spill response equipment should be available to the POTW. Such equipment should include:

- Temporary containment devices (e.g., booms)
- Absorbent materials
- Spill cleanup tools
- Ventilation equipment
- Liquid vacuum pumps
- Containers for storing spilled material
- Decontamination equipment.

3.3.3 Treatment

Upon identification and containment of the released material, appropriate treatment can begin. Table 3-1 presents treatment alternatives for 19 groups of hazardous material slugs that may be implemented in the collection system or at the POTW. Factors such as volume of the discharge, time, location, and availability of equipment and supplies will dictate the appropriateness of any given countermeasure. The POTW can increase the number of in-plant treatment options with in-plant modifications, for example, with a modification to provide chemical addition between grit removal and pre-aeration, the chemical sludge could be settled in the primary clarifier.

3.3.4 Discharge and Sludge Disposal

If the slug consists of hazardous substances, the slug material treated at the treatment plant of the POTW may contaminate the sludge or pass through the plant. Contaminated sludge and the material collected at the IU or in the collection system could be classifiable as a hazardous waste† and therefore would have to be disposed of according to RCRA requirements. Even if the sludge is nonhazardous, it may still need to be disposed of in a nonroutine manner. The POTW should evaluate the availability of local contractors/haulers for transporting, and hazardous waste disposal options for ultimately disposing of contaminated sludge or collected material before such a need arises.

TABLE 3-1. SLUG COUNTERMEASURES FOR MATERIALS ENTERING THE WASTEWATER COLLECTION AND/OR TREATMENT SYSTEM

CONTAMINANTS	HAZARDOUS CHARACTERISTICS					COUNTERMEASURES																
						Collection System/Treatment Plant											Treatment Plant Only					
	Flammable/Combustible	Acidic/Alkaline	Toxic/Poisonous	Solid/Viscous	Radioactive	Add Acid	Add Caustic	Add Oxidant	Add Carbon	Add Gels/Foam	Add Sorbent	Precipitate	Chelate	Divert & Store	Dilute[a]	Force Ventilate	Disperse	Increase Aeration	Activate Skimmers	Change Sludge Return Rate	Aerate Sludge Prior to Recycle	Alter Sludge Waste Rate	Boost Biological Treatment[b]
Elements (liquid, solid)			X	X										X								
Salts (non-heavy metal)			X											X	X							
Salts (heavy metal)			X									X	X		X							
Mineral Salts			X				X								X							
Short Chain Organic Acids	X	X					X	X											X			X
Long Chain Organic Acids	X	X		X					X										X	X	X	X
Caustics, Alkalineso and Hydroxides		X				X									X							
Oxides			X																X			
Pesticides			X						X									X	X	X	X	X
Phenols			X						X						X	X		X	X	X	X	
Poisons			X						X									X	X	X	X	
Radioactive Materials					X									X								
Heavy Metal Organics			X						X			X	X		X				X	X	X	X
Flammable Hydrocarbons	X							X	X	X						X			X	X	X	
Nonflammable Hydrocarbons								X	X										X	X	X	X
Flammable Hydrocarbon Derivatives	X							X	X	X						X			X	X	X	
Nonflammable Hydrocarbon Derivatives			X					X	X		X								X	X	X	X
Compressed Gases	X		X						X		X					X		X				
Fats, Oils, Greases				X			X				X						X					X

[a] Dilution (20 or 50 to 1) is a technique that may often be used when little is known about the spilled materials.

[b] Often the materials need to be contained for long periods of time (1 day to weeks) to allow for acclimation and growth of bacteria for adequate oxidation of pollutants.

POTWs that identify a high risk IU with a potential for slugs that would result in sludge disposal problems should determine the available disposal options during Slug Control Program development. Response actions may be modified dependent upon the disposal option or even OSHA requirements. If response or disposal options are severely limited, the POTW may require the IU to develop stringent Slug Control Plans that are strictly enforced.

If the slug material might or is expected to pass through the plant, the effluent toxicity should be measured to determine the effect of the slug on the receiving water. If it appears that toxicity may occur, mitigating measures such as recirculating or removing the effluent for further treatment may be required. Continued monitoring of the effluent also may be necessary. If the slug results in an upset of the POTW or NPDES permit violation, the POTW should notify the State/EPA NPDES authority.

3.3.5 Safety Considerations

The safety protocol for hazardous materials response may vary with the types of slugs. The safety protocol may also be affected by the requirements of an OSHA emergency action plan or contingency. However, the basic elements of any hazardous material control plan should include:

- An Emergency Response Coordinator, with assigned responsibilities and authority
- Clear staff responsibilities, including Hazardous Material Safety Officers
- Exposure minimization
- Safety supervision
- Proper safety equipment.

At the POTW, the Coordinator must clearly be in charge and able to assess the situation and direct activity to remediate the slug's impact. An effective safety program should also include training of the response team to identify and interpret chemical hazards.

In addition, the number of people exposed in the immediate danger zone should be kept to the absolute minimum. Proper safety clothing, safety

equipment, and work equipment appropriate to the physical and chemical hazards should be a prerequisite for entry into the danger zone.

Safety equipment necessary for a slug of a potentially hazardous nature should include:

- General first aid kit
- Eye and skin contact response kits
- Explosive and toxic gas detectors
- Proper lighting and warning equipment (e.g., barricade, traffic cones, flashing lights).

The following equipment should be made available to any personnel exposed to hazardous materials.

Protective Clothing	Respiratory Protection
• Total encapsulation unit	• Self-contained breathing apparatus
• Rubberized rain gear	• Gas mask with organic vapor canister
• Disposal coveralls	• Half mask respirator with dust cartridge
• Normal working clothing	• Disposable dust respirator.

The type of clothing or respiratory protection required for different situations should be designated (e.g., the operator should know when he or she must be wearing disposable coveralls and a gas mask with an organic vapor cartridge). As the potential for exposure decreases, the levels of protection can be decreased. Supervisors, who are required both to use protective equipment and to supervise workers using the equipment, should complete the safety training program.

3.4 FOLLOW-UP REVIEW AND ACTIONS

A follow-up review of a spill is important in evaluating IU's Slug Control Plan and POTW Slug Control Program and in providing a comprehensive summary of the key aspects of the event. The POTW should conduct a follow-up review of the incident and the IU's report and write a comprehensive final

report. The final report documents the event and may serve as a reference during reviews of the IU Plan or POTW Program, or during the occurrence of similar slug discharges in the future.

This section discusses the procedures that a POTW can use in conducting the review and highlights areas of concern that should be investigated during the review. Procedures for requiring modification of the IU Slug Control Plan and instituting civil and monetary penalties also are discussed in this section.

3.4.1 Review of IU Follow-up Report

In cases where an IU was identified as the source of a slug, a written IU report should be required within five days. The POTW should review this information as part of its follow-up review. This report should address the cause of the slug and precautions that will be taken to prevent a recurrence. The IU also should provide an evaluation of the slug discharge response capabilities onsite and how they will be improved in the future.

The IU's Plan should be reviewed after the incident to determine any deficiencies in implementation. The POTW should identify the deficiencies in the IU's design or implementation of its Plan. The Plan may be determined to be inadequate, or a well-designed Plan may not have been implemented properly and revision should be required.

In some cases, the corrective measures required at the IU's site where the slug discharge originated could require time (e.g., structural modification such as installing dikes, curbs, etc.). The IU should be provided with a compliance schedule to implement all necessary slug discharge prevention measures within a reasonable time.

If the source of the slug did not have a Plan because it was not classified as a high risk, then the IU should be evaluated and required to develop a Plan if necessary. The Plan should address measures taken by the IU to prevent further slugs.

3.4.2 Penalties

The POTW should evaluate its authority to recover the costs of slug response and of the damage to the POTW and the collection system. The POTW may have the authority to enforce civil or criminal penalties against the IUs that violate the prohibited discharge standards or requirements as established under the POTW's pretreatment program. Legal remedies and emergency relief are presented in EPA's Guidance Manual for POTW Pretreatment Program Development and the Pretreatment Compliance Monitoring and Enforcement Guidance.

3.4.3 POTW Slug Control Program Review and Modification

After the slug incident is concluded, the POTW should review its Slug Control Program. Any problems encountered by the POTW during response or follow-up activities should be analyzed. This analysis may indicate deficiencies in the POTW's Program. Corrective measures can then be devised to improve the Program.

Deficiencies could include inadequate enforcement authority, an inability to collect fines and penalties, lack of coordination between the various groups and agencies involved in slug control, inappropriate sampling procedures, and poor documentation. Some examples of modifications could be:

- An industrial discharge sampling program for collection and treatment systems located in heavily industrialized areas may be desirable for continuous maintenance of satisfactory plant performance and effluent quality and determining potential slug discharges.
- A monitoring and surveillance system could be installed at critical points in the collection system and at the head end of treatment plants to facilitate activation of slug discharge contingency plans.
- Emergency response agencies (e.g., police, fire) could be trained to handle hazardous materials spills, be informed of the alternative for handling spills, and be informed of the ramifications of these alternatives regarding wastewater collection and treatment systems.
- The potential for spills and batch discharges of hazardous materials may need to be reassessed. A more thorough inventory of hazardous materials stored within the POTW service area may be warranted. If the POTW already has such an inventory, it may need to be updated regularly.

- Disposal options for released materials or other contaminated materials may need to be investigated. The hazardous material content of sludge resulting from slug discharges or chronic discharges of industrial wastes may need to be quantified. The additional costs incurred for disposal of hazardous materials also could result in a re-evaluation of the budget for slug discharge control.

Depending on the specific problems encountered by a POTW during a slug, appropriate modifications should be implemented to improve future slug control and response, and prevent recurrence.

APPENDIX A

REPORTABLE QUANTITIES USED IN CERCLA/CWA

(FINAL REPORTABLE QUANTITIES WERE ADJUSTED FOR
102 HAZARDOUS SUBSTANCES UNDER CERCLA AND CWA
ON SEPTEMBER 29, 1986.)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES

(See footnotes at end of Table 302.4)

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Code†	RCRA Waste Number	Category	Pounds(Kg)
Acenaphthene	83329		1*	2		B	100 (45.4)
Acenaphthylene	208968		1*	2		D	5000 (2270)
Acetaldehyde	75070	Ethanal	1000	1,4	U001	C	1000 (454)
Acetaldehyde, chloro-	107200	Chloroacetaldehyde	1*	4	P023	C	1000 (454)
Acetaldehyde, trichloro-	75876	Chloral	1*	4	U034	X	1 (0.454)
Acetamide, N-(aminothioxomethyl)-	591082	1-Acetyl-2-thiourea	1*	4	P002	C	1000 (454)
Acetamide, N-(4-ethoxyphenyl)-	62442	Phenacetin	1*	4	U187	X	1 (0.454)
Acetamide, N-9H-fluoren-2-yl-	53963	2-Acetylaminofluorene	1*	4	U005	X	1 (0.454)
Acetamide, 2-fluoro-	640197	Fluoroacetamide	1*	4	P057	B	100(45.4)
Acetic acid	64197		1000	1		D	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codel	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Acetic acid, ethyl ester	141786	Ethyl acetate	1*	4	U112	D	5000 (2270)
Acetic acid, fluoro-, sodium salt	62748	Fluoroacetic acid, sodium salt[36]	1*	4	P058	A	10 (4.54)
Acetic acid, lead salt	301042	Lead acetate	5000	1,4	U144	D	5000# (2270)
Acetic acid, thallium(I) salt	563688	Thallium(I) acetate	1*	4	U214	B	100 (45.4)
Acetic anhydride	108247		1000	1		D	5000 (2270)
Acetimidic acid,N [(methylcarbamoyl) oxy]thio- methyl ester	16752775	Methomyl	1*	4	P066	B	100 (45.4)
Acetone	67641	2-Propanone	1*	4	U002	D	5000 (2270)
Acetone cyanohydrin	75865	2-Methyllactonitrile Propanenitrile, 2-hydroxy-2-methyl	10	1,4	P069	A	10 (4.54)
Acetonitrile	75058	Ethanenitrile	1*	4	U003	D	5000 (2270)
3-(alpha-Acetonylbenzyl)- 4-hydroxycoumarin and salts	81812	Warfarin	1*	4	P001	B	100 (45.4)
Acetophenone	98862	Ethanone, 1-phenyl-	1*	4	U004	D	5000 (2270)
2-Acetylaminofluorene	53963	Acetamide, N-9-H fluoren-2-yl-	1*	4	U005	X	1# (0.454)
Acetyl bromide	506967		5000	1		D	5000 (2270)
Acetyl chloride	75365	Ethanoyl chloride	5000	1,4	U006	D	5000 (2270)
1-Acetyl-2-thiourea	591082	Acetamide, N-(aminothioxomethyl)-	1*	1	P002	C	1000(454)
Acrolein	107028	2-Propenal	1	1,2,4	P003	X	1 (0.454)
Acrylamide	79061	2-Propenamide	1*	4	U007	D	5000 (2270)
Acrylic acid	79107	2-Propenoic acid	1*	4	U008	D	5000 (2270)
Acrylonitrile	107131	2-Propenenitrile	100	1,2,4	U009	B	100# (45.4)
Adipic acid	124049		5000	1		D	5000 (2270)
Alanine, 3-[p-bis(2-chloroethyl)amino]-phenyl-,L-	148823	Melphalan	1*	4	U150	X	1# (0.454)
Aldicarb	116063	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino) carbonyl]oxime	1*	4	P070	X	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codel	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Aldrin	309002	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo, exo-dimethanonaphthalene	1	1,2,4	P004	X	1# (0.454)
Allyl alcohol	107186	2-Propen-1-ol	100	1,4	P005	B	100 (45.4)
Allyl chloride	107051		1000	1		C	1000 (454)
Aluminum phosphide	20859738		1*	4	P006	B	100 (45.4)
Aluminum sulfate	10043013		5000	1		D	5000 (2270)
2-Amino-1-methyl benzene	95534	o-Toluidine	1*	4	U328	X	1# (0.454)
4-Amino-1-methyl benzene	106490	p-Toluidine	1*	4	U353	X	1# (0.454)
5-(Aminomethyl)-3-isoxazolol	2763964	3(2H)-Isoxazolone, 5-(aminomethyl)-	1*	4	P007	C	1000 (454)
4-Aminopyridine	504245	4-Pyridinamine	1*	4	P008	C	1000 (454)
Amitrole	61825	1H-1,2,4-Triazol-3-amine	1*	4	U011	X	1# (0.454)
Ammonia	7664417		100	1		B	100 (45.4)
Ammonium acetate	631618		5000	1		D	5000 (2270)
Ammonium benzoate	1863634		5000	1		D	5000 (2270)
Ammonium bicarbonate	1066337		5000	1		D	5000 (2270)
Ammonium bichromate	7789095		1000	1		C	1000#(454)
Ammonium bifluoride	1341497		5000	1		B	100 (45.4)
Ammonium bisulfite	10192300		5000	1		D	5000 (2270)
Ammonium carbamate	1111780		5000	1		D	5000 (2270)
Ammonium carbonate	506876		5000	1		D	5000 (2270)
Ammonium chloride	12125029		5000	1		D	5000 (2270)
Ammonium chromate	7788989		1000	1		C	1000# (454)
Ammonium citrate, dibasic	3012655		5000	1		D	5000 (2270)
Ammonium fluoborate	13826830		5000	1		D	5000 (2270)
Ammonium fluoride	12125018		5000	1		B	100 (45.4)
Ammonium hydroxide	1336216		1000	1		C	1000 (454)
Ammonium oxalate	6009707 5972736 14258492		5000	1		D	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
536							536
Ammonium picrate	131736	Phenol, 2,4,6-trinitro-, ammonium salt.	1*	4	P009	A	10 (4.54)
Ammonium silicofluoride	16919190		1000	1		C	1000 (454)
Ammonium sulfamate	7773060		5000	1		D	5000 (2270)
Ammonium sulfide	12135761		5000	1		B	100 (45.4)
Ammonium sulfite	10196040		5000	1		D	5000 (2270)
Ammonium tartrate	14307438 3164292		5000	1		D	5000 (2270)
Ammonium thiocyanate	1762954		5000	1		D	5000 (2270)
Ammonium thiosulfate	7783188		5000	1		D	5000 (2270)
Ammonium vanadate	7803556	Vanadic acid, ammonium salt	1*	4	P119	C	1000 (454)
Amyl acetate iso- sec- tert-	628637 123922 626380 625161		1000	1		D	5000 (2270)
Aniline	62533	Benzenamine	1000	1,4	U012	D	5000 (2270)
Anthracene	120127		1*	2		D	5000 (2270)
Antimony 11	7440360		1*	2		D	5000 (2270)
ANTIMONY AND COMPOUNDS			1*	2			**
Antimony pentachloride	7647189		1000	1		C	1000 (454)
Antimony potassium tartrate	28300745		1000	1		B	100 (45.4)
Antimony tribromide	7789619		1000	1		C	1000 (454)
Antimony trichloride	10025919		1000	1		C	1000(454)
Antimony trifluoride	7783564		1000	1		C	1000(454)
Antimony trioxide	1309644		5000	1		C	1000 (454)
Aroclor 1016	12674112	Polychlorinated Biphenyls (PCBs).	10	1,2		A	10#(4.54)
Aroclor 1221	11104282	Polychlorinated Biphenyls (PCBs).	10	1,2		A	10# (4.54)
Aroclor 1232	11141165	Polychlorinated Biphenyls (PCBs).	10	1,2		A	10# (4.54)
Aroclor 1242536	53469219	Polychlorinated Biphenyls (PCBs).	10	1,2		A	10# (4.54)
Aroclor 1248	12672296	Polychlorinated Biphenyls (PCBs)	10	1,2		A	10# (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Aroclor 1254	11097691	Polychlorinated Biphenyls (PCBs).	10	1,2		A	10# (4.54)
Aroclor 1260	11096825	Polychlorinated Biphenyls (PCBs)	10	1,2		A	10# (4.54)
Arsenic 11	7440382		1*	2,3		X	1#(0.454)
Arsenic acid	1327522 7778394		1*	4	P010	X	1# (0.568)
ARSENIC AND COMPOUNDS			1*	2			**
Arsenic disulfide	1303328		5000	1		D	5000# (2270)
Arsenic(III) oxide	1327533	Arsenic trioxide.	5000	1,4	P012	D	5000# (2270)
Arsenic(V) oxide	1303282	Arsenic pentoxide	5000	1,4	P011	D	5000#(2270)
Arsenic pentoxide	1303282	Arsenic(V)oxide	5000	1,4	P011	D	5000# (2270)
Arsenic trichloride	7784341		5000	1		D	5000# (2270)
Arsenic trioxide	1327533	Arsenic(III) oxide	5000	1,4	P012	D	5000# (2270)
Arsenic trisulfide	1303339		5000	1		D	5000# (2270)
Arsine, diethyl-	692422	Diethylarsine	1*	4	P038	X	1# (0.568)
Asbestos 111	1332214		1*	2,3		X	1# (0.454)
Auramine	492808	Benzenamine,536 4,4'-carbonimidoylbis(N,N-dimethyl-536	1*	4	U014	X	1#(0.568)
Azaserine	115026	L-Serine, diazoacetate (ester)	1*	4	U015	X	1# (0.454)
Aziridine	151564	Ethylenamine	1*	4	P054	X	1#(0.454)
Azirino(2',3',3,4)pyrrolo (1,2-a)indole-4,7-dione,6-amino-8-[((aminocarbonyl)oxy) methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-	50077	Mitomycin C	1*	4	U010	X	1# (0.568)
Barium cyanide	542621		10	1,4	P013	A	10 (4.54)
Benz[j]aceanthrylene536 1,2-dihydro-3-methyl-	56495	3-Methylcholanthrene	1*	4	U157	X	1# (0.454)
Benz[c]acridine	225536	3,4-Benzacridine	1*	4	U016	X	1# (0.936)
3,4-Benzacridine	225536	Benz[c]acridine	1*	4	U0536	X	1# (0.568)
Benzal chloride	98873	Benzene, dichloromethyl-	1*	4	U017	D	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Benz[a]anthracene	56553	1,2-Benzanthracene Benzo[a]anthracene	1*	2,4	U018	X	1# (0.454)
1,2-Benzanthracene	56553	Benz[a]anthracene Benzo[a]anthracene	1*	2,4	U018	X	1# (0.454)
1,2-Benzanthracene, 7,12-dimethyl-	57976	7,12 Dimethylbenz[a] anthracene	1*	4	U094	X	1# (0.454)
Benzenamine	62533	Aniline	1000	1,4	U012	D	5000 (2270)
Benzenamine,[4,4'-carbonylbis(N,N-dimethyl-	492808	Auramine	1*	4	U014	X	1# (0.454)
Benzenamine, 4-chloro-	106478	p-Chloroaniline	1*	4	P024	C	1000 (454)
Benzenamine, 4-chloro-2-methyl-,hydrochloride	3165933	4-Chloro-o-toluidine hydrochloride	1*	4	U049	X	1# (0.454)
Benzenamine, N,N-dimethyl-4-phenylazo-	60117	Dimethylaminoazobenzene	1*	4	U093	X	1# (0.454)
Benzenamine, 4,4'-methylenebis(2-chloro-	101144	4,4' Methylenebis(2 chloroaniline)	1*	4	U158	X	1# (0.454)
Benzenamine, 2-methyl-, hydrochloride	636215	o-Toluidine hydrochloride	1*	4	U222	X	1# (0.454)
Benzenamine, 2-methyl-5-nitro-	99558	5-Nitro-o-toluidine	1*	4	U181	X	1# (0.454)
Benzenamine, 4-nitro-	100016	p-Nitroaniline	1*	4	P077	D	5000 (2270)
Benzene	71432		1000	1,2,3,4	U019	C	1000# (454)
Benzene, 1-bromo-4-phenoxy	101553	4-Bromophenyl phenyl ether	1*	2,4	U030	B	100 (45.4)
Benzene, chloro-	108907	Chlorobenzene	100	1,2,4	U037	B	100 (45.4)
Benzene, chloromethyl-	100447	Benzyl chloride	100	1,4	P028	B	100# (45.4)
Benzene, 1,2-dichloro-	95501	1,2-Dichlorobenzene o-Dichlorobenzene	100	1,2,4	U070	B	100 (45.4)
Benzene, 1,3-dichloro-	541731	1,3-Dichlorobenzene m-Dichlorobenzene	1*	2,4	U071	B	100 (45.4)
Benzene, 1,4-dichloro-	106467	1,4-Dichlorobenzene p-Dichlorobenzene	100	1,2,4	U072	B	100 (45.4)
Benzene, (dichloromethyl-	98873	Benzal chloride	**	4	U017	D	5000 (2270)
Benzene, 2,4-diisocyanatomethyl-	584849 91087 26471625	Toluene diisocyanate	1*	4	U223	B	100 (45.4)
Benzene, dimethyl-	1330207	Xylene	1000	1,4	U239	C	1000 (454)
m-	108383	m-					
o-	95476	o-					
p-	106423	p-					
Benzene, hexachloro-	118741	Hexachlorobenzene	1*	2,4	U127	X	1# (0.454)
Benzene, hexahydro-	110827	Cyclohexane	1000	1,4	U056	C	1000 (454)
Benzene, hydroxy-	108952	Phenol	1000	1,2,4	U188	C	1000 (454)
Benzene, methyl-	108883	Toluene	1000	1,2,4	U220	C	1000 (454)
Benzene, 1-methyl-2,4-dinitro-	121142	2,4-Dinitrotoluene	1000	1,2,4	U105	C	1000# (454)
Benzene, 1-methyl-2,6-dinitro-	606202	2,6-Dinitrotoluene	1000	1,2,4	U106	C	1000# (454)
Benzene,[1,2-methylenedioxy-4-allyl-	94597	Safrole	1*	4	U203	X	1# (0.454)
Benzene, 1,2-methylenedioxy-4-propenyl-	120581	Isosafrole	1*	4	U141	X	1# (0.454)
Benzene, 1,2-methylenedioxy-4-propyl-	94586	Dihydrosafrole	1*	4	U090	X	1# (0.454)
Benzene, (1-methylethyl-	98828	Cumene	1*	4	U055	D	5000 (2270)
Benzene, nitro-	98953	Nitrobenzene	1000	1,2,4	U169	C	1000 (454)
Benzene, pentachloro-	608935	Pentachlorobenzene	1*	4	U183	A	10 (4.54)
Benzene, pentachloronitro-	82688	Pentachloronitrobenzene	1*	4	U185	X	1# (0.454)
Benzene, 1,2,4,5-tetrachloro-	95943	1,2,4,5-Tetrachlorobenzene	1*	4	U207	D	5000 (2270)
Benzene, (trichloromethyl-	98077	Benzotrichloride	1*	4	U023	X	1# (0.454)
Benzene, 1,3,5-trinitro-	99354	sym-Trinitrobenzene	**	4	U234	A	10 (4.54)
Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	510156	Ethyl 4,4'-dichlorobenzilate	**	4	U038	X	1# (0.454)
1,2-Benzenedicarboxylic acid anhydride	85449	Phthalic anhydride	1*	4	U190	D	5000 (2270)
1,2-Benzenedicarboxylic acid,[bis(2-ethylhexyl)] ester	117817	Bis(2-ethylhexyl)phthalate	1*	2,4	U028	X	1# (0.454)
1,2-Benzenedicarboxylic acid,dibutyl ester	84742	n-Butyl phthalate Dibutyl phthalate Di-n-butyl phthalate	100	1,2,4	U069	A	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance[536]	CASRN[536]	Regulatory Synonyms	Statutory RQ	Statutory Code[†]	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Benz[a]anthracene	56553	1,2-Benzanthracene Benzo[a]anthracene	1*	2,4	U018	X	1# (0.454)
1,2-Benzanthracene	56553	Benz[a]anthracene Benzo[a]anthracene	1*	2,4	U018	X	1# (0.454)
1,2-Benzanthracene, 7,12-dimethyl-	57976	7,12-Dimethylbenz[a]anthracene	1*	4	U094	X	1# (0.454)
Benzenamine	62533	Aniline	1000	1,4	U012	D	5000 (2270)
Benzenamine, 4,4'-carbonimidoylbis(N,N-dimethyl-	492808	Auramine	1*	4	U014	X	1# (0.454)
Benzenamine, 4-chloro	106478	p-Chloroaniline	1*	4	P024	C	1000 [illegible]
Benzenamine, 4-chloro-2-methyl-, hydrochloride	3165933	4-Chloro-o-toluidine, hydrochloride	1*	4	U049	X	1# (0.454)
Benzenamine, N,N-dimethyl-4-phenylazo-	601536	Dimethylaminoazobenzene	1*	4	U093	X	1# (0.454)
Benzenamine, 4,4'-methylenebis(2-chloro-	101538	4,4'-Methylenebis(2-chloroaniline)	1*	4	U158	X	1# (0.454)
Benzenamine, 2-methyl[536]—hydrochloride	636215	o-Toluidine hydrochloride	1*	4	U222	X	1# (0.454)
Benzenamine, 2-methyl-5-nitro-	99558	5-Nitro-o-toluidine [536]	1*	4	U181	X	1# (0.454)
Benzenamine, 4-nitro-	100018	p-Nitroaniline	1*	4	P077	D	5000 (2270)
Benzene	71432		1000	1,2,3,4	U019	C	1000# (454)
Benzene, 1-bromo-4-phenoxy-	101553	4-Bromophenyl phenyl ether	1*	2,4	U030	B	100 (45.4)
Benzene, chloro-	108907	Chlorobenzene	100	1,2,4	U037	B	100 (45.4)
Benzene, (chloromethyl)-	100447	Benzyl chloride [536]	100	1,4	P028	B	100# (454)
Benzene,588-dichloro-	95501	1,2-Dichlorobenzene o-Dichlorobenzene	100	1,2,4	U070	B	100 (45.4)
Benzene, 1,3-dichloro-	541731	1,3-Dichlorobenzene m-Dichlorobenzene	1*	2,4	U071	B	100 (45.4)
Benzene, 1,4-dichloro-	106467	1,4-Dichlorobenzene p-Dichlorobenzene	100	1,2,4	U072	B	100 (45.4)
Benzene, (dichloromethyl)[536]	98873	Benzal chloride	1*	4	U017	D	5000 (2270)
Benzene, 2,4-diisocyanatomethyl-	584849 91087 26471625	Toluene diisocyanate	1*	4	U223	B	100 [illegible]
Benzene, dimethyl-	1330207	Xylene	1000	1,4	U239	C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code[†]	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
m- o- p-	108383 95476 106423	m- o- p-					
Benzene, hexachloro-	118741	Hexachlorobenzene	1*	2,4	U127	X	1# (0.454)
Benzene, hexahydro-	110827	Cyclohexane	1000	1,4	U056	C	1000 [illegible]
Benzene, hydroxy-	108952	Phenol	1000	1,2,4	U188	C	1000 (454)
Benzene, methyl-	108883	Toluene	1000	1,2,4	U220	C	1000 (454)
Benzene, 1-methyl-2,4-dinitro-	121142	2,4-Dinitrotoluene	1000	1,2,4	U105	C	1000# (454)
Benzene, 1-methyl-2,6-dinitro-	606202	2,6-Dinitrotoluene	1000	1,2,4	U106	C	1000# (454)
Benzene,588-methylenedioxy-4-allyl	94597	Safrole	1*	4	U203	X	1# (0.454)
Benzene,588-methylenedioxy-4[536]propenyl-	120581	Isosafrole	1*	4	U141	X	1# (0.454)
Benzene, 1,2-methylenedioxy-4-propyl-	94586	Dihydrosafrole	1*	4	U090	X	1# (0.454)
Benzene, (1-methylethyl)-	98828	Cumene	1*	4	U055	D	5000 (2270)
Benzene, nitro-	98953	Nitrobenzene	1000	1,2,4	U169	C	1000 (454)
Benzene, pentachloro-	608935	Pentachlorobenzene	1*	4	U183	A	10 (4.54)
Benzene, pentachloronitro-	82688	Pentachloronitrobenzene	1*	4	U185	X	1# (0.454)
Benzene, 1,2,4,5-tetrachloro-	95943	1,2,4,5-Tetrachlorobenzene	1*	4	U207	D	5000 (2270)
Benzene, (trichloromethyl)[536]	98077	Benzotrichloride	1*	4	U023	X	1# [illegible]
Benzene, 1,3,5-trinitro-	99354	sym-Trinitrobenzene	1*	4	U234	A	10 (4.54)
Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	510156	Ethyl 4,4'-dichlorobenzilate	1*	4	U038	X	1# (0.454)
1,2-Benzenedicarboxylic acid anhydride	85449	Phthalic anhydride	1*	4	U190	D	5000 (2270)
1,2-Benzenedicarboxylic acid,[bis(2-ethylhexyl)] ester	117817	Bis(2-ethylhexyl)phthalate	1*	2,4	U028	X	1# (0.454)
1,2-Benzenedicarboxylic acid,dibutyl ester	84742	n-Butyl[illegible]phthalate Dibutyl phthalate Di-n-butyl[illegible]phthalate	100	1,2,4	U069	A	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
1,2-Benzenedicarboxylic acid,diethyl ester	84662	Diethyl phthalate	1*	2,4	U088	C	1000 (454)
1,2 Benzenedicarboxylic acid,dimethyl ester	131113	Dimethyl phthalate	1*	2,4	U102	D	5000 (2270)
1,2 Benzenedicarboxylic acid,di-n octyl ester	117840	Di-n-octyl phthalate	1*	2,4	U107	D	5000 (2270)
1,3 Benzenediol	108463	Resorcinol	(100)	1,4	U201	D	5000 (2270)
1,2 Benzenediol,4 [1 hydroxy 2 (methylamino)ethyl]	51434	Epinephrine	1*	4	P042	C	1000 (454)
Benzenesulfonic acid chloride	98099	Benzenesulfonyl chloride	1*	4	U020	B	100 (45.4)
Benzenesulfonyl chloride	98099	Benzenesulfonic acid chloride	1*	4	U020	B	100 (45.4)
Benzenethiol	108985	Thiophenol	1*	4	P014	B	100 (45.4)
Benzidine	92875	(1,1' Biphenyl) 4,4'diamine	1*	2,4	U021	X	1# (0.454)
1,2 Benzisothiazolin-3-one,1,1-dioxide, and salts	81072	Saccharin and salts	1*	4	U202	X	1# (0.454)
Benzo[a]anthracene	56553	Benz[a]anthracene 1,2-Benzanthracene	1*	2,4	U018	X	1# (0.454)
Benzo[b]fluoranthene	205992		1*	2		X	1# (0.454)
Benzo[k]fluoranthene	207089		1*	2		X	1# (0.454)
Benzo[j,k]fluorene	206440	Fluoranthene	1*	2,4	U120	B	100 (45.4)
Benzoic acid	65850		5000	1		D	5000 (2270)
Benzonitrile	100470		1000	1		D	5000 (2270)
Benzo[ghi]perylene	191242		1*	2		D	5000 (2270)
Benzo[a]pyrene	50328	3,4 Benzopyrene	1*	2,4	U022	X	1# (0.454)
3,4 Benzopyrene	50328	Benzo[a]pyrene	1*	2,4	U022	X	1# (0.454)
p-Benzoquinone	1065141	1,4-Cyclohexadienedione	1*	4	U197	A	10 (4.54)
Benzotrichloride	98077	Benzene, trichloromethyl-	1*	4	U023	X	1# (0.454)
Benzoyl chloride	98884		1000	1		C	1000 (454)
1,2 Benzphenanthrene	218019	Chrysene	1*	2,4	U050	X	1# (0.454)
Benzyl chloride	100447	Benzene, chloromethyl-	100	1,4	P028	B	100# (45.4)
Beryllium† †	7440417	Beryllium dust	1*	2,3,4	P015	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
BERYLLIUM AND COMPOUNDS			1*	2			**
Beryllium chloride	7787475		5000	1		D	5000# (2270)
Beryllium dust	7440417	Beryllium	1*	2,3,4	P015	X	1# (0.454)
Beryllium fluoride	7787497		5000	1		D	5000# (2270)
Beryllium nitrate	13597994 7787555		5000	1		D	5000# (2270)
alpha - BHC	319846		1*	2		X	1# (0.454)
beta - BHC	319857		1*	2		X	1# (0.454)
gamma - BHC	58899	Hexachlorocyclohexane (gamma isomer) Lindane	1	1,2,4	U129	X	1# (0.454)
delta - BHC	319868		1*	2		X	1 (0.454)
2,2'-Bioxirane	1464535	1,2:3,4-Diepoxybutane	1*	4	U085	X	1# (0.454)
(1,1'-Biphenyl)-4,4'diamine	92875	Benzidine	1*	2,4	U021	X	1# (0.454)
(1,1'-Biphenyl)-4,4'-diamine,3,3'dichloro	91941	3,3'-Dichlorobenzidine	1*	2,4	U073	X	1# (0.454)
(1,1'-Biphenyl)-4,4'-diamine,3,3'dimethoxy	119904	3,3'-Dimethoxybenzidine	1*	4	U091	X	1# (0.454)
(1,1'Biphenyl)-4,4'-diamine,3,3'-dimethyl	119937	3,3'-Dimethylbenzidine	1*	4	U095	X	1# (0.454)
Bis(2-chloroethoxy) methane	111911	Ethane, 1,1'-[methylenebis(oxy)] bis(2 chloro	1*	2,4	U024	C	1000 (454)
Bis (2-chloroethyl) ether	111444	Dichloroethyl ether Ethane, 1,1'-oxybis[2 chloro-	1*	2,4	U025	X	1# (0.454)
Bis(2 chloroisopropyl) ether	108601	Propane, 2,2' oxybis[2 chloro-	1*	2,4	U027	C	1000 (454)
Bis(chloromethyl) ether	542881	Methane, oxybis(chloro-	1*	4	P016	X	1# (0.454)
Bis (dimethylthiocarbamoyl) disulfide	137268	Thiram	1*	4	U244	A	10(4154)
Bis(2-ethylhexyl)phthalate	117817	1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)] ester	1*	2,4	U028	X	1# (0.454)
Bromine cyanide	506683	Cyanogen bromide	1*	4	U246	C	1000 (454)
Bromoacetone	598312	2-Propanone, 1-bromo-	1*	4	P017	C	1000 (454)
Bromoform	75252	Methane, tribromo	1*	2,4	U225	B	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Catego-ry	Final RQ Pounds(Kg)
4-Bromophenyl phenyl ether	101553	Benzene, 1-bromo-4-phenoxy-	1*	2,4	U030	B	100 (45.4)
Brucine	357573	Strychnidin-10-one, 2,3-dimethoxy-	1*	4	P018	B	100 (45.4)
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87683	Hexachlorobutadiene	1*	2,4	U128	X	1#1(0.454)
1-Butanamine, N-butyl-N-nitroso-	924163	N-Nitrosodi-n-butylamine	1*	4	U172	X	1# (0.454)
Butanoic acid, 4-[bis(2-chloroethyl)amino] benzene-	305033	Chlorambucil	1*	4	U035	X	1# (0!454)
1-Butanol	71363	n-Butyl alcohol!	1*	4	U031	D	5000 (2270)
2-Butanone	78933	Methyl ethyl ketone	1*	4	U159	D	5000 (2270)
2-Butanone peroxide	1338234	Methyl ethyl ketone peroxide	1*	4	U160	A	10 (4.54)
2-Butenal	123739 4170303	Crotonaldehyde	100	1,4	U053	B	100 (45.4)
2-Butene, 1,4-dichloro-	764410	1,4-Dichloro-2-butene	1*	4	U074	X	1 (0.454)
Butyl acetate iso- sec- tert-	123864 110190 105464 540885		5000	1		D	5000 (2270)
n-Butyl alcohol	71363	1-Butanol	1*	4	U031	D	5000 (2270)
Butylamine iso- sec- sec- tert-	109739 78819 513495 13952846 75649		1000	1		C	1000 (454)
Butyl benzyl phthalate	85687		1*	2		B	100 (45.4)
n-Butyl phthalate	84742	1,2-Benzenedicarboxylic acid,dibutyl ester Dibutyl phthalate Di-n-butyl phthalate	100	1,2,4	U069	A	10 (4.54)
Butyric acid iso-	107926 79312		5000	1		D	5000 (2270)
Cacodylic acid	75605	Hydroxydimethylarsine oxide	1*	4	U136	X	1# (0!454)
Cadmium ††	7440439		1*	2		X	1# (0.454)
Cadmium acetate	543908		100	1		B	100# (45.4)
CADMIUM AND COMPOUNDS			1*	2			**
Cadmium bromide	7789426		100	1		B	100# (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Catego-ry	Final RQ Pounds(Kg)
Cadmium chloride	10108642		100	1		B	100# (45.4)
Calcium arsenate	7778441		1000	1		C	1000# (454)
Calcium arsenite	52740166		1000	1		C	1000# (454)
Calcium carbide	75207		5000	1		A	10 (4.54)
Calcium chromate	13765190	Chromic acid, calcium salt	1000	1,4	U032	C	1000# (454)
Calcium cyanide	592018		10	1,4	P021	A	10 (4.54)
Calcium dodecylbenzene sulfonate	26264062		1000	1		C	1000 (454)
Calcium hypochlorite	7778543		100	1		A	10(4.54)
Camphene, octachloro-	8001352	Toxaphene	1	1,2,4	P123	X	1# (0.454)
Captan	133062		10	1		A	10# (4.54)
Carbamic acid, ethyl ester	51796	Ethyl carbamate (Urethan)	1*	4	U238	X	1# (0.454)
Carbamic acid, methylnitroso-, ethyl ester	615532	N-Nitroso-N-methylurethane	1*	4	Ut 78	X	I# (0.454)
Carbamide, N-ethyl-N-nitroso-	759739	N-Nitroso-N-ethylurea	1*	4	U176	X	1# (0.454)
Carbamide, N-methyl-N-nitroso-	684935	N-Nitroso-N-methylurea	1*	4	U177	X	1# (0.454)
Carbamide, thio-	62566	Thiourea	1*	4	U2!9	X	1# (0.454)
Carbamimidoselenoic acid	630104	Selenourea	1*	4	P103	C	1000 (454)
Carbamoyl chloride, dimethyl-	79447	Dimethylcarbamoyl chloride	1*	4	U097	X	1# (0!454)
Carbaryl	63252		100	1		B	100 (45.4)
Carbofuran	1563662		10	1		A	10 (4.54)
Carbon bisulfide	75150	Carbon disulfide	5000	1,4	P022	B	100 (45.4)
Carbon disulfide	75150	Carbon bisulfide	5000	1,4	P022	B	100 (45.4)
Carbonic acid, dithallium(I) salt	6533739	Thallium(I) carbonate	1*	4	U2!5	B	100 (45.4)
Carbonochloridic acid, methyl ester	79221	Methyl chlorocarbonate	1*	4	U156	C	1000 (454)
Carbon oxyfluoride	353504	Carbonyl fluoride	1*	4	U033	C	1000 (454)
Carbon tetrachloride	56235	Methane, tetrachloro-	5000	1,2,4	U211	D	5000# (2270)
Carbonyl chloride	75445	Phosgene	5000	1,4	P095	A	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Carbonyl fluoride	353504	Carbon oxyfluoride	1*	4	U033	C	1000 (454)
Chloral	75876	Acetaldehyde, trichloro-	1*	4	U034	X	1# (0.454)
Chlorambucil	305033	Butanoic acid, 4-[bis(2-chloroethyl)amino] benzene-	1*	4	U035	X	1# (0.454)
CHLORDANE (TECHNICAL MIXTURE AND METABOLITES)			1*	2			**
Chlordane	57749	Chlordane, technical 4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-	1	1,2,4	U036	X	1# (0.454)
Chlordane, technical	57749	Chlordane 4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-	1	1,2,4	U036	X	1# (0.454)
CHLORINATED BENZENES			1*	2			**
CHLORINATED ETHANES			1*	2			**
CHLORINATED NAPHTHALENE			1*	2			**
CHLORINATED PHENOLS			1*	2			**
Chlorine	7782505		10	1		A	10 (4.54)
Chlorine cyanide	506774	Cyanogen chloride	10	1,4	P033	A	10 (4.54)
Chlornaphazine	494031	2-Naphthylamine,N-bis(2-chloroethyl)-	1*	4	U026	X	1# (0.454)
Chloroacetaldehyde	107200	Acetaldehyde, chloro-	1*	4	P023	C	1000 (454)
CHLOROALKYL ETHERS			1*	2			**
p-Chloroaniline	106478	Benzenamine,4-chloro-	1*	4	P024	C	1000 (454)
Chlorobenzene	108907	Benzene, chloro-	100	1,2,4	U037	B	100 (45.4)
4-Chloro-m-cresol	59507	p-Chloro-m-cresol Phenol, 4-chloro-3-methyl-	1*	2,4	U039	D	5000 (2270)
p-Chloro-m-Cresol	59507	4-Chloro-m-cresol Phenol, 4-chloro-3-methyl-	1*	2,4	U039	D	5000 (2270)
Chlorodibromomethane	124481		1*	2		B	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
1-Chloro-2,3-epoxypropane	106898	Epichlorohydrin Oxirane, 2-(chloromethyl)-	1000	1,4	U041	C	1000# (454)
Chloroethane	75003		1*	2		B	100 (45.4)
2-Chloroethyl vinyl ether	110758	Ethene, 2-chloroethoxy-	1*	2,4	U042	C	1000 (454)
Chloroform	67663	Methane, trichloro-	5000	1,2,4	U044	D	5000# (2270)
Chloromethyl methyl ether	107302	Methane, chloromethoxy-	1*	4	U046	X	1# (0.454)
beta-Chloronaphthalene	91587	2-Chloronaphthalene Naphthalene, 2-chloro-	1*	2,4	U047	D	5000 (2270)
2-Chloronaphthalene	91587	beta-Chloronaphthalene Naphthalene, 2-chloro-	1*	2,4	U047	D	5000 (2270)
2-Chlorophenol	95578	o-Chlorophenol Phenol, 2-chloro-	1*	2,4	U048	B	100 (45.4)
o-Chlorophenol	95578	2-Chlorophenol Phenol, 2-chloro-	1*	2,4	U048	B	100 (45.4)
4-Chlorophenyl phenyl ether	7005723		1*	2		D	5000 (2270)
1-(o-Chlorophenyl)thiourea	5344821	Thiourea, (2-chlorophenyl)-	1*	4	P026	B	100 (45.4)
3-Chloropropionitrile	542767	Propanenitrile, 3-chloro-	1*	4	P027	C	1000 (454)
Chlorosulfonic acid	7790945		1000	1		C	1000 (454)
4-Chloro-o-toluidine, hydrochloride	3165933	Benzenamine, 4-chloro-2-methyl-,hydrochloride	1*	4	U049	X	1# (0.454)
Chlorpyrifos	2921882		1	1		X	1 (0.454)
Chromic acetate	1066304		1000	1		C	1000 (454)
Chromic acid	11115745 7738945		1000	1		C	1000# (454)
Chromic acid, calcium salt	13765190	Calcium chromate	1000	1,4	U032	C	1000# (454)
Chromic sulfate	10101538		1000	1		C	1000 (454)
Chromium II	7440473		1*	2		X	1# (0.454)
CHROMIUM AND COMPOUNDS			1*	2			**
Chromous chloride	10049055		1000	1		C	1000 (454)
Chrysene	218019	1,2-Benzphenanthrene	1*	2,4	U050	X	1# (0.454)
Cobaltous bromide	7789437		1000	1		C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Code†	RCRA Waste Number	Category	Pounds(Kg)
Cobaltous formate	544183		1000	1		C	1000 (454)
Cobaltous sulfamate	14017415		1000	1		C	1000 (454)
Coke Oven Emissions	N.A.		1*	3		X	1# (0.454)
Copper ††	7440508		1*	2		D	5000 (2270)
COPPER AND COMPOUNDS			1*	2			**
Copper cyanide	544923		1*	4	P029	A	10 (4.54)
Coumaphos	56724		10	1		A	10 (4.54)
Creosote	8001589		1*	4	U051	X	1# (0.454)
Cresol(s)	1319773	Cresylic acid	1000	1,4	U052	C	1000# (454)
m-	108394						
o-	95487						
p-	106445						
Cresylic acid	1319773	Cresol(s)	1000	1,4	U052	C	1000# (454)
m-	108394						
o-	95487						
p-	106445						
Crotonaldehyde	123739 4170303	2-Butenal	100	1,4	U053	B	100 (45.4)
Cumene	98828	Benzene, 1-methylethyl-	1*	4	U055	D	5000 (2270)
Cupric acetate	142712		100	1		B	100 (45.4)
Cupric acetoarsenite	12002038		100	1		B	100# (45.4)
Cupric chloride	7447394		10	1		A	10 (4.54)
Cupric nitrate	3251238		100	1		B	100 (45.4)
Cupric oxalate	5893663		100	1		B	100 (45.4)
Cupric sulfate	7758987		10	1		A	10 (4.54)
Cupric sulfate ammoniated	10380297		100	1		B	100 (45.4)
Cupric tartrate	815827		100	1		B	100 (45.4)
CYANIDES			1*	2			**
Cyanides (soluble cyanide salts), not elsewhere specified	57125		1*	4	P030	A	10 (4.54)
Cyanogen	460195		1*	4	P031	B	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Code†	RCRA Waste Number	Category	Pounds(Kg)
Cyanogen bromide	506683	Bromine cyanide	1*	4	U246	C	1000 (454)
Cyanogen chloride	506774	Chlorine cyanide	10	1,4	P033	A	10 (4.54)
1,4-Cyclohexadienedione	106514	p-Benzoquinone	1*	4	U197	A	10 (4.54)
Cyclohexane	110827	Benzene, hexahydro-	1000	1,4	U056	C	1000 (454)
Cyclohexanone	108941		1*	4	U057	D	5000 (2270)
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77474	Hexachlorocyclopentadiene.	1	1,2,4	U130	X	1# (0.454)
Cyclophosphamide	50180	2H-1,3,2-Oxazaphosphorine,2-[bis(2-chloroethyl)amino] tetrahydro-2-oxide	1*	4	U058	X	1# (0.454)
2,4-D Acid	94757	2,4-D, salts and esters 2,4-Dichlorophenoxyacetic acid, salts and esters	100	1,4	U240	B	100 (45.4)
2,4-D Esters	94111 94791 94804 1320189 1928387 1928616 1929733 2971382 25168267 53467111		100	1		B	100 (45.4)
2,4-D, salts and esters	94757	2,4-D Acid 2,4-Dichlorophenoxyacetic acid, salts and esters	100	1,4	U240	B	100 (45.4)
Daunomycin	20830813	5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-	1*	4	U059	X	1# (0.454)
DDD	72548	4,4'-DDD Dichlorodiphenyl dichloroethane TDE	1	1,2,4	U060	X	1# (0.454)
4,4'-DDD	72548	DDD Dichlorodiphenyl dichloroethane TDE	1	1,2,4	U060	X	1# (0.454)
DDE	72559	4,4'-DDE	1*	2		X	1# (0.454)
4,4'-DDE	72559	DDE	1*	2		X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
DDT	50293	4,4' DDT Dichlorodiphenyl trichloroethane	1	1,2,4	U061	X	1# (0.454)
4,4'DDT	50293	DDT Dichlorodiphenyl trichloroethane	1	1,2,4	U061	X	1# (0.454)
DDT AND METABOLITES			1*	2			**
Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]pentalen-2-one	143500	Kepone	1	1,4	U142	X	1# (0.454)
Diallate	2303164	S-(2,3 Dichloroallyl) diisopropylthiocarbamate	1*	4	U062	X	1# (0.454)
Diamine	302012	Hydrazine	1*	4	U133	X	1# (0.454)
Diaminotoluene	95807 25376458 496720 823405	Toluenediamine	1*	4	U221	X	1# (0.454)
Diazinon	53334115		1	3		X	1 (0.454)
Dibenz[a,h]anthracene	53703	1,2 5,6-Dibenzanthracene Dibenzo[a,h]anthracene	1*	2,4	U063	X	1# (0.454)
1,2 5,6-Dibenzanthracene	53703	Dibenz[a,h]anthracene Dibenzo[a,h]anthracene	1*	2,4	U063	X	1# (0.454)
Dibenzo[a,h]anthracene	53703	Dibenz[a,h]anthracene 1,2 5,6-Dibenzanthracene	1*	2,4	U063	X	1# (0.454)
1,2 7,8-Dibenzopyrene	189559	Dibenz[a,i]pyrene	1*	4	U064	X	1# (0.454)
Dibenz[a,i]pyrene	189559	1,2 7,8-Dibenzopyrene	1*	4	U064	X	1#(0.454)
1,2-Dibromo-3-chloropropane	96128	Propane, 1,2 dibromo-3-chloro-	1*	4	U066	X	1# (0.454)
Dibutyl phthalate	84742	1,2-Benzenedicarboxylic acid,dibutyl ester Di-n-butyl phthalate n Butyl phthalate	100	1,2,4	U069	A	10 (4.54)
Di-n-butyl phthalate	84742	1,2-Benzenedicarboxylic acid,dibutyl ester n Butyl phthalate Dibutyl phthalate	100	1,2,4	U069	A	10 (4.54)
Dicamba	1918009		1000	1		C	1000 (454)
Dichlobenil	1194656		1000	1		B	100 (45.4)
Dichlone	117806		1	1		X	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
S-(2,3-Dichloroallyl) diisopropylthiocarbamate	2303164	Diallate	1*	4	U062	X	1# (0.454)
3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide	23950585	Pronamide	1*	4	U192	D	5000 (2270)
Dichlorobenzene (mixed)	25321226		100	1		B	100 (45.4)
1,2-Dichlorobenzene	95501	Benzene, 1,2-dichloro- o-Dichlorobenzene	100	1,2,4	U070	B	100 (45.4)
1,3-Dichlorobenzene	541731	Benzene, 1,3-dichloro- m-Dichlorobenzene	1*	2,4	U071	B	100 (45.4)
1,4-Dichlorobenzene	106467	Benzene, 1,4-dichloro- p-Dichlorobenzene	100	1,2,4	U072	B	100 (45.4)
m-Dichlorobenzene	541731	Benzene, 1,3-dichloro- 1,3-Dichlorobenzene	1*	2,4	U071	B	100 (45.4)
o-Dichlorobenzene	95501	Benzene, 1,2-dichloro 1,2-Dichlorobenzene	100	1,2,4	U070	B	100 (45.4)
p-Dichlorobenzene	106467	Benzene, 1,4-dichloro- 1,4-Dichlorobenzene	100	1,2,4	U072	B	100 (45.4)
DICHLOROBENZIDINE			1*	2			**
3,3'-Dichlorobenzidine	91941	(1,1'-Biphenyl)-4,4'-diamine,3,3'dichloro-	1*	2,4	U073	X	1# (0.454)
Dichlorobromomethane	75274		1*	2		D	5000 (2270)
1,4-Dichloro-2-butene	764410	2-Butene, 1,4-dichloro-	1*	4	U074	X	1 (0.454)
Dichlorodifluoromethane	75718	Methane, dichlorodifluoro-	1*	4	U075	D	5000 (2270)
Dichlorodiphenyl dichloroethane	72548	DDD 4,4' DDD TDE	1	1,2,4	U060	X	1# (0.454)
Dichlorodiphenyl trichloroethane	50293	DDT 4,4'DDT	1	1,2,4	U061	X	1# (0.454)
1,1-Dichloroethane	75343	Ethane, 1,1-dichloro- Ethylidene dichloride	1*	2,4	U076	C	1000 (454)
1,2-Dichloroethane	107062	Ethane, 1,2-dichloro- Ethylene dichloride	5000	1,2,4	U077	D	5000# (2270)
1,1-Dichloroethylene	75354	Ethene, 1,1-dichloro- Vinylidene chloride	5000	1,2,4	U078	D	5000# (2270)
1,2-trans-Dichloroethylene	156605	Ethene, trans-1,2-dichloro-	1*	2,4	U079	C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
Dichloroethyl ether	111444	Bis (2-chloroethyl) ether. Ethane, 1,1'-oxybis(2-chloro-	1*	2,4	U025	X	1# (0.454)
2,4-Dichlorophenol	120832	Phenol, 2,4-dichloro-	1*	2,4	U081	B	100 (45.4)
2,6-Dichlorophenol	87650	Phenol, 2,6-dichloro-	1*	4	U082	B	100 (45.4)
2,4-Dichlorophenoxyacetic acid, salts and esters	94757	2,4-D Acid. 2,4-D, salts and esters	100	1,4	U240	B	100 (45.4)
Dichlorophenylarsine	696286	Phenyl dichloroarsine	1*	4	P036	X	1# (0.454)
Dichloropropane	26638197		5000	1		C	1000 (454)
1,1-Dichloropropane	78999						
1,3-Dichloropropane	142289						
1,2-Dichloropropane	78875	Propylene dichloride	5000	1,2,4	U083	C	1000 (454)
Dichloropropane - Dichloropropene (mixture)	8003198		5000	1		B	100# (45.4)
Dichloropropene(s)	26952238		5000	1		B	100 (45.4)
2,3-Dichloropropene (isomer)	78886						
1,3-Dichloropropene	542756	Propene, 1,3-dichloro-	5000	1,2,4	U084	B	100# (45.4)
2,2-Dichloropropionic acid	75990		5000	1		D	5000 (2270)
Dichlorvos	62737		10	1		A	10 (4.54)
Dieldrin	60571	1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,exo-1,4:5,8-dimethanonaphthalene	1	1,2,4	P037	X	1# (0.454)
1,2:3,4-Diepoxybutane	1464535	2,2'-Bioxirane	1*	4	U085	X	1# (0.454)
Diethylamine	109897		1000	1		B	100 (45.4)
Diethylarsine	692422	Arsine, diethyl-	1*	4	P038	X	1# (0.454)
1,4-Diethylene dioxide	123911	1,4-Dioxane	1*	4	U108	X	1# (0.454)
N,N'-Diethylhydrazine	1615801	Hydrazine, 1,2-diethyl-	1*	4	U086	X	1# (0.454)
O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate	298044	Disulfoton	1	1,4	P039	X	1 (0.454)
O,O-Diethyl S-methyl dithiophosphate	3288582	Phosphorodithioic acid, O,O-diethyl S-methylester	1*	4	U087	D	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
Diethyl-p-nitrophenyl phosphate	311455	Phosphonic acid,diethyl p-nitrophenyl ester	1*	4	P041	B	100 (45.4)
Diethyl phthalate	84662	1,2-Benzenedicarboxylic acid,diethyl ester	1*	2,4	U088	C	1000 (454)
O,O-Diethyl O-pyrazinyl phosphorothioate	297972	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	1*	4	P040	B	100 (45.4)
Diethylstilbestrol	56531	4,4'-Stilbenediol, alpha,alpha'-diethyl-	1*	4	U089	X	1# (0.454)
1,2-Dihydro-3,6-pyridazinedione	123331	Maleic hydrazide	1*	4	U148	D	5000 (2270)
Dihydrosafrole	94586	Benzene, 1,2-methylenedioxy-4-propyl-	1*	4	U090	X	1# (0.454)
Diisopropyl fluorophosphate	55914	Phosphorofluoridic acid,bis(1-methylethyl) ester	1*	4	P043	B	100 (45.4)
Dimethoate	60515	Phosphorodithioic acid,O,O-dimethyl S-[2(methylamino)-2-oxoethyl) ester	1*	4	P044	A	10 (4.54)
3,3'-Dimethoxybenzidine	119904	(1,1'-Biphenyl)-4,4'diamine,3,3'-dimethoxy-	1*	4	U091	X	1# (0.454)
Dimethylamine	124403	Methanamine, N-methyl-	1000	1,4	U092	C	1000 (454)
7,12-Dimethylbenz[a] anthracene	57976	1,2-Benzanthracene, 7,12-dimethyl-	1*	4	U094	X	1# (0.454)
3,3'-Dimethylbenzidine	119937	(1,1'-Biphenyl)-4,4'-diamine,3,3'-dimethyl-	1*	4	U095	X	1# (0.454)
alpha,alpha-Dimethylbenzylhydroperoxide	80159	Hydroperoxide, 1-methyl-1-phenylethyl-	1*	4	U096	A	10 (4.54)
3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino) carbonyl] oxime	39196184	Thiofanox	1536	4	P045	B	100 (45.4)
Dimethylcarbamoyl chloride	79447	Carbamoyl chloride, dimethyl-	1*	4	U097	X	1# (0.454)
1,1-Dimethylhydrazine	57147	Hydrazine, 1,1-dimethyl-	1*	4	U098	X	1# (0.454)
1,2-Dimethylhydrazine	540738	Hydrazine, 1,2-dimethyl-	1*	4	U099	X	1# (0.454)
O,O-Dimethyl O-p-nitrophenyl phosphorothioate	298000	Methyl parathion	100	1,4	P071	B	100 (45.4)
Dimethylnitrosamine	62759	N-Nitrosodimethylamine	1*	2,4	P082	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
alpha,alpha-Dimethylphenethylamine	122098	Ethanamine, 1,1-dimethyl-2-phenyl-	1*	4	P046	D	5000 (2270)
2,4-Dimethylphenol	105679	Phenol, 2,4-dimethyl-	1*	2,4	U101	B	100 (45.4)
Dimethyl phthalate	131113	1,2-Benzenedicarboxylic acid,dimethyl ester	1*	2,4	U102	D	5000 (2270)
Dimethyl sulfate	77781	Sulfuric acid, dimethyl ester	1*	4	U103	X	1# (0.454)
Dinitrobenzene (mixed)	25154545		1000	1		B	100 (45.4)
m-	99650						
o-	528290						
p-	100254						
4,6-Dinitro-o-cresol and salts	534521	Phenol, 2,4-dinitro-6-methyl-, and salts	1*	2,4	P047	A	10 (4.54)
4,6-Dinitro-o-cyclohexylphenol	131895	Phenol, 2-cyclohexyl-4,6-dinitro-	1*	4	P034	B	100 (45.4)
Dinitrophenol	25550587		1000	1		A	10 (4.54)
2,5-	329715						
2,6-	573568						
2,4-Dinitrophenol	51285	Phenol, 2,4-dinitro-	1000	1,2,4	P048	A	10 (4.54)
Dinitrotoluene	25321146		1000	1,2		C	1000# (454)
3,4-Dinitrotoluene	610399						
2,4-Dinitrotoluene	121142	Benzene, 1-methyl-2,4-dinitro-	1000	1,2,4	U105	C	1000# (454)
Dinoseb	88857	Phenol, 2,4-dinitro-6-(1-methylpropyl)-	1*	4	P020	C	1000 (454)
Di-n-octyl phthalate	117840	1,2-Benzenedicarboxylic acid,di-n-octyl ester	1*	2,4	U107	D	5000 (2270)
1,4-Dioxane	123911	1,4-Diethylene dioxide	1*	4	U108	X	1# (0.454)
DIPHENYLHYDRAZINE			1*	2			**
1,2-Diphenylhydrazine	122667	Hydrazine, 1,2-diphenyl-	1*	2,4	U109	X	1# (0.454)
Diphosphoramide, octamethyl-	152169	Octamethylpyrophosphoramide	1*	4	P085	B	100 (45.4)
Dipropylamine	142847	1-Propanamine, N-propyl-	1*	4	U110	D	5000 (2270)
Di-n-propylnitrosamine	621647	N-Nitrosodi-n-propylamine	1*	2,4	U111	X	1# (0.454)
Diquat	85007		1000	1		C	1000 (454)
	2764729						
Disulfoton	298044	O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate	1	1,4	P039	X	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
2,4-Dithiobiuret	541537	Thioimidodicarbonic diamide	1*	4	P049	B	100 (45.4)
Dithiopyrophosphonic acid, tetraethyl ester	3689245	Tetraethyldithiopyrophosphate	1*	4	P109	B	100 (45.4)
Diuron	330541		100	1		B	100 (45.4)
Dodecylbenzenesulfonic acid	27176870		1000	1		C	1000 (454)
Endosulfan	115297	5-Norbornene-2,3-dimethanol,1,4,5,6,7,7-hexachloro, cyclic sulfite	1	1,2,4	P050	X	1 (0.454)
alpha-Endosulfan	959988		1*	2		X	1 (0.454)
beta - Endosulfan	33213659		1*	2		X	1 (0.454)
ENDOSULFAN AND METABOLITES			1*	2			**
Endosulfan sulfate	1031078		1*	2		X	1 (0.454)
Endothall	145733	7-Oxabicyclo[2.2.1] heptane-2,3-dicarboxylic acid	1*	4	P088	C	1000 (454)
Endrin	72208	1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,endo-1,4,5,8-dimethanonaphthalene	1	1,2,4	P051	X	1 (0.454)
Endrin aldehyde	7421934		1*	2		X	1 (0.454)
ENDRIN AND METABOLITES			1*	2			**
Epichlorohydrin	106898	1-Chloro-2,3-epoxypropane. Oxirane, 2-(chloromethyl)-	1000	1,4	U041	C	1000# (454)
Epinephrine	51434	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-	1*	4	P042	C	1000 (454)
Ethanal	75070	Acetaldehyde	1000	1,4	U001	C	1000 (454)
Ethanamine, 1,1-dimethyl-2-phenyl-	122098	alpha,alpha-Dimethylphenethylamine	1*	4	P046	D	5000 (2270)
Ethanamine, N-ethyl-N-nitroso-	55185	N-Nitrosodiethylamine	1*	4	U174	X	1# (0.454)
Ethane, 1,2-dibromo-	106934	Ethylene dibromide	1000	1,4	U067	C	1000# (454)
Ethane, 1,1-dichloro-	75343	1,1-Dichloroethane. Ethylidene dichloride	1*	2,4	U076	C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
Ethane, 1,2-dichloro-	107062	1,2-Dichloroethane Ethylene dichloride	5000	1,2,4	U077	D	5000# (2270)
Ethane, 1,1,1,2,2,2-hexachloro-	67721	Hexachloroethane	1*	2,4	U131	X	1# (0.454)
Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-	111911	Bis(2-chloroethoxy) methane	1*	2,4	U024	C	1000 (454)
Ethane, 1,1'-oxybis-	60297	Ethyl ether	1*	4	U117	B	100 (45.4)
Ethane, 1,1'-oxybis[2-chloro-	111444	Bis (2-chloroethyl) ether Dichloroethyl ether	1*	2,4	U025	X	1# (0.454)
Ethane, pentachloro-	76017	Pentachloroethane	1*	4	U184	X	1# (0.454)
Ethane, 1,1,1,2-tetrachloro-	630206	1,1,1,2-Tetrachloroethane	1*	4	U208	X	1# (0.454)
Ethane, 1,1,2,2-tetrachloro-	79345	1,1,2,2-Tetrachloroethane	1*	2,4	U209	X	1# (0.454)
Ethane, 1,1,2-trichloro-	79005	1,1,2-Trichloroethane	1*	2,4	U227	X	1# (0.454)
Ethane, 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)-	72435	Methoxychlor	1	1,4	U247	X	1 (0.454)
1,2-Ethanediylbiscarbamodithoic acid	111546	Ethylenebis (dithiocarbamic acid)	1*	4	U114	D	5000 (2270)
Ethanenitrile	75058	Acetonitrile	1*	4	U003	D	5000 (2270)
Ethanethioamide	62555	Thioacetamide	1*	4	U218	X	1# (0.454)
Ethanol, 2,2'-(nitrosoimino)bis-	1116547	N-Nitrosodiethanolamine	1*	4	U173	X	1# (0.454)
Ethanone, 1-phenyl-	98862	Acetophenone	1*	4	U004	D	5000 (2270)
Ethanoyl chloride	75365	Acetyl chloride	5000	1,4	U006	D	5000 (2270)
Ethanamine, N-methyl-N-nitroso-	4549400	N-Nitrosomethylvinylamine	1*	4	P084	X	1# (0.454)
Ethene, chloro-	75014	Vinyl chloride	1*	2,3,4	U043	X	1# (0.454)
Ethene, 2-chloroethoxy-	110758	2-Chloroethyl vinyl ether	1*	2,4	U042	C	1000 (454)
Ethene, 1,1-dichloro-	75354	1,1-Dichloroethylene Vinylidene chloride	5000	1,2,4	U078	D	5000# (2270)
Ethene, 1,1,2,2-tetrachloro-	127184	Tetrachloroethylene	1*	2,4	U210	X	1# (0.454)
Ethene, trans-1,2-dichloro-	156605	1,2-trans-Dichloroethylene	1*	2,4	U079	C	1000 (454)
Ethion	563122		10	1		A	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
2-Ethoxyethanol	110805	Ethylene glycol monoethyl ether	1*	4	U359	X	1# (0.454)
Ethyl acetate	141786	Acetic acid, ethyl ester	1*	4	U112	D	5000 (2270)
Ethyl acrylate	140885	2-Propenoic acid, ethyl ester	1*	4	U113	C	1000 (454)
Ethylbenzene	100414		1000	1,2		C	1000 (454)
Ethyl carbamate (Urethan)	51796	Carbamic acid, ethyl ester	1*	4	U238	X	1# (0.454)
Ethyl cyanide	107120	Propanenitrile	1*	4	P101	A	10 (4.54)
Ethyl 4,4'-dichlorobenzilate	510156	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	1*	4	U038	X	1# (0.454)
Ethylene dibromide	106934	Ethane, 1,2-dibromo-	1000	1,4	U067	C	1000# (454)
Ethylene dichloride	107062	1,2-Dichloroethane Ethane, 1,2-dichloro-	5000	1,2,4	U077	D	5000# (2270)
Ethylene oxide	75218	Oxirane	1*	4	U115	X	1# (0.454)
Ethylenebis (dithiocarbamic acid)	111546	1,2-Ethanediylbiscarbamodithoic acid	1*	4	U114	D	5000 (2270)
Ethylenediamine	107153		1000	1		D	5000 (2270)
Ethylenediamine tetraacetic acid (EDTA)	60004		5000	1		D	5000 (2270)
Ethylene glycol monoethyl ether	110805	2-Ethoxyethanol	1*	4	U359	X	1# (0.454)
Ethylenethiourea	96457	2-Imidazolidinethione	1*	4	U116	X	1# (0.454)
Ethylenimine	151564	Aziridine	1*	4	P054	X	1# (0.454)
Ethyl ether	60297	Ethane, 1,1'-oxybis-	1*	4	U117	B	100 (45.4)
Ethylidene dichloride	75343	1,1-Dichloroethane Ethane, 1,1-dichloro-	1*	2,4	U076	C	1000 (454)
Ethyl methacrylate	97632	2-Propenoic acid, 2-methyl-, ethyl ester	1*	4	U118	C	1000 (454)
Ethyl methanesulfonate	62500	Methanesulfonic acid, ethyl ester	1*	4	U119	X	1# (0.454)
Famphur	52857	Phosphorothioic acid, O,O-dimethyl-O-(p-[(dimethylamino)-sulfonyl]phenyl) ester	1*	4	P097	C	1000 (454)
Ferric ammonium citrate	1185575		1000	1		C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Ferric ammonium oxalate	2944674 55488874		1000	1		C	1000 (454)
Ferric chloride	7705080		1000	1		C	1000 (454)
Ferric dextran ***	9004664	Iron dextran ***	1*	4	U139	D	5000 (2270)
Ferric fluoride	7783508		100	1		B	100 (4514)
Ferric nitrate	10421484		1000	1		C	1000 (454)
Ferric sulfate	10028225		1000	1		C	1000 (454)
Ferrous ammonium sulfate	10045893		1000	1		C	1000 (454)
Ferrous chloride	7758943		100	1		B	100 (45.4)
Ferrous sulfate	7720787 7782630		1000	1		C	1000 (454)
Fluoroacetic acid, sodium salt	62748	Acetic acid, fluoro-, sodium salt	1*	4	P058	A	10 (4.54)
Fluoranthene	206440	Benzo[j,k]fluorene	1*	2,4	U120	B	100 (45.4)
Fluorene	86737		1*	2		D	5000 (2270)
Fluorine	7782414		1*	4	P056	A	10 (4.54)
Fluoroacetamide	640197	Acetamide, 2-fluoro-	1*	4	P057	B	100 (45.4)
Formaldehyde	50000	Methylene oxide	1000	1,4	U122	C	1000# (454)
Formic acid	64186	Methanoic acid	5000	1,4	U123	D	5000 (2270)
Fulminic acid, mercury(II) salt	628864	Mercury fulminate	1*	4	P065	A	10 (4.54)
Fumaric acid	110178		5000	1		D	5000 (2270)
Furan	110009	Furfuran	1*	4	U124	B	100 (45.4)
Furan, tetrahydro-	109999	Tetrahydrofuran	1*	4	U213	C	1000 (454)
2-Furancarboxaldehyde	98011	Furfural	1000	1,4	U125	D	5000 (2270)
2,5-Furandione	108316	Maleic anhydride	5000	1,4	U147	D	5000 (2270)
Furfural	98011	2-Furancarboxaldehyde	1000	1,4	U125	D	5000 (2270)
Furfuran	110009	Furan	1*	4	U124	B	100 (45.4)
D-Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)	18883664	Streptozotocin	1*	4	U206	X	1# (0.454)
Glycidylaldehyde	765344	1-Propanal, 2,3-epoxy-	1*	4	U126	X	1# (0.454)
Guanidine, N-nitroso-N-methyl-N'-nitro-	70257	N-Methyl-N'-nitro-N-nitrosoguanidine	1*	4	U163	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Guthion	86500		1	1		X	1 (0.454)
HALOETHERS			1*	2			**
HALOMETHANES			1*	2			**
Heptachlor	76448	4,7-Methano-1H-indene,1l,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	1	1,2,4	P059	X	1#(0.454)
HEPTACHLOR AND METABOLITES			1*	2			**
Heptachlor epoxide	1024573		1*	2		X	1# (0.454)
Hexachlorobenzene	118741	Benzene, hexachloro-	1*	2,4	U127	X	1# (0.454)
Hexachlorobutadiene	87683	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	1*	2,4	U128	X	1# (0!454)
HEXACHLOROCYCLOHEXANE (all isomers)	608731		1*	2			**
Hexachlorocyclohexane (gamma isomer)	58899	gamma-BHC Lindane	1	1,2,4	U129	X	1# (0!454)
Hexachlorocyclopentadiene	77474	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	1	1,2,4	U130	X	1# (0!454)
1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,8,7,8,8a-octahydro-endo,endo-1,4:5,8-dimethanonaphthalene	72208	Endrin	1	1,2,4	P051	X	1 (0.454)
1l,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,8,7,8,8a-octahydro-endo,exo-1,4:5,8-dimethanonaphthalene	60571	Dieldrin	1	1,2,4	P037	X	1# (0.454)
Hexachloroethane	67721	Ethane, 1,1,1l,2,2,2-hexachloro-	1*	2,4	U131	X	1# (0.454)
Hexachlorohexahydro-endo,endo-dimethanonaphthalene	465736	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,endo-dimethanonaphthalene	1*	4	P060	X	1 (0.454)
1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,endo-dimethanonaphthalene	465736	Hexachlorohexahydro-endo,endo-dimethanonaphthalene	1l*	4	P060	X	1 (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
1,2,3,4,10-10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4 5,8 endo, exo-dimethanonaphthalene	309002	Aldrin	1	1,2,4	P004	X	1# (0.454)
Hexachlorophene	70304	2,2'-Methylenebis(3,4,6-trichlorophenol)	1*	4	U132	B	100 (45.4)
Hexachloropropene	1888717	1-Propene, 1,1,2,3,3,3-hexachloro-	1*	4	U243	C	1000 (454)
Hexaethyl tetraphosphate	757584	Tetraphosphoric acid, hexaethyl ester	1*	4	P062	B	100 (45.4)
Hydrazine	302012	Diamine	1*	4	U133	X	1# (0.454)
Hydrazine, 1,2-diethyl-	1615801	N,N'-Diethylhydrazine	1*	4	U086	X	1# (0.454)
Hydrazine, 1,1-dimethyl-	57147	1,1-Dimethylhydrazine	1*	4	U098	X	1# (0.454)
Hydrazine, 1,2-dimethyl-	540738	1,2-Dimethylhydrazine	1*	4	U099	X	1# (0.454)
Hydrazine, 1,2-diphenyl-	122667	1,2-Diphenylhydrazine	1*	2,4	U109	X	1# (0.454)
Hydrazine, methyl-	60344	Methyl hydrazine	1*	4	P068	A	10 (4.54)
Hydrazinecarbothioamide	79196	Thiosemicarbazide	1*	4	P116	B	100 (45.4)
Hydrochloric acid	7647010		5000	1		D	5000 (2270)
Hydrocyanic acid	74908	Hydrogen cyanide	10	1,4	P063	A	10 (4.54)
Hydrofluoric acid	7664393	Hydrogen fluoride	5000	1,4	U134	B	100 (45.4)
Hydrogen cyanide	74908	Hydrocyanic acid	10	1,4	P063	A	10 (4.54)
Hydrogen fluoride	7364393	Hydrofluoric acid	5000	1,4	U134	B	100 (45.4)
Hydrogen phosphide	7803512	Phosphine	1*	4	P096	B	100 (45.4)
Hydrogen sulfide	7783064	Hydrosulfuric acid Sulfur hydride	100	1,4	U135	B	100 (45.4)
Hydroperoxide, 1-methyl-1-phenylethyl-	80159	alpha,alpha-Dimethylbenzylhydroperoxide	1*	4	U096	A	10 (4.54)
Hydrosulfuric acid	7783064	Hydrogen sulfide Sulfur hydride	100	1,4	U135	B	100 (45.4)
Hydroxydimethylarsine oxide	75605	Cacodylic acid	1*	4	U136	X	1# (0.454)
2-Imidazolidinethione	96457	Ethylenethiourea	1*	4	U116	X	1# (0.454)
Indeno(1,2,3-cd)pyrene	193395	1,10-(1,2-Phenylene)pyrene	1*	2,4	U137	X	1# (0.454)
Iron dextran ***	9004664	Ferric dextran ***	1*	4	U139	D	5000 (2270)
Isobutyl alcohol	78831	1-Propanol, 2-methyl-	1*	4	U140	D	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
Isocyanic acid, methyl ester	624839	Methyl isocyanate	1*	4	P064	X	1###(0.454)
Isophorone	78591		1*	2		D	5000 (2270)
Isoprene	78795		1000	1		B	100 (45.4)
Isopropanolamine dodecylbenzenesulfonate	42504461		1000	1		C	1000 (454)
Isosafrole	120581	Benzene, 1,2-methylenedioxy-4-propenyl-	1*	4	U141	X	1# (0.454)
3(2H)-Isoxazolone, 5-(aminomethyl)-	2763964	5-(Aminomethyl)-3-isoxazolol	1*	4	P007	C	1000 (454)
Kelthane	115322		5000	1		A	10 (4.54)
Kepone	143500	Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one	1	1,4	U142	X	1# (0.454)
Lasiocarpine	303344		1*	4	U143	X	1# (0.454)
Lead ††	7439921		1*	2		X	1# (0.454)
Lead acetate	301042	Acetic acid, lead salt	5000	1,4	U144	D	5000# (2270)
LEAD AND COMPOUNDS			1*	2			**
Lead arsenate	7784409 7645252 10102484		5000	1		D	5000# (2270)
Lead chloride	7758954		5000	1		B	100# (45.4)
Lead fluoborate	13814965		5000	1		B	100# (45.4)
Lead fluoride	7783462		1000	1		B	100# (45.4)
Lead iodide	10101630		5000	1		B	100# (45.4)
Lead nitrate	10099748		5000	1		B	100# (45.4)
Lead phosphate	7446277	Phosphoric acid, lead salt	1*	4	U145	X	1# (0.454)
Lead stearate	7428480 1072351 52652592 56189094		5000	1		D	5000# (2270)
Lead subacetate	1335326		1*	4	U146	X	1# (0.454)
Lead sulfate	15739807 7446142		5000	1		B	100# (45.4)
Lead sulfide	1314870		5000	1		D	5000# (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Lead thiocyanate	592870		5000	1		B	100# (45.4)
Lindane	58899	gamma - BHC Hexachlorocyclohexane (gamma isomer)	1	1,2,4	U129	X	1# (0.454)
Lithium chromate	14307358		1000	1		C	1000# (454)
Malathion	121755		10	1		B	100 (45.4)
Maleic acid	110167		5000	1		D	5000 (2270)
Maleic anhydride	108316	2,5-Furandione	5000	1,4	U147	D	5000 (2270)
Maleic hydrazide	123331	1,2-Dihydro-3,6-pyridazinedione	1*	4	U148	D	5000 (2270)
Malononitrile	109773	Propanedinitrile	1*	4	U149	C	1000 (454)
Melphalan	148823	Alanine, 3 [p-bis(2-chloroethyl)amino] phenyl-, L-	1*	4	U150	X	1# (0.454)
Mercaptodimethur	2032657		100	1		A	10 (4.54)
Mercuric cyanide	592041536		1	1		X	1 (0.454)
Mercuric nitrate	10045940		10	1		A	10 (4.54)
Mercuric sulfate	7783359		10	1		A	10 (4.54)
Mercuric thiocyanate	592858		10	1		A	10 (4.54)
Mercurous nitrate	10415755		10	1		A	10 (4.54)
Mercury	7439976		1*	2,3,4	U151	X	1 (0.454)
MERCURY AND COMPOUNDS			1*	2			**
Mercury, (acetato-O)phenyl-	62384	Phenylmercuric acetate	1*	4	P092	B	100 (45.4)
Mercury fulminate	628864	Fulminic acid, mercury(II) salt	1*	4	P065	A	10 (4.54)
Methacrylonitrile	126987	2-Propenenitrile, 2-methyl-	1*	4	U152	C	1000 (454)
Methanamine, N-methyl-	124403	Dimethylamine	1000	1,4	U092	C	1000 (454)
Methane, bromo-	74839	Methyl bromide	1*	2,4	U029	C	1000 (454)
Methane, chloro-	74873	Methyl chloride	1*	2,4	U045	X	1# (0.454)
Methane, chloromethoxy-	107302	Chloromethyl methyl ether	1*	4	U046	X	1# (0.454)
Methane, dibromo-	74953	Methylene bromide	1*	4	U068	C	1000 (454)
Methane, dichloro-	75092	Methylene chloride	1*	2,4	U080	C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Methane, dichlorodifluoro-	75718	Dichlorodifluoromethane	1*	4	U075	D	5000 (2270)
Methane, oxybis-	74884	Methyl ether	1*	4	U138	X	1# (0.454)
Methane, oxybis(chloro-	542881	Bis(chloromethyl) ether	1*	4	P016	X	1# (0.454)
Methane, tetrachloro-	56235	Carbon tetrachloride	5000	1,2,4	U211	D	5000# (2270)
Methane, tetranitro-	509148	Tetranitromethane	1*	4	P112	A	10 (4.54)
Methane, tribromo-	75252	Bromoform	1*	2,4	U225	B	100 (45.4)
Methane, trichloro-	67663	Chloroform	5000	1,2,4	U044	D	5000# (2270)
Methane, trichlorofluoro-	75694	Trichloromonofluoromethane	1*	4	U121	D	5000 (2270)
Methanesulfonic acid, ethyl ester	62500	Ethyl methanesulfonate	1*	4	U119	X	1# (0.454)
Methanethiol	74931	Methylmercaptan Thiomethanol	100	1,4	U153	B	100 (45.4)
Methanesulfenyl chloride, trichloro-	594423	Trichloromethanesulfenyl chloride	1*	4	P118	B	100 (45.36)
4,7-Methano-1H-indene,1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	76448	Heptachlor	1	1,2,4	P059	X	1# (0.454)
Methanoic acid	64186	Formic acid	5000	1,4	U123	D	5000 (2270)
4,7-Methanoinden, 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-	57749	Chlordane Chlordane, technical	1	1,2,4	U036	X	1# (0.454)
Methanol	67561	Methyl alcohol	1*	4	U154	D	5000 (2270)
Methapyrilene	91805	Pyridine, 2-[(2-(dimethylamino)ethyl)-2-thenylamino]-	1*	4	U155	D	5000 (2270)
Methomyl	16752775	Acetimidic acid, N-[(methylcarbamoyl)oxy] thio-, methyl ester	1536	4	P066	B	100 (45.4)
Methoxychlor	72435	Ethane, 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)-	1	1,4	U247	X	1 (0.454)
Methyl alcohol	67561	Methanol	1*	4	U154	D	5000 (2270)
2-Methylaziridine	75558	1,2-Propylenimine	1*	4	P067	X	1# (0.454)
Methyl bromide	74839	Methane, bromo-	1*	2,4	U029	C	1000 (454)
1-Methylbutadiene	504609	1,3-Pentadiene	1*	4	U186	B	100 (45.4)
Methyl chloride	74873	Methane, chloro-	1*	2,4	U045	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
Methyl chlorocarbonate	79221	Carbonochloridic acid, methyl ester	1*	4	U156	C	1000 (454)
Methyl chloroform	71556	1,1,1-Trichloroethane	1*	2,4	U226	C	1000 (454)
4,4'-Methylenebis(2-chloroaniline)	101144	Benzenamine, 4,4'-methylenebis(2-chloro-	1*	4	U158	X	1# (0.454)
2,2'-Methylenebis(3,4,6-trichlorophenol)	70304	Hexachlorophene	1*	4	U132	B	100 (45.4)
3-Methylcholanthrene	56495	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	1*	4	U157	X	1# (0.454)
Methylene bromide	74953	Methane, dibromo-	1*	4	U068	C	1000 (454)
Methylene chloride	75092	Methane, dichloro-	1*	2,4	U080	C	1000 (454)
Methylene oxide	50000	Formaldehyde	1000	1,4	U122	C	1000# (454)
Methyl ethyl ketone	78933	2-Butanone	1*	4	U159	D	5000 (2270)
Methyl ethyl ketone peroxide	1338234	2-Butanone peroxide	1*	4	U160	A	10 (4.54)
Methyl hydrazine	60344	Hydrazine, methyl-	1*	4	P068	A	10 (4.54)
Methyl iodide	74884	Methane, iodo-	1*	4	U138	X	1#
Methyl isobutyl ketone	108101	4-Methyl-2-pentanone	1*	4	U161	D	5000 (2270)
Methyl isocyanate	624839	Isocyanic acid, methyl ester	1*	4	P064	X	1#
2-Methyllactonitrile	75865	Acetone cyanohydrin Propanenitrile, 2-hydroxy-2-methyl-	10	1,4	P069	A	10 (4.54)
Methylmercaptan	74931	Methanethiol Thiomethanol	100	1,4	U153	B	100 (45.4)
Methyl methacrylate	80626	2-Propenoic acid, 2-methyl-, methyl ester	5000	1,4	U162	C	1000 (454)
N-Methyl-N'-nitro-N-nitrosoguanidine	70257	Guanidine, N-nitroso-N-methyl-N'-nitro-	1*	4	U163	X	1# (0.454)
Methyl parathion	298000	O,O-Dimethyl O-p-nitrophenyl phosphorothioate	100	1,4	P071	B	100 (45.4)
4-Methyl-2-pentanone	108101	Methyl isobutyl ketone	1*	4	U161	D	5000 (2270)
Methylthiouracil	56042	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	1*	4	U164	X	1# (0.454)
Mevinphos	7786347		1	1		A	10 (4.54)
Mexacarbate	315184		1000	1		C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
Mitomycin C	50077	Azirino(2',3',3,4)pyrrolo(1,2-a)indole-4,7-dione,6-amino-8-[((aminocarbonyl)oxy)methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-	1*	4	U010	X	1# (0.454)
Monoethylamine	75047		1000	1		B	100 (45.4)
Monomethylamine	74895		1000	1		B	100 (45.4)
Naled	300765		10	1		A	10 (4.54)
5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-	20830813	Daunomycin	1*	4	U059	X	1# (0.454)
Naphthalene	91203		5000	1,2,4	U165	B	100 (45.4)
Naphthalene, 2-chloro-	91587	beta-Chloronaphthalene 2-Chloronaphthalene	1*	2,4	U047	D	5000 (2270)
1,4-Naphthalenedione	130154	1,4-Naphthoquinone	1*	4	U166	D	5000 (2270)
2,7-Naphthalenedisulfonic acid,3,3'-[(3,3'-dimethyl-(1,1'-biphenyl)-4,4'-diyl)bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt	72571	Trypan blue	1*	4	U236	X	1#
Naphthenic acid	1338245		100	1		B	100 (45.4)
1,4-Naphthoquinone	130154	1,4-Naphthalenedione	1*	4	U166	D	5000 (2270)
1-Naphthylamine	134327	alpha-Naphthylamine	1*	4	U167	X	1#
2-Naphthylamine	91598	beta-Naphthylamine	1*	4	U168	X	1# (0.454)
alpha-Naphthylamine	134327	1-Naphthylamine	1*	4	U167	X	1# (0.454)
beta-Naphthylamine	91598	2-Naphthylamine	1*	4	U168	X	1#
2-Naphthylamine, N,N-bis(2-chloroethyl)-	494031	Chlornaphazine	1*	4	U026	X	1# (0.454)
alpha-Naphthylthiourea	86884	Thiourea, 1-naphthalenyl-	1*	4	P072	B	100 (45.4)
Nickel ††	7440020		1*	2		X	1# (0.454)
NICKEL AND COMPOUNDS			1*	2			**

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Nickel ammonium sulfate	15699180		5000	1		D	5000# (2270)
Nickel carbonyl	13463393	Nickel tetracarbonyl	1*	4	P073	X	1# (0.454)
Nickel chloride	7718549 37211655		5000	1		D	5000# (2270)
Nickel cyanide	557197	Nickel(II) cyanide	1*	4	P074	X	1# (0.454)
Nickel(II) cyanide	557197	Nickel cyanide	1*	4	P074	X	1# (0.454)
Nickel hydroxide	12054487		1000	1		C	1000# (454)
Nickel nitrate	14216752		5000	1		D	5000# (2270)
Nickel sulfate	7786814		5000	1		D	5000# (2270)
Nickel tetracarbonyl	13463393	Nickel carbonyl	1*	4	P073	X	1# (0.454)
Nicotine and salts	54536	Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts	1*	4	P075	B	100 (45.4)
Nitric acid	7697372		1000	1		C	1000 (454)
Nitric oxide	10102439	Nitrogen(II) oxide	1*	4	P076	A	10 (4.54)
p-Nitroaniline	100016	Benzenamine, 4-nitro-	1536	4	P077	D	5000 (2270)
Nitrobenzene	98953	Benzene, nitro-	1000	1,2,4	U169	C	1000 (454)
Nitrogen dioxide	10102440 10544536	Nitrogen(IV) oxide	1000	1,4	P078	A	10 (4.54)
Nitrogen(II) oxide	10102439	Nitric oxide	1*	4	P076	A	10 (4.54)
Nitrogen(IV) oxide	10102440 10544726	Nitrogen dioxide	1000	1,4	P078	A	10 (4.54)
Nitroglycerine	55630	1,2,3-Propanetriol, trinitrate-	1*	4	P081	A	10 (4536)
Nitrophenol (mixed) m- o- p-	25154656 554847 88755 100027	2-Nitrophenol 4-Nitrophenol Phenol, 4-nitro	1000	1		B	100 (45406)
p-Nitrophenol	100027	4-Nitrophenol Phenol, 4-nitro-	1000	1,2,4	U170	B	100 (45.4)
2-Nitrophenol	88755	o-Nitrophenol	1000	1,2		B	100 (45.4)
4-Nitrophenol	100027	p-Nitrophenol Phenol, 4-nitro	1000	1,2,4	U170	B	100 (45.4)
NITROPHENOLS			1*	2			**
2-Nitropropane	79469	Propane, 2-nitro	1*	4	U171	X	1# (0.454)
NITROSAMINES			1*	2			**

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
N-Nitrosodi-n-butylamine	924163	1-Butanamine, N-butyl-N-nitroso-	1*	4	U172	X	1# (0.454)
N-Nitrosodiethanolamine	1116547	Ethanol, 2,2'-(nitrosoimino)bis-	1*	4	U173	X	1# (0.454)
N-Nitrosodiethylamine	55185	Ethanamine, N-ethyl-N-nitroso-	1*	4	U174	X	1# (0.454)
N-Nitrosodimethylamine	62759	Dimethylnitrosamine	1*	2,4	P082	X	1# (0.454)
N-Nitrosodiphenylamine	86306		1*	2		B	100 (45.4)
N-Nitrosodi-n-propylamine	621647	Di-n-propylnitrosamine	1*	2,4	U111	X	1# (0.454)
N-Nitroso-N-ethylurea	759739	Carbamide, N-ethyl-N-nitroso-	1*	4	U176	X	1# (0.454)
N-Nitroso-N-methylurea	684935	Carbamide, N-methyl-N-nitroso-.	1*	4	U177	X	1# (0.454)
N-Nitroso-N-methylurethane	615532	Carbamic acid, methylnitroso-, ethyl ester	1*	4	U178	X	1# (0.454)
N-Nitrosomethylvinylamine	4549400	Ethenamine, N-methyl-N-nitroso-	1*	4	P084	X	1# (0.454)
N-Nitrosopiperidine	100754	Pyridine, hexahydro-N-nitroso-.	1*	4	U179	X	1# (0.454)
N-Nitrosopyrrolidine	930552	Pyrrole, tetrahydro-N-nitroso-.	1*	4	U180	X	1# (0.454)
Nitrotoluene m- o- p-	1321126 99081 88722 99990		1000	1		C	1000 (454)
5-Nitro-o-toluidine	99558	Benzenamine, 2-methyl-5-nitro-	1*	4	U181	X	1# (0.454)
5-Norbornene-2,3-dimethanol,1,4,5,6,7,7-hexachloro, cyclic sulfite	115297	Endosulfan	1	1,2,4	P050	X	1 (0.454)
Octamethylpyrophosphoramide	152169	Diphosphoramide, octamethyl-	1*	4	P085	B	100 (45.4)
Osmium oxide	20816120	Osmium tetroxide	1*	4	P087	C	1000 (454)
Osmium tetroxide	20816120	Osmium oxide	1*	4	P087	C	1000 (454)
7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	145733	Endothall	1*	4	P088	C	1000 (454)
1,2-Oxathiolane, 2,2-dioxide	1120714	1,3-Propane sultone	1*	4	U193	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Catego-ry	Final RQ Pounds(Kg)
2H-1,3,2-Oxazaphosphorine,2-[bis(2-chloroethyl)amino] tetrahydro-2-oxide	50180	Cyclophosphamide	1*	4	U058	X	1# (0.454)
Oxirane	75218	Ethyleneoxide	1*	4	U115	X	1# (0.454)
Oxirane, 2-(chloromethyl)-	106898	1-Chloro-2,3-epoxypropane. Epichlorohydrin	1000	1,4	U041	C	1000# (454)
Paraformaldehyde	30525894		1000	1		C	1000 (454)
Paraldehyde	123637	1,3,5-Trioxane, 2,4,6-trimethyl-	1*	4	U182	C	1000 (454)
Parathion	56382	Phosphorothioic acid,O,O-diethyl O-(p-nitrophenyl) ester	1	1,4	P089	X	1# (0.454)
Pentachlorobenzene	608935	Benzene, pentachloro-	1*	4	U183	A	10 (4.54)
Pentachloroethane	76017	Ethane, pentachloro-	1*	4	U184	X	1# (0.454)
Pentachloronitrobenzene	82688	Benzene, pentachloronitro-	1*	4	U185	X	1# (0.454)
Pentachlorophenol	87865	Phenol, pentachloro-	10	1,2,4	U242	A	10# (4.54)
1,3-Pentadiene	504609	1-Methylbutadiene	1*	4	U186	B	100 (45.4)
Phenacetin	62442	Acetamide, N-(4-ethoxyphenyl)-	1*	4	U187	X	1# (0.454)
Phenanthrene	85018		1*	2		D	5000 (2270)
Phenol	108952	Benzene, hydroxy-	1000	1,2,4	U188	C	1000 (454)
Phenol, 2-chloro-	95578	2-Chlorophenol. o-Chlorophenol	1*	2,4	U048	B	100 (45.4)
Phenol, 4-chloro-3-methyl-	59507	4-Chloro-m-cresol. p-Chloro-m-cresol	1*	2,4	U039	D	5000 (2270)
Phenol, 2-cyclohexyl-4,6-dinitro-	131895	4,6-Dinitro-o-cyclohexylphenol	1*	4	P034	B	100 (45.4)
Phenol, 2,4-dichloro-	120832	2,4-Dichlorophenol	1*	2,4	U081	B	100 (45.4)
Phenol, 2,6-dichloro-	87650	2,6-Dichlorophenol	1*	4	U082	B	100 (45.4)
Phenol, 2,4-dimethyl-	105679	2,4-Dimethylphenol	1*	2,4	U101	B	100 (45.4)
Phenol, 2,4-dinitro-	51285	2,4-Dinitrophenol	1000	1,2,4	P048	A	10 (4.54)
Phenol, 2,4-dinitro-6-(1-methylpropyl)-	88857	Dinoseb	1*	4	P020	C	1000 (454)
Phenol, 2,4-dinitro-6-methyl-, and salts	534521	4,6-Dinitro-o-cresol and salts	1*	2,4	P047	A	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Catego-ry	Final RQ Pounds(Kg)
Phenol, 4-nitro-	100027	p-Nitrophenol. 4-Nitrophenol	1000	1,2,4	U170	B	100 (45.4)
Phenol, pentachloro-	87865	Pentachlorophenol	10	1,2,4	U242	A	10# (4.54)
Phenol, 2,3,4,6-tetrachloro-	58902	2,3,4,6-Tetrachlorophenol	1*	4	U212	A	10 (4.54)
Phenol, 2,4,5-trichloro-	95954	2,4,5-Trichlorophenol	10	1,4	U230	A	10# (4.54)
Phenol, 2,4,6-trichloro-	88062	2,4,6-Trichlorophenol	10	1,2,4	U231	A	10# (4.54)
Phenol, 2,4,6-trinitro-, ammonium salt	131748	Ammonium picrate	1*	4	P009	A	10 (4.54)
Phenyl dichloroarsine	696286	Dichlorophenylarsine	1*	4	P036	X	1#(0.454)
1,10-(1,2-Phenylene)pyrene	193395	Indeno(1,2,3-cd)pyrene	1*	2,4	U137	X	1# (0.454)
Phenylmercuric acetate	62384	Mercury, (acetato-O)phenyl-	1*	4	P092	B	100 (45.4)
N-Phenylthiourea	103855	Thiourea, phenyl-	1*	4	P093	B	100 (45.4)
Phorate	298022	Phosphorodithioic acid, O,O-diethyl S-(ethylthio) methyl ester	1*	4	P094	A	10 (4.54)
Phosgene	75445	Carbonyl chloride	5000	1,4	P095	A	10 (4.54)
Phosphine	7803512	Hydrogen phosphide	1*	4	P096	B	100 (45.4)
Phosphoric acid	7664382		5000	1		D	5000 (2270)
Phosphoric acid,diethyl p-nitrophenyl ester	311455	Diethyl-p-nitrophenyl phosphate	1*	4	P041	B	100 (45.4)
Phosphoric acid, lead salt	7446277	Lead phosphate	1*	4	U145	X	1# (0.454)
Phosphorodithioic acid, O,O-diethyl S-methylester	3288582	O,O-Diethyl S-methyl dithiophosphate	1*	4	U087	D	5000 (2270)
Phosphorodithioic acid, O,O-diethyl S-(ethylthio) methyl ester	298022	Phorate	1*	4	P094	A	10 (4.54)
Phosphorodithioic acid,O,O-dimethyl S-[2(methylamino)-2-oxoethyl] ester	60515	Dimelhoate	1*	4	P044	A	10 (4.54)
Phosphorofluoridic acid,bis(1-methylethyl) ester	55914	Diisopropyl fluorophosphate	1*	4	P043	B	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Phosphorothioic acid,O,O-diethyl O-(p-nitrophenyl) ester	56382	Parathion	1	1,4	P089	X	1#†(0.454)
Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	297972	O,O Diethyl O-pyrazinyl phosphorothioate	1*	4	P040	B	100 (45.4)
Phosphorothioic acid, O,O-dimethyl O-[p-[(dimethylamino) sulfonyl]phenyl] ester	52857	Famphur	1*	4	P097	C	1000 (454)
Phosphorus	7723140		1	1		X	1 (0.454)
Phosphorus oxychloride	10025873		5000	1		C	1000 (454)
Phosphorus pentasulfide	1314803	Phosphorus sulfide Sulfur phosphide	100	1,4	U189	B	100 (45.4)
Phosphorus sulfide	1314803	Phosphorus pentasulfide Sulfur phosphide	100	1,4	U189	B	100 (45.4)
Phosphorus trichloride	7719122		5000	1		C	1000 (454)
PHTHALATE ESTERS			1*	2			••
Phthalic anhydride	85449	1,2-Benzenedicarboxylic acid anhydride	1*	4	U190	B	5000 (2270)
2-Picoline	109068	Pyridine,2-methyl-	1*	4	U191	D	5000 (2270)
Plumbane, tetraethyl	78002	Tetraethyl lead	100	1,4	P110	A	10# (4.54)
POLYCHLORINATED BIPHENYLS (PCBs)	1336363	Aroclors	10	1,2		A	10# (4.54)
	12674112	Aroclor 1016					
	11104282	Aroclor 1221					
	11141165	Aroclor 1232					
	53469219	Aroclor 1242					
	12672296	Aroclor 1248					
	11097691	Aroclor 1254					
	11096825	Aroclor 1260					
POLYNUCLEAR AROMATIC HYDROCARBONS			1*	2			••
Potassium arsenate	7784410		1000	1		C	1000# (454)
Potassium arsenite	10124502		1000	1		C	1000# (454)
Potassium bichromate	7778509		1000	1		C	1000# (454)
Potassium chromate	7789006		1000	1		C	1000# (454)
Potassium cyanide	151508		10	1,4	P098	A	10 (4.54)
Potassium hydroxide	1310583		1000	1		C	1000 (454)
Potassium permanganate	7722647		100	1		B	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Potassium silver cyanide	506616		1*	4	P099	X	1 (0.454)
Pronamide	23950585	3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide	1*	4	U192	D	5000 (2270)
1-Propanal, 2,3-epoxy-	765344	Glycidylaldehyde	1*	4	U126	X	1# (0.454)
Propanal, 2-methyl-2-(methylthio)-,O-[(methylamino) carbonyl]oxime	116063	Aldicarb	1*	4	P070	X	1 (0.454)
1-Propanamine	107108	n-Propylamine	1*	4	U194	D	5000 (2270)
1-Propanamine, N-propyl-	142847	Dipropylamine	1*	4	U110	D	5000 (2270)
Propane, 1,2-dibromo-3-chloro-	96128	1,2-Dibromo-3-chloropropane	1*	4	U066	X	1# (0.454)
Propane, 2-nitro-	79469	2-Nitropropane	1*	4	U171	X	1# (0.454)
Propane, 2,2'-oxybis(2-chloro-	108601	Bis(2-chloroisopropyl) ether	1*	2,4	U027	C	1000 (454)
1,3-Propane sultone	1120714	1,2-Oxathiolane, 2,2-dioxide	1*	4	U193	X	1# (0.454)
Propanedinitrile	109773	Malononitrile	1*	4	U149	C	1000 (4.54)
Propanenitrile	107120	Ethyl cyanide	1*	4	P101	A	10 (4.54)
Propanenitrile, 3-chloro-	542767	3-Chloropropionitrile	1*	4	P027	C	1000 (454)
Propanenitrile, 2-hydroxy-2-methyl-	75865	Acetone cyanohydrin 2-Methyllactonitrile	10	1,4	P069	A	10 (4.54)
1,2,3-Propanetriol, trinitrate-	55630	Nitroglycerine	1*	4	P081	A	10 (4.54)
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126727	Tris(2,3-dibromopropyl) phosphate	1*	4	U235	X	1# (0.454)
1-Propanol, 2-methyl-	78831	Isobutyl alcohol	1*	4	U140	D	5000 (2270)
2-Propanone	67641	Acetone	1*	4	U002	D	5000 (2270)
2-Propanone, 1-bromo-	598312	Bromoacetone	1*	4	P017	C	1000 (454)
Propargite	2312358		10	1		A	10 (4.54)
Propargyl alcohol	107197	2-Propyn-1-ol	1*	4	P102	C	1000 (454)
2-Propenal	107028	Acrolein	1	1,2,4	P003	X	1 (0.454)
2-Propenamide	790611	Acrylamide	1*	4	U007	D	5000 (2270)
Propene, 1,3-dichloro-	542756	1,3-Dichloropropene	5000	1,2,4	U084	B	100# (45.4)
1-Propene, 1,1,2,3,3,3-hexachloro-	1888717	Hexachloropropene	1*	4	U243	C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
2-Propenenitrile	107131	Acrylonitrile	100	1,2,4	U009	B	100# (45.4)
2-Propenenitrile, 2-methyl-	126987	Methacrylonitrile	1*	4	U152	C	1000 (454)
2-Propenoic acid	79107	Acrylic acid	1*	4	U008	D	5000 (2270)
2-Propenoic acid, ethyl ester	140885	Ethyl acrylate	1*	4	U113	C	1000 (454)
2-Propenoic acid, 2-methyl-, ethyl ester	97632	Ethyl methacrylate	1*	4	U118	C	1000 (454)
2-Propenoic acid, 2-methyl-, methyl ester	80626	Methyl methacrylate	5000	1,4	U162	C	1000 (454)
2-Propen-1-ol	107186	Allyl alcohol	100	1,4	P005	B	100 (45.4)
Propionic acid	79094		5000	1		D	5000 (2270)
Propionic acid, 2-(2,4,5-trichlorophenoxy)-	93721	Silvex 2,4,5-TP acid	100	1,4	U233	B	100 (45.4)
Propionic anhydride	123626		5000	1		D	5000 (2270)
n-Propylamine	107108	1-Propanamine	1*	4	U194	D	5000 (2270)
Propylene dichloride	78875	1,2-Dichloropropane	5000	1,2,4	U083	C	1000 (454)
Propylene oxide	75569		5000	1		B	100 (45.4)
1,2-Propylenimine	75558	2-Methylaziridine	1*	4	P067	X	1# (0.454)
2-Propyn-1-ol	107197	Propargyl alcohol	1*	4	P102	C	1000 (454)
Pyrene	129000		1*	2		D	5000 (2270)
Pyrethrins	121299 121211 8003347		1000	1		X	1 (0.454)
4-Pyridinamine	504245	4-Aminopyridine	1*	4	P008	C	1000 (454)
Pyridine	110861		1*	4	U196	C	1000 (454)
Pyridine, 2-[(2-(dimethylamino)ethyl)-2-thenylamino]-	91805	Methapyrilene	1*	4	U155	D	5000 (2270)
Pyridine, hexahydro-N-nitroso-	100754	N-Nitrosopiperidine	1*	4	U179	X	1# (0.454)
Pyridine,2-methyl-	109068	2-Picoline	1*	4	U191	D	5000 (2270)
Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts	54115	Nicotine and salts	1*	4	P075	B	100 (45.4)
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56042	Methylthiouracil	1*	4	U164	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Pyrophosphoric acid, tetraethyl ester	107493	Tetraethyl pyrophosphate	100	1,4	P111	A	10 (4.54)
Pyrrole, tetrahydro-N-nitroso-	930552	N-Nitrosopyrrolidine	1*	4	U180	X	1 (0.454)
Quinoline	91225		1000	1		D	5000 (2270)
RADIONUCLIDES			1*	3		X	1§ (0.454)
Reserpine	50555	*Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-methyl ester*	1*	4	*U200*	D	*5000 (2270)*
Resorcinol	108463	1,3-Benzenediol	1000	1,4	U201	D	5000 (2270)
Saccharin and salts	81072	1,2-Benzisothiazolin-3-one,1,1-dioxide, and salts	1*	4	U202	X	1# (0.454)
Safrole	94597	Benzene, 1,2-methylenedioxy-4-allyl-	1*	4	U203	X	1# (0.454)
Selenious acid	7783008		1*	4	U204	A	10 (4.54)
Selenium ‡‡	7782492		1*	2		B	100 (45.4)
SELENIUM AND COMPOUNDS			1*	2			**
Selenium dioxide	7446084	Selenium oxide	1000	1,4	U204	A	10 (4.54)
Selenium disulfide	7488564	Sulfur selenide	1*	4	U205	X	1# (0.454)
Selenium oxide	7446084	Selenium dioxide	1000	1,4	U204	A	10 (4.54)
Selenourea	630104	Carbamimidoselenoic acid	1*	4	P103	C	1000 (454)
L-Serine, diazoacetate (ester)	115026	Azaserine	1*	4	U015	X	1#‡(0.454)
Silver ‡‡	7440224		1*	2		C	1000 (454)
SILVER AND COMPOUNDS			1*	2			**
Silver cyanide	506649		1*	4	P104	X	1 (0.454)
Silver nitrate	7761888		1	1		X	1 (0.454)
Silvex	93721	Propionic acid, 2-(2,4,5-trichlorophenoxy)-2,4,5-TP acid	100	1,4	U233	B	100 (45.4)
Sodium	7440235		1000	1		A	10 (4.54)
Sodium arsenate	7631892		1000	1		C	1000# (454)
Sodium arsenite	7784465		1000	1		C	1000# (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Sodium azide	26628228		1*	4	P105	C	1000 (454)
Sodium bichromate	10588019		1000	1		C	1000# (454)
Sodium bifluoride	1333831		5000	1		B	100 (45.4)
Sodium bisulfite	7631905		5000	1		D	5000 (2270)
Sodium chromate	7775113		1000	1		C	1000# (454)
Sodium cyanide	143339		10	1,4	P106	A	10 (4.54)
Sodium dodecylbenzene sulfonate	25155300		1000	1		C	1000 (454)
Sodium fluoride	7681494		5000	1		C	1000 (454)
Sodium hydrosulfide	16721805		5000	1		D	5000 (2270)
Sodium hydroxide	1310732		1000	1		C	1000 (454)
Sodium hypochlorite	7681529 10022705		100	1		B	100 (45.4)
Sodium methylate	124414		1000	1		C	1000 (454)
Sodium nitrite	7632000		100	1		B	100 (45.4)
Sodium phosphate, dibasic	7558794 10039324 10140655		5000	1		D	5000 (2270)
Sodium phosphate, tribasic	7601549 7785844 10101890 10361894 7758294 10124568		5000	1		D	5000 (2270)
Sodium selenite	10102188 7782823		1000	1		B	100 (45.4)
4,4'-Stilbenediol, alpha,alpha'-diethyl	56531	Diethylstilbestrol	1*	4	U089	X	1# (0.454)
Streptozotocin	18883664	D-Glucopyranose, 2-deoxy 2-(3-methyl-3-nitrosoureido)-	1*	4	U206	X	1# (0.454)
Strontium chromate	7789062		1000	1		C	1000# (454)
Strontium sulfide	1314961		1*	4	P107	B	100 (45.4)
Strychnidin-10-one, and salts	57249	Strychnine and salts	10	1,4	P108	A	10 (4.54)
Strychnidin-10-one, 2,3 dimethoxy-	357573	Brucine	1*	4	P018	B	100 (4.54)
Strychnine and salts	57249	Strychnidin-10-one, and salts	10	1,4	P108	A	10 (4.54)
Styrene	100425		1000	1		C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Sulfur hydride	7783064	Hydrogen sulfide Hydrosulfuric acid	100	1,4	U135	B	100 (45.4)
Sulfur monochloride	12771083		1000	1		C	1000 (454)
Sulfur phosphide	1314803	Phosphorus pentasulfide Phosphorus sulfide	100	1,4	U189	B	100 (45.4)
Sulfur selenide	7488564	Selenium disulfide	1*	4	U205	X	1# (0.454)
Sulfuric acid	7664939 8014957		1000	1		C	1000 (454)
Sulfuric acid, dimethyl ester	77781	Dimethyl sulfate	1*	4	U103	X	1# (0.454)
Sulfuric acid, thallium(I) salt	7446186 10031591	Thallium(I) sulfate	1000	1,4	P115	B	100 (45.4)
2,4,5-T	93765	2,4,5-T acid 2,4,5-Trichlorophenoxy-acetic acid	100	1,4	U232	C	1000 (454)
2,4,5-T acid	93765	2,4,5-T 2,4,5-Trichlorophenoxy acetic acid	100	1,4	U232	C	1000 (454)
2,4,5-T amines	2008460 6369966 6369977 1319728 3813147		100	1		D	5000 (2270)
2,4,5-T esters	93798 2545597 61792072 1928478 25168154		100	1		C	1000 (454)
2,4,5-T salts	13560991		100	1		C	1000 (454)
TDE	72548	DDD 4,4' DDD Dichlorodiphenyl dichloroethane	1	1,2,4	U060	X	1# (0.454)
1,2,4,5-Tetrachlorobenzene	95943	Benzene, 1,2,4,5-tetrachloro-	1*	4	U207	D	5000 (2270
2,3,7,8-Tetrachlorodibenzo p-dioxin(TCDD)	1746016		1*	2		X	1#1(0.454)
1,1,1,2-Tetrachloroethane	630206	Ethane,1,1,1,2-tetrachloro-	1*	4	U208	X	1# (0.454)
1,1,2,2-Tetrachloroethane	79345	Ethane, 1,1,2,2-tetrachloro-	1*	2,4	U209	X	1#1(0.454)
Tetrachloroethylene	127184	Ethene, 1,1,2,2-tetrachloro-	1*	2,4	U210	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
2,3,4,6-Tetrachlorophenol	58902	Phenol, 2,3,4,6-tetrachloro-	1*	4	U212	A	10 (4.54)
Tetraethyldithiopyrophosphate	3689245	Dithiopyrophosphonic acid,tetraethyl ester	1*	4	P109	B	100 (45.4)
Tetraethyl lead	78002	Plumbane, tetraethyl-	100	1,4	P110	A	10# (4.54)
Tetraethyl pyrophosphate	107493	Pyrophosphonic acid, tetraethyl ester	100	1,4	P111	A	10 (4.54)
Tetrahydrofuran	109999	Furan, tetrahydro-	1*	4	U213	C	1000 (454)
Tetranitromethane	509148	Methane, tetranitro-	1*	4	P112	A	10 (4.54)
Tetraphosphonic acid, hexaethyl ester	757584	Hexaethyl tetraphosphate	1*	4	P062	B	100 (45.4)
Thallic oxide	1314325	Thallium(III) oxide	1*	4	P113	B	100 (45.4)
Thallium ††‡	7440280		1*	2		C	1000 (454)
THALLIUM AND COMPOUNDS			1*	2			**
Thallium(I) acetate	563688	Acetic acid, thallium(I) salt	1*	4	U214	B	100 (45.4)
Thallium(I) carbonate	6533739	Carbonic acid, dithallium(I) salt	1*	4	U215	B	100 (45.4)
Thallium(I) chloride‡	7791120		1*	4	U216	B	100 (45.4)
Thallium(I) nitrate	10102451		1*	4	U217	B	100 (45.4)
Thallium(III) oxide	1314325	Thallic oxide	1*	4	P113	B	100 (45.4)
Thallium(I) selenide	12039520		1*	4	P114	C	1000 (454)
Thallium(I) sulfate	7446186 10031591	Sulfuric acid, thallium(I) salt	1000	1,4	P115	B	100 (45.4)
Thioacetamide	62555	Ethanethioamide	1*	4	U218	X	1# (0.454)
Thiofanox	39196184	3,3-Dimethyl-1-(methylthio)-2-butanone,O-[(methylamino) carbonyl] oxime	1*	4	P045	B	100 (45.4)
Thiomidodicarbonic diamide	541537	2,4-Dithiobiuret	1*	4	P049	B	100 (45.4)
Thiomethanol	74931	Methanethiol Methylmercaptan	100	1,4	U153	B	100 (45.4)
Thiophenol	108985	Benzenethiol	1*	4	P014	B	100 (45.4)
Thiosemicarbazide	79196	Hydrazinecarbothioamide	1*	4	P116	B	100 (45.4)
Thiourea	62566	Carbamide, thio-	1*	4	U219	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Thiourea, (2-chlorophenyl)-	5344821	1-(o-Chlorophenyl)thiourea	1*	4	P026	B	100 (4514)
Thiourea, 1-naphthalenyl-	86884	alpha-Naphthylthiourea	1*	4	P072	B	100 (45.4)
Thiourea, phenyl	103855	N-Phenylthiourea	1*	4	P093	B	100 (45.4)
Thiram	137268	Bis(dimethylthiocarbamoyl) disulfide	1*	4	U244	A	10 (4.54)
Toluene	108883	Benzene, methyl-	1000	1,2,4	U220	C	1000 (454)
Toluenediamine	95807 25376458 496720 823405	Diaminotoluene	1*	4	U221	X	1# (0.454)
Toluene diisocyanate	584849 91087 26471625	Benzene, 2,4-diisocyanatomethyl-	1*	4	U223	B	100 (45.4)
o-Toluidine	95534	2-Amino-1-methyl benzene	1*	4	U328	X	1# (0.454)
p-Toluidine	106490	4-Amino-1-methyl benzene	1*	4	U353	X	1# (0.454)
o-Toluidine hydrochloride	636215	Benzenamine, 2-methyl-, hydrochloride	1*	4	U222	X	1# (0.454)
Toxaphene	8001352	Camphene, octachloro-	1	1,2,4	P123	X	1# (0.454)
2,4,5-TP acid	93721	Propionic acid, 2-(2,4,5-trichlorophenoxy)- Silvex	100	1,4	U233	B	100 (45.4)
2,4,5-TP acid esters	32534955		100	1		B	100 (45.4)
1H-1,2,4-Triazol-3-amine	61825	Amitrole	1*	4	U011	X	1# (0.454)
Trichlorfon	52686		1000	1		B	100 (45.4)
1,2,4-Trichlorobenzene	120821		1*	2		B	100 (45.4)
1,1,1-Trichloroethane	71556	Methyl chloroform	1*	2,4	U226	C	1000 (454)
1,1,2-Trichloroethane	79005	Ethane, 1,1,2-trichloro-	1*	2,4	U227	X	1# (0.454)
Trichloroethene	79016	Trichloroethylene	1000	1,2,4	U228	C	1000# (454)
Trichloroethylene	79016	Trichloroethene	1000	1,2,4	U228	C	1000# (454)
Trichloromethanesulfenyl chloride	594423	Methanesulfanyl chloride, trichloro	1*	4	P118	B	100 (45.4)
Trichloromonofluoromethane	75694	Methane, trichlorofluoro	1*	4	U121	D	5000 (2270)
Trichlorophenol	25167822		10	1		A	10# (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
2,3,4-Trichlorophenol	15950660						
2,3,5 Trichlorophenol	933788						
2,3,6-Trichlorophenol	933755						
2,4,5-Trichlorophenol	95954	Phenol, 2,4,5 trichloro-					
2,4,6-Trichlorophenol	88062	Phenol, 2,4,6-trichloro-					
3,4,5-Trichlorophenol	609198						
2,4,5-Trichlorophenol	95954	Phenol, 2,4,5-trichloro-	10	1,4	U230	A	10# (4.54)
2,4,6-Trichlorophenol	88062	Phenol, 2,4,6-trichloro-	10	1,2,4	U231	A	10# (4.54)
2,4,5 Trichlorophenoxyacetic acid	93765	2,4,5-T	100	1,4	U232	C	1000 (454)
		2,4,5-T acid					
Triethanolamine dodecylbenzenesulfonate	27323417		1000	1		C	1000 (454)
Triethylamine	121448		5000	1		D	5000 (2270)
Trimethylamine	75503		1000	1		B	100 (45.4)
sym Trinitrobenzene	99354	Benzene, 1,3,5-trinitro-	1*	4	U234	A	10 (4.54)
1,3,5-Trioxane, 2,4,6-trimethyl-	123637	Paraldehyde	1*	4	U182	C	1000 (454)
Tris(2,3-dibromopropyl) phosphate	126727	1-Propanol, 2,3-dibromo-, phosphate (3:1)	1*	4	U235	X	1# (0.454)
Trypan blue	72571	2,7'-Naphthalenedisulfonic acid,3,3'-[(3,3'-dimethyl-[1,1'-biphenyl]-4,4'-diyl)-bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt	1*	4	U236	X	1# (0.454)
Unlisted Hazardous Wastes Characteristic of EP Toxicity	N.A.						
Characteristic of Ignitability			1*	4	D001	B	100 (45.4)
Characteristic of Corrosivity			1*	4	D002	B	100 (45.4)
Characteristic of Reactivity			1*	4	D003	B	100 (45.4)
Characteristic of EP Toxicity			1*	4			

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Arsenic			1*	4	D004	X	1# (0.454)
Barium			1*	4	D005	C	1000 (454)
Cadmium			1*	4	D006	X	1# (0.454)
Chromium			1*	4	D007	X	1# (0.454)
Lead			1*	4	D008	X	1## (0.454)
Mercury			1*	4	D009	X	1 (0.454)
Selenium D010	N.A.		1*	4	D010	A	10 (4.54)
Silver			1*	4	D011	X	1 (0.454)
Endrin			1	1,4	D012	X	1 (0.454)
Lindane			1	1,4	D013	X	1# (0.454)
Methoxychlor			1	1,4	D014	X	1 (0.454)
Toxaphene			1	1,4	D015	X	1# (0.454)
2,4-D			100	1,4	D016	B	100 (45.4)
2,4,5-TP			100	1,4	D017	B	100 (45.4)
Uracil, 5-[bis(2-chloroethyl)amino]-	66751	Uracil mustard	1*	4	U237	X	1# (0.454)
Uracil mustard	66751	Uracil, 5-[bis(2-chloroethyl)amino]-	1*	4	U237	X	1# (0.454)
Uranyl acetate ****	541093		5000	1		B	100 (45.4)
Uranyl nitrate ****	10102064		5000	1		B	100 (45.4)
Vanadic acid, ammonium salt	7803556	Ammonium vanadate	1*	4	P119	C	1000 (454)
Vanadium(V) oxide	1314621	Vanadium pentoxide	1000	1,4	P120	C	1000 (454)
Vanadium pentoxide	1314621	Vanadium(V) oxide	1000	1,4	P120	C	1000 (454)
Vanadyl sulfate	27774136		1000	1		C	1000 (454)
Vinyl acetate	108054		1000	1		D	5000 (2270)
Vinyl chloride	75014	Ethene, chloro-	1*	2,3,4	U043	X	1# (0.454)
Vinylidene chloride	75354	1,1-Dichloroethylene Ethene, 1,1-dichloro-	5000	1,2,4	U078	D	5000# (2270)
Warfarin	81812	3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin and salts	1*	4	P001	B	100 (45.4)
Xylene (mixed) m- o- p-	1330207 108383 95476 106423	Benzene,dimethyl m- o- p-	1000	1,4	U239	C	1000 (454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
Xylenol	1300716		1000	1		C	1000 (454)
Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-methylester	50555	Reserpine	1*	4	U200	D	5000 (2270)
Zinc 1	7440666		1*	2		C	1000 (454)
ZINC AND COMPOUNDS			1*	2			**
Zinc acetate	557346		1000	1		C	1000 (454)
Zinc ammonium chloride	52628258		5000	1		C	1000 (454)
Zinc borate	1332076		1000	1		C	1000 (454)
Zinc bromide	7699458		5000	1		C	1000 (454)
Zinc carbonate	3486359		1000	1		C	1000 (454)
Zinc chloride	7646857		5000	1		C	1000 (454)
Zinc cyanide	557211		10	1,4	P121	A	10 (4.54)
Zinc fluoride	7783495		1000	1		C	1000 (454)
Zinc formate	557415		1000	1		C	1000 (454)
Zinc hydrosulfite	7779864		1000	1		C	1000 (454)
Zinc nitrate	7779886		5000	1		C	1000 (454)
Zinc phenolsulfonate	127822		5000	1		D	5000 (2270)
Zinc phosphide	1314847		1000	1,4	P122	B	100 (45.4)
Zinc silicofluoride	16871719		5000	1		D	5000 (2270)
Zinc sulfate	7733020		1000	1		C	1000 (454)
Zirconium nitrate	13746899		5000	1		D	5000 (2270)
Zirconium potassium fluoride	16923958		5000	1		C	1000 (454)
Zirconium sulfate	14644612		5000	1		D	5000 (2270)
Zirconium tetrachloride	10026116		5000	1		D	5000 (2270)
F001			1*	4	F001	X	1# (0.454)
The following spent halogenated solvents used in degreasing and sludges from the recovery of these solvents in degreasing operations							
(a) Tetrachloroethylene	127184					X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
(b) Trichloroethylene	79016					C	1000# (454)
(c) Methylene chloride	75092					C	1000 (454)
(d) 1,1,1-Trichloroethane	71556					C	1000 (454)
(e) Carbon tetrachloride	56235					D	5000# (2270)
(f) Chlorinated fluorocarbons	(NIA)					D	5000 (2270)
F002			1*	4	F002	X	1# (0.454)
The following spent halogenated solvents and the still bottoms from the recovery of these solvents							
(a) Tetrachloroethylene	127184					X	1#1(0!454)
(b) Methylene Chloride	75092					C	1000 (454)
(c) Trichloroethylene	79016					C	1000# (454)
(d) 1,1,1-Trichloroethane	71556					C	1000 (454)
(e) Chlorobenzene	108907					B	100 (45.4)
(f) 1,1,2-Trichloro-1,2,2-trifluoroethane	76131					D	5000 (2270)
(g) o-Dichlorobenzene	106467					B	100 (45.4)
(h) Trichlorofluoromethane	75694					D	5000 (2270)
F003			1*	4	F003	B	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents							
(a) Xylene	1330207					C	1000 (454)
(b) Acetone	67641					D	5000 (2270)
(c) Ethyl acetate	141786					D	5000 (2270)
(d) Ethylbenzene	100414					C	1000 (454)
(e) Ethyl ether	60297					B	100 (45.4)
(f) Methyl isobutyl ketone	108101					D	5000 (2270)
(g) n-Butyl alcohol	71363					D	5000 (2270)
(h) Cyclohexanone	108941					D	5000 (2270)
(i) Methanol	67561					D	5000 (2270)
F004			1*	4	F004	C	1000# (454)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents							
(a) Cresols/Cresylic acid							
(b) Nitrobenzene							

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
F005 The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents: (a) Toluene (b) Methyl ethyl ketone (c) Carbon disulfide (d) Isobutanol (e) Pyridine			1*	4	F005	B	100 (45.4)
F006 Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum			1*	4	F006	X	1# (0.454)
F007 Spent cyanide plating bath solutions from electroplating operations (except for precious metals electroplating spent cyanide plating bath solutions)			1*	4	F007	A	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
F008 Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process (except for precious metals electroplating plating bath sludges)			1*	4	F008	A	10 (4.54)
F009 Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process (except for precious metals electroplating spent stripping and cleaning bath solutions)			1*	4	F009	A	10 (4.54)
F010 Quenching bath sludge from oil baths from metal heat treating operations where cyanides are used in the process (except for precious metals heat-treating quenching bath sludges)			1*	4	F010	A	10 (4.54)
F011 Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations (except for precious metals heat treating spent cyanide solutions from salt bath pot cleaning)			1*	4	F011	A	10 (4.54)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
F012 Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process (except for precious metals heat treating quenching wastewater treatment sludges)			1*	4	F012	A	10 (4.54)
F019 Wastewater treatment sludges from the chemical conversion coating of aluminum			1*	4	F019	X	1# (0.454)
F020 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)			1*	4	F020	X	1# (0.454)
F021			1*	4	F021	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives							
F022 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions			1*	4	F022	X	1# (0.454)
F023 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.)			1*	4	F023	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
F024 Wastes, including but not limited to distillation residues, heavy ends, tars, and reactor cleanout wastes, from the production of chlorinated aliphatic hydrocarbons,having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent dessicants(sic) wastewater wastewater treatment sludges spent catalysts and wastes listed in § 261.32.)			1*	4	F024	X	1# (0.454)
F026 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions			1*	4	F026	X	1# (0.454)
F027			1*	4	F027	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.)							
F028 Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027			1*	4	F028	X	1# (0.454)
K001 Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol			1*	4	K001	X	1# (0.454)
K002 Wastewater treatment sludge from the production of chrome yellow and orange pigments			1*	4	K002	X	1# (0.454)
K003 Wastewater treatment sludge from the production of molybdate orange pigments			1*	4	K003	X	1# (0.454)
K004 Wastewater treatment sludge from the production of zinc yellow pigments			1*	4	K004	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K005 Wastewater treatment sludge from the production of chrome green pigments			1*	4	K005	X	1# (0.454)
K006 Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)			1*	4	K006	X	1# (0.454)
K007 Wastewater treatment sludge from the production of iron blue pigments			1*	4	K007	X	1# (0.454)
K008 Oven residue from the production of chrome oxide green pigments			1*	4	K008	X	1# (0.454)
K009 Distillation bottoms from the production of acetaldehyde from ethylene			1*	4	K009	X	1# (0.454)
K010 Distillation side cuts from the production of acetaldehyde from ethylene			1*	4	K010	X	1# (0.454)
K011 Bottom stream from the wastewater stripper in the production of acrylonitrile			1*	4	K011 K013	X	1# (0.454)
K013 Bottom stream from the acetonitrile column in the production of acrylonitrile			1*	4	K013	X	1# (0.454)
K014 Bottoms from the acetonitrile purification column in the production of acrylonitrile			1*	4	K011 K013	D	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K015 Still bottoms from thedistillation of benzyl chlonde			1*	4	K015	X	1# (0.454)
K016 Heavy ends or distillation residues from the productionof carbon tetrachlonde			1*	4	K016	X	1# (0.454)
K017 Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin			1*	4	K017 K136	X	1# (0.454)
K018 Heavy ends from the fractionation column in ethyl chloride production			1*	4	K018 K136	X	1# (0.454)
K019 Heavy ends from the distillation of ethylene dichloride in ethylene dichlonde production			1*	4	K019	X	1# (0.454)
K020 Heavy ends from the distillation of vinyl chlonde in vinyl chlonde monomer production			1*	4	K020	X	1# (0.454)
K021 Aqueous spent antimony catalyst waste from fluoromethanes production			1*	4	K021	X	1# (0.454)
K022 Distillation bottom tars from the production of phenol/acetone from cumene			1*	4	K022	X	1# (0.454)
K023 Distillation light ends from the production of phthalic anhydride from naphthalene			1*	4	K023	D	5000 (2270)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K024 Distillation bottoms from the production of phthalic anhydride from naphthalene			1*	4	K024	D	5000 (2270)
K025 Distillation bottoms from the production of nitrobenzene by the nitration of benzene			1*	4	K025	X	1# (0.454)
K026 Stripping still tails from the production of methyl ethyl pyridines			1*	4	K026	C	1000 (454)
K027 Centrifuge and distillation residues from toluene diisocyanate production			1*	4	K027	X	1# (0.454)
K028 Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane			1*	4	K028	X	1# (0.454)
K029 Waste from the product steam stripper in the production of 1,1,1-trichloroethane			1*	4	K029	X	1# (0.454)
K030 Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene			1*	4	K030	X	1# (0.454)
K031 By-product salts generated in the production of MSMA and cacodylic acid			1*	4	K031	X	1# (0.454)
K032 Wastewater treatment sludge from the production of chlordane			1*	4	K032	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Codet	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K033 Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane			1*	4	K033	X	1# (0.454)
K034 Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane			1*	4	K034	X	1# (0.454)
K035 Wastewater treatment sludges generated in the production of creosote			1*	4	K035	X	1# (0.454)
K036 Still bottoms from toluene reclamation distillation in the production of disulfoton			1*	4	K036	X	1 (0.454)
K037 Wastewater treatment sludges from the production of disulfoton			1*	4	K037	X	1 (0454)
K038 Wastewater from the washing and stripping of phorate production			1*	4	K038	X	1# (0.454)
K039 Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate			1*	4	K039	A	10 (4.54)
K040 Wastewater treatment sludge from the production of phorate			1*	4	K040	X	1# (0.454)
K041 Wastewater treatment sludge from the production of toxaphene			1*	4	K041	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K042 Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T			1*	4	K042	X	1# (0.454)
K043 2,6-Dichlorophenol waste from the production of 2,4-D			1*	4	K043	X	1# (0.454)
K044 Wastewater treatment sludges from the manufacturing and processing of explosives			1*	4	K044	A	10 (4.54)
K045 Spent carbon from the treatment of wastewater containing explosives			1*	4	K045	A	10 (4.54)
K046 Wastewater treatment sludges from the manufacturing, formulation and loading of lead based initiating compounds			1*	4	K046	B	100(45.4)
K047 Pink/red water from TNT operations			1*	4	K047	A	10 (4.54)
K048 Dissolved air flotation (DAF) float from the petroleum refining industry			1*	4	K048	X	1# (0.454)
K049 Slop oil emulsion solids from the petroleum refining industry			1*	4	K049	X	1# (0.454)
K050 Heat exchanger bundle cleaning sludge from the petroleum refining industry			1*	4	K050	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K051 API separator sludge from the petroleum refining industry			1*	4	K051	X	1# (0.454)
K052 Tank bottoms (leaded) from the petroleum refining industry			1*	4	K052	A	10# (4.54)
K060 Ammonia still lime sludge from coking operations			1*	4	K060	X	1# (0.454)
K061 Emission control dust/sludge from the primary production of steel in electric furnaces			1*	4	K061	X	1# (0.454)
K062 Spent pickle liquor from steel finishing operations			1*	4	K062	X	1# (0.454)
K069 Emission control dust/sludge from secondary lead smelting			1*	4	K069	X	1# (0.454)
K071 Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used			1*	4	K071	X	1 (0.454)
K073 Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production			1*	4	K073	X	1# (0.454)
K083 Distillation bottoms from aniline extraction			1*	4	K083	B	100 (45.4)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K084 Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo arsenic compounds			1*	4	K084	X	1# (0.454)
K085 Distillation or fractionation column bottoms from the production of chlorobenzenes			1*	4	K085	X	1# (0.454)
K086 Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead			1*	4	K086	X	1# (0.454)
K087 Decanter tank tar sludge from coking operations			1*	4	K087	B	100 (45.4)
K093 Distillation light ends from the production of phthalic anhydride from ortho-xylene			1*	4	K093	D	5000 (2270)
K094 Distillation bottoms from the production of phthalic anhydride from ortho xylene			1*	4	K094	D	5000 (2270)
K095 Distillation bottoms from the production of 1,1,1 trichloroethane			1*	4	K095	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory RQ	Statutory Code†	Statutory RCRA Waste Number	Final RQ Category	Final RQ Pounds(Kg)
K096 Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane			1*	4	K096	X	1# (0.454)
K097 Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane			1*	4	K097	X	1# (0.454)
K098 Untreated process wastewater from the production of toxaphene			1*	4	K098	X	1# (0.454)
K099 Untreated wastewater from the production of 2,4-D			1*	4	K099	X	1# (0.454)
K100 Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting (Components of this waste are identical with those of K069).			1*	4	K100	X	1# (0.454)
K101 Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds			1*	4	K101	X	1# (0.454)
K102 Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds			1*	4	K102	X	1# (0.454)

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—*Continued*

[See footnotes at end of Table 302.4]

Hazardous Substance	CASRN	Regulatory Synonyms	Statutory			Final RQ	
			RQ	Codet	RCRA Waste Number	Category	Pounds(Kg)
K103 Process residues from aniline extraction from the production of aniline			1*	4	K103	B	100 (45.4)
K104 Combined wastewater streams generated from nitrobenzene/aniline chlorobenzenes			1*	4	K104	X	1# (0.454)
K105 Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes			1*	4	K105	X	1# (0.454)
K106 Wastewater treatment sludge from the mercury cell process in chlorine production			1*	4	K106	X	1 (0.454)
K111 Product washwaters from the production of dinitrotoluene via nitration of toluene			1*	4	K111	X	1# (0.454)
K112 Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene			1*	4	K112	X	1# (0.454)
K113 Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene			1*	4	K113	X	1# (0.454)
K114 Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene			1*	4	K114	X	1# (0.454)
K115 Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene			1*	4	K115	X	1# (0.454)
K116 Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine			1*	4	K116	X	1# (0.454)
K117 Wastewater from the reaction vent gas scrubber in the production of ethylene bromide via bromination of ethene			1*	4	K117	X	1# (0.454)
K118 Spent absorbent solids from purification of ethylene dibromide in the production of ethylene dibromide			1*	4	K118	X	1# (0.454)
K136 Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene			1*	4	K136	X	1# (0.454)

t - indicates the statutory source as defined by 1, 2, 3, or 4 below

†† - no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 micrometers (0.004 inches)

††† - the RQ for asbestos is limited to friable forms only

1 - indicates that the statutory source for designation of this hazardous substance under CERCLA is CWA Section 311(b)(4)

2 - indicates that the statutory source for designation of this hazardous substance under CERCLA is CWA Section 307(a)

3 - indicates that the statutory source for designation of this hazardous substance under CERCLA is CAA Section 112

4 - indicates that the statutory source for designation of this hazardous substance under CERCLA is RCRA Section 3001

1* - indicates that the 1-pound RQ is a CERCLA statutory RQ

** - indicates that no RQ is being assigned to the generic or broad class

*** - Iron dextran was designated as a hazardous substance under CERCLA solely because of its listing as a hazardous waste under Section 3001 of RCRA. The Agency recently proposed to delist iron dextran under RCRA(50 FR 46468-46470, November 8,1985). The Agency has also proposed to delist iron dextran from Table 302.4 of 40 CFR 302.4 and thereby remove its designation as a CERCLA hazardous substance

**** - Uranyl acetate and uranyl nitrate currently are being evaluated for their radioactive properties. Their RQs may be further adjusted in a future rulemaking adjusting the RQ of radionuclides

- indicates that the RQ is subject to change when the assessment of potential carcinogenicity and/or chronic toxicity is completed

- The Agency may adjust the RQ for methyl isocyanate in a future rulemaking, until then the statutory RQ applies

§ The Agency may adjust the RQ for radionuclides in a future rulemaking, until then the statutory RQ applies

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[See footnotes at end of Table 302.4]

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES

CASRN	Hazardous Substance
50000	Formaldehyde Methylene oxide
50077	Azirino(2',3',3,4)pyrrolo(1,2-a)indole-4,7-dione,6-amino-8-[((aminocarbonyl)oxy)methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl- Mitomycin C
50180	Cyclophosphamide 2H-1,3,2-Oxazaphosphorine-2-[bis(2-chloroethyl)amino]tetrahydro-2-oxide
50293	DDT 4,4'-DDT Dichlorodiphenyl trichloroethane
50328	Benzo[a]pyrene 3,4-Benzopyrene
50555	Reserpine Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester
51285	2,4-Dinitrophenol Phenol, 2,4-dinitro-
51434	1,2-Benzenediol,4-[1-hydroxy-2-(methylamino)ethyl]- Epinephrine
51796	Carbamic acid, ethyl ester Ethyl carbamate (Urethan)
52686	Trichlorfon
52857	Famphur Phosphorothioic acid, O,O-dimethyl-O-[p-[(dimethylamino)-sulfonyl)phenyl] ester
53703	Dibenz[a,h]anthracene 1,2:5,6-Dibenzanthracene Dibenzo[a,h]anthracene
53963	Acetamide, N-9H-fluoren-2-yl- 2-Acetylaminofluorene
54115	Nicotine and salts Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)- and salts
55185	Ethanamine, N-ethyl-N-nitroso- N-Nitrosodiethylamine
55630	Nitroglycerine 1,2,3-Propanetriol, trinitrate
55914	Diisopropyl fluorophosphate Phosphorofluoridic acid,bis(1-methylethyl) ester
56042	Methylthiouracil 4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
56235	Carbon tetrachloride Methane, tetrachloro-

§ 302.4 40 CFR Ch. I (7-1-87 Edition)

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
56382	Parathion Phosphorothioic acid,O,O-diethyl O-(p-nitrophonyl)ester
56495	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl- 3-Methylcholanthrene
56531	Diethylstilbestrol 4,4'-Stilbenediol, alpha,alpha'-diethyl-
56553	Benz[a]anthracene 1,2-Benzanthracene Benzo[a]anthracene
56724	Coumaphos
57125	Cyanides (soluble cyanide salts), not elsewhere specified
57147	1,1-Dimethylhydrazine Hydrazine, 1,1-dimethyl-
57249	Strychnidin-10-one, and salts Strychnine and salts
57749	Chlordane Chlordane, technical 4,7-Methanoinda,n, 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-
57976	1,2-Benzanthracene, 7,12-dimethyl- 7,12-Dimethylbenz[a]anthracene
58899	gamma - BHC Hexachlorocyclohexane (gamma isomer) Lindane
58902	Phenol, 2,3,4,6-tetrachloro- 2,3,4,6-Tetrachlorophenol
59507	4-Chloro-m-cresol p-Chloro-m-cresol Phenol, 4-chloro-3-methyl
60004	Ethylenediamine tetraacetic acid (EDTA)
60117	Benzenamine, N,N-dimethyl-4-phenylazo- Dimethylaminoazobenzene
60297	Ethane, 1,1'-oxybis- Ethyl ether
60344	Hydrazine, methyl- Methyl hydrazine
60515	Dimethoate Phosphorodithioic acid,O,O-dimethyl S-[2(methylamino)-2-oxoethyl] ester
60571	Dieldrin 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,exo-1,4-5,8-dimethanonaphthalene
61825	Amitrole 1H-1,2,4-Triazol-3-amine

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
62384	Mercury, (acetato-O)phenyl- Phenylmercuric acetate
62442	Acetamide, N-(4-ethoxyphenyl)- Phenacetin
62500	Ethyl methanesulfonate Methanesulfonic acid, ethyl ester
62533	Aniline Benzenamine
62555	Ethanethioamide Thioacetamide
62566	Carbamide, thio- Thiourea
62737	Dichlorvos
62748	Acetic acid, fluoro-, sodium salt Fluoroacetic acid, sodium salt
62759	Dimethylnitrosamine N-Nitrosodimethylamine
63252	Carbaryl
64186	Formic acid Methanoic acid
64197	Acetic acid
65850	Benzoic acid
66751	Uracil, 5-[bis(2-chloroethyl)amino]- Uracil mustard
67561	Methanol Methyl alcohol
67641	Acetone 2-Propanone
67663	Chloroform Methane, trichloro-
67721	Ethane, 1,1,1,2,2,2-hexachloro- Hexachloroethane
70257	Guanidine, N-nitroso-N-methyl-N'-nitro- N-Methyl-N'-nitro-N-nitrosoguanidine
70304	Hexachlorophene 2,2'-Methylenebis(3,4,6-trichlorophenol)
71363	1-Butanol n-Butyl alcohol
71432	Benzene
71556	Methyl chloroform 1,1,1-Trichloroethane

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
72208	Endrin 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,endo-1,4-5,8-dimethanonaphthalene
72435	Ethane, 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)- Methoxychlor
72548	DDD 4,4'-DDD Dichlorodiphenyl dichloroethane TDE
72559	DDE 4,4'-DDE
72571	2,7-Naphthalenedisulfonic acid,3,3'-[(3,3'-dimethyl-(1,1'-biphenyl)-4,4'-diyl)-bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt Trypan blue
74839	Methane, bromo- Methyl bromide
74873	Methane, chloro- Methyl chloride
74884	Methane, iodo- Methyl iodide
74895	Monomethylamine
74908	Hydrocyanic acid Hydrogen cyanide
74931	Methanethiol Methylmercaptan Thiomethanol
74953	Methane, dibromo- Methylene bromide
75003	Chloroethane
75014	Ethene, chloro- Vinyl chloride
75047	Monoethylamine
75058	Acetonitrile Ethanenitrile
75070	Acetaldehyde Ethanal
75092	Methane, dichloro- Methylene chloride
75150	Carbon bisulfide Carbon disulfide
75207	Calcium carbide
75218	Ethylene oxide Oxirane

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
75252	Bromoform Methane tribromo-
75274	Dichlorobromomethane
75343	1,1-Dichloroethane Ethane, 1,1-dichloro- Ethylidene dichloride
75354	1,1-Dichloroethylene Ethene, 1,1 dichloro Vinylidene chloride
75365	Acetyl chloride Ethanoyl chloride
75445	Carbonyl chloride Phosgene
75503	Trimethylamine
75558	2-Methylazridine 1,2-Propylenimine
75569	Propylene oxide
75605	Cacodylic acid Hydroxydimethylarsine oxide
75649	tert-Butylamine
75694	Methane, trichlorofluoro- Trichloromonofluoromethane
75718	Dichlorodifluoromethane Methane, dichlorodifluoro
75865	Acetone cyanohydrin 2-Methyllactonitrile Propanenitrile, 2-hydroxy-2-methyl-
75876	Acetaldehyde, trichloro- Chloral
75990	2,2-Dichloropropionic acid
76017	Ethane, pentachloro- Pentachloroethane
76448	Heptachlor 4,7-Methano-1H-indene, 1t,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
77474	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro- Hexachlorocyclopentadiene
77781	Dimethyl sulfate Sulfuric acid, dimethyl ester
78002	Plumbane, tetraethyl- Tetraethyl lead

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
78591	Isophorone
78795	Isoprene
78819	iso-Butylamine
78831	Isobutyl alcohol 1-Propanol, 2-methyl-
78875	1,2-Dichloropropane Propylene dichloride
78886	2,3-Dichloropropene (isomer)
78933	2-Butanone Methyl ethyl ketone
78999	1,1-Dichloropropane
79005	Ethane, 1,1,2-trichloro 1,1,2-Trichloroethane
79016	Trichloroethene Trichloroethylene
79061	Acrylamide 2-Propenamide
79094	Propionic acid
79107	Acrylic acid 2-Propenoic acid
79196	Hydrazinecarbothioamide Thiosemicarbazide
79221	Carbonochloridic acid, methyl ester Methyl chlorocarbonate
79312	iso-Butyric acid
79345	Ethane, 1,1,2,2-tetrachloro- 1,1,2,2-Tetrachloroethane
79447	Carbamoyl chloride, dimethyl- Dimethylcarbamoyl chloride
79469	2-Nitropropane Propane, 2-nitro-
80159	alpha,alpha-Dimethylbenzylhydroperoxide Hydroperoxide, 1-methyl-1-phenylethyl-
80626	Methyl methacrylate 2-Propenoic acid, 2-methyl-, methyl ester
81072	1,2 Benzisothiazolin-3-one,1,1-dioxide, and salts Saccharin and salts
81812	3-(alpha-Acetonylbenzyl)-4 hydroxycoumarin and salts Warfarin
82688	Benzene, pentachloronitro- Pentachloronitrobenzene

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
83329	Acenaphthene
84662	1,2-Benzenedicarboxylic acid,diethyl ester Diethyl phthalate
84742	1,2-Benzenedicarboxylic acid,dibutyl ester n-Butyl phthalate Dibutyl phthalate Di-n-butyl phthalate
85007	Diquat
85018	Phenanthrene
85449	1,2-Benzenedicarboxylic acid anhydride Phthalic anhydride
85687	Butyl benzyl phthalate
86306	N-Nitrosodiphenylamine
86500	Guthion
86737	Fluorene
86884	alpha-Naphthylthiourea Thiourea, 1-naphthalenyl-
87650	2,6-Dichlorophenol Phenol, 2,6-dichloro-
87683	1,3-Butadiene, 1,1,2,3,4,4-hexachloro- Hexachlorobutadiene
87865	Pentachlorophenol Phenol, pentachloro-
88062	Phenol, 2,4,6-trichloro 2,4,6-Trichlorophenol
88722	o-Nitrotoluene
88755	o-Nitrophenol 2-Nitrophenol
88857	Dinoseb Phenol, 2,4-dinitro-6-(1-methylpropyl)-
91087	Benzene, 2,4-diisocyanatomethyl- Toluene diisocyanate
91203	Naphthalene
91225	Quinoline
91587	beta-Chloronaphthalene 2-Chloronaphthalene Naphthalene, 2-chloro
91598	2-Naphthylamine beta-Naphthylamine
91805	Methapyrilene Pyridine, 2-[(2 (dimethylamino)ethyl)-2 thenylamino]-

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
91941	(1,1'-Biphenyl)-4,4'diamine,3,3'dichloro- 3,3'-Dichlorobenzidine
92875	Benzidine (1,1'-Biphenyl)-4,4'diamine
93721	Propionic acid, 2-(2,4,5-trichlorophenoxy)- Silvex 2,4,5-TP acid
93765	2,4,5-T 2,4,5-T acid 2,4,5-Trichlorophenoxyacetic acid
93798	2,4,5-T esters
94111	2,4-D Esters
94586	Benzene, 1,2-methylenedioxy-4-propyl- Dihydrosafrole
94597	Benzene, 1,2-methylenedioxy-4-allyl- Safrole
94757	2,4-D Acid 2,4-D, salts and esters 2,4-Dichlorophenoxyacetic acid, salts and esters
94791	2,4-D Esters
94804	2,4-D Esters
95476	Benzene, o-dimethyl- o-Xylene
95487	o-Cresol o-Cresylic acid
95501	Benzene, 1,2-dichloro- 1,2-Dichlorobenzene o-Dichlorobenzene
95534	o-Toluidine 2-Amino-1-methyl benzene
95578	2-Chlorophenol o-Chlorophenol Phenol, 2-chloro-
95807	Diaminotoluene Toluenediamine
95943	Benzene, 1,2,4,5-tetrachloro- 1,2,4,5-Tetrachlorobenzene
95954	Phenol, 2,4,5-trichloro 2,4,5-Trichlorophenol
96128	1,2-Dibromo-3-chloropropane Propane, 1,2-dibromo-3-chloro-
96457	Ethylenethiourea 2-Imidazolidinethione
97632	Ethyl methacrylate 2-Propenoic acid, 2-methyl-, ethyl ester

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
98011	2-Furancarboxaldehyde Furfural
98077	Benzene, trichloromethyl- Benzotrichloride
98099	Benzenesulfonic acid chloride Benzenesulfonyl chloride
98828	Benzene, 1-methylethyl- Cumene
98862	Acetophenone Ethanone, 1-phenyl-
98873	Benzal chloride Benzene, dichloromethyl-
98884	Benzoyl chloride
98953	Benzene, nitro- Nitrobenzene
99081	m-Nitrotoluene
99354	Benzene, 1,3,5-trinitro- sym-Trinitrobenzene
99558	Benzenamine, 2-methyl-5-nitro 5-Nitro-o-toluidine
99650	m-Dinitrobenzene
99990	p-Nitrotoluene
100016	Benzenamine, 4-nitro p-Nitroaniline
100027	p-Nitrophenol 4-Nitrophenol Phenol, 4-nitro-
100254	p-Dinitrobenzene
100414	Ethylbenzene
100425	Styrene
100447	Benzene, chloromethyl- Benzyl chloride
100470	Benzonitrile
100754	N-Nitrosopiperidine Pyridine, hexahydro-N-nitroso
101144	Benzenamine, 4,4' methylenebis(2 chloro 4,4'-Methylenebis(2-chloroaniline)
101553	Benzene, 1-bromo-4-phenoxy- 4-Bromophenyl phenyl ether
103855	N-Phenylthiourea Thiourea, phenyl-
105464	sec-Butyl acetate
105679	2,4-Dimethylphenol Phenol, 2,4 dimethyl-
106423	Benzene, p-dimethyl- p-Xylene
106445	p-Cresol p-Cresylic acid
106467	Benzene, 1,4-dichloro- 1,4-Dichlorobenzene p-Dichlorobenzene
106478	Benzenamine, 4-chloro- p-Chloroaniline
106490	p-Toluidine 4-Amino-1-methyl benzene
106514	p-Benzoquinone 1,4-Cyclohexadienedione
106898	1-Chloro-2,3-epoxypropane Epichlorohydrin Oxirane, 2-(chloromethyl)-
106934	Ethane, 1,2-dibromo- Ethylene dibromide
107028	Acrolein 2-Propenal
107051	Allyl chloride
107062	1,2-Dichloroethane Ethane, 1,2-dichloro- Ethylene dichloride
107108	1-Propanamine n-Propylamine
107120	Ethyl cyanide Propanenitrile
107131	Acrylonitrile 2-Propenenitrile
107153	Ethylenediamine
107186	Allyl alcohol 2-Propen-1-ol
107197	Propargyl alcohol 2-Propyn-1-ol
107200	Acetaldehyde, chloro- Chloroacetaldehyde
107302	Chloromethyl methyl ether Methane, chloromethoxy-
107493	Pyrophosphoric ac tetraethyl ester Tetraethyl pyrophosphate

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
107926	Butyric acid
108054	Vinyl acetate
108101	Methyl isobutyl ketone 4-Methyl-2-pentanone
108247	Acetic anhydride
108316	2,5-Furandione Maleic anhydride
108383	Benzene, m-dimethyl m-Xylene
108394	m-Cresol m-Cresylic acid
108463	1,3-Benzenediol Resorcinol
108601	Bis(2-chloroisopropyl) ether Propane, 2,2'-oxybis(2-chloro-
108883	Benzene, methyl- Toluene
108907	Benzene, chloro- Chlorobenzene
108941	Cyclohexanone
108952	Benzene, hydroxy- Phenol
108985	Benzenethiol Thiophenol
109068	2-Picoline Pyridine, 2-methyl-
109739	Butylamine
109773	Malononitrile Propanedinitrile
109897	Diethylamine
109999	Furan, tetrahydro- Tetrahydrofuran
110009	Furan Furfuran
110167	Maleic acid
110178	Fumaric acid
110190	iso-Butyl acetate
110758	2-Chloroethyl vinyl ether Ethene, 2-chloroethoxy-
110865	Ethylene glycol monoethyl ether 2-Ethoxyethanol
110827	Benzene, hexahydro- Cyclohexane
110861	Pyridine
111444	Bis (2-chloroethyl) ether Dichloroethyl ether Ethane, 1,1'-oxybis(2-chloro-
111546	1,2-Ethanediylbiscarbamodithioic acid Ethylenebis(dithiocarbamic acid)
111911	Bis(2-chloroethoxy) methane Ethane, 1,1'-[methylenebis(oxy)]bis(2-chloro-
115026	Azaserine L-Serine, diazoacetate (ester)
115297	Endosulfan 5-Norbornene-2,3-dimethanol,1,4,5,6,7,7-hexachloro,cyclic sulfite
115322	Kelthane
116063	Aldicarb Propanal, 2-methyl-2-(methylthio)-,O-[(methylamino)carbonyl]oxime
117806	Dichlone
117817	1,2-Benzenedicarboxylic acid,[bis(2-ethylhexyl)] ester Bis(2-ethylhexyl)phthalate
117840	1,2-Benzenedicarboxylic acid,di-n-octyl ester Di-n-octyl phthalate
118741	Benzene, hexachloro- Hexachlorobenzene
119904	(1,1'-Biphenyl)-4,4'diamine,3,3'dimethoxy- 3,3'-Dimethoxybenzidine
119937	(1,1'Biphenyl)-4,4'-diamine,3,3'-dimethyl- 3,3'-Dimethylbenzidine
120127	Anthracene
120581	Benzene, 1,2-methylenedioxy-4-propenyl- Isosafrole
120821	1,2,4-Trichlorobenzene
120832	2,4-Dichlorophenol Phenol, 2,4-dichloro-
121142	Benzene, 1-methyl-2,4-dinitro- 2,4-Dinitrotoluene

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
121211	Pyrethrins
121299	Pyrethrins
121448	Triethylamine
121755	Malathion
122098	alpha,alpha-Dimethylphenethylamine Ethanamine, 1,1-dimethyl-2-phenyl-
122667	1,2-Diphenylhydrazine Hydrazine, 1,2-diphenyl-
123331	1,2-Dihydro-3,6-pyridazinedione Maleic hydrazide
123626	Propionic anhydride
123637	Paraldehyde 1,3,5-Trioxane, 2,4,6-trimethyl-
123739	2-Butenal Crotonaldehyde
123864	Butyl acetate
123911	1,4-Diethylene dioxide 1,4-Dioxane
123922	iso-Amyl acetate
124049	Adipic acid
124403	Dimethylamine Methanamine, N-methyl
124414	Sodium methylate
124481	Chlorodibromomethane
126727	1-Propanol, 2,3-dibromo-, phosphate (3:1) Tris(2,3-dibromopropyl) phosphate
126987	Methacrylonitrile 2-Propenenitrile, 2-methyl-
127184	Ethene, 1,1,2,2-tetrachloro- Tetrachloroethylene
127822	Zinc phenolsulfonate
129000	Pyrene
130154	1,4-Naphthalenedione 1,4-Naphthoquinone
131113	1,2-Benzenedicarboxylic acid,dimethyl ester Dimethyl phthalate
131748	Ammonium picrate Phenol, 2,4,6-trinitro-, ammonium salt
131895	4,6-Dinitro-o-cyclohexylphenol Phenol, 2-cyclohexyl-4,6-dinitro-
133062	Captan
134327	1-Naphthylamine alpha-Naphthylamine
137268	Bis(dimethylthiocarbamoyl) disulfide Thiram
140885	Ethyl acrylate 2-Propenoic acid, ethyl ester
141786	Acetic acid, ethyl ester Ethyl acetate
142289	1,3-Dichloropropane
142712	Cupric acetate
142847	Dipropylamine 1-Propanamine, N-propyl-
143339	Sodium cyanide
143500	Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one Kepone
145733	Endothall 7-Oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid
148823	Alanine, 3-[p-bis(2-chloroethyl)amino]phenyl-,L- Melphalan
151508	Potassium cyanide
151564	Aziridine Ethylenimine
152169	Diphosphoramide, octamethyl- Octamethylpyrophosphoramide
156605	1,2-trans-Dichloroethylene Ethene, trans-1,2-dichloro-
189559	1,2:7,8-Dibenzopyrene Dibenz[a,i]pyrene
191242	Benzo[ghi]perylene
193395	Indeno(1,2,3-cd)pyrene 1,10-(1,2-Phenylene)pyrene
205992	Benzo[b]fluoranthene
206440	Benzo[j,k]fluorene Fluoranthene
207089	Benzo[k]fluoranthene
208968	Acenaphthylene
218019	1,2-Benzphenanthrene Chrysene
225514	Benz[c]acridine 3,4-Benzacridine

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
297972	O,O-Diethyl O-pyrazinyl phosphorothioate Phosphorothioic acid, O,O-diethyl, O-pyrazinyl ester
298000	Methyl parathion O,O-Dimethyl O-p-nitrophenyl phosphorothioate
298022	Phorate Phosphorodithioic acid, O,O diethyl S (ethylthio),methyl ester
298044	O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate Disulfoton
300765	Naled
301042	Acetic acid, lead salt Lead acetate
302012	Diamine Hydrazine
303344	Lasiocarpine
305033	Butanoic acid, 4-[bis(2-chloroethyl)amino] benzene- Chlorambucil
309002	Aldrin 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4-5,8-endo,exo-dimethanonaphthalene
311455	Diethyl-p-nitrophenyl phosphate Phosphoric acid,diethyl,p-nitrophenyl ester
315184	Mexacarbate
319846	alpha - BHC
319857	beta - BHC
319868	delta - BHC
329715	2,5-Dinitrophenol
330541	Diuron
333415	Diazinon
353504	Carbon oxyfluoride Carbonyl fluoride
357573	Brucine Strychnidin-10-one, 2,3-dimethoxy-
460195	Cyanogen
465736	Hexachlorohexahydro-endo,endo-dimethanonaphthalene 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo,endo-dimethanonaphthalene
492808	Auramine Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl-
494031	Chlornaphazine 2-Naphthylamine, N,N-bis(2-chloroethyl)-
496720	Diaminotoluene Toluenediamine
504245	4-Aminopyridine 4-Pyridinamine
504609	1-Methylbutadiene 1,3-Pentadiene
506616	Potassium silver cyanide
506649	Silver cyanide
506683	Bromine cyanide Cyanogen bromide
506774	Chlorine cyanide Cyanogen chloride
506876	Ammonium carbonate
506967	Acetyl bromide
509348	Methane, tetranitro- Tetranitromethane
510156	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-,ethyl ester Ethyl 4,4'-dichlorobenzilate
513495	sec-Butylamine
528290	o-Dinitrobenzene
534521	4,6-Dinitro-o-cresol and salts Phenol,2,4-dinitro-6-methyl-, and salts
540738	1,2-Dimethylhydrazine Hydrazine, 1,2-dimethyl-
540885	tert-Butyl acetate
543093	Uranyl acetate
543537	2,4-Dithiobiuret Thioimidodicarbonic diamide
543731	Benzene, 1,3-dichloro- 1,3-Dichlorobenzene m-Dichlorobenzene
542621	Barium cyanide
542756	Propene, 1,3-dichloro- 1,3-Dichloropropene
542767	3-Chloropropionitrile Propanenitrile, 3-chloro-

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
542881	Bis(chloromethyl) ether Methane, oxybis(chloro-
543908	Cadmium acetate
544183	Cobaltous formate
544923	Copper cyanide
554847	m-Nitrophenol
557197	Nickel cyanide Nickel(II) cyanide
557211	Zinc cyanide
557346	Zinc acetate
557415	Zinc formate
563122	Ethion
563688	Acetic acid, thallium(I) salt Thallium(I) acetate
573568	2,6-Dinitrophenol
584849	Benzene, 2,4-diisocyanatomethyl Toluene diisocyanate
591082	Acetamide, N-(aminothioxomethyl)- 1-Acetyl-2-thiourea
592018	Calcium cyanide
592041	Mercuric cyanide
592858	Mercuric thiocyanate
592870	Lead thiocyanate
594423	Methanesulfenyl chloride, trichloro- Trichloromethanesulfenyl chloride
598312	Bromoacetone 2-Propanone, 1-bromo-
606202	Benzene, 1-methyl-2,6-dinitro- 2,6-Dinitrotoluene
608935	Benzene, pentachloro- Pentachlorobenzene
609198	3,4,5-Trichlorophenol
610399	3,4-Dinitrotoluene
615532	Carbamic acid, methylnitroso-, ethyl ester N-Nitroso-N-methylurethan
621647	Di-n-propylnitrosamine N-Nitroso-di-n-propylamine
624839	Isocyanic acid, methyl ester Methyl isocyanate

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
625161	tert-Amyl acetate
626380	sec-Amyl acetate
628637	Amyl acetate
628864	Fulminic acid, mercury(II)salt Mercury fulminate
630104	Carbamimidoselenoic acid Selenourea
630206	Ethane, 1,1,1,2-tetrachloro- 1,1,1,2-Tetrachloroethane
631618	Ammonium acetate
636215	Benzenamine, 2-methyl-, hydrochloride m-Toluidine hydrochloride
640197	Acetamide, 2-fluoro- Fluoroacetamide
684935	Carbamide, N-methyl-N-nitroso- N-Nitroso-N-methylurea
692422	Arsine, diethyl- Diethylarsine
696286	Dichlorophenylarsine Phenyl dichloroarsine
757584	Hexaethyl tetraphosphate Tetraphosphoric acid, hexaethyl ester
759739	Carbamide, N-ethyl-N-nitroso- N-Nitroso-N-ethylurea
764410	2-Butene, 1,4-dichloro- 1,4-Dichloro-2-butene
765344	Glycidylaldehyde 1-Propanal, 2,3-epoxy-
815827	Cupric tartrate
823405	Diaminotoluene Toluenediamine
924163	1-Butanamine, N-butyl-N-nitroso- N-Nitrosodi-n-butylamine
930552	N-Nitrosopyrrolidine Pyrrole, tetrahydro-N-nitroso

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
933755	2,3,6-Trichlorophenol
933788	2,3,5-Trichlorophenol
959988	alpha - Endosulfan
1024573	Heptachlor epoxide
1031078	Endosulfan sulfate
1066304	Chromic acetate
1066337	Ammonium bicarbonate
1072351	Lead stearate
1111780	Ammonium carbamate
111654dh	Ethanol, 2,2'-(nitrosoimino)bis- N-Nitrosodiethanolamine
1120714	1,2-Oxathiolane, 2,2-dioxide 1,3-Propane sultone
1185575	Ferric ammonium citrate
1194656	Dichlobenil
1300716	Xylenol
1303282	Arsenic(V) oxide Arsenic pentoxide
1303328	Arsenic disulfide
1303339	Arsenic trisulfide
1309644	Antimony trioxide
1310583	Potassium hydroxide
1310732	Sodium hydroxide
1314325	Thallic oxide Thallium(III) oxide
1314621	Vanadium pentoxide Vanadium(V) oxide
1314803	Phosphorus pentasulfide Phosphorus sulfide Sulfur phosphide
1314847	Zinc phosphide
1314870m	Lead sulfide
1314961	Strontium sulfide
1319728	2,4,5-T amines
1319773	Cresol(s) Cresylic acid

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
1320189	2,4-D Esters
1321126	Nitrotoluene
1327522	Arsenic acid
1327533	Arsenic(III) oxide Arsenic trioxide
1330207	Benzene, dimethyl- Xylene
1332076m	Zinc borate
1332214	Asbestos
1333831	Sodium bifluoride
1335326	Lead subacetate
1336216m	Ammonium hydroxide
1336363	POLYCHLORINATED BIPHENYLS (PCBs) Aroclors
1338234	2-Butanone peroxide Methyl ethyl ketone peroxide
1338245	Naphthenic acid
1341497	Ammonium bifluoride
1464535	2,2'-Bioxirane 1,2,3,4-Diepoxybutane
1563662	Carbofuran
1615801	N,N'-Diethylhydrazine Hydrazine, 1,2-diethyl-
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin(TCDD)
1762954	Ammonium thiocyanate
1863634	Ammonium benzoate
1888717	Hexachloropropene 1-Propene, 1,1,2,3,3,3-hexachloro-
1918009	Dicamba
1928387	2,4-D Esters
1928478	2,4,5-T esters
1928616	2,4-D Esters
1929733	2,4-D Esters
2008460	2,4,5-T amines
2032657	Mercaptodimethur
2303164	Diallate S-(2,3-Dichloroallyl) diisopropylthiocarbamate

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
2312358	Propargite
2545597	2,4,5-T esters
2763964	5-(Aminomethyl)-3-isoxazotol 3(2H)-isoxazolone, 5-(aminomethyl)-
2764729	Diquat
2921882	Chlorpyrifos
2944674	Ferric ammonium oxalate
2971382	2,4-D Esters
3012655	Ammonium citrate, dibasic
3164292	Ammonium tartrate
3165933	Benzenamine, 4-chloro-2-methyl-,hydrochloride 4-Chloro-o-toluidine, hydrochloride
3251238	Cupric nitrate
3288582	O,O-Diethyl S-methyl dithiophosphate Phosphorodithioic acid, O,O-diethyl S-methylester
3486359	Zinc carbonate
3689245	Dithiopyrophosphoric acid,tetraethyl ester Tetraethyldithiopyrophosphate
3813147	2,4,5-T amines
4170303	2-Butenal Crotonaldehyde
4549400	Ethenamine, N-methyl-N-nitroso- N-Nitrosomethylvinylamine
5344821	1-(o-Chlorophenyl)thiourea Thiourea, (2-chlorophenyl)-
5893663	Cupric oxalate
5972736	Ammonium oxalate
6009707	Ammonium oxalate
6369966	2,4,5-T amines
6369977	2,4,5-T amines
6533739	Carbonic acid, dithallium (I) salt Thallium(I) carbonate
7005723	4-Chlorophenyl phenyl ether
7421934	Endrin aldehyde
7428480	Lead stearate
7439921	Lead
7439976	Mercury
7440020	Nickel
7440224	Silver
7440235	Sodium
7440280	Thallium
7440360	Antimony
7440382	Arsenic
7440417	Beryllium Beryllium dust
7440439	Cadmium
7440473	Chromium
7440508	Copper
7440666	Zinc
7446084	Selenium dioxide Selenium oxide
7446142	Lead sulfate
7446186	Sulfuric acid, thallium(I) salt Thallium(I) sulfate
7446277	Lead phosphate Phosphoric acid, lead salt
7447394	Cupric chloride
7488564	Selenium disulfide Sulfur selenide

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
7558794	Sodium phosphate, dibasic
7601549	Sodium phosphate, tribasic
7631892	Sodium arsenate
7631905	Sodium bisulfite
7632000	Sodium nitrite
7645252	Lead arsenate
7646857	Zinc chloride
7647010	Hydrochloric acid
7647189	Antimony pentachloride
7664382	Phosphoric acid
7664393	Hydrofluoric acid Hydrogen fluoride
7664417	Ammonia
7664939	Sulfuric acid
7681494	Sodium fluoride
7681529	Sodium hypochlorite
7697372	Nitric acid
7699458	Zinc bromide
7705080	Ferric chloride
7718549	Nickel chloride
7719122	Phosphorus trichloride
7720787	Ferrous sulfate
7722647	Potassium permanganate
7723140	Phosphorus
7733020	Zinc sulfate
7738945	Chromic acid
7758294	Sodium phosphate, tribasic
7758943	Ferrous chloride
7758954	Lead chloride
7758987	Cupric sulfate
7761888	Silver nitrate
7773060	Ammonium sulfamate
7775113	Sodium chromate
7778394	Arsenic acid
7778441	Calcium arsenate
7778509	Potassium bichromate
7778543	Calcium hypochlorite
7779864	Zinc hydrosulfite
7779886	Zinc nitrate
7782414	Fluorine
7782492	Selenium
7782505	Chlorine
7782630	Ferrous sulfate
7782823	Sodium selenite
7782867	Mercurous nitrate
7783008	Selenious acid
7783064	Hydrogen sulfide Hydrosulfuric acid Sulfur hydride
7783188	Ammonium thiosulfate

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
7783359	Mercuric sulfate
7783462	Lead fluoride
7783495	Zinc fluoride
7783508	Ferric fluoride
7783564	Antimony trifluoride
7784343	Arsenic trichloride
7784409	Lead arsenate
7784410	Potassium arsenate
7784465	Sodium arsenite
7785844	Sodium phosphate, tribasic
7786347	Mevinphos
7786814	Nickel sulfate
7787475	Beryllium chloride
7787497	Beryllium fluoride
7787555	Beryllium nitrate
7788989	Ammonium chromate
7789006	Potassium chromate
7789062	Strontium chromate
7789095	Ammonium bichromate
7789426	Cadmium bromide
7789437	Cobaltous bromide
7789619	Antimony tribromide
7790945	Chlorosulfonic acid
7791320	Thallium(I) chloride
7803512	Hydrogen phosphide Phosphine
7803556	Ammonium vanadate Vanadic acid, ammonium salt
8001352	Camphene, octachloro- Toxaphene
8001389	Creosote
8003198	Dichloropropane - Dichloropropene (mixture)
8003347	Pyrethrins
8018957	Sulfuric acid
9004664	Ferric dextran Iron dextran

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
10022705	Sodium hypochlorite
10025873	Phosphorus oxychloride
10025919	Antimony trichloride
10026116	Zirconium tetrachloride
10028225	Ferric sulfate
10031591	Sulfuric acid, thallium(I) salt Thallium(I) sulfate
10039324	Sodium phosphate, dibasic
10043013	Aluminum sulfate
10045893	Ferrous ammonium sulfate
10045940	Mercuric nitrate
10049055	Chromous chloride
10099748	Lead nitrate
10101538	Chromic sulfate
10101630	Lead iodide
10101890	Sodium phosphate, tribasic
10102064	Uranyl nitrate
10102188	Sodium selenite
10102439	Nitric oxide Nitrogen(II) oxide
10102440	Nitrogen dioxide Nitrogen(IV) oxide
10102451	Thallium(I) nitrate
10102484	Lead arsenate
10108642	Cadmium chloride
10124502	Potassium arsenite
10124568	Sodium phosphate, tribasic
10140655	Sodium phosphate, dibasic
10192300	Ammonium bisulfite
10196040	Ammonium sulfite
10361894	Sodium phosphate, tribasic
10380297	Cupric sulfate ammoniated
10413755	Mercurous nitrate
10421484	Ferric nitrate
10544226	Nitrogen dioxide Nitrogen(IV) oxide

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
10588019	Sodium bichromate
11096825	Aroclor 1260 Polychlorinated Biphenyls (PCBs)
11097691	Aroclor 1254 Polychlorinated Biphenyls (PCBs)
11104282	Aroclor 1221 Polychlorinated Biphenyls (PCBs)
11115745	Chromic acid
11141165	Aroclor 1232 Polychlorinated Biphenyls (PCBs)
12002038	Cupric acetoarsenite
12039520	Thallium(I) selenide
12054487	Nickel hydroxide
12125018	Ammonium fluoride
12125029	Ammonium chloride
12135761	Ammonium sulfide
12672296	Aroclor 1248 Polychlorinated Biphenyls (PCBs)
12674112	Aroclor 1016 Polychlorinated Biphenyls (PCBs)
12771083	Sulfur monochloride
13463393	Nickel carbonyl Nickel tetracarbonyl
13560993	2,4,5-T salts
13597994	Beryllium nitrate
13746899	Zirconium nitrate
13765190	Calcium chromate Chromic acid, calcium salt

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
13814965	Lead fluoborate
13826830	Ammonium fluoborate
13952846	sec-Butylamine
14017415	Cobaltous sulfamate
14216752	Nickel nitrate
14258492	Ammonium oxalate
14307358	Lithium chromate
14307438	Ammonium tartrate
14639975	Zinc ammonium chloride
14639986	Zinc ammonium chloride
14644612	Zirconium sulfate
15699180	Nickel ammonium sulfate
15739807	Lead sulfate
15950660	2,3,4-Trichlorophenol
16721805	Sodium hydrosulfide
16752775	Acetimidic acid, N-[(methylcarbamoyl)oxy]thio-,methyl ester Methomyl
16871719	Zinc silicofluoride
16919190	Ammonium silicofluoride
16923958	Zirconium potassium fluoride
18883664	D-Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)- Streptozotocin
20816120	Osmium oxide Osmium tetroxide
20830813	Daunomycin 5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-
20859738	Aluminum phosphide
23950585	3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide Pronamide

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
25154545	Dinitrobenzene (mixed)
25154556	Nitrophenol (mixed)
25155300	Sodium dodecylbenzene sulfonate
25167822	Trichlorophenol
25168154	2,4,5-T esters
25168267	2,4-D Esters
25321146	Dinitrotoluene
25321226	Dichlorobenzene (mixed)
25376458	Diaminotoluene Toluenediamine
25550587	Dinitrophenol
26264062	Calcium dodecylbenzene sulfonate
26471625	Benzene, 2,4-diisocyanatomethyl- Toluene diisocyanate
26628228	Sodium azide
26638197	Dichloropropane
26952238	Dichloropropene(s)
27176870	Dodecylbenzenesulfonic acid
27323417	Triethanolamine dodecylbenzene sulfonate
27774136	Vanadyl sulfate
28300745	Antimony potassium tartrate
30525894	Paraformaldehyde
32534955	2,4,5-TP acid esters
33213659	beta - Endosulfan
36478769	Uranyl nitrate
37211055	Nickel chloride
39196184	3,3-Dimethyl-1-(methylthio)-2-butanone,O-[(methylamino)carbonyl] oxime Thiofanox
42504461	Isopropanolamine dodecylbenzene sulfonate
52628258	Zinc ammonium chloride
52652592	Lead stearate
52740166	Calcium arsenite
53467111	2,4-D Esters
53469219	Aroclor 1242 Polychlorinated Biphenyls (PCBs)

APPENDIX A—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
55488874	Ferric ammonium oxalate
56189094	Lead stearate
61792072	2,4,5-T esters

APPENDIX B

IU SLUG CONTROL PLAN REVIEW CHECKLIST FOR POTWs

APPENDIX B. IU SLUG CONTROL PLAN REVIEW CHECKLIST FOR POTWs

The IU Slug Control Plan should be evaluated using the following requirements criteria and checking the appropriate column. A check in the "S" Column means the Plan satisfactorily meets the requirements; "U" means the Plan unsatisfactorily meets the requirements; "A" means that additional information is needed to determine if the requirement is being met; and "N/A" means the requirement is not applicable to the facility. The reviewer should use best engineering judgment in determining the adequateness of the Plan in meeting each requirement. Comments should be provided as appropriate.

		S	U	A	N/A
I.	General Information Facility Name, Address, Contacts and Phone Numbers				
	Type of Business, Operating Schedule, Number of Employees				
	Daily Wastewater Discharge Flow Rates(s)				
	Applicable Categorical Standards				
	Previous Slugs				
	Security and Warning Signs				
	Comments:				

	S	U	A	N/A
II. Facility Layout and Flow Diagrams				
General Layout of Facility Showing:				
Property Boundaries				
Entrance and Exit Routes				
Manufacturing Areas				
Hazardous Materials Process & Storage Areas				
Waste Handling, Storage and Treatment Facilities				
Loading and Unloading Areas				
Drainage Direction				
Floor Drains, Pipes, and Channels and Drainage Destinations				
Flow Diagram(s) Showing:				
Piping and Instrumentation				
Flow Rates				
Tanks and Capacities				
Treatment Systems				
Final Destinations of Flows				
Comments:				

		S	U	A	N/A
III.	Hazardous Materials Data				
	Hazardous Materials				
	Location				
	Maximum Volume				
	Container Volume				
	Type of Container				
	Comments:				

		S	U	A	N/A
IV.	Slug Prevention Equipment and Procedures				
	Adequate Equipment in the Following Areas:				
	Storage				
	Loading/Unloading				
	Process				
	Treatment				
	Other Areas:				
	Comments:				

	S	U	A	N/A
Adequate Procedures Including the Following:				
Inspections and Maintenance of Containers and Tanks				
Inspections and Maintenance of Slug Prevention and Response Equipment				
Inspections of Storage, Process, Loading and Unloading Areas				
Proper Labeling				
Other Procedures Needed:				
Comments:				

		S	U	A	N/A
V.	Emergency Response Equipment and Procedures				
	Availability of the Following Equipment:				
	Communication Equipment and Alarms				
	Spill Containment and Control Equipment and Tools				
	Spilled Material Storage Containers				
	Protective Clothing				
	Respirators				
	First Aid Kits				
	Decontamination Equipment				
	Ventilation Equipment				

	S	U	A	N/A
Other Equipment Needed:				
Comments:				
Adequate Response Procedures Including the Following:				
Notification of Responsible Facility Personnel				
Chain of Command				
Safety and First Aid Procedures				
Evacuation Procedures				
Notification of Outside Assistance				
Spill and Slug Assessment Procedures				
Spill and Slug Cleanup Procedures				
Decontamination Procedures				
Procedures for Preventing Contact Between Incompatible Materials				
Procedures for Disposing or Treating Spilled Materials				
Other Procedures Needed:				
Comments:				

		S	U	A	N/A
VI.	Slug Reporting and Control Plan Modification Procedures				
	Slug Reporting Procedures				
	Slug Plan Modification Procedures				
	Comments:				

		S	U	A	N/A
VII.	Training Program				
	Detailed Outline of Training Program				
	Training Appropriate to Job Description				
	Hazards of Chemicals Used at the Facility				
	Emergency Response Training				
	Comments:				

		S	U	A	N/A
VIII.	Certifications				
	Facility Representative Certification				
	Professional Engineer Certification				
	Comments:				

General Comments and Follow-up Actions Needed:

IX. Approval Status

Approved _____
Not Approved _____

Reviewed by: _____ Date: _____
(POTW Reviewer)

APPENDIX C

EXAMPLE FORMS TO DOCUMENT SLUGS

- SLUG NOTIFICATION LOG SHEET
- LOG OF CONTACT WITH OTHER AGENCIES
- LOG OF KEY EVENTS OF THE SLUG
- FINAL REPORT FORM

General Comments and Follow-up Actions Needed:

IX. Approval Status

Approved _____
Not Approved _____

Reviewed by: _____ Date: _____
(POTW Reviewer)

APPENDIX C

EXAMPLE FORMS TO DOCUMENT SLUGS

- SLUG NOTIFICATION LOG SHEET
- LOG OF CONTACT WITH OTHER AGENCIES
- LOG OF KEY EVENTS OF THE SLUG
- FINAL REPORT FORM

SLUG LOADING NOTIFICATION LOG SHEET

SLUG LOADING INFORMATION

Type of Slug _____

Location/Facility _____

Address _____

Reported by _____ Phone No. _____

_____

Comments _____

_____

DESCRIPTION OF SLUG LOADING

Time/Date _____

Discharged Material _____ Amount _____

Discharged to _____

Containment in place _____

Current response efforts _____

Comments _____

_____

HAZARD EVALUATION

Fire hazard _____ Explosive _____ Fumes _____

Corrosive _____

Personnel Safety Concerns: Explosure _____

Structural Danger _____

Comments _____

_____

INITIATION OF RESPONSE

Report Received By _____

Date/Time _____

Agencies Contacted	Date/Time

LOG OF CONTACT WITH OTHER AGENCIES

(Only some of these agencies may need to be notified in a particular incident; the Slug Response Coordinator's best judgment should be used.)

AGENCY	TELEPHONE NUMBER	CONTACT	DATE/TIME	REMARKS
Federal Agencies				
Depart. of Transportation Hazardous Materials				
Nat'l. Bureau of Standards				
Oil and Haz. Mat. Tech. Asst. Data System				
O.S.H.A.				
Resource Conservation & Recovery (Haz. Waste)				
U.S. Coast Guard				
U.S. Energy Department				
National Institute Disease Control				
U.S. Nuclear Reg'l. Comm'l.				
State Agencies				
Health Department				
Solid & Haz. Waste				
Water Resources Dept.				
Local Agencies				
Fire Department				
Health Department				
Hospital				
Police Department				
Water Plant				

AGENCY	TELEPHONE NUMBER	CONTACT	DATE/TIME	REMARKS
Chemical Companies				
Other				
American Petro. Inst.				
Railroad				
Red Cross				

LOG OF KEY EVENTS OF THE SLUG
(On site, in collection system, in community, and at POTW.
Include the date, time, and action for each event.)

Notification

Response Efforts/Investigation

Control Efforts

Containment Treatment Efforts

Disposal

Remedial Actions

FINAL REPORT FORM

SLUG LOADING IDENTIFICATION (Type of slug, volume, time, date, location)

BRIEF DESCRIPTION OF SLUG (Flow schematic of slug if appropriate, explanation of cause of slug)

EFFECT ON THE POTW (Documentation of pass through, interference, and damages to the POTW and any other problems resulting from the slug)

IU SLUG CONTROL PLAN EVALUATION AND REMEDIAL ACTION (Summary of evaluation, resulting modifications, and compliance schedules)

ENFORCEMENT ACTION (Fines and penalties, litigation for damages)

PRESENT STATUS (In compliance, cleanup effort, POTW operations, enforcement efforts)

OTHER COMMENTS

APPENDIX D

SAMPLE IU SLUG CONTROL PLANS

WILL'S ICE CREAM PLANT
30 Wonka Drive
Funtown, CA 67890

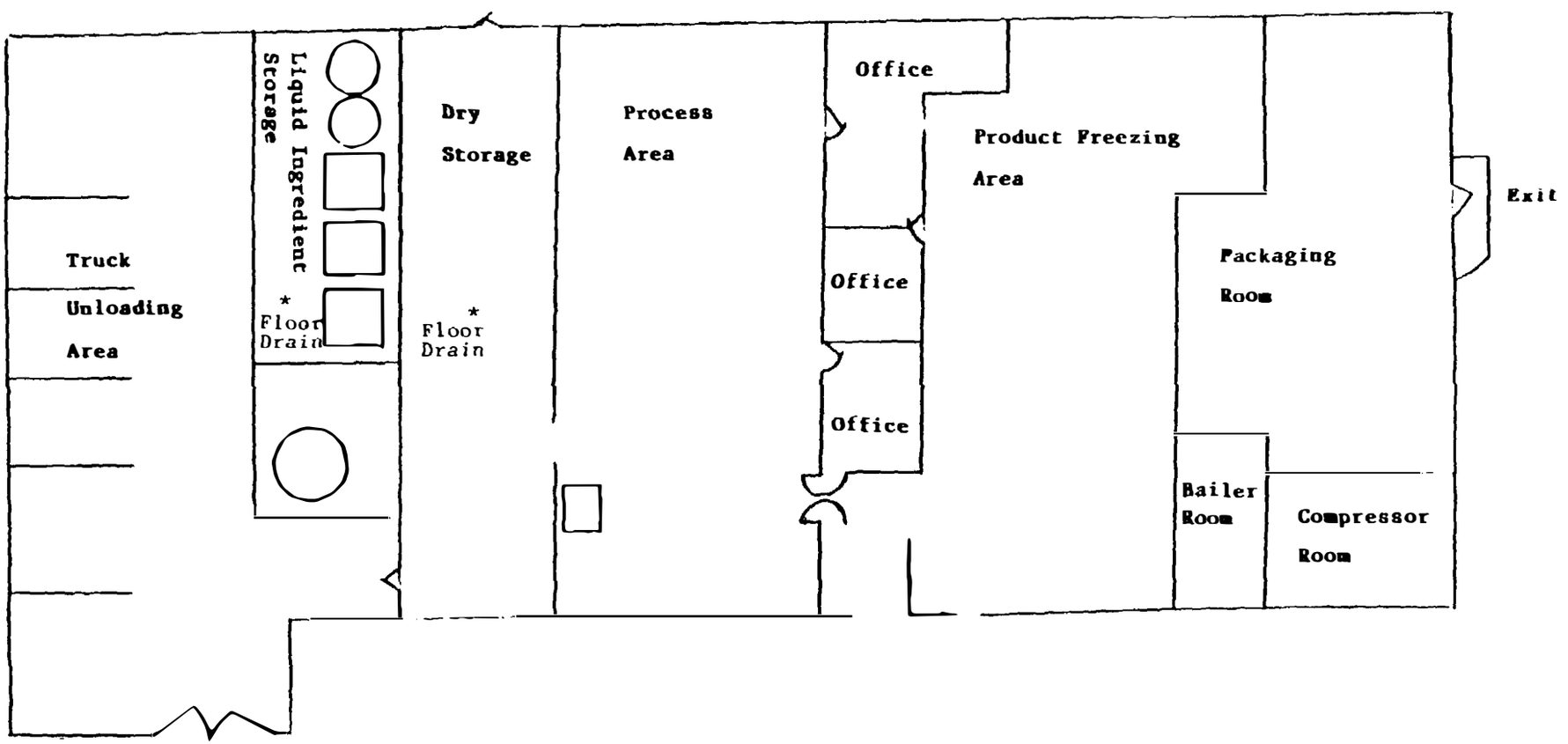
SLUG DISCHARGE PREVENTION AND CONTROL PLAN

Emergency Contact:	Cher E. Sherbet	Work Phone:	(101) 212-3243
Title:	Plant Manager	Emergency Phone:	(101) 212-7685
Secondary Contact:	Rocky Rhode	Work Phone:	(101) 212-4352
Title:	Spill Response Coordinator	Emergency Phone:	(101) 212-9807

Type of Manufacturer:	Ice Cream
Operating Schedule:	8:00 a.m. to 11:30 p.m.
Number of Employees:	The plant has 21 employees total, including part-time staff. Shifts overlap all day. Some staff come in early to start up, and other people cover lunches and breaks. People also come in late in the day for cleanup activities and deliveries.
Average daily discharge of wastewater:	7,800 gallons per week
Description of previous slugs:	Periodic discharges with high BOD and high or low pH.
Security provisions:	Tankers, trailers, and fences area are all locked at night.
Description of wastewater sources:	The majority of wastewater discharged to the sanitary sewer is generated from equipment washdown and cleanup operation. Other sources of wastewater include sanitary waste, cooling water, and boiler blowdown.

A copy of this plan can be obtained from the Spill Response Coordinator.

Table A shows an inventory of chemicals and materials that are used at the plant and can be spilled accidentally.



PLANT LAYOUT

TABLE A. CHEMICAL AND MATERIAL INVENTORY

Chemicals	Location	Average Stored Volume	Total Container Volume	Special Provisions[1]	Discharge Path	Remarks[2]
Ingredients a. Butter Fat Milk Solids Whey Solids	Truck unloading area during transfer to Liquid Ingredient Storage or Milk Vat Storage	72,600 gal/week	3,200 gal	Tanks are closed top under atmospheric pressure	a. To tank truck catch basin if hose inadvertently disconnects b. Through Product Mixing Room drain if wall vat piping fails	Material can cause significant (slug) loading of City wastewater treatment plant
b. Corn Syrup Liquid Sugar	Truck unloading area during transfer to sweetener storage	6,900 gal/week	5,000 gal	Tanks are closed top under atmospheric pressure	a. To tank truck catch basin if drain is not plugged b. Through Product Mixing Room drain if process piping fails	Material can cause significant (slug) loading of City wastewater treatment plant
Product (Ice Cream)	In various freezers	35-40,000 lbs	60,000 lbs	Product is stacked	None, unless product melts	
Cleansers[3] a. Granular Chlorshine-O H.D.C.-3-R Power Spray-R	Dry cleanser storage and dry storage	 600 lbs 600 lbs 600 lbs	 400 lbs/ea 400 lbs/ea 400 lbs/ea	Stored in granular form	None when dry. Through Product Mixing or Freezing and Packaging Room drains after use	Material contains no priority pollutants
b. Liquid M.R.S.-200-O Acidize-O Water Stain Remover Microsan	Dry Storage	 55-60 gal 15 gal 30-40 gal 10 gal	 1 gal/ea 30 gal/ea N/A 5 gal/ea	Stored as liquid in original shipping containers	Through Product Mixing Room drain	Material contains no priority pollutants

---

This section should be updated regularly on any of the following that may be appropriate: (1) condition of the container, (2) materials of the container, (3) if it is appropriate material to store the specified chemical, (4) any protective devices, (5) open or closed top, or (6) under pressure.

This section should be updated regularly to include comments concerning the toxicity or hazards associated with the chemical, and any special precautions needed to handle the material properly.

) = Oxidant, R = Reductant

SPILL PREVENTION EQUIPMENT INVENTORY

The following spill prevention equipment is available in the event of an accidental spill:

1. Noncombustible, inert, absorbent mops
   - Location: Compressor room, boiler room, and liquid ingredient storage
   - Handling Method: Insert into or encircle drain; Encircle spill
   - Disposal Method: Approved landfill
   - Alternate Material: Kitty litter or sand

2. Sewer plugs
   - Location: Compressor room and product freezing and packaging room
   - Handling Method: Manual (wear protective gloves), insert into drain
   - Disposal Method: Clean and reuse, if possible
   - Alternate Method: Cover drain with temporary plate (wood, plastic, or steel)

3. Storage conditions: There are no heated products or pressure storage tanks. All tanks are compatible with storage conditions.

4. Other equipment: Scoop, empty cleanser drums, and rags are available in dry storage

PREVENTATIVE MAINTENANCE

All areas should be checked frequently for leaking valve steam, seals, and gaskets. Have leaks repaired as soon as possible. Before disconnecting any piping, make sure that all isolation valves are completely closed.

Routinely check all instrumentation for proper operation. Any abnormal reading should be investigated. Extreme temperatures or pressures on closed tanks can result in the automatic opening of their relief valves and the spilling of contents.

Although most tankage has collision protection, fork trucks and tank trucks should be driven with utmost caution. No material should be handled by a fort truck without a proper pallet. Follow all vehicular warning signs.

During raw materials or product mixture transfer, all piping and hoses should be checked to make sure they are properly connected. Connections that are misshapen or have worn gaskets are to be repaired or replaced, as are worn hoses or corroded piping. Hoses are to be kept out of traffic lanes, and all values are to be closed and hoses disconnected before tank trucks are moved.

Inspections will be conducted weekly as part of a typical preventive maintenance program. Abnormalities will be recorded and duly noted to the Spill Response Coordinator.

SLUG PREVENTION PROCEDURES

The following are routine operation and maintenance procedures to minimize slugs. They are not substitutions or replacements for competent operation and maintenance of the plant".

A spill may still occur despite the implementation of spill preventive measures. All spill response activities can be grouped into the following categories":

- Safety measures
- Acquisition of assistance/notification
- Spill containment/diversion/isolation.

During spill response, the above-described activities must be carried out in the order shown. If adequate spill prevention and control measures have been taken, emergency spill control may not be necessary; therefore, although spill control is of great importance, safety and notification are to be addressed first. Spillage of ingredients or products which may not be toxic can cause a slug load at the treatment plant".

To minimize the chance of a batch discharge of washwater resulting in a slug loading to the POTW, all wash operation batch discharges must be tested for pH and neutralized if necessary. In addition, the discharge must not exceed a BOD level of 250 mg/l.

Safety

The safety of personnel and the community is of paramount importance at the time of any chemical spill. The threat to human health depends upon the nature, quantity, and location of the material spilled. Every spill or slug discharge is unique, and there is no substitute for sound, professional onsite assessments; but certain general safety considerations can be delineated.

- Personnel should be evacuated from areas where flammable, explosive, reactive, or noxious/fuming chemicals have been spilled in large quantities (e.g., in areas that are not ventilated).
- All heated or flame-producing apparatus in the vicinity of a flammable material spill should be immediately shut down and/or cooled. Exposed steam lines within such areas should be valved off. Obviously, personnel should not create any flame or spark within such an area.
- Incompatible materials stored in the vicinity of a spill must be moved. Bagged cleaners,for example, must be moved from the scene of an acid cleanser spill. Reductant chemicals should similarly be moved from the scene of an oxidant spill. (Such measures should be taken only when the safety of industry personnel performing the tasks is assured.)
- Breathing apparatus should be immediately provided to all personnel in the vicinity of a fire near noxious or fuming chemicals. If no apparatus are available, do not attempt to go near the fire or extinguish it; the fire department is trained for such matters. Because such chemicals may also be corrosive oxidants, oxidation-resistant clothing will also be essential.
- Spill response personnel should carefully weigh each spill response action in terms of safety. Incorrect response activities sometimes do more harm than good. For example, fans may not be a good choice of equipment for ventilating noxious fumes; if the fumes are flammable or explosive, the fan's electrical motor could spark a fire or explosion. Caution is the watchword.

Acquisition of Assistance

The industry spill response coordinator should contact the wastewater treatment plant and fire department immediately upon ensuring the safety of industry personnel onsite. These local agencies can provide assistance in spill response and onsite cleanup coordination. In the case of a fire and/or explosion, the fire department will provide remedial action expertise. The industry may also be required to contact the County, State, or Federal agency

responsible for emergency response. A quick assessment of the severity of the spill will dictate the need to call the wastewater treatment plant or the fire department before other concerned agencies are officially notified.

The fire department can be notified by calling dispatch at 911.

The wastewater treatment plant can be notified by calling (101) 212-6574.

Spill Containment/Diversion/Isolation

The next highest priority in immediate spill response activities is spill isolation. Clearly, the first spill response step after safety considerations are met should be to stop the flow of material being spilled. This activity consists of shutting valves and/or stopping pumps from feeding chemicals to the vessel generating the spill. Generally, the size of a spill can be limited to a single tank volume or less if prompt action is taken.

Containment diversion activities depend upon the nature of the material spilled. The following are intended as guidelines for handling ingredient product, and cleanser spills:

Ingredient and Product:

In the event of a spill, dam the spill area and plug the drain. Scoop or pump the material into waste drums. Cover the containers and move them out of the spill area. Clean the area through normal cleanup procedures. Dispose of the material by landfilling it or making it available to local farmers.

Cleansers:

The following chemicals are used in our cleaning process. Follow these steps when handling an accidental spill. Each product's Material Safety Data Sheet (MSDS) is appended to this plan.

Chloroshine: Granular Powder (Wal-Chem). Use proper protective equipment. Keep combustibles away from the spill area. Carefully sweep up and shovel into dry containers without raising dust. Cover containers and move containers out of the spill area. Flush area with water, and follow with normal cleanup procedures.

H.D.C.-3: Granular Powder (Wal-Chem). Use proper protective equipment". Keep combustibles away from spill area. Carefully sweep up and shovel into ~~dry containe~~rs wi~~thout~~ raising dust". Cover containers and move containers out of the spill area. Flush area with water, neutralize with a diluted weak acid (such as Acidize), and follow with normal cleanup procedures.

Power Spray: Granular Power (Wal-Chem). Use proper protective equipment. Keep combustibles away from spill area. Carefully sweep up and shovel into ~~dry containe~~rs without raising dust. Cover containers and move containers out the of spill area. Flush area with water", and follow with normal cleanup procedures".

M.S.R.-200: Liquid (Wal-Chem). Wear protective equipment including rubber boots. Stop leak if you can do so without risk. Dike or dam large spills. Soak up with sand or other noncombustible inert absorbent materials. Flush area with water and follow with normal cleanup procedures. Keep combustibles away. Be careful, as spills are slippery".

Acidize: Liquid (Wal-Chem). Wear protective equipment including rubber boots. Stop leak if you can do so without risk. Dike or dam large spills. Soak up with sand or other noncombustible inert absorbent materials. Flush area with water and follow with normal cleanup procedures. Keep combustibles away. Be careful, as spills are slippery.

Microsan: Liquid (Janco United). Wear protective clothing including goggles, rubber boots, and rubber gloves". Before entering a confined space, monitor for oxygen and ventilate the atmosphere. If ventilation is not available, wear a self-contained breathing apparatus. Dike or dam large spills". Soak up spill with sand or other noncombustible inert absorbent materials. Flush area with water and follow with normal cleanup procedures. Keep combustibles away. Be careful, as spills are slippery.

Slug Response, Follow-up Reporting, and Documentation Procedures

The follow-up reporting and documentation procedures to be followed after a slug are described below. Two major questions must be addressed in this documentation:

- What caused the incident, or how can it be avoided in the future?
- How effective were response and cleanup activities, and how can response procedures be improved?

The facility will then follow-up with an internal investigation to ascertain what sequence of events lead to the incident. Two factors contribute to the occurrence of most slugs:

- Improper process operations
- Insufficient inspection and maintenance programs.

Poorly maintained process and storage equipment can also result in slugs. The following will be noted:

- Tanks--condition of welds
- Drums--extent of corrosion, deterioration
- Pumps, valves--condition of seals, packing
- Spill prevention equipment--availability, appropriateness, condition.

The investigation will also report on the adequacy of our response procedures. The following items will be addressed:

- Was the safety of industry personnel and the surrounding community protected throughout the incident?
- Were personnel working close to the incident provided adequate access to breathing apparatus, protective clothing, and other safety devices?
- Was the slug material confined quickly?
- Was fire extinguishing equipment adequate and readily available?
- Were appropriate wastewater treatment plant and fire department officials immediately notified of the incident?

Upon completion of the above-described investigation, improved operational, inspection, maintenance, and/or slug response procedural recommendations will be made in the investigation report. The investigation report will then be made available to the wastewater treatment plant, fire department, and insurance firms (if applicable) to assist these agencies in their own investigations.

SLUG PREVENTION TRAINING:

This plan represents a working document for all plant employees. At the start of their employment, all new employees will receive training consistent with this plan. All current employees will be trained when this plan is

implemented. Each year, employees will receive a brief refresher course. All employees will be made aware of changes to this plan as they are implemented.

The information employees receive must include:

A. The requirements of OSHA Laws

B. Any operations in their work area where hazardous chemicals are present

C. The location of the Slug Control Plan and list of hazardous chemicals and material safety data sheets.

Training must include:

A. Methods and observation that may be used to detect the presence or release of a hazardous chemical. The employees should be informed of the visual appearance or smell of the chemicals so they will know when they are being released into the atmosphere. They should also understand all monitoring surveillance and alarm procedures.

B. The physical and health hazards of the chemicals in the work area.

C. The measures employees can take to protect themselves including:

   1. Specific procedures implemented to protect employees from exposure to harmful materials

   2. Emergency response procedures

   3. Personal protective equipment, etc.

   4. Processes used to protect employees.

BASED ON MY INQUIRY OF THE PERSON OR PERSONS DIRECTLY RESPONSIBLE FOR MANAGING COMPLIANCE WITH THE SLUG CONTROL MEASURES IN THE SLUG CONTROL PLAN", I CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS FACILITY IS IMPLEMENTING THE SLUG CONTROL PLAN SUBMITTED TO THE [POTW].

_____ _____

NAME/TITLE OF AUTHORIZED REPRESENTATIVE OF THE IU RESPONSIBLE FOR THE SLUG CONTROL PLAN

DATE

I CERTIFY THAT THE SLUG PREVENTION AND CONTROL EQUIPMENT INSTALLED BY THE INDUSTRY WILL PROVIDE ADEQUATE PROTECTION FROM SLUG LOADING WHEN USED AND MAINTAINED PROPERLY.

NAME _____ DATE _____

ABC CIRCUITS
10 Circuit Drive
Circuit Town, IN 12345

SLUG CONTROL PLAN

The purpose of this plan is to provide detailed instructions for slug prevention and control.

A complete copy of this plan is maintained at the following locations:

1. Materials Department
2. Security Desk
3. Safety Office.

This plan will be updated whenever the situation dictates, and all departments and locations will receive updated copies.

Emergency Contact:	Chip Smith	Work Phone:	(111) 222-3333
Title:	Plant Manager	Emergency Phone:	(111) 123-4321
Secondary Contact:	Susan Jones	Work Phone:	(111) 222-3333
Title:	Safety Supervisor	Emergency Phone:	(111) 234-5432

FACILITY DESCRIPTION

ABC Circuits is a printed circuit board manufacturer. The facility operates two shifts per day, Monday through Friday, from 7:00 a.m. to 3:00 p.m. and 3:00 p.m. to 11:00 p.m. There are 75 people employed on the first shift and 19 during the second. Approximately 300 finished boards are manufactured per day.

Sources of wastewater from the printed circuit board manufacturing operation includes rinse water, spent process baths, and spent cleaning solutions. Hazardous materials are stored until removed to a licensed disposal site with the specified 90-day period. Wastewater is neutralized with sodium hydroxide and is batch discharged to the city sewer system at a pH range of 6-9.

ABC CIRCUITS

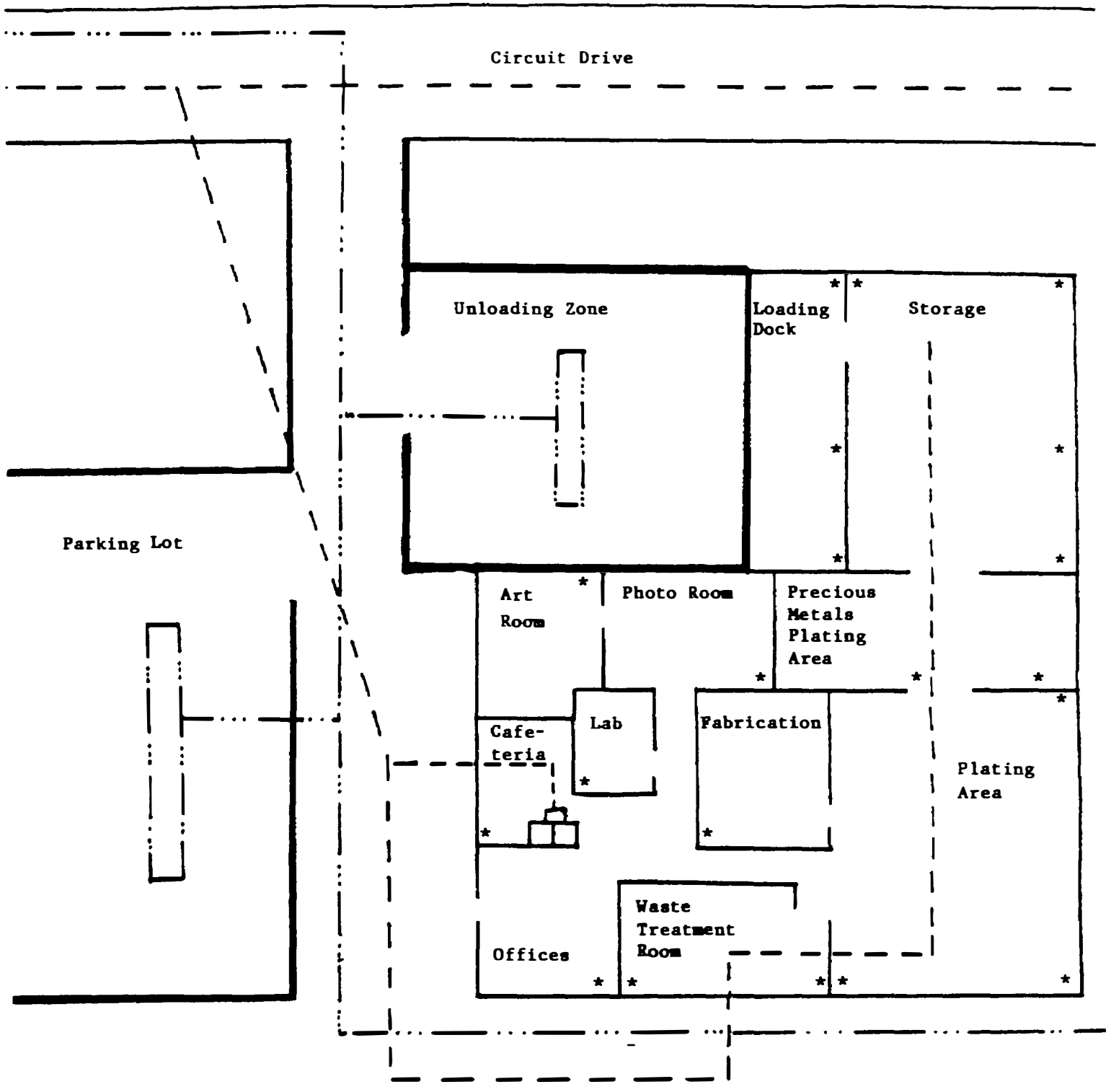


TABLE A. CHEMICAL AND MATERIAL INVENTORY

Chemical	Location In Plant	Maximum Value	Container Type	Container Volume	Remarks
Copper Plating Batch - Copper Sulfate - Sulfuric Acid	Plating Room	2,000 gallons	Tank	2,000 gallons	Spill from failure of copper plating tank or filter pump system.
Electroless Copper Solution - Copper Salts - Formaldehyde - Methanol	Storage Area Plating Room	350 gallons 150 gallons	Drum Tank	55 gallons 150 gallons	Spillage from storage drums, plating tank, or addition pump.
Etchant	Storage Area Plating Room	600 gallons 150 gallons	Drum Tank	55 gallons 150 gallons	Spillage from storage drums; failure of etcher feedline; failure of etcher containment feed
Methylene Chloride	Storage Area Plating Room	1,000 gallons 500 gallons	Tank Tank	1,000 gallons 500 gallons	Spill from failure of storage tanks, recovery still tank, R&R machine containment structure, or interconnecting pipe. If involved in a fire or chemical reaction, it could give off chlorine gas and other poisonous gases, such as phosgene.
Nickel Plating Solution - Nickel sulfamate	Plating Room	110 gallons	Tank	55 gallons	Spillage from storage containers, failure of nickel plating tank
Screen Wash - Toluene - Acetone	Photo Dept.	800 gallons	Tank Drum	300 gallons 55 gallons	Spillage from storage drums; failure of recirculator in spray booth
Sulfuric Acid	Plating Room	1,000 gallons	Tank	55 gallons	Spillage from storage drums
Trichloroethane	Plating Room	500 gallons	Degreasing Unit Tank	50 gallons 600 gallons	Spill from failure of storage tanks, recovery still tank, containment structure, or interconnecting pipe net. If involved in a fire or chemical reaction, it could give off chlorine gas and other poisonous gases, such as phosgene.

REPORTABLE MATERIAL DATA

Table A is a list of chemicals present in large quantities. It includes all substances that are listed, or have components that are listed, as hazardous materials and are present in quantities greater than 55 gallons or the Reportable Quantity (RQ) of the hazardous material.

SLUG PREVENTION

All drums are to be marked with a hazardous waste label and must be sealed at all times when not being filled or dispensed from. Drums put up in the dispensing rack are to be fitted with approved faucets and pressure relief devices. Drip cans are to be kept under facets at all times.

Plating tanks must be visually inspected by the shift supervisor at the beginning and end of each shift for any signs of leakage or potential problems. An inspection log will be maintained by the safety officer.

All batch operation discharges must be tested for pH and neutralized if appropriate". Continuous pH monitoring must be conducted during discharge.

SPILL CONTAINMENT

The first concern is to stop the source of the spill and provide ventilation to the area. Leaking containers must have their contents reconfined by transferring the chemical or confining the container. The spilled material must be kept from reaching a floor drain or from soaking into the ground. Inert absorbent material, rags, paper towels, and such can all be used to sop up such a spill or dike it away from a sewer or open ground. Do not use iron or any item that could spark a flammable material while cleaning up. Wear a respirator for cleaning spills of over 1/2 gallon". If a solvent odor is strong, clear the area of all but the cleanup crew, who must wear respirators. Neoprene gloves and boots will have to be used by the cleanup crew unless more inert material is available. Contaminated earth must be dug up and drummed for disposal. For a spill of a few gallons, the best procedure is to isolate the spill and soak it up with inert media, taking all safety precautions and disposing in a flammable waste can. Larger spills will require a separate

disposal drum and a more extensive cleanup. If a spill results in the material reaching the sewer system, stop the municipal drain and halt any more solvent from reaching the sewer, and notify the appropriate authorities.

EMERGENCY RESPONSE EQUIPMENT INVENTORY

1. 8 SCBA emergency air packs (Lab)
2. 21 fire extinguishers (located throughout the facility)
3. 20 gallons of acid neutralizer (Waste Treatment Room)
4. 8 sets of protective clothing (Lab)
5. 50 lbs absorbent material (Waste Treatment Room)
6. Portable eye showers
7. Fire alarms.

EMERGENCY RESPONSE PROCEDURES

Any employee discovering the release of any toxic or potentially hazardous material that is not readily controlled must activate the emergency alarm and notify an emergency coordinator. The name and phone number of the emergency coordinator is posted throughout the facility".

In the event of any release of potentially toxic or hazardous materials necessitating evacuation, the emergency coordinator will assess the situation and notify all appropriate agencies.

Control and containment of any spill of hazardous materials will be accomplished through the use of materials and procedures readily available throughout the facility and manufactured specifically for the materials involved.

It is not anticipated that outside contractors will be utilized, however, the companies listed below have available the necessary equipment and manpower for cleanup of a spill:

1. Spill Away Phone: (111) 777-8888
2. Cleanland, Inc. Phone: (111) 777-9999

SLUG REPORTING PROCEDURES

After any reportable incident, a member of the emergency coordinators group will notify the EPA Regional Administrator and any appropriate State and local agencies that all appropriate follow-up actions have been implemented per the facilities" Slug Control plan. This and all other needed reports will be processed within five days of the incident".

TRAINING

All personnel involved in manufacturing and cleanup activities will receive instruction in the proper handling and disposal of chemicals and cleanup materials in order to keep regulated materials out of industrial wastewater. New employees will be trained in these procedures immediately. All personnel working in these activities must be familiar with this plan and must follow the procedure established to eliminate regulated materials from entering the wastewater system.

Training consists of classroom instruction which reviews the following:

1. The chemicals known to be used at the plant and the areas in which they are used
2. The location of lift stations and drains with emphasis upon the location of pretreatment system systems for each area in the plant
3. The Slug Control Plan and the proper procedures for handling and disposing of hazardous materials.

CERTIFICATION

BASED ON MY INQUIRY OF THE PERSON OR PERSONS DIRECTLY RESPONSIBLE FOR MANAGING COMPLIANCE WITH THE SLUG CONTROL MEASURES IN THE SLUG CONTROL PLAN, I CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS FACILITY IS IMPLEMENTING THE SLUG CONTROL PLAN SUBMITTED TO THE [POTW].

NAME/TITLE OF AUTHORIZED REPRESENTATIVE
OF THE IU RESPONSIBLE FOR THE SLUG CONTROL PLAN

DATE

I CERTIFY THAT THE SLUG PREVENTION AND CONTROL EQUIPMENT INSTALLED BY THE INDUSTRY WILL PROVIDE ADEQUATE PROTECTION FROM SLUG LOADING WHEN USED AND MAINTAINED PROPERLY.

NAME _____ DATE _____

APPENDIX E

BIBLIOGRAPHY OF REFERENCE MATERIALS

APPENDIX E. BIBLIOGRAPHY OF REFERENCE MATERIALS

Analytical Quality Control in Water and Wastewater Laboratories (P8213884).*

Annual Book of Standards, Part 31 (Water and Atmospheric Analysis) 1975, American Society for Testing and Materials.

Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program, Office of Water Enforcement and Permits, U.S. Environmental Protection Agency. December 1987.

Effects of Hazardous Material Spills on Biological Treatment Processes, U.S. EPA, 600/2-77-239. December 1987

Guidance Manual for POTW Pretreatment Program Development, Office of Water Enforcement and Permits, U.S. Environmental Protection Agency. October 1983.

Guidance Manual for Preventing Interference at POTWs, Office of Water Enforcement and Permits, U.S. Environmental Protection Agency. September 1987.

Guidance Manual for Implementing Total Toxic Organics (TTO) Pretreatment Standards. Office of Water Enforcement and Permits, Washington, DC. U.S. Environmental Protection Agency. September 1985(a).

Guidelines for the Development and Implementation of Preparedness, Prevention and Contingency (PPC) Plans. Pennsylvania Department of Environmental Resources (PADER). 1983.

Handbook of Chemistry and Physics, CRC Press, Inc. Cleveland, OH, most recent edition.

Handbook of Toxic and Hazardous Chemicals and Carcinogens, 2nd ed., 1985, Marshall Sihis.

Hazardous Chemicals, Spill Cleanup, ed. by J.S. Robinson, 1979.

Hazardous Chemical Data Book, ed. by G. Weiss, 1980.

Hazardous Materials and Natural Disaster, Emergencies, Incident Action Guidebook, Ernest J. Terrien, Technomic Publishing Co., 1984.

Hazardous Material Spills and Responses for Municipalities, U.S. EPA, 600-2-80-108.

Hazardous Wastes Handbook, 5th Edition, Ridgway M. Hall, et. al., Government Institutes, Inc., October 1984.

Industrial User Permitting Guidance Manual, Office of Water Enforcement and Permits, U.S. Environmental Protection Agency. Early 1989 (expected).

NPDES Best Management Practices Guidance Document. U.S. Environmental Protection Agency, Office of Research and Development, Hydroscience, Inc. 1979. EPA-600/9-79-045, Washington, DC.

Lange's Handbook of Chemistry. Lange, Norbert Adolph. McGraw-Hill Book Co., New York, most recent edition.

Oil and Hazardous Substances Response Manual, U.S. EPA Region X Emergency Response Team.

Pretreatment Compliance Monitoring and Enforcement Guidance. Office of Water Enforcement and Permits, Washington, DC. U.S. Environmental Protection Agency. September 1986.

NPDES Compliance Inspection Manual. Office of Water Enforcement and Permits, Washington, DC. (NTIS Order No. PB81-153215). U.S. Environmental Protection Agency, June 1984.

Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency. Office of Research and Development, 1979, EPA-600-4-79-020. Washington, DC. (NTIS Order No. PB-297686, PD-259973).

Pretreatment Compliance Monitoring and Enforcement Guidance, Office of Water Enforcement and Permits, Washington, DC, U.S. Environmental Protection Agency. September 1986.

PRELIM Users Guide: Documentation for the EPA Computer Program/Model for Developing Local Limits for Industrial Pretreatment Programs at Publicly Owned Treatment Works, Version 3.0, Office of Water Enforcement and Permits, U.S. Environmental Protection Agency; January 1987.

RCRA Information on Hazardous Wastes for Publicly Owned Treatment Works. Office of Water Enforcement and Permits, Washington, DC. U.S. Environmental Protection Agency. September 1985.

Region X Guidance Manual for the Development of an Accidental Spill Prevention Program, U.S. EPA, 1986.

Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works (The Domestic Sewage Study). Office of Water Regulations and Standards, Washington, DC. U.S. Environmental Protection Agency. December 1985.

Standard Methods for the Examination of Water and Wastewater, American Public Health Association (APHA), American Water Works Association (AWWA), and Water Pollution Control Federation (WPCF). 16th Ed., 1985.

Toxicity Reduction Evaluation Protocol for Municipal Wastewater Treatment Plants, Office of Water Enforcement and Permits, Office of Research and Development, U.S. Environmental Protection Agency. 1988.

*These publications are available from National Technical Information Services, 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4600.