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Regulatory Analysis of the Underground Storage Tank - Integrated Demonstration Program

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**REGULATORY ANALYSIS OF THE UNDERGROUND STORAGE TANK-
INTEGRATED DEMONSTRATION PROGRAM**

E. H. Smith

ABSTRACT

The Underground Storage Tank-Integrated Demonstration (UST-ID) Program has been developed to identify, demonstrate, test, and evaluate technologies that will provide alternatives to the current underground storage tank remediation program. The UST-ID Program is a national program that consists of five participating U.S. Department of Energy (DOE) sites where technologies can be developed and ultimately demonstrated. Once these technologies are demonstrated, the UST-ID Program will transfer the developed technology system to industry (governmental or industrial) for application or back to Research and Development for further evaluation and modification, as necessary.

In order to ensure that the UST-ID Program proceeds without interruption, it will be necessary to identify regulatory requirements along with associated permitting and notification requirements early in the technology development process. This document serves as a baseline for identifying certain federal regulatory requirements that may impact the UST-ID Program and the demonstration of any identified technologies. Included in this assessment is a summary of the National Environmental Policy Act of 1969¹, the Clean Air Act of 1977², the Resource Conservation and Recovery Act of 1976³, the Clean

¹National Environmental Policy Act of 1969, 42 USC 4321, et seq.

²Clean Air Act of 1977, 42 USC 7401, et seq.

³Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq.

Water Act of 1977⁴, certain DOE Orders, and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980⁵. In addition, this document provides a brief discussion of how each of these requirements will impact the UST-ID Program.

In order to ensure that state regulatory requirements are addressed, in addition to the federal regulatory requirements, this document will be expanded to include an evaluation of state regulatory requirements associated with each of the five participating DOE sites. This information will be included as a revision to this federal regulatory requirements baseline document. This information will be transmitted to each of the participating DOE sites to ensure that both federal and state regulatory requirements are identified and addressed as appropriate.

⁴Clean Water Act of 1977, 33 USC 1251, et seq.

⁵Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq.

CONTENTS

1.0	INTRODUCTION	1-1
1.1	PURPOSE OF DOCUMENT	1-1
1.2	BACKGROUND	1-1
1.2.1	Overview of the Underground Storage Tank- Integrated Demonstration Program	1-2
1.2.2	Development of Technical Support Groups	1-2
2.0	NATIONAL ENVIRONMENTAL POLICY ACT OF 1969	2-1
2.1	BACKGROUND	2-1
2.2	EXISTING NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 DOCUMENTATION REVIEW	2-1
2.3	CATEGORICAL EXCLUSION AND INFORMATION BULLETIN	2-1
2.4	ACTION DESCRIPTION MEMORANDUM	2-2
2.5	ENVIRONMENTAL ASSESSMENT	2-2
2.6	ENVIRONMENTAL IMPACT STATEMENT	2-3
2.7	IMPACTS TO THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM	2-3
3.0	CLEAN AIR ACT OF 1977	3-1
3.1	BACKGROUND	3-1
3.2	NEW SOURCE PERFORMANCE STANDARDS	3-1
3.3	NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS	3-1
3.3.1	Application for Approval of Construction or Modification	3-2
3.3.2	Approval of Construction or Modification	3-2
3.4	IMPACTS TO THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM	3-3
4.0	RESOURCE CONSERVATION AND RECOVERY ACT OF 1976	4-1
4.1	BACKGROUND	4-1
4.2	IDENTIFICATION OF HAZARDOUS WASTE	4-1
4.3	SAMPLE EXCLUSION	4-2
4.4	TREATABILITY STUDY SAMPLE EXCLUSION	4-3
4.4.1	Limitations on Treatability Studies	4-3
4.4.2	Quantity Limits per Waste Stream per Treatment Process	4-3
4.4.3	Transportation Shipment Limits	4-4
4.4.4	Treatment Rate Limit	4-5
4.4.5	Storage Limits	4-5
4.4.6	Residues and Unused Samples	4-5
4.4.7	Reporting and Recordkeeping Requirements	4-5
4.5	RESEARCH DEVELOPMENT AND DEMONSTRATION PERMITS	4-6
4.6	GENERATOR AND TRANSPORTER STANDARDS	4-7
4.7	LAND DISPOSAL RESTRICTIONS	4-7
4.8	TREATMENT, STORAGE, AND DISPOSAL FACILITIES	4-8
4.9	TREATMENT AND STORAGE TANK CLOSURE OPTIONS	4-9
4.9.1	Closure as a Treatment and Storage Tank	4-9
4.9.2	Closure as a Landfill	4-10
4.9.3	Closure as a Miscellaneous Unit	4-10
4.10	IMPACTS TO THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM	4-11

CONTENTS (cont)

5.0	CLEAN WATER ACT OF 1977	5-1
5.1	BACKGROUND	5-1
5.2	WASTEWATER DISCHARGES THROUGH A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	5-1
5.2.1	Permitting Requirements	5-1
5.3	WASTEWATER DISCHARGES TO A PUBLICLY OWNED TREATMENT WORKS	5-2
5.3.1	Pretreatment Permits	5-2
5.4	IMPACTS TO THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM	5-3
6.0	U.S. DEPARTMENT OF ENERGY ORDERS	6-1
6.1	BACKGROUND	6-1
6.2	DOE ORDER 5400.1	6-1
6.3	DOE ORDER 5400.5	6-1
6.4	DOE ORDER 5480.3	6-1
6.5	DOE ORDER 5480.11	6-2
6.6	DOE ORDER 5820.2A	6-2
6.7	DOE ORDER 6430.1	6-2
6.8	IMPACTS TO THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM	6-3
7.0	RESOURCE CONSERVATION AND RECOVERY ACT CORRECTIVE ACTION	7-1
7.1	BACKGROUND	7-1
7.2	THE CORRECTIVE ACTION PROCESS	7-1
7.3	REGULATED CONSTITUENTS	7-3
7.4	CLEANUP REQUIREMENTS	7-3
7.5	DEMONSTRATION OF TECHNICAL IMPRACTICABILITY	7-3
7.6	CONDITIONAL REMEDIES	7-4
7.7	MANAGEMENT OF CLOSURE DERIVED WASTE	7-4
7.8	IMPACTS TO THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM	7-4
8.0	COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT	8-1
8.1	BACKGROUND	8-1
8.2	NATIONAL CONTINGENCY PLAN	8-1
8.2.1	Applicable or Relevant and Appropriate Requirements	8-2
8.3	RELEASE REPORTING REQUIREMENTS	8-3
8.4	IMPACTS TO THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM	8-3
9.0	REFERENCES	9-1

LIST OF FIGURES

1	Overview of the <i>National Environmental Policy Act of 1969</i> Decision Process	2-4
2	Comparison of <i>Resource Conservation and Recovery Act of 1976</i> Corrective Action and <i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i> Remedial Processes	7-2

LIST OF TERMS

ADM	action description memorandum
AEA	<i>Atomic Energy Act of 1954</i>
ALAR	applicable, relevant, and appropriate requirements
ALARA	as low as reasonably achievable
BDAT	best demonstrated available technology
CAA	<i>Clean Air Act of 1977</i>
CAMU	corrective action management unit
CEQ	Council on Environmental Quality
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
CFR	<i>Code of Federal Regulations</i>
CMS	Corrective Measures Study
CWA	<i>Clean Water Act of 1977</i>
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy - Headquarters
DOT	U.S. Department of Transportation
EA	environmental assessment
EDE	effective dose equivalent
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FONSI	finding of no significant impact
FS	feasibility study
HLW	high-level waste
HRS	Hazard Ranking System
HSWA	Hazardous and Solid Waste Amendments
LDR	land disposal restrictions
LEPC	Local Emergency Planning Committee
LLW	low-level waste
NCP	National Contingency Plan
NEPA	<i>National Environmental Policy Act of 1969</i>
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	National Response Center
PA/SI	Preliminary Assessment/Site Investigation
POTW	publicly owned treatment works
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RD&D	research, development, and demonstration
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RMW	radioactive mixed waste
SERC	State Emergency Response Commission
SWMU	solid waste management unit
TOC	total organic carbon
TRU	transuranic
TSD	treatment, storage, or disposal
TSG	technical support groups
USPS	U.S. Postal Service
UST-ID	Underground Storage Tank-Integrated Demonstration

REGULATORY ANALYSIS OF THE UNDERGROUND STORAGE TANK- INTEGRATED DEMONSTRATION PROGRAM

1.0 INTRODUCTION

This document provides a review of environmental protection regulations and other requirements that may impact the Underground Storage Tank-Integrated Demonstration (UST-ID) Program. As this program is initiated, a number of regulatory requirements will be identified that must be addressed. This information will be utilized to guide the development, selection, testing, and evaluations of technologies to be used in the UST-ID system by defining the expected working environments within which the technologies must be functional.

1.1 PURPOSE OF DOCUMENT

This document provides an overview of the major environmental regulations that may impact the UST-ID Program. Regulatory requirements most often define performance standards that waste management technologies must meet in order to be accepted by the regulatory authorities. The development of new technologies for the management of hazardous waste will require an in-depth analysis of potentially applicable regulations to ensure that a chosen technology can meet applicable performance standards. In addition, identification of regulatory requirements early in the development phase will ensure that all necessary permits and notifications for the subsequent management of hazardous waste are secured without delays to the UST-ID Program.

This document provides the initial step in evaluating regulatory requirements that may impact development of technologies and the UST-ID Program. As discussed above, regulatory requirements, in some cases, establish performance-based criteria that a specified technology must meet when used for the treatment, storage, or disposal (TSD) of hazardous waste. In addition, in order to utilize a developed technology, it may be necessary to obtain permits from the regulatory authorities prior to construction of facilities or testing a desired technology. These types of potential impacts to the UST-ID Program require early identification so that the long-term goal of tank waste remediation and technology development can proceed without long-term delays.

1.2 BACKGROUND

National defense activities have generated radioactive and chemical wastes since 1944. These wastes have been stored in underground storage tanks at a number of U.S. Department of Energy (DOE) sites. Removal and treatment of this type of waste present a unique and complex problem for DOE sites that will eventually remediate or close these tanks in accordance with hazardous waste regulations established under the *Resource Conservation and Recovery Act of 1976* (RCRA). In addition to addressing the chemical component of the

waste, these sites are also required to address the radioactive components, which are regulated under the *Atomic Energy Act of 1954*. Thus, radioactive mixed waste (RMW) is subject to dual regulation by two separate federal regulatory authorities and authorized states.

1.2.1 Overview of the Underground Storage Tank-Integrated Demonstration Program

The objective of the UST-ID Program is to identify; direct the development of; and demonstrate, test, and evaluate advanced technologies that will provide alternatives to the current technology baseline for underground storage tank and tank content remediation. The UST-ID Program will stimulate technology development where voids exist and combine and demonstrate technologies within a given system. Once demonstrated, the UST-ID Program will transfer technologies and technology systems out to industry (government or commercial) for application or back to research and development for further development.

This program is expected to reduce overall costs by identifying potential regulatory issues early in the developmental stage. This should allow adequate time for issue resolution prior to impacting program schedules. Finally, this program has been designed to provide a safer way to demonstrate tank waste remediation and closure technologies while reducing personnel radiation exposures to as low as reasonably achievable (ALARA).

1.2.2 Development of Technical Support Groups

The UST-ID Program will be subdivided into eight technical support groups (TSG). The TSGs will identify those technologies that are determined to warrant further research and development to support the UST-ID and/or the DOE Office of Technology Development. The TSGs and their associated responsibilities include the following:

- **Waste Characterization**--The waste characterization TSG will include analyses of radioactive, chemical, and mixed waste throughout all phases (e.g., retrieval, processing, disposal) of the demonstration. Activities include in situ, onsite, and laboratory analyses.
- **Waste Retrieval, Transfer, and Storage**--The retrieval, transfer, and temporary storage of tank waste will be addressed by this TSG. Technical areas will include the following technologies: dislodging (hydraulic, pneumatic, mechanical), robotics systems and controls, conveyance, and transport mechanisms for both in-tank transfers and transfers to storage and/or processing facilities.
- **Soil and Past-Practice Unit Remediation**--All ancillary equipment, diverter boxes, catch basins, soil contaminated from spills, and miscellaneous equipment external to the tank will be covered by this group.
- **Waste Separation (High-Level/Low-Level/Transuranic/Hazardous)**--This TSG will cover processes for the separation of retrieved tank wastes

into categories of treatment/disposal interests. These categories include high-level waste (HLW), low-level waste (LLW), transuranic (TRU), and hazardous waste.

- **Tank HLW Treatment/Disposal (including TRU)**--Treatment and disposal of the HLW (e.g., cesium and strontium) and TRU fractions of retrieved waste will be addressed by this TSG.
- **Tank LLW Treatment/Disposal (including Hazardous)**--Treatment and disposal processes for the LLW and hazardous fractions of the retrieved waste will be addressed by this TSG.
- **In Situ Treatment**--This TSD will cover in situ treatment and disposal options for the tank waste, tank structure, infratank piping, in-tank equipment, and contaminated soil/groundwater.
- **Site Closure**--The site closure TSG will include technical and regulatory considerations surrounding potential site closure options, including surface and subsurface permanent barriers and in situ remediation to total retrieval of all waste, tanks, and soil.

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2.0 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

2.1 BACKGROUND

The *National Environmental Policy Act of 1969* (NEPA) was signed into law on January 1, 1970. This law requires federal agencies to prepare detailed statements [i.e., environmental impact statements (EIS)] assessing the environmental impacts of and alternatives to proposed major federal actions that may significantly affect the environment. In addition, all federal agencies are required to develop methods and procedures to ensure that environmental considerations are factored into all decision-making processes. The Council on Environmental Quality (CEQ) provides oversight to federal NEPA compliance issues and has established implementing NEPA regulations at 40 *Code of Federal Regulations* (CFR) Parts 1500 through 1508 (EPA 1988).

2.2 EXISTING NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 DOCUMENTATION REVIEW

For any proposed action associated with the UST-ID Program, the cognizant manager should evaluate existing NEPA documentation, where available, to determine whether or not the action in question has already been addressed from a NEPA perspective. If NEPA documentation has already been prepared and approved for the action in question, the cognizant manager should prepare a letter of transmittal to the representing DOE Field Office documenting that additional NEPA documentation is not warranted. The approved NEPA documentation should be in the form of an environmental assessment (EA) or an EIS.

2.3 CATEGORICAL EXCLUSION AND INFORMATION BULLETIN

In the event that a proposed action has not been addressed by previous NEPA documentation, the proposed action will require a NEPA evaluation. If the potential impacts to the environment are clearly insignificant and the proposed action falls within a category of actions that do not normally require an EA or an EIS, the action may be eligible for a categorical exclusion. If the proposed action meets the criteria for a categorical exclusion, then an information bulletin (IB) is prepared describing the proposed action and identifying the applicable action category that allows the exclusion. In general, a typical IB may include the following information: (1) a summary of the proposed action and its background, (2) a justification of why the action may be categorically excluded, and (3) a discussion of associated environmental impacts involved with the proposed action.

The DOE issued a proposed rule in the November 2, 1990, *Federal Register* (DOE 1990a) that provides a listing of activities for which categorical exclusions have been developed. Among other things, the following types of activities have been identified:

- Site characterization and environmental monitoring, including siting, construction, operation, and dismantlement or closing

(abandonment) of characterization and monitoring devices, if the devices would not introduce or cause the inadvertent movement of hazardous substances

- Indoor, bench-scale research projects, and conventional laboratory operation (e.g., preparation of standards and sample analysis)
- Removal of contaminated material and equipment (other than fuel or special nuclear material in reactors), if the action is not part of a decommissioning project.

2.4 ACTION DESCRIPTION MEMORANDUM

In the event that a proposed action does not fall within a category of actions that may be categorically excluded, an action description memorandum (ADM) must be prepared. The ADM serves as the basis for the U.S. Department of Energy-Headquarters (DOE-HQ) to determine the appropriate level of NEPA documentation required (i.e., an EA or EIS).

Action description memorandums are concise documents, usually consisting of three to five pages and typically including a discussion of the following information: (1) the purpose and need of the proposed action, (2) a brief but concise description of the proposed action, (3) a brief description of the potentially affected environment, and (4) potential environmental issues associated with the proposed action.

2.5 ENVIRONMENTAL ASSESSMENT

In the event that an EA is deemed necessary, the DOE Field Office supporting the proposed action will be required to develop an EA in accordance with CEQ regulations. An EA has the following three defined functions:

- To provide sufficient information to allow the DOE to determine whether a proposed action requires preparation of an EIS or a finding of no significant impacts (FONSI)
- To provide an interdisciplinary review of the proposed action and alternatives to the proposed action
- To facilitate preparation of an EIS when one is necessary.

A typical EA should include a discussion of the following information: (1) a statement of purpose and the need for the proposed action, (2) a clear and concise description of the proposed action, (3) a description of alternatives to the proposed action, and (4) a description of the existing environment expected to be impacted by the proposed action. An assessment of the environmental consequences associated with a proposed action and alternatives to that action should be discussed in the EA. The discussion should include the consequences of accidents and routine operations along with the cumulative and long-term impacts associated with the proposed action.

All EAs are submitted to the associated DOE Field Office for review, with subsequent transmittal to DOE-HQ. At DOE-HQ, a final determination will be made by the Assistant Secretary for Environmental Safety and Health. This determination will result in one of the following.

- If the proposed action is a major action that will significantly affect the environment, an EIS must be prepared.
- If the proposed action is not a major action and will not significantly affect the environment, a FONSI is prepared and published in the *Federal Register*.

2.6 ENVIRONMENTAL IMPACT STATEMENT

According to CEQ regulations, an EIS should be no more than 300 pages long and include an analysis of alternatives, affected environment, etc. The EIS is very similar to the EA, but includes considerably more detail. When DOE has decided to draft an EIS, the following sequence occurs.

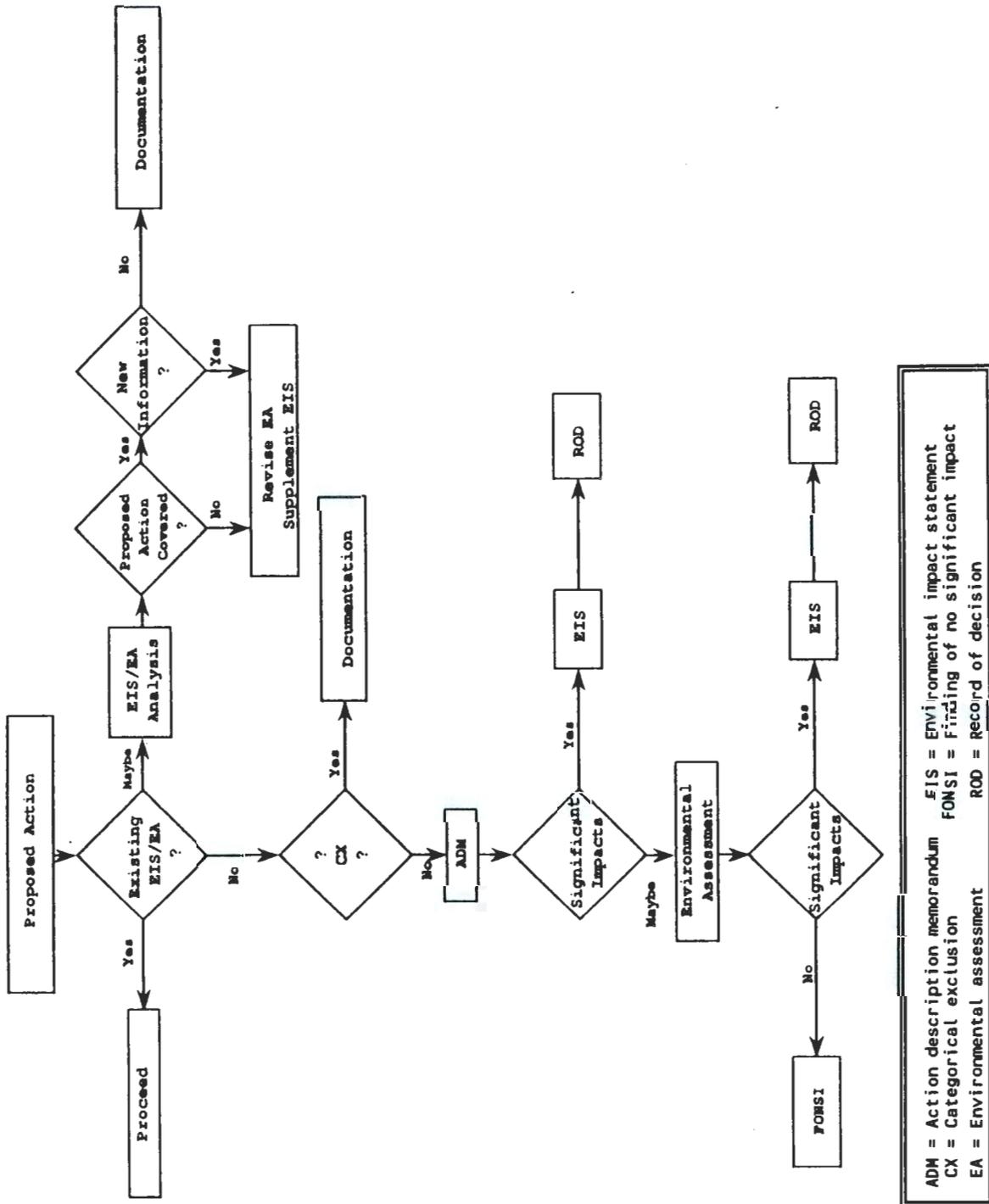
1. A notice of intent (NOI) is published in the *Federal Register* announcing the intent to draft an EIS. The NOI invites written comment and public testimony on the scope and purpose of the EIS.
2. As a result of scoping and other planning, an implementation plan is published. This includes a detailed outline of the EIS, target dates, and a description of how the EIS will be prepared.
3. After approval of the implementation plan, a draft EIS is prepared.
4. Upon completion of the draft DEIS, the draft is made available to the public and other governmental agencies for review and comment.
5. Comments are incorporated into the draft DEIS, and the EIS is finalized and made available to the public for review.
6. No sooner than 30 days after public notice of the availability of the final EIS, the DOE can publish its record of decision, which details the decisions reached in the EIS and the reasons for those decisions.

2.7 IMPACTS TO THE UNDERGROUND STORAGE TANK-INTEGRATED DEMONSTRATION PROGRAM

Recent revisions to NEPA implementation were issued through the Secretary of Energy Notice 15-90 (DOE 1990b). Among other things, this notice declared that there would no longer be a catchall category of actions that would not require NEPA documentation. In other words, all activities require some form of NEPA documentation. Even activities that are categorically exempt require development and submittal of an IB. Therefore, the requirements established pursuant to the NEPA must be carefully evaluated to determine their applicability to projects or demonstrations associated with the UST-ID Program. Depending upon the type of NEPA documentation required and

the extent of existing NEPA documentation associated with a given facility, development and approval of NEPA documentation can result in significant delays if adequate timing is not accounted for. An overview of the NEPA decision process is outlined in Figure 1.

Figure 1. Overview of the *National Environmental Policy Act of 1969* Decision Process.



ADM = Action description memorandum
 CX = Categorical exclusion
 EA = Environmental assessment
 EIS = Environmental impact statement
 FONSI = Finding of no significant impact
 ROD = Record of decision

3.0 CLEAN AIR ACT OF 1977

3.1 BACKGROUND

The *Clean Air Act of 1977* (CAA) provides a mechanism for the U.S. Environmental Protection Agency (EPA) to regulate emissions into the air of toxic substances that may adversely impact human health or the environment. The implementing regulations of the CAA regulate stationary sources as well as mobile sources of air pollution. Among other things, the CAA establishes national ambient air quality standards that must be met by sources regulated under those corresponding regulations.

3.2 NEW SOURCE PERFORMANCE STANDARDS

Section 111 of the CAA authorizes the EPA to establish specific standards for new industrial sources of air pollutants, known as New Source Performance Standards. The EPA expects that establishment of these standards will ensure that specific industries do not unacceptably increase air pollutants. These regulations have been established at 40 CFR Part 60 (EPA 1987a) and are applicable to facilities constructed or modified after such standards were established. Subpart C of 40 CFR Part 60 establishes a list of regulated industries covered by these regulations. It is unlikely that a project or demonstration associated with the UST-ID Program would be subject to regulation under this part. However, the cognizant manager should ensure that any newly constructed or modified facility is reviewed against these regulations to ensure that such standards, where applicable, can be met.

3.3 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Regulations governing airborne radioactive emissions are codified at 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants" (EPA 1990a). Under the Subpart H regulations, the EPA has promulgated a standard mandating that radioactive airborne emissions from any DOE facility shall not exceed those amounts that would cause any member of the public to receive, in any given year, an effective dose equivalent (EDE) to 10 millirem per year.

The Subpart H regulations require that radionuclide emission rates be continuously measured at all stacks or vents with a potential to discharge radionuclides into the air in quantities that could cause an EDE to the hypothetical, maximally exposed offsite individual in excess of 1 percent of the 10 millirem per year EDE standard. Furthermore, each radionuclide that could contribute greater than 10 percent of the potential EDE from each such release point must be continuously measured according to the methods specified by the Subpart H regulations. With prior EPA approval, alternative methods may be used. When determining whether a given release point has the potential to exceed 1 percent of the 10 millirem per year standard, it must be assumed that all pollution control equipment between the point of generation and the point of discharge do not exist.

3.3.1 Application for Approval of Construction or Modification

According to 40 CFR Part 61.07, the owner or operator is required to submit to the EPA an application for approval of the construction of any new source or modification of any existing source of radionuclide emission. The application for approval is required to be submitted before the construction or modification is planned to begin. A separate application is required to be submitted for each stationary source and is required if the estimated maximum dose added by the new construction or modification is greater than 0.1 millirem per year. Each application for approval of construction must contain the following information:

- The name and address of the applicant
- The location or proposed location of the source
- Technical information describing the proposed nature, size, design, operating design capacity and method of operating design capacity, and method of operation of the source, including a description of any equipment to be used for control of emissions. Such technical information shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of the calculations.

In addition to requiring an application for approval for construction of new sources of radionuclides, the EPA also requires application approval for modifications to existing facilities. An application for approval of modification must also include the following information:

- The precise nature of the proposed changes
- The productive capacity of the source before and after the changes are completed
- Calculations of emissions' estimates before and after the changes are completed in sufficient detail to permit assessment of the validity of the calculations.

Subpart H of 40 CFR 61 requires information specifically for radionuclide emissions from DOE facilities. The 40 CFR 61.93 states: "To determine compliance with the standard, radionuclide emissions shall be determined and doses equivalent to members of the public shall be calculated using EPA approved sampling procedures, EPA models CAP-88 or AIRDOS-PC, or other procedures for which EPA has granted prior approval." Further, 40 CFR 61.93 indicates that DOE facilities, where the maximally exposed individual lives within 3 kilometers of all sources of emissions in the facility, may use EPA's COMPLY model and associated procedures for determining dose for purposes of compliance.

3.3.2 Approval of Construction or Modification

According to 40 CFR Part 61.08, the EPA will notify DOE within 60 days after receipt of all appropriate information of approval or intention to deny

approval for construction or modification. Additional notifications are required once construction approval is granted, such as notification of intent to start-up 30-60 days prior to start-up. In addition, 40 CFR Part 61.09 requires another notification within 15 days following start-up.

3.4 IMPACTS TO THE UNDERGROUND STORAGE TANK-INTEGRATED DEMONSTRATION PROGRAM

It is unlikely that the UST-ID Program will be impacted by the new source performance standards of the CAA. As discussed above, Subpart C of 40 CFR Part 60 establishes a list of regulated industries that are covered by these regulations. It is unlikely that a project or demonstration associated with the UST-ID Program would be subject to regulation under this part.

It is possible that treatability studies or other activities associated with the UST-ID Program may require notification under National Emission Standards for Hazardous Air Pollutants regulations. The construction of new sources of radionuclide emissions or a modification to existing radionuclide emission sources may require notification and approval of such actions from the EPA. Approval for construction of new sources or modification of existing sources may take up to 6 months or longer. Therefore, it is important to identify projects that will be expected to increase radiological emissions early in the planning phases to ensure that all appropriate notifications and approvals can be secured without causing significant delays.

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4.0 RESOURCE CONSERVATION AND RECOVERY ACT OF 1976

4.1 BACKGROUND

The *Resource Conservation and Recovery Act of 1976* establishes a cradle-to-grave system for the management of hazardous waste. The RCRA, which establishes regulations for the generation, transportation, and TSD of hazardous waste, became effective on November 18, 1980. The RCRA regulations make generators of hazardous waste responsible for the proper TSD of that waste. The implementing RCRA regulations are identified at 40 CFR Parts 260 through 268⁶ and 40 CFR Parts 270 (EPA 1990j).

In 1984, the EPA amended RCRA to considerably expand the previous regulations. Among other things, these amendments, known as the Hazardous and Solid Waste Amendments (HSWA), authorized the EPA to establish treatment standards that must be met for all RCRA wastes prior to being placed in or on the land for disposal. These regulations are known as the land disposal restrictions (LDR).

The EPA also excluded certain types of wastes at 40 CFR Part 261. The following sections discuss some of the exclusions that may benefit the UST-ID Program, followed by a summary of the major requirements established at 40 CFR Part 260 through 268 and 270. For future consideration, this section also provides an analysis of the closure options available for RCRA treatment and storage tanks that are used for the storage of RMW.

4.2 IDENTIFICATION OF HAZARDOUS WASTE

In order for a material to be a hazardous waste, it must first meet the definition of a solid waste. The criteria for determining whether or not a material is a solid waste are identified at 40 CFR Part 261.2. In summary, a solid waste is any material that is abandoned, discarded, or recycled, unless it meets one of the exclusions of 40 CFR Part 261.4. It is important to note that a solid waste, by definition, includes certain wastewaters, sludges, slurries, and containerized gasses. Once a material has been determined to meet the definition of a solid waste, an evaluation is required to determine if the solid waste meets the definition of a hazardous waste.

A solid waste is defined as a hazardous waste if it exhibits a hazardous waste characteristic or is specifically listed by the EPA. The EPA has established four hazardous waste characteristics including corrosivity, ignitability, reactivity, and toxicity characteristic. The lists of wastes identified by the EPA include wastes generated from nonspecific sources (F-listed wastes), specific sources (K-listed wastes), and discarded commercial chemical products (P- and U-listed wastes).

⁶(EPA 1990b), (EPA 1990c), (EPA 1990d), (EPA 1990e), (EPA 1990f), (EPA 1990g), (EPA 1990h), (EPA 1990i).

The EPA established alpha-numeric waste codes that correspond to each category of waste. A waste exhibiting a hazardous waste characteristic is assigned a D code. For example, an ignitable waste is assigned the waste code of D001. Listed waste codes correspond to the designations discussed above, followed by a unique set of three numbers that correspond to one of the lists of wastes developed by the EPA. For example, spent carbon tetrachloride used as a degreaser will be assigned the waste code of F001.

Two major rules have been developed in association with listed hazardous waste: the mixture rule and the derived from rule. The mixture rule states that a mixture of a listed hazardous waste and a solid waste renders the entire mixture a listed hazardous waste, irrespective of the resulting listed waste constituent concentration. The derived from rule states that any waste derived from the TSD of a listed hazardous waste remains a listed hazardous waste until delisted, irrespective of the resulting listed waste constituent concentration.

4.3 SAMPLE EXCLUSION

The RCRA regulations establish an exclusion for hazardous waste samples that are being sent to an analytical laboratory for compositional analysis. The sample exclusion provision is identified at 40 CFR Part 261.4(d). Under the provisions of this exclusion, samples of solid waste or samples of water, soil, or air, collected for the sole purpose of testing to determine their characteristics or composition, are exempt from RCRA regulation provided that certain conditions are met. Samples collected for these purposes are exempt from RCRA regulations when:

- The sample is being transported to a laboratory for the purpose of testing or being transported back to the sample collector after testing
- The sample is being stored by the sample collector before transport to a laboratory for testing
- The sample is being stored in a laboratory prior to testing
- The sample is being stored in a laboratory (after testing) for a specific purpose (e.g., until the conclusion of a court case or enforcement action when further testing of the sample may be necessary).

In order to qualify for the sample exclusion, a sample collector shipping samples to a laboratory and a laboratory returning samples to a sample collector must comply with U.S. Department of Transportation (DOT), U.S. Postal Service (USPS), or any other applicable shipping requirements. If it is determined that the requirements of the DOT, USPS, or other shipping requirements do not apply to the sample, the sample collector or laboratory must package the sample so that it does not leak and the following information must accompany the sample:

- The sample collector's and laboratory's name, mailing address, and telephone number

- The quantity and description of the sample
- The date of shipment.

4.4 TREATABILITY STUDY SAMPLE EXCLUSION

On July 19, 1988, the EPA expanded a previous exclusion for laboratory samples to include samples obtained for the purposes of performing small-scale treatability tests. The regulations applicable to the collection and shipment of treatability study samples are identified at 40 CFR Part 261.4(e). In addition, a treatability study is defined as a study in which a hazardous waste is subjected to a treatment process to determine:

- Whether the waste is amenable to a treatment process or the level of pretreatment (if any) that is required
- The optimal process conditions needed to achieve the desired treatment or the efficiency of the treatment process
- The characteristics and volume of residuals from a particular treatment process.

Also included in this definition are liner compatibility, corrosion, and other material compatibility studies and toxicological and health effects studies. A "treatability study" is not a means to commercially treat or dispose of hazardous waste.

4.4.1 Limitations on Treatability Studies

Persons who generate or collect samples for the purposes of performing treatability studies are not subject to the requirements of 40 CFR Parts 261 through 263 (i.e., identification of hazardous waste, generator standards, and transporter standards, respectively) when one of the following applies.

- The sample is being collected and prepared for transportation by the generator or sample collector.
- The sample is being accumulated or stored by the generator or sample collector prior to transportation to a laboratory or testing facility.
- The sample is being transported to the laboratory or testing facility for the purpose of conducting a treatability study.

4.4.2 Quantity Limits per Waste Stream per Treatment Process

The EPA has established weight limits for each process being evaluated and for each generated waste stream. The 40 CFR Part 261.4(e) provides for an exemption of 1,000 kg on nonacute hazardous waste per waste stream pretreatment process; 1 kg of acute hazardous waste per waste stream per

treatment process; or 250 kg of soils, water, or debris contaminated by acute hazardous waste per waste stream per treatment process.

The EPA defines "waste stream" such that a waste stream and the quantity limit are not based on the EPA waste code alone; rather, the Agency believes that a broad interpretation is necessary because each medium (i.e., soils, water, or debris) may require a different treatability study and may need to be shipped to a different laboratory or testing facility. The EPA also broadly defines "treatment process" to allow a generator to evaluate various alternative approaches. For example, a generator could send 1,000 kg of nonacute hazardous waste; 1 kg of acute hazardous waste; or 250 kg of soils, water, or debris contaminated with acute hazardous waste for each generated waste stream to a number of different processes (i.e., biological treatment, incineration, fixation, etc.).

On a case-by-case basis, the EPA may allow an increase to the above specified quantity limitations of an additional 500 kg of nonacute hazardous waste; 1 kg of acute hazardous waste; and 250 kg of soils, water, and debris contaminated with acute hazardous waste. The EPA will only allow additional quantities of hazardous waste when it can be demonstrated that one of the following circumstances or situations exist.

- There has been an equipment or mechanical failure and additional waste is needed to conduct a study.
- There is a need to verify the results of a previously evaluated treatment process.
- There is a need to study and analyze alternative techniques within a previously evaluated treatment process.
- There is a need to do further evaluation of an ongoing treatability study to determine final specifications for treatment.

These adjustments may only be authorized if the specified limits per waste stream per treatment process have been subjected to a treatability study evaluation and insufficient data are available to properly design a treatment process.

4.4.3 Transportation Shipment Limits

The EPA has established shipment limits for treatability study samples as follows: 1,000 kg of nonacute hazardous waste; 1 kg of acute hazardous waste; or 250 kg of soils, water, or debris contaminated with acute hazardous waste. These shipment limitations apply to the shipment of waste samples from the generator or sample collector to the laboratory or testing facility when such samples are being sent for the purpose of conducting a treatability study. The exemption will also apply when unused waste samples and residues generated by the treatability study are returned to the generator or sample collector following completion of the study.

All samples of hazardous waste being shipped to a laboratory for the purpose of performing treatability studies remain subject to all applicable

DOT and USPS regulations regarding shipment of hazardous materials. If the shipments do not fall under DOT or USPS jurisdiction, the generator or sample collector and the laboratory or testing facility must follow the requirements for labeling and packaging established at 40 CFR Part 261.4(e)(2)(iii).

4.4.4 Treatment Rate Limit

In order for a laboratory performing treatability studies to be exempt per 40 CFR Part 261.4(f) a number of restrictions apply. The laboratory is required to notify the Regional Administrator of EPA in writing at least 45 days prior to conducting treatability studies. In addition, the EPA has established a treatment rate of 250 kg per day of "as received" waste for the entire laboratory or testing facility. The term "as received" was chosen because some of the treatment processes involve the addition of nonhazardous material to reduce the environmental mobility of hazardous constituents. "As received" refers to the waste shipped by the generator or sample collector as it arrives at the laboratory or testing facility. Laboratories and testing facilities that are conducting treatability studies and that meet the treatment rate limit are exempted from the requirements to obtain a RCRA Subtitle C treatment permit.

4.4.5 Storage Limits

The EPA has established a storage limitation of 1,000 kg per laboratory or testing facility. However, the EPA has also decided to specify the 1,000 kg storage limitation for "as received" waste. The 1,000 kg storage limitation per laboratory or testing facility can include 500 kg of soils, water, or debris contaminated with acute hazardous waste or 1 kg of acute hazardous waste.

4.4.6 Residues and Unused Samples

Any untreated sample and any residue generated during the treatability study must be returned to the generator within 90 days of study completion or within 1 year from the date of shipment by the generator to the laboratory or testing facility, whichever is earlier. Otherwise, the laboratory or testing facility conducting the treatability test must manage these materials as a RCRA hazardous waste (unless the waste is no longer hazardous). Once samples and residues are returned to the generator, they are no longer exempt under these regulations. Ultimately, the unused sample and residues that are still hazardous must be manifested and disposed of in a RCRA designated facility by the laboratory or testing facility, the waste generator, or the sample collector.

4.4.7 Reporting and Recordkeeping Requirements

In addition to the requirements specified above, the EPA has established specific reporting and recordkeeping requirements applicable to the laboratory or testing facility performing the treatability study. These requirements are identified at 40 CFR Part 261.4(f)(7) through (9).

4.5 RESEARCH DEVELOPMENT AND DEMONSTRATION PERMITS

The HSWA amendments of 1984 provided the EPA authority to issue permits for research, development, and demonstration (RD&D) treatment activities. The amendment grants EPA authority to issue permits independent of existing regulations relating to hazardous waste treatment processes. The EPA is directed to include certain provisions in each permit, as well as any other requirements deemed necessary, to protect human health and the environment. With several exceptions, the amendment also allows a waiver or modification of the permit application and permit issuance requirements of the general permit regulations. The EPA has codified the requirements for obtaining an RD&D permit at 40 CFR Part 270.65. This regulation has four basic provisions, which are discussed below.

Paragraph (a) of the regulation authorizes the Administrator to issue RD&D permits for innovative and experimental technologies or processes for which permit standards have not been established under 40 CFR Part 264 or 266. The regulation authorizes the Administrator to establish permit terms and conditions for the RD&D activities, as necessary, to protect human health and the environment. The statutory amendment allows the Administrator to select the appropriate technical standards for each RD&D activity to be permitted. The EPA is required to address construction, limit operation for not longer than 1 year, and place limitations on the waste that may be received to those types and quantities of wastes deemed necessary to conduct the RD&D activities. Other possible requirements include, but are not limited to, provisions regarding monitoring, operation, closure, remedial action, and testing and providing information.

Paragraph (b) provides that the Agency will generally follow the permitting procedures of Parts 124 (EPA 1990k) and 270. As authorized, EPA reserves the right to waive or modify these procedures to expedite permitting as long as human health and the environment are protected. However, EPA will not waive the public participation procedures.

Paragraph (c) implements the statutory authority provision that authorizes the Administrator to order an immediate cessation of any operations at the facility, if necessary, to protect human health or the environment.

Finally, paragraph (d) indicates that permits are initially to be issued for a period of 1 year of operation. The permit may be renewed up to three times for periods of not more than 1 year of operating days.

Background information for HSWA provides three examples of RD&D activities that may be covered by these regulations.

1. A common experiment involves an individual or company who has designed on paper or in the laboratory an innovative treatment system for hazardous waste. In order to determine whether this new technology is technically feasible, a small pilot-scale unit may be constructed and operated for purposes of evaluation. If this is successful, a larger but still pilot-scale, experimental unit may be constructed to demonstrate the reliability, economic feasibility, and environmental impacts of the process.

2. A type of hazardous waste management experiment involves an equipment vendor and a waste generating or processing customer. Vendors often custom prepare storage and processing equipment (i.e., tanks, incinerators, etc.) based on a customer's individual needs, and this may require one or more tests with a pilot facility using samples of the customer's waste.
3. A manufacturer or user of a particular commercial treatment process may want to improve its efficiency or effectiveness or to reduce environmental impacts. This may involve the construction of a pilot-scale treatment unit that will be operated in an experimental mode to test new wastes or alternate operating conditions.

The above list of examples is not an exclusive list of the activities that may be permitted.

4.6 GENERATOR AND TRANSPORTER STANDARDS

The 40 CFR Part 262 establishes the requirements applicable to generators of hazardous waste. According to these regulations, large quantity generators may accumulate hazardous waste onsite without a permit, provided that the waste is not accumulated for greater than 90 days from the time of initial generation. In order to accumulate hazardous waste onsite, the generator must ensure that a hazardous waste determination is made on the waste and that the waste is properly transported to a permitted TSD facility. The generator must also ensure that containers of hazardous waste are packaged, marked, and labeled in accordance with DOT requirements.

The regulations applicable to transporters of hazardous waste are identified at 40 CFR Part 263. Any person transporting hazardous waste must receive an EPA identification number and ensure that each shipment is accompanied with a hazardous waste manifest. Before transporting the hazardous waste, the transporter must sign and date the manifest, acknowledging acceptance of the hazardous waste from the generator. The transporter must return a signed and dated copy of the manifest to the generator and ensure that any subsequent transporter or designated facility also receives a copy of the manifest. The transporter must ensure that the entire shipment of hazardous waste is transported to the designated facility or to an alternate facility if the designated facility is unable to accept the shipment. Finally, the transporter of hazardous waste must maintain a copy of the manifest, signed by the generator, for a period of at least 3 years and must take immediate response action to discharges of hazardous waste that occur during transportation.

4.7 LAND DISPOSAL RESTRICTIONS

As discussed above, one of the major provisions of HSWA was the establishment of the LDR regulations. These regulations are identified at 40 CFR Part 268 and require that all hazardous wastes meet certain treatment standards prior to being disposed of in or on the land. These treatment standards require treatment using a specified technology or a specific concentration and require the use of best demonstrated available technology

(BDAT). Where a treatment standard is identified as a specified technology, the owner or operator may only treat the waste using that specific technology. However, where the treatment standard is specified as a concentration, the owner or operator may utilize any technology that will reduce the regulated constituents to the specified concentration.

The LDR regulations also establish two broad waste categories that will impact the type of treatment required: wastewater and nonwastewater. Wastewaters are wastes that contain less than 1 percent by weight total organic carbon (TOC) and less than 1 percent total suspended solids. An alternate definition of wastewater was developed for listed hazardous wastes with the waste code of F001-F005. For these wastes, a wastewater is defined as solvent-water mixtures that contain less than 1 percent by weight TOC or less than 1 percent by weight total F001-F005 solvent constituents listed in 40 CFR Part 268.41. Nonwastewaters are defined as those wastes that do not meet the definition of wastewater.

The LDR regulations require the generator of a hazardous waste to determine whether or not the waste is restricted and, thus, subject to LDR regulations. The generator is required to make this determination at the point of generation and prior to commingling with other waste streams. In addition, 40 CFR Part 268.7 establishes the waste analysis requirements and the certification requirements for wastes that do and do not meet the applicable treatment standard of 40 CFR Part 268, Subpart D.

The LDR regulations also establish limitations on the storage of restricted waste, known as the storage prohibition. Under this prohibition, an owner or operator of a TSD facility may store a restricted hazardous waste for up to 1 year, provided that such storage is necessary to accumulate sufficient quantities of waste to facilitate treatment. The burden of proving that such accumulation is legitimate rests with the EPA during the first 1-year accumulation period. After the first year of accumulation, the burden of proving that the accumulation of hazardous waste is necessary to facilitate treatment rests with the owner or operator.

All restricted wastes are prohibited from land disposal without prior treatment unless a variance from the LDR regulations is obtained from the EPA. The types of variances from the LDR regulations are a no-migration petition and a treatability variance. In order to secure a no-migration petition, the owner or operator must demonstrate that there will be no release of hazardous constituents from the land disposal unit for as long as the waste remains hazardous. The information required for this type of petition is identified at 40 CFR Part 268.6. Additionally, an owner or operator may file a treatability variance petition if the waste in question is significantly different than the waste that was evaluated in establishing the corresponding BDAT treatment standard. An equivalency petition may also be filed when a specified technology will not be used, but an equivalent level of treatment will be provided.

4.8 TREATMENT, STORAGE, AND DISPOSAL FACILITIES

In establishing the RCRA regulations, the EPA determined that existing facilities or facilities for which construction had commenced would be allowed

to operate under interim status until a final permit was approved by the EPA. A facility was determined to be in existence if TSD of hazardous waste was being conducted on or before November 19, 1980. A facility was considered to have begun construction if contractual obligations, which could not be canceled or modified without substantial loss, had been entered into for physical construction of the site. In order to allow continued operation of TSD facilities under interim status, the EPA required the owner or operator of existing facilities to submit a Part A permit application. The second part of the permit application, the Part B permit application, was required to be submitted to the EPA by dates specified in 40 CFR Part 270, depending upon the type of unit in question.

The EPA has established technical standards for interim status facilities at 40 CFR Part 265 and for final status facilities (i.e., those that have received an approved facility permit) at 40 CFR Part 264. The EPA has established technical standards for containers, tanks, surface impoundments, landfills, waste piles, land treatment units, incinerators, and miscellaneous units. As discussed above, hazardous waste may be accumulated without undergoing the permitting process, provided that such waste is transported to a permitted TSD facility within 90 days of generation.

A TSD facility may only accept wastes that have been identified on the corresponding Part A and Part B permit applications. If a particular waste code is not included on the TSD facility's permit application, the permit will require modification in accordance with the procedures specified at 40 CFR Part 270. New TSD facilities are not allowed to manage hazardous waste until they receive final permit approval from the EPA or unless an existing facility can be expanded to accommodate the waste or process in question.

4.9 TREATMENT AND STORAGE TANK CLOSURE OPTIONS

The following sections discuss regulatory options that may be pursued to address final closure of a tank system associated with the UST-ID Program. Final closure of a RCRA regulated tank system must be undertaken in accordance with an approved closure plan. Development of a closure plan and closure options for a RCRA tank system may be outside of the scope of the UST-ID Program. However, the following discussion may be helpful in establishing the most appropriate approach for closure of tanks used for the treatment and storage of RMW.

In most cases, closure will be undertaken in accordance with existing RCRA regulations. These closure options may include: (1) retrieve or decontaminate all waste and waste residues, contaminated equipment, and tank systems (40 CFR Part 264, Subpart J); (2) perform closure as a landfill with waste remaining in place (40 CFR Part 264, Subpart N); or (3) perform closure as a miscellaneous unit (40 CFR Part 264, Subpart X).

4.9.1 Closure as a Treatment and Storage Tank

The 40 CFR Part 264, Subpart J tank standards require complete removal or decontamination of waste and the tank system upon closure. In the event that the owner or operator cannot remove all contaminated soil at closure, final

closure must be conducted in accordance with the requirements for landfills. In addition, postclosure monitoring would be required in accordance with a postclosure permit application, meeting the requirements of 40 CFR Part 264, Subpart N, "Landfills." Depending upon the physical characteristics of the waste in question, it may not be feasible to meet the remove or decontaminate standard. In this case, a landfill closure option should be evaluated.

4.9.2 Closure as a Landfill

In a December 10, 1987, *Federal Register* (EPA, 1987b), the EPA provided clarification on the definition of a landfill. As part of this clarification, the EPA stated the following:

"Under limited circumstances, the Subpart J tank standards do allow treatment or storage tanks that cannot remove all contamination at closure to close and to perform post-closure care in accordance with the closure and post-closure requirements for landfills. Further, disposal in tanks will be regulated under the Subpart N standards as a landfill because "landfills" and the disposal of hazardous waste in tanks raise similar human health and environmental concerns and because tanks are similarly placed in or on the land."

Although this language is not reflected in current regulations, it is clear that the EPA does have the discretion to allow a landfill closure of treatment and storage tanks when contamination cannot be removed. The advantage to this approach is that complete waste removal or decontamination would not be required.

As part of the landfill closure requirements of 40 CFR Part 264, Subpart N, postclosure monitoring, including the installation of an intrusion barrier and a RCRA compliant groundwater monitoring system, would be required. Also, postclosure monitoring and inspection of the closed facility would be required for a period of at least 30 years.

4.9.3 Closure as a Miscellaneous Unit

The UST-ID Program will evaluate a number of innovative waste treatment options, including in situ treatment. The EPA developed standards for TSD facilities that are not addressed by the existing RCRA Subtitle C regulatory framework. These regulations are identified at 40 CFR Part 264, Subpart X, "Miscellaneous Units." Depending upon the type of technology implemented for a given tank system, classification of a tank system as a miscellaneous unit may provide a mechanism for obtaining a RCRA permit when a tank system cannot meet the remove or decontaminate standard. For example, in situ vitrification may prove to be an acceptable technology to accommodate closure of a tank system. In this case, treatment would be initiated in a tank system; but, as vitrification proceeds, the tank system and waste contained in the tank would be vitrified, resulting in a landfill type of closure activity. The waste unit designation for those situations where tank waste cannot be removed or decontaminated will most likely be concluded through negotiations with state authorities.

**4.10 IMPACTS TO THE UNDERGROUND STORAGE TANK-INTEGRATED
DEMONSTRATION PROGRAM**

The RCRA regulations are expected to have significant impacts on the UST-ID Program. Regulations applicable to the generation of hazardous waste as well as the obtaining of permits for RD&D activities may be required, and adequate time to secure all needed permits should be included early in the planning phases. In addition, treatment activities associated with pretreatment programs may require a RCRA treatment permit if such activities cannot be conducted under the provisions of a RD&D permit. As discussed above, new TSD facilities require permit approval prior to construction unless the activities can be conducted in an existing facility under the provisions of an expansion.

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5.0 CLEAN WATER ACT OF 1977

5.1 BACKGROUND

In 1972 Congress recodified the Federal Water Pollution Control Act. The recodified act, known as the *Clean Water Act of 1977* (CWA), made the EPA responsible for establishing wastewater effluent standards on an industry-by-industry basis. Among other things, the implementing regulations of the CWA were developed to regulate wastewater discharges from industrial point sources and also to regulate the discharge of industrial wastewaters to publicly owned treatment works (POTW). These implementing regulations and discharge limits have been codified at 40 CFR Parts 122 through 125.

5.2 WASTEWATER DISCHARGES THROUGH A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Section 402 of the CWA establishes permitting requirements and limitations for point source discharges of wastewater into any waters of the United States. The requirements applicable to such discharges and the corresponding discharge limits have been codified at 40 CFR Part 122 entitled "National Pollutant Discharge Elimination System" (NPDES) (EPA 1990). Section 502(14) of the CWA defines a "point source" as follows:

"Any discernable, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharge. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture."

In addition, the EPA defines waters of the United States to include the following: (1) navigable waters, (2) tributaries of navigable waters, (3) interstate waters, and (4) intrastate lakes, rivers, and streams.

5.2.1 Permitting Requirements

Under Section 402 of the CWA, the EPA is the NPDES permit issuing authority until such time that the EPA authorizes a given state to implement the federal program. The requirements associated with obtaining an NPDES permit are codified at 40 CFR Part 122, Subpart B. According to these regulations, any person proposing a new discharge is required to submit an application to the EPA or authorized state at least 180 days before the day on which the discharge is to commence, unless the Director of EPA or an authorized state has granted permission for a later date. Persons proposing a new discharge are encouraged to submit their applications well in advance of the 180-day requirements in order to avoid delays. In most cases, when a given state is authorized to implement the federal program, the effluent discharge limits specified in the NPDES permit will make reference to corresponding state water quality standards.

5.3 WASTEWATER DISCHARGES TO A PUBLICLY OWNED TREATMENT WORKS

In the event that a facility associated with the UST-ID Program discharges wastewater to a POTW, the discharge and permit requirements of 40 CFR Part 403 may be applicable. These requirements were adopted pursuant to Section 307(b) of the CWA and were established to protect the POTW receiving such wastewater and to prevent the discharge of pollutants that will pass through the POTW as untreated wastewater. The regulations developed under 40 CFR Part 403 (EPA 1990m) include general wastewater discharge limits that all facilities discharging to a POTW must comply with, as well as industry specific standards that are applicable only to that specified industry. The general wastewater discharge limits, established to prevent interruption of the POTW, include the following discharge prohibitions:

- Pollutants that create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Celsius using the test method specified in 40 CFR Part 261.21
- Pollutants that will cause corrosive structural damage to the POTW, but in no case discharges with a pH lower than 5.0 unless the works is specifically designed to accommodate such discharges
- Solid or viscous pollutants in amounts that will cause obstruction to the flow in the POTW, resulting in interference
- Any pollutant, including oxygen-demanding pollutants (biological oxygen demand, etc.) released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW
- Heat in amounts that will inhibit biological activity in the POTW and will result in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 104 degrees Fahrenheit or 40 degrees Celsius unless the approval authority, upon request of the POTW, approves alternate temperature limits
- Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through
- Pollutants that result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.

5.3.1 Pretreatment Permits

Under Section 307 of the CWA, the EPA is authorized to issue pretreatment standards, codified at 40 CFR Part 403. These standards are usually established as industrial effluent guidelines, requiring industrial facilities discharging directly into municipal treatment works to remove toxic substances from their wastes through waste pretreatment prior to discharging to the POTW system. U.S. Department of Energy facilities are not categorized as industrial, for which the EPA has established pretreatment discharge limits.

The POTW receiving wastewater from DOE facilities will establish effluent discharge limits for the facility in question, based upon the effluent limitations specified in its NPDES permit.

5.4 IMPACTS TO THE UNDERGROUND STORAGE TANK-INTEGRATED DEMONSTRATION PROGRAM

The extent to which the requirements of the CWA will impact the UST-ID Program is contingent upon the type of wastewater generated and how it is discharged from the generating source. It is unlikely that projects and/or demonstrations conducted in existing facilities will be impacted by the requirements of the CWA. In this case, it is assumed that existing facilities that discharge wastewater from a point source or to a POTW would have already addressed pretreatment and permitting requirements.

The requirements of the CWA may significantly impact the UST-ID Program for newly constructed facilities that will discharge wastewater from a point source or to a POTW. Permitting and pretreatment requirements for these facilities will need to be identified well in advance of facility construction. As discussed above, NPDES permits are required to be submitted to the EPA or authorized state 6 months prior to beginning construction, and the owner or operator is encouraged to submit permit applications well in advance of the 6-month time period in order to avoid delays.

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6.0 U.S. DEPARTMENT OF ENERGY ORDERS

6.1 BACKGROUND

Congress passed the *Atomic Energy Act of 1954* (AEA) to establish a program for governmental control of the possession, use, and production of atomic energy and special nuclear materials in the interest of common defense and security and to protect human health and safety of the public. The AEA specifically regulates source, special nuclear, and by-product materials and originally established the Atomic Energy Commission as the regulatory authority governing the management of these materials. The DOE is now the lead regulatory authority and implements the provisions and requirements of the AEA through DOE Orders.

6.2 DOE ORDER 5400.1

The purpose of DOE Order 5400.1 (DOE 1988a) is to establish environmental protection program requirements and responsibilities for DOE operations and to ensure compliance with applicable environmental protection laws and regulations. Chapter II of this order requires field organizations and DOE contractors to notify the Headquarters Emergency Operations Center of the significant nonroutine release of any pollutant or hazardous substance. A significant nonroutine release is determined to mean those releases of hazardous substances that are reported to the EPA National Response Center as required by the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). Chapter III requires DOE operations develop and implement program plans for each facility or group of facilities for which they are responsible. Finally, Chapter IV requires the development of effluent monitoring plans for each DOE facility.

6.3 DOE ORDER 5400.5

The purpose of DOE Order 5400.5 (DOE 1990c) is to establish dose limits for public exposure to radiation from DOE operations, to set specific limits for releases of radiation to air and water, and to require that doses to individuals be maintained ALARA. These limits will require effective protection against radiation releases during waste management operations. This order also establishes derived concentration guides for conducting radiological environmental protection programs at operational DOE facilities. Derived air concentration guides for controlling occupational intake of radionuclides through inhalation are also provided in this order.

6.4 DOE ORDER 5480.3

The purpose of DOE Order 5480.3 (DOE 1985) is to establish requirements for the packaging and transportation of hazardous materials, hazardous substances, and hazardous wastes. This order states "when offered to the carrier, each shipment of hazardous materials, hazardous substances, or hazardous waste shall be in compliance with this order, and the applicable safety regulations of the Department of Transportation." The package

standards specified in this order include the standards for radioactive materials in amounts greater than Type A quantities, structural standards for Type B packaging, and criticality standards for fissile material packages.

6.5 DOE ORDER 5480.11

The purpose of DOE Order 5480.11 (DOE 1988b) is to establish radiation protection standards and program requirements for the DOE and DOE contractor operations with respect to the protection of the worker from ionizing radiation. These radiation standards are consistent with EPA guidance, based on recommendations by the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection.

The DOE policy published in DOE Order 5480.11 requires that occupational exposure to radiation be maintained ALARA. The exposure of an occupational worker shall not exceed the following values:

- Stochastic effects: The annual effective dose from internal and external sources is 5 rem.
- Nonstochastic effects: The annual dose equivalent for individual organs is:
 - lens of eye = 15 rem
 - skin of the whole body = 50 rem
 - extremity = 50 rem
 - organ or tissue = 50 rem.
- Unborn child: The annual dose equivalent to the unborn child during the gestation period is 0.5 rem.

Nonemergency planned special exposures may, under unusual circumstances, exceed the annual effective dose equivalent limits specified above.

6.6 DOE ORDER 5820.2A

The purpose of DOE Order 5820.2A (DOE 1988c) applies to all DOE contractors and subcontractors performing work that involves management of waste containing radioactivity. This order requires that wastes be managed in a manner that ensures protection of the health and safety of the public, operating personnel, and the environment. The DOE Order 5820.2A establishes requirements for management of HLW, TRU, and LLW, as well as wastes containing naturally occurring or accelerator produced radioactive material; decommissioning of facilities; and the format for a waste management plan.

6.7 DOE ORDER 6430.1

The purpose of DOE Order 6430.1A (DOE 1989) is to provide mandatory, minimally acceptable requirements for facility design. These criteria apply to any building, acquisition, new facility addition, and alteration (including

onsite constructed buildings, plant-fabricated modular buildings, and temporary facilities). These criteria will be applicable during the planning, design, and developing phases.

6.8 IMPACTS TO THE UNDERGROUND STORAGE TANK-INTEGRATED DEMONSTRATION PROGRAM

The extent to which DOE Orders will impact the UST-ID Program will depend on the type of activity proposed and whether the associated activities will be conducted in existing or new facilities. For new facilities, DOE Order 6430.1 will be applicable and will significantly impact design considerations. The DOE Order 5820.2A will be applicable where RMW is generated and may impact operations when equipment is ready to be demonstrated, if such demonstrations are conducted in a tank containing RMW. Finally, any hazardous waste, including RMW, will be required to meet the applicable portions of DOE Order 5480.3 for the transportation of such waste.

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7.0 RESOURCE CONSERVATION AND RECOVERY ACT CORRECTIVE ACTION

7.1 BACKGROUND

The Hazardous and Solid Waste Amendments of 1984 significantly revised RCRA by adding requirements under the statutory authority of Section 3004(u). Included in these amendments are requirements for an owner or operator of a RCRA-permitted facility to address releases of hazardous waste constituents from solid waste management units (SWMU), regardless of when the waste was placed in such units. The EPA has proposed to define a SWMU as follows:

"Any discernable unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released."

In the context of the above definition, discernable units are typically identified with the RCRA regulatory program and include landfills, surface impoundments, land treatment units, waste piles, tanks, container storage areas, incinerators, injection wells, wastewater treatment units, waste recycling units, and other physical or biological treatment units [45 *Federal Register* 30798, (EPA 1990n)].

The EPA also clarified the types of units that could be expected to fall within the definition of a SWMU. Those areas of a facility where solid wastes have been released in a routine and systematic manner are considered to be SWMUs. On the other hand a one-time spill or release of a hazardous waste would not be considered to be a routine or systematic release and, thus, would not be considered a SWMU. In identifying SWMUs, the definition of facility includes all contiguous property under the control of the owner or operator of a facility seeking a permit under Subtitle C of RCRA.

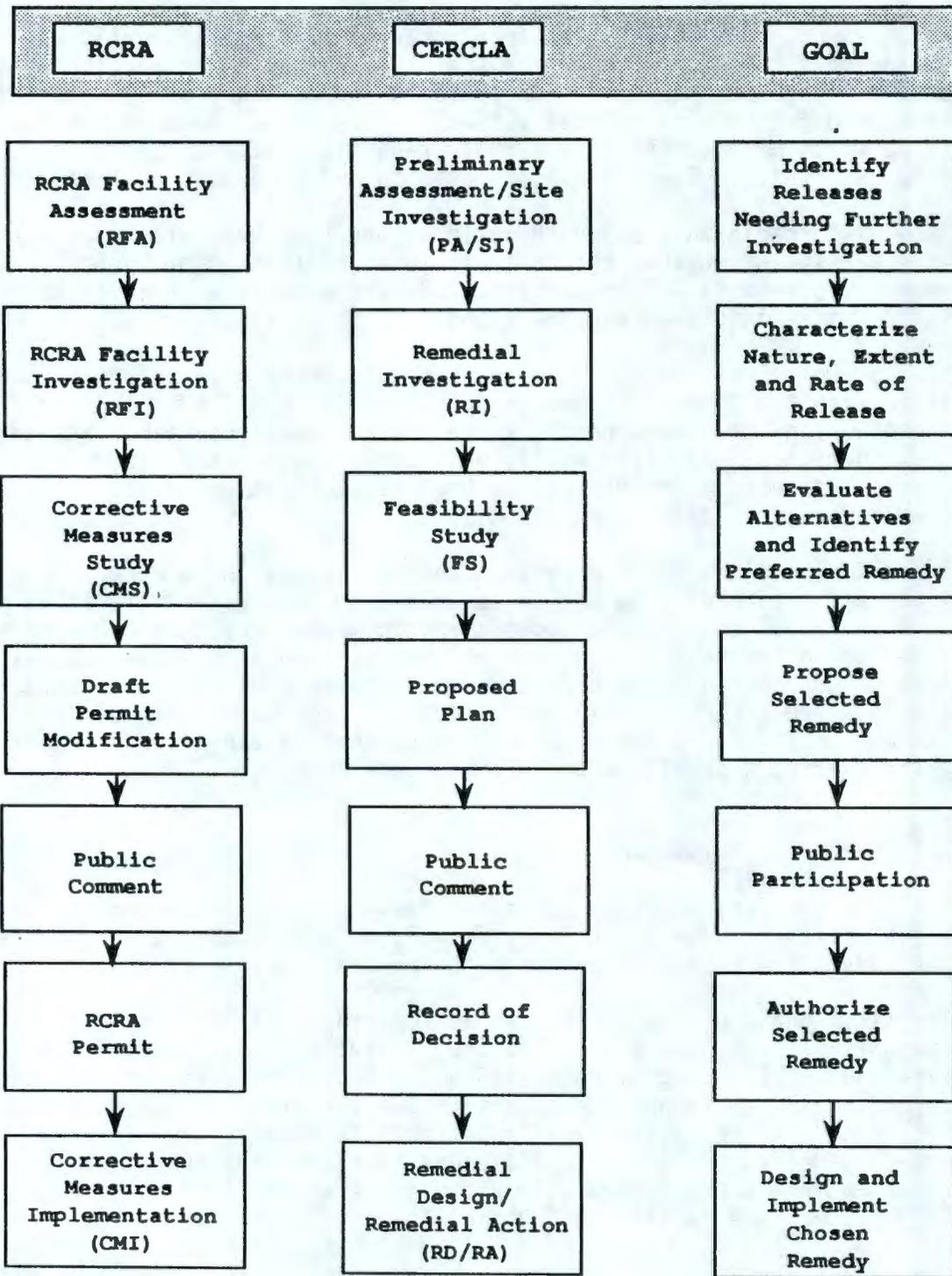
7.2 THE CORRECTIVE ACTION PROCESS

The RCRA corrective action process closely parallels the remediation process established under CERCLA. Figure 2 provides a schematic comparison of the RCRA corrective action process and the CERCLA remediation process.

The first phase of the corrective action process is the RCRA Facility Assessment (RFA), which is similar to the Preliminary Assessment/Site Investigation (PA/SI) program regulated under Superfund. In general, the purpose of the RFA is to provide a broad brush overview of available site information and, if possible, sampling efforts to confirm such information. If the Agency determines that a release may have occurred (based on the results of the RFA), the Agency will establish a schedule of compliance that will be included in a facility's RCRA permit.

The second stage of the corrective action program is the RCRA Facility Investigation (RFI). The RFI is undertaken when a potentially significant release has been identified in the RFA. The purpose of the RFI, which is analogous to the Remedial Investigation (RI) process regulated under Superfund, is to characterize the extent of contamination. When the

Figure 2. Comparison of *Resource Conservation and Recovery Act of 1976* Corrective Action and *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* Remedial Processes.



CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980

RCRA = Resource Conservation and Recovery Act of 1976

Agency determines that cleanup is likely to be necessary, the owner/operator will be required to conduct a Corrective Measures Study (CMS) to identify a solution for the problems at the site. Under certain circumstances, the Agency may require an "interim measure" at a given facility without waiting for the final result of the RFI or the CMS. These measures will only be undertaken in situations that pose a threat to human health or the environment.

7.3 REGULATED CONSTITUENTS

Section 3004(u) of RCRA requires corrective action for releases of "hazardous wastes or hazardous constituents." The remedial authority under Section 3004(u) is not limited to releases of wastes specifically listed in 40 CFR Part 261 or identified pursuant to the characteristic tests found in that section. In addition to having authority over hazardous waste, the EPA's remedial authority extends to "hazardous constituents" found in Appendix VIII of 40 CFR Part 261 and proposes to include those constituents identified in Appendix IX to 40 CFR Part 261.

7.4 CLEANUP REQUIREMENTS

In order to facilitate these cleanup goals, the EPA has determined that to be "protective" of human health, the cleanup levels for carcinogens must be equal to or below an upper bound lifetime cancer risk level of 1 in 10,000. As proposed, cleanup levels would be selected within the upper bound of 1×10^{-4} to 1×10^{-6} risk range during the selection of a remedy process. However, remedies at the more protective end of the range would ordinarily be preferred.

For noncarcinogens, cleanup levels would be set at a level at which adverse effects would not be expected to occur. For potentially drinkable groundwater, this would generally be maximum contaminant levels. Soils would be cleaned to a level consistent with plausible future patterns of land use. For example, cleanup to less stringent levels might be appropriate where an industrial site is dedicated to long-term hazardous waste management. The action levels for soils have been established assuming exposure through consumption of soil contaminated with the hazardous constituent of concern.

7.5 DEMONSTRATION OF TECHNICAL IMPRACTICABILITY

The proposed Subpart S regulations would allow the Regional Administrator to make a determination that remediation of a release to meet a specific media cleanup standard is not required when remediation is technically impracticable. In order to obtain a variance from an established cleanup standard, the owner or operator must provide clear and convincing information to the Regional Administrator that demonstrates the technical impracticability. The concept of technical impracticability may apply to situations in which use of available remedial technologies would create unacceptable risks to workers or surrounding populations or where cleanup would create unacceptable cross-media contamination.

7.6 CONDITIONAL REMEDIES

The proposed Subpart S regulations also allow the EPA to select "conditional" remedies for specific units. A conditional remedy would allow, at EPA's or the authorized State's discretion, an owner or operator to phase-in a remedy over time, as long as certain conditions are met. Generally, a conditional remedy would allow existing contamination to remain within the facility boundary, provided releases that extend beyond the facility boundary are addressed as soon as practicable, continuous releases are controlled, and further onsite migration of hazardous constituents is controlled. According to EPA, conditional remedies may be frequently used at federal facilities due to a combination of factors. These factors may include technical limitations on the ability to achieve complete cleanup at facilities that are extremely large and complex and the unique financial constraints placed on federal facilities by the nature of the federal budget process.

7.7 MANAGEMENT OF CLOSURE DERIVED WASTE

The proposed Subpart S rule indicates that all hazardous wastes that are generated as a result of performing the SWMU investigation must be managed in accordance with RCRA. Land disposal restrictions will be triggered when restricted hazardous wastes are removed from the corrective action management unit (CAMU), treated, and subsequently redeposited at the CAMU or into another land disposal unit. On the other hand, conducting earth-moving operations or excavations within the CAMU does not constitute placement of a hazardous waste in a land disposal unit and will not constitute either creation of a new or replacement unit or a lateral expansion of an existing unit; therefore, the minimum technology requirements for new landfills and lateral expansions or replacement units of existing landfills would not apply. Similarly, hazardous waste that is moved entirely within the CAMU would not be subject to the land disposal restrictions promulgated under 40 CFR Part 268.

7.8 IMPACTS TO THE UNDERGROUND STORAGE TANK-INTEGRATED DEMONSTRATION PROGRAM

The impact to the UST-ID Program from the corrective action regulations will be contingent upon the type of activity being planned and the status of the unit for which the activity is being conducted. For example, demonstration of retrieval equipment in a tank that is an active TSD facility will most likely not be impacted by the RCRA corrective action regulations. In this case, the RCRA regulations applicable to generators and TSD facilities will most likely have the greatest impact on the proposed action.

However, a demonstration that is being conducted in a tank or unit that has been categorized as a past-practice unit may be significantly impacted by these regulations. Depending upon the type of activity planned, it is possible that the EPA may not allow certain activities to be conducted until the RFA and preliminary characterization activities are completed.

8.0 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980

8.1 BACKGROUND

The *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* establishes a mechanism to ensure identification and remediation of hazardous substances that have been released to the environment. The CERCLA is a liability-based statute in that those potentially responsible parties (PRP), responsible for hazardous substances at a given site, are also financially responsible for the cleanup of such sites. The CERCLA also establishes a fund of money that can be utilized in cases where PRPs cannot be identified.

Two of the major regulatory provisions of CERCLA are the National Contingency Plan (NCP) and the release-reporting requirements. The regulations that implement these two major portions of CERCLA are identified at 40 CFR Part 300 (EPA 1990o) and 40 CFR Part 302 (EPA 1990p), respectively. These two major regulatory provisions of CERCLA are discussed in more detail in the following paragraphs.

8.2 NATIONAL CONTINGENCY PLAN

The NCP provides a methodology for evaluating or ranking units from which releases of hazardous substances may adversely impact human health or the environment. Once a hazardous waste disposal site is identified, EPA will conduct a PA/SI. The information obtained from the PA/SI will provide information that can be utilized to rank the site in accordance with the procedures established in the Hazard Ranking System (HRS) of Appendix A to 40 CFR Part 300. In ranking waste disposal units, the HRS considers, among other things, the nature of the hazardous substances involved, the pathways of exposure to human receptors, depth to groundwater, and other relevant factors. The EPA utilizes this information to determine whether or not a given waste disposal unit should be added to the National Priorities List (NPL) for future remediation.

Those sites that have been placed on the NPL are required to undergo a specific process for evaluating alternatives to remediate the site in question. The CERCLA process begins with an RI. The RI includes the following:

- The collection of data identified during project scoping as necessary to characterize the site and evaluate remedial alternatives
- The characterization of current and potential risks through a baseline risk assessment
- Treatability studies.

During the site characterization, site specific data are collected and assessed to determine what, if any, types of response actions are warranted.

Once the contaminants of concern have been identified, the baseline risk assessment is performed to determine whether the site poses a current or potential risk to human health and the environment.

The second phase of the CERCLA process is the feasibility study (FS). The purpose of the FS is to provide the decision makers with an assessment of alternatives and trade-offs in selecting one remediation alternative over another. The first step in the FS process involves developing remedial action objectives for protecting human health and the environment, which should specify contaminants and media of concern. The preliminary remediation goal is to assist in the development and evaluation of remedial alternatives, by establishing initially acceptable contaminant levels for each exposure route.

Once the RI/FS process is completed, the EPA will evaluate the identified remediation alternatives and decide on the appropriate remedial action for the site in question. The final remedial action will be specified in a record of decision, issued by the EPA, that identifies the specified remedial action and the level of cleanup expected to be achieved.

8.2.1 Applicable or Relevant and Appropriate Requirements

The NCP requires remedial actions to comply with applicable or relevant and appropriate requirements (ARAR) to the extent practicable, considering the exigencies of the situation. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental requirements that specifically address a hazardous substance, pollutant, remedial action or other circumstances at a CERCLA site. Determining whether or not a requirement is both relevant and appropriate requires consideration as well. A requirement is considered to be relevant if it generally pertains to the remedial action in question. A requirement is considered to be appropriate if the requirement is determined to be well suited to the particular site, based on the nature of the hazardous substances, characteristics of the site, and the proposed remedial action.

The LDR regulations are one of the ARARs that warrant attention. According to the LDR regulations, a prohibited waste must be treated either to a specified concentration or by a specified technology before such waste is placed in or on the land for disposal. The EPA has determined a number of actions undertaken that constitute placement of a hazardous waste and, thus, trigger LDR regulations. Placement or disposal of a hazardous waste occurs under the following conditions.

- Wastes from different units are consolidated into one unit (other than a land disposal unit within an area of contamination).
- Waste is removed and treated outside a unit and redeposited into the same or another unit (other than a land disposal unit within an area of contamination).
- Waste is picked up from the unit and treated within the area of contamination in an incinerator, surface impoundment, or tank, and then redeposited into the unit. In situ treatment activities do not constitute placement/disposal and do not trigger LDR regulations.

8.3 RELEASE REPORTING REQUIREMENTS

The requirement for reporting the releases of hazardous substances in excess of a reportable quantity (RQ) is the second major provision of CERCLA. These regulations and associated RQs for regulated hazardous substances are identified at 40 CFR Part 302. In summary, an owner or operator of a facility is required to make a notification to the National Response Center (NRC) when a hazardous substance has been released to the environment in excess of an RQ.

In establishing the release-reporting requirements, the EPA included a special provision for facilities that are expected to have continuous releases of hazardous substances in excess of an RQ. The EPA defined a continuous release to be a release of a hazardous substance that is "continuous" and "stable in quantity and rate." For example, a continuous release may be a release that occurs 24 hours a day (such as a radon release from a stock pile), or a release that occurs during a certain process (such as benzene released during the production of polymers), or a release that occurs intermittently (such as the release of a hazardous substance from a tank vent each time the tank is filled) (EPA 1990q). Rather than report every time a release of a hazardous substance in excess of an RQ occurs, the EPA requires the following reporting requirements for continuous releases:

1. Initial notification by telephone to the NRC, the State Emergency Response Commission (SERC), the Local Emergency Planning Committee (LEPC), and initial written notification to the EPA Regional Office, SERC, and LEPC
2. A one-time written follow-up report to the EPA Regional Office
3. Immediate notification of a statistically significant increase to the NRC, SERC, and LEPC
4. Written notification to the EPA Regional Office of any other changes in the release
5. Within 30 days of the first anniversary date of the initial written notification, the owner or operator is required to reassess all reported continuous releases of CERCLA hazardous substances and submit a one-time follow-up report to the appropriate EPA Regional Office.

8.4 IMPACTS TO THE UNDERGROUND STORAGE TANK-INTEGRATED DEMONSTRATION PROGRAM

Impacts to the UST-ID Program from CERCLA regulations will be contingent upon the type of unit in which a demonstration will be performed. Because the regulations that implement the NCP are focused on past-practice units, it is unlikely that the NCP and remedial action process will significantly impact this program. However, the release-reporting requirements will be applicable and must be considered for releases of hazardous substances to the environment in excess of a specified RQ. The potential for releases of hazardous

substances is likely to depend upon the types of activity being planned. It is important to note that the CERCLA reporting requirements are not limited to releases of hazardous wastes and include releases to any environmental media.

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