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ENVIRONMENTAL GUIDANCE

RCRA/CERCLA DIVISION

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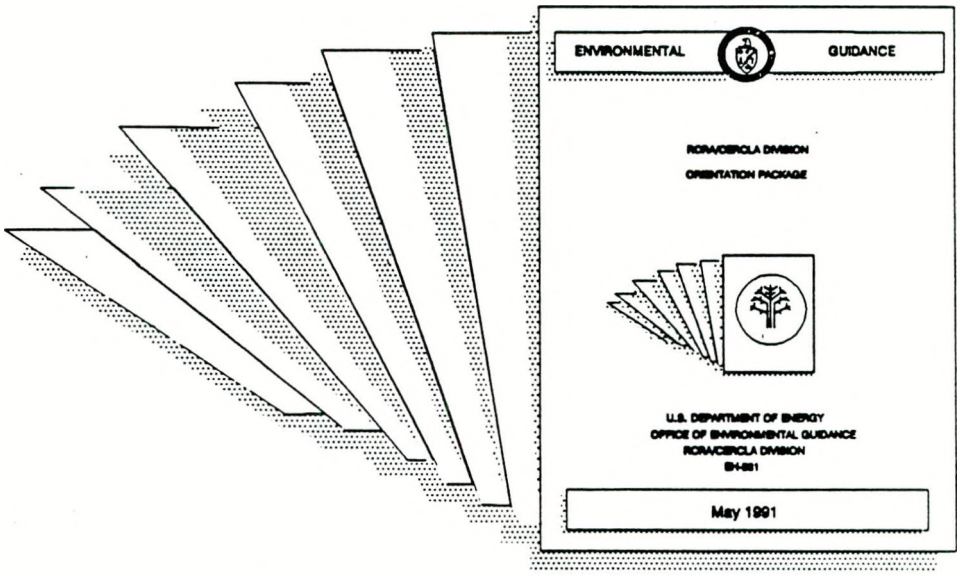

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENVIRONMENTAL GUIDANCE
RCRA/CERCLA DIVISION
EH-231

May 1991

MASTER

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NOTE: The documents listed above are available through the Office of Scientific and Technical Information (OSTI). To place an order with OSTI contact Ms. Leota Kane at (FTS) 626-3385 or (615) 576-3385.

Chapter I

Mission of Office of Environmental Guidance

OFFICE OF ENVIRONMENTAL GUIDANCE

MISSION

The Office of Environmental Guidance is located within the Office of Environmental Guidance and Compliance, Office of the Assistant Secretary to the Environment, Safety and Health (ES&H).

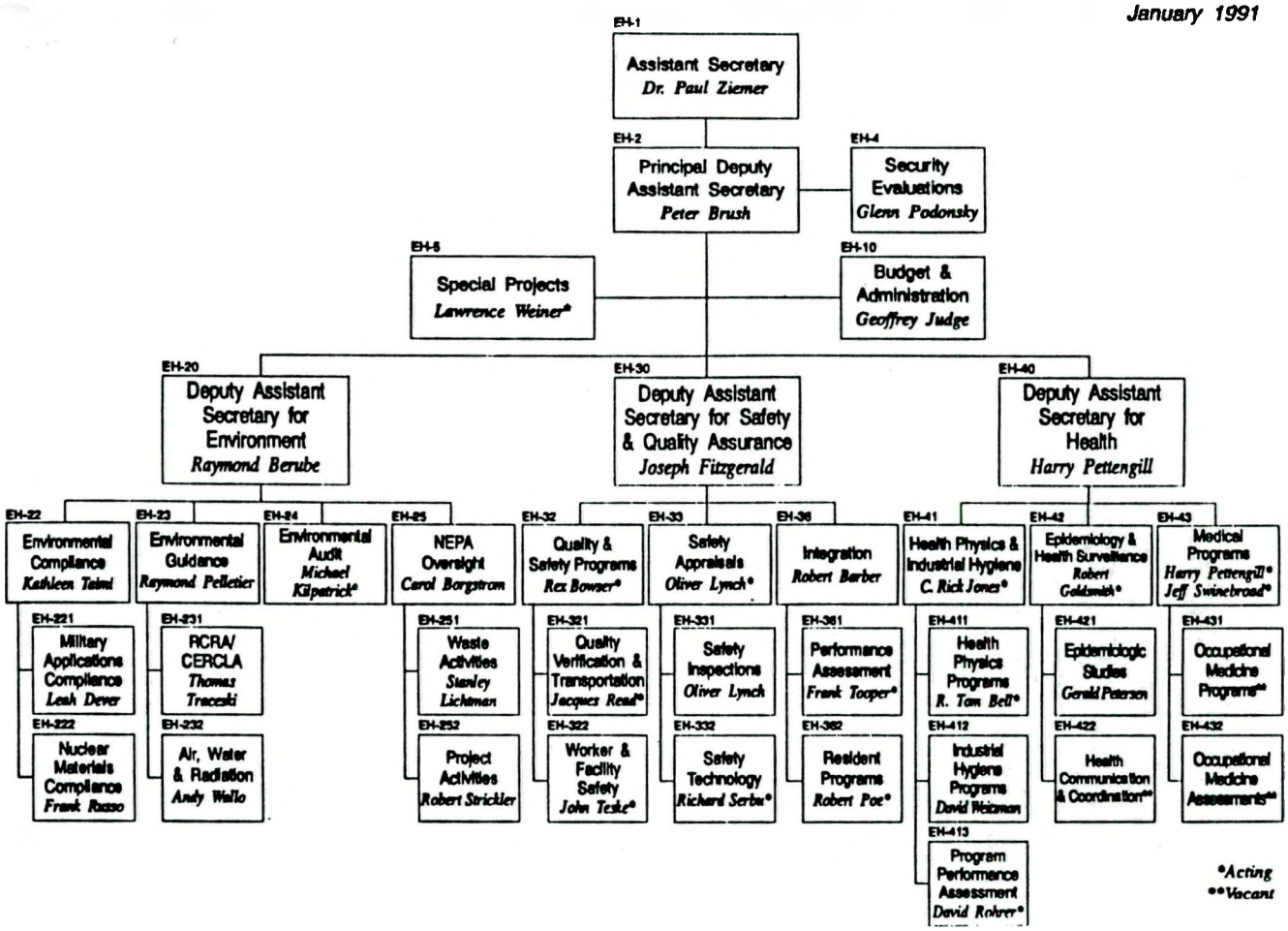
The mission of the Office of Environmental Guidance is to develop DOE-wide environmental policies and requirements; to assure that the Department's position is appropriately represented in the development of regulatory requirements by EPA and other Federal agencies; and to assure DOE-wide understanding of DOE environmental policies, directives, and environmental laws and regulations. The Office is responsible for developing written compliance policies, standards, guidance documents, and internal DOE orders, which cover the full range of environmental statutes and regulations. The Office monitors regulatory and legislative developments, keeps DOE personnel abreast of emerging and changing environmental requirements, coordinates the development of Departmental positions, and serves as the advocate for DOE's position with respect to other agencies' environmental rulemaking efforts. The Office also provides training to assure that Department and contractor personnel have the required technical skills and knowledge of environmental laws, regulations, policies and technologies in order to fulfill the requirements of their respective positions.

Chapter II

Organizational Chart

Assistant Secretary for Environment, Safety and Health

January 1991



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Gary Roles	Radioactive Waste		896-0289
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Chapter III

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A. Federal Environmental Reporting Requirements Handbook

ENVIRONMENTAL GUIDANCE

FEDERAL ENVIRONMENTAL REPORTING REQUIREMENTS HANDBOOK

U.S. DEPARTMENT OF ENERGY
ENVIRONMENTAL GUIDANCE DIVISION
RCRA/CERCLA UNIT
EH-231

May 1990

EGD (CERCLA)-(001/0590

FEDERAL ENVIRONMENTAL REPORTING REQUIREMENTS HANDBOOK

MAY 1990

PREPARED BY:

U.S. DEPARTMENT OF ENERGY
ENVIRONMENTAL GUIDANCE DIVISION
RCRA/CERCLA UNIT
EH-231

TECHNICAL SUPPORT:

ENERGETICS, INC.

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INTRODUCTION

The Environmental Reporting Requirements Handbook has been developed by DOE Headquarters' Environmental Guidance Division (EH-231) in order to assist DOE Field Organizations in the identification of the various reporting the notification requirements mandated by Federal environmental laws, regulations, and Executive Orders (see appendix A for a list of all such documents reviewed).

The Handbook makes a distinction between "routine" and "non-routine" reporting/notification requirements. Routine reporting requirements include the submission of documents that are required either on a regular basis, such as annual or biennial reports, or periodic notifications that result from what would be considered "normal" operations, such as Material Safety Data Sheet (MSDS) updates that are required when new information not contained on previous MSDS submissions is discovered. Non-routine reporting requirements are generally associated with occurrences that represent significant deviations from regulated or planned performance; examples include the unintentional discharge of oil or hazardous substances. It must be noted that, in most cases, environmental laws and regulations do not differentiate between route and non-routine reporting requirements; the Handbook's distinction between the two is somewhat arbitrary and is only intended as a guide for use by DOE Field Organizations. For the user's convenience, non-routine reporting/notification requirements have been listed in **bold, underlined type**. The due dates and timeframes for all identified reporting requirements are also listed in **bold, underlined type**.

ACRONYMS

AEA	-	Atomic Energy Act
CAA	-	Clean Air Act
CERCLA	-	Comprehensive Environmental Response, Compensation and Liability Act
COTP	-	Captain of the Port
CWA	-	Clean Water Act
DOE	-	Department of Energy
DMR	-	Discharge Monitoring Report
EHS	-	Extremely Hazardous Substance
EPA	-	Environmental Protection Agency
EPCRA	-	Emergency Planning and Community Right-to-Know Act
FIFRA	-	Federal Insecticide, Fungicide and Rodenticide Act
HWM	-	Hazardous Waste Management
LEPC	-	Local Emergency Planning Committee
MSDS	-	Material Safety Data Sheet
NCP	-	National Contingency Plan
NRC	-	National Response Center
OSC	-	On-Scene Coordinator
OSHA	-	Occupational Safety and Health Administration
PCBs	-	polychlorinated biphenyls
SDWA	-	Safe Drinking Water Act
SERC	-	State Emergency Response Commission
SWDA	-	Solid Waste Disposal Act
TSCA	-	Toxic Substances Control Act

I. CERCLA

TABLE 1
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)

Notification/Reporting	Source of Requirement	Requirement
Release Notification to NRC	Section 103(a) 40 CFR 302.6	(a) Any person in charge of a vessel, or an offshore or onshore facility shall, upon release of a hazardous substance in a reportable quantity, **immediately** notify the National Response Center (NRC).
EPA Notification	Section 103(c) 40 CFR 302	Any person who owns or operates or who at the time of disposal owned or operated, or who accepted hazardous substances for transport, and selected a facility where such substances are stored, treated, or disposed of shall, unless the facility has a Solid Waste Disposal Act (SWDA) Subtitle C permit (or interim status), notify the Environmental Protection Agency (EPA) of the facility and amounts and type of hazardous substances to be found there, and any knowledge of releases.
Exemption	Section 103(f) 40 CFR 302	No notification shall be required under Section 103(a) for any release of a hazardous substance which is required to be reported under Subtitle C of the SWDA and has been reported to the NRC or which is a continuous release, stable in quantity and rate, and is required to be reported under Section 103(c) (see above).
Notification of Potential Damage to Natural Resources	Section 104(b)(2) 43 CFR 11.20	(a) (1) Section 104(b)(2) of CERCLA requires **prompt** notification of Federal and State natural resource trustees of potential damages to natural resources under investigation and requires coordination of the assessments, investigations, and planning under Section 104 of CERCLA with such trustees. (2) The National Contingency Plan (NCP) provides for the On-Scene Coordinator (OSC) or lead agency to notify the natural resource trustee when natural resources have been or are likely to be injured by a discharge of oil or a release of a hazardous substance being investigated under the NCP.

TABLE 1
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Notification of Potential Damage to Natural Resources (continued)	Section 104(b)(2) 43 CFR 11.20	(3) Natural resource trustees, upon such notification described in paragraphs (a) (1) and (2) of this section, shall take such actions, as may be consistent with the NCP.
Natural Resource Emergency Notification	Section 104(b)(2) 43 CFR 11.21	(a) (1) In the event of a natural resource emergency, the Federal or State agency acting as trustee shall contact the NRC (800/424-8802) to report the actual or threatened discharge or release and to request that an immediate response action be taken. (2) An emergency is any situation related to a discharge or release requiring immediate action to avoid an irreversible loss of natural resources or to prevent or reduce any continuing danger to natural resources, or a situation in which there is a similar need for emergency action.

II. Title III – Community Right to Know

TABLE 2
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III
(Emergency Planning and Community Right-to-Know Act of 1986)

Notification/Reporting	Source of Requirement	Requirement
SERC/LEPC Notification of Compliance	Section 302(c) 40 CFR 355.30	(b) The owner or operator any facility that has an Extremely Hazardous Substance (EHS) present in an amount in excess of the threshold planning quantity shall notify the State Emergency Response Commission (SERC) that such facility is subject to the requirements of Subtitle A* of Title III. Thereafter, the facility shall notify the SERC and the Local Emergency Planning Committee (LEPC) **within 60 days** after an EHS in an amount in excess of the threshold planning quantity first becomes present at such facility, that such facility is subject to the requirements of Subtitle A of Title III.
Facility Representative Notification	Section 303(d)(1) 40 CFR 355.30	(c) By September 17, 1987, or **30 days** after the establishment of the Local Emergency Planning Commission (LEPC), each facility subject to the requirements of Subtitle A of Title III shall notify the LEPC of a facility representative who will participate in the emergency planning process as a facility emergency coordinator.
Facility Changes	Section 303(d)(2) 40 CFR 355.30	(d) The owner or operator of a facility subject to the requirements of Subtitle A of Title III shall **promptly** inform the emergency planning committee of any relevant changes occurring at such facility as such changes occur or are expected to occur.

* A facility is subject to the requirements of Subtitle A if a substance from the List of Extremely Hazardous Substances is present at the facility in an amount in excess of the threshold planning quantity established for such substance.

TABLE 2
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III
(continued)

Notification/Reporting	Source of Requirement	Requirement
Notification of Release	Section 304(a)(2) 40CFR 355.40	(a) (2) If a release of an EHS occurs from a facility at which a hazardous chemical is produced, used, or stored, and such release is not subject to the notification requirements under Section 103(a) of CERCLA, the owner or operator of the facility shall, **immediately after a release,** provide the same notice as for Section 304(a)(1), but only if the release: (i) is not a federally permitted release as defined by Section 101(10) of CERCLA; (ii) is in an amount in excess of quantity which EPA has determined requires notice; and (iii) occurs in a manner which would require notification under Section 103(a) of CERCLA.
Notification of Release	Section 304(a)(1), 304(b)(1) 40 CFR 355.40	(b) (2) If a release of an EHS occurs from a facility at which a hazardous chemical is produced, used, or stored, and the release requires notification under Section 103(a) of CERCLA, the owner or operator of the facility shall **immediately** provide notice of the release to the SERC and the community emergency coordinator for the LEPCs for any area likely to be affected by the release. Such notice shall include the following: (i) the chemical name or identify of any substance in the release; (ii) an indication of whether the substance is included on the EHS list; (iii) an estimate of the quantity involved in the release;

TABLE 2
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III
(continued)

Notification/Reporting	Source of Requirement	Requirement
		(iv) the time and duration of the release; (v) the medium or media into which the release occurred; (vi) any know health risks associated with released substances, and any medical advice; (viii) the name and telephone number of person to be contacted for further information.
Emergency Follow-up Notice	304(a)(1) 304(c) 40CFR 355.40	(b) (3) In addition, as soon as practicable after a release, the owner or operator shall provide a written follow-up emergency notice updating the above listed notification requirements and including the addition of the following: (i) actions taken to respond to and contain the release; (ii) any known or anticipated health risks associated with the release; and (iii) any medical advice for exposed individuals.
Notification of Release	Section 304(a)(3) 40 CFR 355.40	(b) (4) If a non-EHS release occurs at a facility at which a hazardous chemical is produced, used, or stored, and such release requires notification under Section 103(a) of CERCLA then: (i) the owner or operator must provide the same notification requirements for a Section 304(a)(1) release if the released substance is one for which a reportable quantity has been established under Section 103(a) of CERCLA;

TABLE 2
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III
(continued)

Notification/Reporting	Source of Requirement	Requirement
Submit MSDS	Section 311(a)(1) 40 CFR 370.21	(a) The owner or operator of any facility that is required under the Occupational Safety and Health Act of 1970 (OSHA) to prepare a material safety data sheet (MSDS) for a hazardous chemical, shall submit a MSDS or a list of such chemicals (subject to the requirements of Section 311(a)(2) of Title III) to the appropriate LEPC, SERC, and fire department.
MSDS Submittal Schedule	Section 311(d)(1) 40 CFR 370.21	(b) This section delineates the time requirements for the preparation and submittal of a MSDS or hazardous chemical list for the requirement of Section 311. The initial MSDS or list shall be provided before the later of: o for manufacturers, October 17, 1987, or o for non-manufacturers, except those in the construction industry, three months after the owner or operator of a facility is required to prepare a MSDS, September 24, 1988.
MSDS Update	Section 311(d)(2) 40 CFR 370.21	(c) The owner or operator is required **within 3 months** following discovery of significant information not formally present on a previously submitted MSDS to revise the MSDS and resubmit it to the appropriate person(s).
Submit Inventory Form	Section 312(a)(1) 40 CFR 370.25	The owner or operator of any facility required to prepare a MSDS for a hazardous chemical shall also prepare and submit an emergency and hazardous chemical inventory form (Tier I) to the appropriate LEPC, SERC, and fire department.
Inventory Form Requirements	Section 312(1)(2), 312(d) 40 CFR 370.25	(a) The inventory form containing the following Tier 1 information shall be submitted **on or before March 1, 1988** and **annually** thereafter **on March 1.** Tier 1 information includes:

TABLE 2
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III
(continued)

Notification/Reporting	Source of Requirement	Requirement
		o an estimate, in ranges, of the maximum amount of hazardous chemicals in each category present at the facility at any time during the preceding calendar year; o an estimate, in ranges, of the average daily amount of hazardous chemicals in each category present at the facility during the preceding calendar year; and o the general location of hazardous chemicals in each category. (b) The preceding requirement does not apply, if, by the same deadline and for the same calendar year, the following Tier II information is submitted in the inventory form to the same recipients. Tier II information includes Tier I information plus the following: o the chemical name or the common name as provided on the MSDS; o a brief description of the manner of storage of the hazardous chemical; and o an indication of whether the owner elects to withhold location information of a specific hazardous chemical form disclosure to the public under Section 324 of Title III.
Toxic Chemical Release Form	Section 313 40 CFR 372.22,372.25	The owner or operator of a facility that has 10 or more full-time employees and is in SIC codes 20 through 39 and that manufactured, processed, or otherwise used a toxic chemical (those chemicals listed in the publication title "Toxic Chemicals Subject to Section 313 of EPCRA of 1986," including revisions) in excess of the following quantities, shall complete a toxic chemical release form for each toxic chemical manufactured, processed, or used at the facility for the preceding year. The

TABLE 2
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III
(continued)

Notification/Reporting	Source of Requirement	Requirement
		threshold amounts for the purposes of reporting toxic chemicals are as follows: o for a toxic chemical used at a facility, 10,000 pounds of the chemical per year; o for a toxic chemical manufactured or processed at a facility, the threshold amount is 75,000 pounds for the first year that the form is required, 50,000 pounds for the second year, and 25,000 pounds for each year after.

III. RCRA

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

Notification/Reporting	Source of Requirement	Requirement
Emergency Response by Small Quantity Generators	Section 3001 40 CFR 262.34	(d) A generator who generates greater than 100 kilograms but less than 1000 kilograms of hazardous waste in a calendar month may accumulate hazardous waste on-site for 180 days or less without a permit or without having interim status provided that: (5)(i) **At all times** there must be at least one employee either on the premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures specified. This employee is the emergency coordinator. (5)(iv) The emergency coordinator or his designee must respond to any emergencies that arise. The applicable responses are as follows: (A) In the event of a fire, call the fire department or attempt to extinguish it using a fire extinguisher; (B) In the event of a spill, contain the flow of hazardous waste to the extent possible, and as soon as is practicable, clean up the hazardous waste and any contaminated materials or soil (C) In the event of a fire, explosion, or other release which could threaten human health outside the facility or when the generator has knowledge that a spill has reached surface water, the generator must **immediately** notify the NRC (using their 24-hour toll free number 800/424-8802). The report must include the following information: (1) The name, address, and U.S. EPA Identification Number of the generator; (2) Date, time, and type of incident (e.g., spill or fire);

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Emergency Response by Small Quantity Generators (continued)	Section 3001 40 CFR 262.34	(3) Quantity and type of hazardous waste involved in the incident; (4) Extent of injuries, if any; and (5) Estimated quantity and disposition of recovered materials, if any.
Biennial Report	Section 3002 40 CFR 262.41	(a) A generator who ships any hazardous waste off-site to a treatment, storage or disposal facility within the United States must prepare and submit a single copy of a Biennial Report to the Regional Administrator by March 1 of each even numbered year. The Biennial Report must be submitted on EPA Form 8700-13A. It must cover generator activities during the previous year, and must include the following information: (1) The EPA identification number, name, and address of the generator; (2) The calendar year covered by the report; (3) The EPA identification number, name, and address for each off-site treatment, storage, or disposal facility in the United States to which waste was shipped during the year; (4) The name and EPA identification number of each transporter used during the reporting year for shipments to a treatment, storage or disposal facility within the United States; (5) A description, EPA hazardous waste number, Department of Transportation (DOT) hazardous class, and quantity of each hazardous waste shipped off-site for shipments to a treatment, storage or disposal facility within the United States. This information must be listed by EPA identification number of each off-site facility to which waste was shipped;

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Biennial Report (continued)	Section 3002 40 CFR 262.41	(6) A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated; (7) A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for years prior to 1984; (8) The certification signed by the generator or authorized representative; (9) Any generator who treats, stores, or disposes of hazardous waste on-site must submit a biennial report covering these wastes in accordance with the provisions of 40 CFR Parts 270, 264, 265, and 266. Reporting for exports of hazardous waste is not required on the Biennial Report form. A separate annual report requirement is set forth at 40 CFR 262.56 (see pages 13-14).
Manifest Exception Report	Section 3002 40 CFR 262.42	(a) A generator of greater than 1000 kilograms of hazardous waste in a calendar month who does not receive a copy of the manifest with the handwritten signature of the owner or operator of the designated facility **within 35 days** of the date the waste was accepted by the initial transporter must contact the transporter and/or the owner or operator of the designated facility to determine the status of the hazardous waste. (b) A generator of greater than 1000 kilograms of hazardous waste in a calendar month must submit an Exception Report to the EPA Regional Administrator for the Region in which the generator is located if he has not received a copy of the manifest with the handwritten signature of the owner or operator of the designated facility **within 45 days** of the date the waste was accepted by the initial transporter.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Manifest Exception Report (continued)	Section 3002 40 CFR 262.42	The Exception Report must include: (1) A legible copy of the manifest for which the generator does not have confirmation of delivery; (2) A cover letter signed by the generator or his authorized representative explaining the efforts taken to locate the hazardous waste and the results of those efforts;
Special Requirements for Generators of Between 100 and 1000 kg/mo	Section 3002 40 CFR 262.44	A generator of greater than 100 kilograms but less than 1000 kilograms of hazardous waste in a calendar month who does not receive a copy of the manifest with the handwritten signature of the owner or operator of the designated facility **within 60 days** of the date the waste was accepted by the initial transporter must submit a legible copy of the manifest, with some indication that the generator has not received confirmation of delivery, to the EPA Regional Administrator for the Region in which the generator is located.
Annual Report for Exporters	Section 3003 40 CFR 262.56	(a) Primary exporters of hazardous waste shall file with the Administrator no later than **March 1 of each year**, a report summarizing the types, quantities, frequency, and ultimate destination of all hazardous waste exported during the previous calendar year. Such reports shall include the following: (1) The EPA identification number, name, and mailing and site address of the exporter; (2) The calendar year covered by the report; (3) The name and site address of each consignee;

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Annual Report for Exporters (continued)	Section 3003 40 CFR 262.56	(4) By consignee, for each hazardous waste exported, a description of the hazardous waste, the EPA hazardous waste number (from 40 CFR Part 261, Subpart C or D), DOT hazard class, the name and US EPA ID number (where applicable) for each transporter used, the total number of shipments pursuant to each notification; (5) Except for hazardous waste produced by exporters of greater than 100 kg but less than 1000 kg in a calendar month, unless provided pursuant to § 262.41 (as described below), in even numbered years: (i) A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated; and (ii) A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for years prior to 1984. (6) A certification signed by the primary exporter which states: I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Annual Report for Exporters (continued)	Section 3003 40 CFR 262.56	(b) Reports shall be sent to the following address: Office of International Activities (A-106), Environmental Protection Agency, 401 M Street S.W., Washington, DC 20460.
Reporting Requirements for Discharges of Hazardous Waste by Transporters	Section 3003 40 CFR 263.30	(a) In the event of a discharge of hazardous waste during transportation, the transporter must take appropriate immediate action to protect human health and the environment (e.g., notify local authorities, dike the discharge area). (b) If a discharge of hazardous waste occurs during transportation and an official (State or local government or a Federal Agency) acting within the scope of his official responsibilities determines that immediate removal of the waste is necessary to protect human health or the environment, that official may authorize the removal of the waste by transporters who do not have EPA identification numbers and without the preparation of a manifest. (c) An air, rail, highway, or water transporter who has discharged hazardous waste must: (1) Give notice, if required by 49 CFR 171.15, to the NRC (800-424-8802 or 202-426-2675); (2) Report in writing as required by 49 CFR 171.16 to the Director, Office of Hazardous Materials Regulations, Materials Transportation Bureau, Department of Transportation, Washington, D.C. 20590. (d) A water (bulk shipment) transporter who has discharged hazardous waste must give the same notice as required by 33 CFR 153.203 for oil and hazardous substances which provides that:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements for Discharges of Hazardous Waste by Transporters (continued)	Section 3003 40 CFR 263.30 33 cfr 153.203	Any person in charge of a vessel or of an onshore or offshore facility shall, as soon as they have knowledge of any discharge of oil or a hazardous substance from such vessel or facility in violation of section 311(b)(3) (see below) of the Act, immediately notify the NRC, U.S. Coast Guard, 2100 Second Street, S.W., Washington, DC 20593, toll free telephone number 800-424-8802 (in Washington, DC metropolitan area, 426-2675). If direct reporting to the NRC is not practicable, reports may be made to the Coast Guard or EPA predesignated OSC for the geographic area where the discharge occurs. All such reports shall be promptly relayed to the NRC. If it is not possible to notify the NRC or the predesignated OSC immediately, reports may be made immediately to the nearest Coast Guard unit, provided that the person in charge of the vessel or onshore or offshore facility notifies the NRC as soon as possible. This requirement is repeated under 33 CFR 153-203, Coast Guard Oil Regulations.
	Section 311(b)(3) CWA 40 CFR 263.30	The discharge of oil or hazardous substances into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson Fishery Conservation and Management Act of 1976), in such quantities as may be harmful as determined by the President under paragraph (4) of this subsection, is prohibited, except (A) in the case of such discharges into the waters of the contiguous zone or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson Fishery Conservation and Management Act of 1976), where permitted under the Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, 1973 and (B) where permitted in quantities and at times and locations or under such circumstances or

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements for Discharges of Hazardous Waste by Transporters (continued)	Section 3003 40 CFR 263.30	conditions as the President may, by regulation, determine not to be harmful. Any regulations issued under this subsection shall be consistent with maritime safety and with marine and navigation laws and regulations and applicable water quality standards. (4) The President shall by regulation determine for the purposes of this section those quantities of oil and any hazardous substances the discharge of which may be harmful to the public health or welfare of the United States, including but not limited to fish, shellfish, wildlife, and public and private property, shorelines, and beaches.
Emergency Reporting Requirements	Section 3004 40 CFR 264.56	(a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must **immediately**: (1) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel; and (2) Notify appropriate State or local agencies with designated response roles if their help is needed. (d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows: (1) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and (2) He must **immediately** notify either the government official designated as the on-scene coordinator for that geographical area, (in the applicable regional contingency plan under Part 1510 of this title) or the NRC (using their 24-hour toll free number 800/424-8802).

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Emergency Reporting Requirements (continued)	Section 3004 40 CFR 264.56	The Report must include: (i) Name and telephone number of reporter; (ii) Name and address of facility; (iii) Time and type of incident (e.g., release, fire); (iv) Name and quantity of material(s) involved, to the extent known; (v) The extent of injuries, if any; and (vi) The possible hazards to human health, or the environment, outside the facility. (i) The owner or operator must notify the Regional Administrator, and appropriate State and local authorities, that the facility is in compliance with paragraph (h) of this section before operations are resumed in the affected area(s) of the facility. (h) The emergency coordinator must ensure that, in the affected area(s) of the facility: (1) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and (2) All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Emergency Reporting Requirements (continued)	Section 3004 40 CFR 264.56	(j) The owner or operator must note in the operating record the time,date, and details of any incident that requires implementing the contingency plan. **Within 15 days** after the incident, he must submit a written report on the incident to the Regional Administrator. The report must include: (1) Name, address, and telephone number of the owner or operator; (2) Name, address, and telephone number of the facility; (3) Date, time, and type of incident (e.g., fire, explosion); (4) Name and quantity of material(s) involved; (5) The extent of injuries, if any; (6) An assessment of actual or potential hazardous to human health or the environment, where this is applicable; and (7) Estimated quantity and disposition of recovered material that resulted from the accident.
Manifest System	Section 3004 40 CFR 264.71	This section applies to all facilities (whether on-site or off-site), except as 264.1 provides otherwise. (a) If a facility receives hazardous waste accompanied by a manifest, the owner or operator, or his agent, must: (1) Sign and date each copy of the manifest to certify that the hazardous waste covered by the manifest was received; (2) Note any significant discrepancies in the manifest (as defined in § 264.72(a)), (see page 21); [Comment: The Agency does not intend that the owner or operator of a facility whose procedures under § 264.13(c) include waste analysis must perform that analysis before signing the manifest and giving it to the transporter. Section 264.13(c) states:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Manifest System (continued)	Section 3004 40 CFR 264.71	o For off-site facilities, the waste analysis plan required in paragraph (b) of this section must also specify the procedures which will be used to inspect and, if necessary, analyze each movement of hazardous waste received at the facility to ensure that it matches the identity of the waste designated on the accompanying manifest or shipping paper. At a minimum, the plan must describe: o The procedures which will be used to determine the identity of each movement of waste managed at the facility; and; o The sampling method which will be used to obtain a representative sample of the waste to be identified, if the identification method includes sampling. (3) **Immediately** give the transporter at least one copy of the signed manifest; (4) **Within 30 days** after the delivery, send a copy of the manifest to the generator; and (5) Retain at the facility a copy of each manifest for at least three years from the date of delivery. (b) If a facility receives, from a rail or water (bulk shipment) transporter, hazardous waste which is accompanied by a shipping paper containing all the information required on the manifest (excluding the EPA identification numbers, generator's certification, and signatures), the owner or operator, or his agent must:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Manifest System (continued)	Section 3004 40 CFR 264.71	(2) Note any significant discrepancies (as defined in § 264.72(a)) (see page 21), in the manifest or shipping paper (if the manifest has not been received) on each copy of the manifest or shipping paper. (3) **Immediately** give the rail or water (bulk shipment) transporter at least one copy of the manifest or shipping paper (if the manifest has not been received); (4) **Within 30 days** after the delivery, send a copy of the signed and dated manifest to the generator; however, if the manifest has not been received within 30 days after delivery, the owner or operator, or his agent, must send a copy of the shipping paper signed and dated to the generator; and (5) Retain at the facility a copy of the manifest and shipping paper (if signed in lieu of the manifest at the time of delivery) for at least three years from the date of delivery. (c) Whenever a shipment of hazardous waste is initiated from a facility which generated that waste, the owner or operator of that facility must comply with the requirements of Part 262 of this chapter.
Manifest Discrepancies	Section 3004 40 CFR 264.72	(a) Manifest discrepancies are differences between the quantity or type of hazardous waste designated on the manifest or shipping paper, and the quantity or type of hazardous waste a facility actually receives. Significant discrepancies in quantity are: (1) for bulk waste, variations greater than 10 percent in weight, and (2) for batch waste, any variation in piece count, such as a discrepancy of one drum in a truckload. Significant discrepancies in type are obvious differences which can be discovered by inspection or waste analysis, such as waste solvent substituted for waste acid, or toxic constituents not reported on the manifest or shipping paper.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Manifest Discrepancies (continued)	Section 3004 40 CFR 264.72	(b) Upon discovering a significant discrepancy, the owner or operator must attempt to reconcile the discrepancy with the waste generator or transporter (e.g., with telephone conversations). If the discrepancy is not resolved within 15 days after receiving the waste, the owner or operator must immediately submit to the Regional Administrator a letter describing the discrepancy and attempts to reconcile it, and a copy of the manifest or shipping paper at issue.
Operating Record	Section 3004 40 CFR 264.73	(a) The owner or operator must keep a written operating record at his facility containing the following information: (1) A description and the quantity of each hazardous waste received, and the method(s) and date(s) of its treatment, storage, or disposal at the facility; (2) The location of each hazardous waste within the facility and the quantity at each location. For disposal facilities, the location and quantity of each hazardous waste must be recorded on a map or diagram of each cell or disposal area. For all facilities, this information must include cross-references to specific manifest document numbers, if the waste was accompanied by a manifest; (3) Records and results of waste analyses performed; (4) Summary reports and details of all incidents that require implementing the contingency plan as specified in § 264.56(j) (see page 18);

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Operating Record (continued)	Section 3004 40 CFR 264.73	(5) Records and results of inspections as required by § 264.15(d) (these data need be kept only three years); (6) Monitoring, testing or analytical data, and corrective action where required by Subpart F and §§ 264.226, 264.253, 264.254, 264.276, 264.278, 264.280, 264.303, 264.309, 264.347, and 264.602; (7) For off-site facilities, notices to generators as specified in § 264.12(b); and (8) All closure cost estimates under § 264.142, and, for disposal facilities, all post-closure cost estimates under § 264.144. (9) A certification by the permittee no less often than **annually**, that the permittee has a program in place to reduce the volume and toxicity of hazardous waste that he generates to the degree determined by the permittee to be economically practicable; and the proposed method of treatment, storage or disposal is that practicable method currently available to the permittee which minimizes the present and future threat to human health and the environment. (10) Records of the quantities (and date of placement) for each shipment of hazardous waste placed in land disposal units under an extension to the effective date of any land disposal restriction granted pursuant to § 268.5, a petition pursuant to § 268.6 or a certification under § 268.6, and the applicable notice required by a generator under § 268.7(a)(3); (11) For an off-site treatment facility, a copy of the notice, required by a generator under § 268.7(a)(1);

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Operating Record (continued)	3004 40 CFR 264.73	o For an on-site treatment facility, the information contained in the notice required by a generator under § 268.7(a)(1); o For an off-site land disposal facility, a copy of the notice, and the certification by the owner or operator of a treatment facility under § 268.7(b)(1) and (2) or a copy of the notice and certification required by the generator under 268.7(a)(2), whichever is applicable; o For an on-site land disposal facility, the information contained in the notice required by the generator or owner or operator of a treatment facility under § 268.7(a)(2), except for the manifest number, or the information contained in the notice required by a treater under § 268.7(b)(1), except for the manifest number, whichever is applicable.
Biennial Report	Section 3004 40 CFR 264.75	The owner or operator must prepare and submit a single copy of a biennial report to the Regional Administrator by March 1 of each even numbered year. The biennial report must be submitted on EPA form 8700-13B. The report includes: (a) The EPA identification number, name, and address of the facility; (b) The calendar year covered by the report; (c) For off-site facilities, the EPA identification number of each hazardous waste generator from which the facility received a hazardous waste during the year; for imported shipments, the report must give the name and address of the foreign generator; (d) A description and the quantity of each hazardous waste the facility received during the year. For off-site facilities, this information must be listed by EPA identification number of each generator;

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Biennial Report (continued)	Section 3004 40 CFR 264.75	(e)The method of treatment, storage, or disposal for each hazardous waste; (g) The most recent closure cost estimate under § 264.142, and, for disposal facilities, the most recent post-closure cost estimate under § 264.144; (h)(i) For generators who treat, store, or dispose of hazardous waste on-site, a description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated; and a description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984; and (j) The certification signed by the owner or operator of the facility or his authorized representative.
Unmanifested Waste Report	Section 3004 40 CFR 264.76	If a facility accepts for treatment, storage, or disposal any hazardous waste from an off-site source without an accompanying manifest, or without an accompanying shipping paper as described in § 263.20(e)(2) of this Chapter, and if the waste is not excluded from the manifest requirement by § 261.5 of this Chapter, then the owner or operator must prepare and submit a single copy of a report to the Regional Administrator **within fifteen days** after receiving the waste. The unmanifested waste report must be submitted on EPA form 8700-13B. Such report must be designated 'Unmanifested Waste Report' and include the following information: (a) The EPA identification number, name, and address of the facility; (b) The date the facility received the waste;

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Unmanifested Waste Report (continued)	Section 3004 40 CFR 264.76	(c) The EPA identification number, name, and address of the generator and the transporter, if available; (d) A description and the quantity of each unmanifested hazardous waste and facility received; (e) The method of treatment, storage, or disposal for each hazardous waste; (f) The certification signed by the owner or operator of the facility or his authorized representative; and (g) A brief explanation of why the waste was unmanifested, if known. [Comment: Small quantities of hazardous waste are excluded from regulation under this Part and do not require a manifest. Where a facility receives unmanifested hazardous wastes, the Agency suggests that the owner or operator obtain from each generator a certification that the waste qualifies for exclusion. Otherwise, the Agency suggests that the owner or operator file an unmanifested waste report for the hazardous waste movement.]
Miscellaneous Additional Reports	Section 3004 40 CFR 264.77	In addition to submitting the biennial reports and unmanifested waste reports described in §§ 264.75 and 264.76 (see page 25), the owner or operator must also report to the Regional Administrator: (a) Releases, fires, and explosions as specified in § 264.56(j) (see page 19); (b) Facility closures specified in § 264.115; and (c) As otherwise required by Subparts F and K-N.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Monitoring Notification for Statistically Significant Increases of Parameters on Constituents	Section 3004 40 CFR 264.98	If the owner or operator determines [see 264.98(g)] that there is a statistically significant increase for parameters of constituents specified pursuant to paragraph (a) of this section at any monitoring well at the compliance point, he must: o Notify the Regional Administrator of this finding in writing within seven days. The notification must indicate what parameters or constituents have shown statistically significant increases.
Compliance Monitoring Notification Requirements	Section 3004 40 CFR 264.99	(f) The owner or operator must analyze samples from all monitoring wells at the compliance point for all constituents contained in Appendix VIII of Part 261 of this chapter at least annually to determine whether additional hazardous constituents are present in the uppermost aquifer. If the owner or operator finds Appendix VIII constituents in the ground water that are not identified in the permit as hazardous constituents, the owner or operator must report the concentrations of these additional constituents to the Regional Administrator within seven days after completion of the analysis. (i) If the owner or operator determines, pursuant to paragraph (h) of this section, that the groundwater protection standard is being exceeded at any monitoring well at the point of compliance, he must: (1) Notify the Regional Administrator of this finding in writing **within seven days**. The notification must indicate what concentration limits have been exceeded; (2) Submit to the Regional Administrator an application for a permit modification to establish a corrective action program meeting the requirements of § 264.100 **within 180 days, or within 90 days** if an engineering feasibility study has been previously submitted to the Regional Administrator under § 264.98(h)(5). The application must at a minimum include the following information:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Compliance Monitoring Notification Requirements (continued)	Section 3004 40 CFR 264.99	(i) A detailed description of corrective actions that will achieve compliance with the groundwater protection standard specified in the permit under paragraph (a) of this section; and (ii) A plan for a groundwater monitoring program that will demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on a compliance monitoring program developed to meet the requirements of this section.
Corrective Action Program Notification	Section 3004 40 CFR 264.100	(g) The owner or operator must report in writing to the regional Administrator on the effectiveness of the corrective action program. The owner or operator must submit these reports semi-annually. (h) If the owner or operator determines that the corrective action program no longer satisfies the requirements of this section, he must, **within 90 days**, submit an application for a permit modification to make any appropriate changes to the program.
Tank System or Secondary Containment System Spill Notification Requirements	Section 3003 40 CFR 264.196	A tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, must be removed from service **immediately**, and the owner or operator must satisfy the following requirements: (d)(1) Any release to the environment, except as provided in paragraph (d)(2) of this section (see below), must be reported to the Regional Administrator **within 24 hours** of its detection. If the release has been reported pursuant to 40 CFR Part 302, that report will satisfy this requirement; (d)(2) (d)(2) A leak or spill of hazardous waste is exempted from the requirements of this paragraph if it is:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Tank System or Secondary Containment System Spill Notification Requirements (continued)	Section 3003 40 CFR 264.196	(i) Less than or equal to a quantity of one (1) pound; and (ii) Immediately contained and cleaned up. (3) **Within 30 days** of detection of a release to the environment, a report containing the following information must be submitted to the Regional Administrator: (i) Likely route of migration of the release; (ii) Characteristics of the surrounding soil (soil composition, geology, hydrogeology, climate); (iii) Results of any monitoring or sampling conducted in connection with the release (if available). If sampling or monitoring data relating to the release are not available within 30 days, these data must be submitted to the Regional Administrator as soon as they become available; (iv) Proximity to downgradient drinking water, surface water, and populated areas; and (v) Description of response actions taken or planned.
Emergency Repair Notification	Section 3003 40 CFR 264.227	(b) When a surface impoundment must be removed from service as required when the levels of liquids in the impoundment suddenly drops and the drop is not known to be caused by changes in the flows into or out of the impoundment, or the dike leaks, the owner or operator must: (6) Notify the Regional Administrator of the problem in writing **within seven days** after detecting the problem.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting of Statistically Significant Increases of Hazardous Constituents Below the Treatment Zone	Section 3004 40 CFR 264.278	(f) The owner or operator must determine whether there is a statistically significant change over background values for any hazardous constituent to be monitored under paragraph (a) of this section below the treatment zone **each time** he conducts soil monitoring and soil-pore liquid monitoring under paragraph (d) of this section. (1) In determining whether a statistically significant increase has occurred, the owner or operator must compare the value of each constituent, as determined under paragraph (d) of this section, to the background value for that constituent according to the statistical procedure specified in the facility permit under this paragraph. (2) The owner or operator must determine whether there has been a statistically significant increase below the treatment zone within a reasonable time period after completion of sampling. The Regional Administrator will specify that time period in the facility permit after considering the complexity of the statistical test and the availability of laboratory facilities to perform the analysis of soil and soil-pore liquid samples. (3) The owner or operator must determine whether there is a statistically significant increase below the treatment zone using a statistical procedure that provides reasonable confidence that migration from the treatment zone will be identified. The Regional Administrator will specify a statistical procedure in the facility permit that he finds: (i) Is appropriate for the distribution of the data used to establish background values; and

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting of Statistically Significant Increases of Hazardous Constituents Below the Treatment Zone (continued)	Section 3004 40 CFR 264.278	(ii) Provides a reasonable balance between the probability of falsely identifying migration from the treatment zone and the probability of failing to identify real migration from the treatment zone. (g) If the owner or operator determines, pursuant to paragraph (f) of this section (see above), that there is a statistically significant increase of hazardous constituents below the treatment zone, he must: (1) Notify the Regional Administrator of this finding in writing **within seven days**. The notification must indicate what constituents have shown statistically significant increases; (2) **Within 90 days**, submit to the Regional Administrator an application for a permit modification to modify the operating practices at the facility in order to maximize the success of degradation, transformation, or immobilization processes in the treatment zone. (h) If the owner or operator determines, pursuant to paragraph (f) (see above) of this section, that there is a statistically significant increase of hazardous constituents below the treatment zone, he may demonstrate that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. While the owner or operator may make a demonstration under this paragraph in addition to, or in lieu of, submitting a permit modification application under paragraph (g)(2) of this section (see above), he is not relieved of the requirement to submit a permit modification application within the time specified in paragraph (g)(2) of this section (see above) unless the demonstration made under this paragraph successfully shows that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. In making a demonstration under this paragraph, the owner or operator must:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting of Statistically Significant Increases of Hazardous Constituents Below the Treatment Zone (continued)	Section 3004 40 CFR 264.278	(1) Notify the Regional Administrator in writing **within seven days** of determining a statistically significant increase below the treatment zone that he intends to make a determination under this paragraph; (2) **Within 90 days**, submit a report to the Regional Administrator demonstrating that a source other than the regulated units caused the increase or that the increase resulted from error in sampling, analysis, or evaluation; (3) **Within 90 days**, submit to the Regional Administrator an application for a permit modification to make any appropriate changes to the unsaturated zone monitoring program at the facility; and (4) Continue to monitor in accordance with the unsaturated zone monitoring program established under this section.
Emergency Notification	Section 3005 40 CFR 265.56	(d) If the emergency coordinator (at any type of hazardous waste facility) determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows: (1) If his assessment indicates that evacuation of local areas may be advisable, he must **immediately** notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and (2) He must **immediately** notify either the government official designated as the on-scene coordinator for that geographical area (in the applicable regional contingency plan under Part 1510 of this title), or the NRC (using their 24-hour toll free number 800/424-8802). The report must include:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Emergency Notification (continued)	Section 3005 40 CFR 265.56	(i) Name and telephone number of reporter; (ii) Name and address of facility; (iii) Time and type of incident (e.g., release, fire); (iv) Name and quantity of material(s) involved, to the extent known; (v) The extent of injuries, if any; and (vi) The possible hazards to human health, or the environment, outside the facility. (i) The owner or operator must notify the Regional Administrator, and appropriate State and local authorities, that the facility is in compliance with the following two requirements found in 265.56(h) before operations are resumed in the affected area(s) of the facility: o No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and o All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed. (j) The owner or operator must note in the operating record the time, date, and details of any incident that requires implementing the contingency plan. **Within 15 days** after the incident, he must submit a written report on the incident to the Regional Administrator. The report must include:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Emergency Notification (continued)	Section 3005 40 CFR 265.56	(1) Name, address, and telephone number of the owner or operator; (2) Name, address, and telephone number of the facility; (3) Date, time, and type of incident (e.g., fire, explosion); (4) Name and quantity of material(s) involved; (5) The extent of injuries, if any; (6) An assessment of actual or potential hazards to human health or the environment, where this is applicable; and (7) Estimated quantity and disposition of recovered material that resulted from the incident.
Groundwater Quality Notification	Section 3004 40 CFR 265.93	(d) (1) If the analyses performed [see 265.93(b)(c)] confirm the significant increase (or pH decrease), the owner or operator must provide written notice to the Regional Administrator -- **within seven days** of the date of such confirmation -- that the facility may be affecting groundwater quality. (2) **Within 15 days** after the notification under (d)(1) of this section, the owner or operator must develop and submit to the Regional Administrator a specific plan, based on the outline required [see 265.93(a)] of this section and certified by a qualified geologist or geotechnical engineer, for a groundwater quality assessment program at the facility.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Groundwater Quality Notification (continued)	Section 3004 40 CFR 265.93	(3) The plan to be submitted must specify: (i) The number, location, and depth of wells; (ii) Sampling and analytical methods for those hazardous wastes or hazardous waste constituents in the facility; (iii) Evaluation procedures, including any use of previously-gathered groundwater quality information; and (iv) A schedule of implementation. (4) The owner or operator must implement the groundwater quality assessment plan which satisfies the above requirements and, at a minimum, determine: (i) The rate and extent of migration of the hazardous waste or hazardous waste constituents in the groundwater; and (ii) The concentrations of the hazardous waste or hazardous waste constituents in the groundwater. (5) The owner or operator must make his first determination under paragraph (d)(4) of this section as soon as technically feasible, and, within 15 days after that determination, submit to the Regional Administrator a written report containing an assessment of the groundwater quality.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Groundwater Quality Notification (continued)	Section 3004 40 CFR 265.93	(6) If the owner or operator determines, based on the results of the first determination under paragraph (d)(4) of this section, that no hazardous waste or hazardous waste constituents from the facility have entered the groundwater, then he may reinstate the indicator evaluation program described in § 265.92 and paragraph (b) of this section. If the owner or operator reinstates the indicator evaluation program he must so notify the Regional Administrator in the report submitted above, (d)(5).
Groundwater Reporting Requirements	Section 3004 40 CFR 265.94	(2) Unless the groundwater is monitored to satisfy the requirements of § 265.93(d)(4) (see page 35), the owner or operator must report the following groundwater monitoring information to the Regional Administrator: (i) During the first year when initial background concentrations are being established for the facility: concentrations or values of the parameters listed in § 265.92(b)(1) for each groundwater monitoring well within 15 days after completing each quarterly analysis. The owner or operator must separately identify for each monitoring well any parameters whose concentration or value has been found to exceed the maximum contaminant levels listed in Appendix III; Annually: Concentrations or values of the parameters listed in § 265.92(b)(3) for each groundwater monitoring well, along with the required evaluations for these parameters under § 265.93(b). the owner or operator must separately identify any significant differences from initial background found in the upgradient wells, in accordance with § 265.93(c)(1). During the active life of the facility, this information must be submitted no later than March 1 following each calendar year.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Groundwater Reporting Requirements (continued)	Section 3004 40 CFR 265.94	No later than March 1 following each calendar year: Results of the evaluations or groundwater surface elevations under § 265.93(f), and a description of the response to that evaluation, where applicable. If the groundwater is monitored to satisfy the requirements of § 265.93(d)(4) (see page 26), the owner or operator must: (2) Annually, until final closure of the facility, submit to the Regional Administrator a report containing the results of his or her groundwater quality assessment program which includes, but it not limited to, the calculated (or measured) rate of migration of hazardous waste or hazardous waste constituents in the groundwater during the reporting period. This information must be submitted no later than March 1 following each calendar year.
Tank System or Secondary Containment Spill Notification	Section 3004 40 CFR 265.196	A tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, must be removed from service immediately, and the owner or operator must satisfy the following requirements: (d) Notifications, report: (1) Any release to the environment, except as provided in paragraph (d)(2) of this section, must be reported to the Regional Administrator within 24 hours of detection. If the release has been reported pursuant to 40 CFR Part 302, that report will satisfy this requirement. (2) A leak or spill of hazardous waste that is: (i) Less than or equal to a quantity of one (1) pound, and

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Tank System of Secondary Containment Spill Notification (continued)	Section 3004 40 CFR 265.196	(ii) Immediately contained and cleaned-up is exempted from the requirements of this paragraph. (3) Within 30 days of detection of a release to the environment, a report containing the following information must be submitted to the Regional Administrator: (i) Likely route of migration of the release; (ii) Characteristics of the surrounding soil (soil composition, geology, hydrogeology, climate); (iii) Results of any monitoring or sampling conducted in connection with the release, (if available). If sampling or monitoring data relating to the release are not available within 30 days, these data must be submitted to the Regional Administrator as soon as they become available; (iv) Proximity to downgradient drinking water, surface water, and population areas; and (v) Description of response actions taken or planned. (e) Provision of secondary containment, repair, or closure. (1) Unless the owner or operator satisfies the requirements of paragraphs (e)(2) through (4) of this section, the tank system must be closed in accordance with § 265.197.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Tank System or Secondary Containment Spill Notification (continued)	Section 3004 40 CFR 265.196	(2) If the cause of the release was a spill that has not damaged the integrity of the system, the owner/operator may return the system to service as soon as the released waste is removed and repairs, if necessary, are made. (3) If the cause of the release was a leak from the primary tank system into the secondary containment system, the system must be repaired prior to returning the tank system to service. (4) If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the owner/operator must provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of § 265.193 before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system. If the source is an aboveground component that can be inspected visually, the component must be repaired and may be returned to service without secondary containment as long as the requirements of paragraph (f) of this section are satisfied. If a component is replaced to comply with the requirements of this subparagraph, that component must satisfy the requirements for new tank systems or components in §§ 265.192 and 265.193. Additionally, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an inground or onground tank), the entire component must be provided with secondary containment in accordance with § 265.193 prior to being returned to use.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification	Source of Requirement	Requirement
Tank System or Secondary Containment Spill Notification (continued)	Section 3004 40 CFR 265.196	(f) Certification of major repairs. If the owner or operator has repaired a tank system in accordance with paragraph (e) of this section, and the repair has been extensive (e.g., installation of an internal liner; repair of a ruptured primary containment or secondary containment vessel), the tank system must not be returned to service unless the owner/operator has obtained a certification by an independent, qualified, registered professional engineer in accordance with § 270.11(d) that the repaired system is capable of handling hazardous wastes without release for the intended life of the system. This certification must be submitted to the Regional Administrator within seven days after returning the tank system to use.
Waste Analysis and Record-keeping	Section 3004 40 CFR 268.7	(a) Except as specified in § 268.32 or section 268.43 of this part, the generator must test his waste, or test an extract developed using the test method described in Appendix I of this part, or use knowledge of the waste, to determine if the waste is restricted from land disposal under this part. (1) If a generator determines that he is managing a restricted waste under this part and the waste does not meet the applicable treatment standards set forth in Subpart D of this part or exceeds the applicable prohibition levels set forth in § 268.32 or RCRA § 3004(d), with each shipment of waste the generator must notify the treatment or storage facility in writing of the appropriate treatment standards set forth in Subpart D of this part and any applicable prohibition levels set forth in § 268.32 or RCRA § 3004(d). The notice must include the following information: (i) EPA Hazardous Waste Number; (ii) The corresponding treatment standards and all applicable prohibitions set forth in § 268.32 or RCRA section 3004(d);

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification	Source of Requirement	Requirement
Waste Analysis and Record-keeping (continued)	Section 3004 40 CFR 268.7	(iii) The manifest number associated with the shipment waste; and (iv) Waste analysis data, where available. [NOTE: The reporting requirements in this section are extensive and do not lend themselves to reproduction in this handbook. Please refer to 40 CFR 268.7 for additional information.]
Notification Requirements Applicable to all RCRA Permits	Section 3005 40 CFR 270.30	The following conditions apply to all RCRA permits, and shall be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to these regulations (or the corresponding approved State regulations) must be given in the permit. (6) The permittee shall report any non-compliance which may endanger health or the environment orally **within 24 hours** from the time the permittee becomes aware of the circumstances, including: (A) Information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies; (B) Any information of a release or discharge of hazardous waste or of a fire or explosion from the Hazardous Waste Management (HWM) facility, which could threaten the environment or human health outside the facility; (ii) The description of the occurrence and its cause shall include:

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification	Source of Requirement	Requirement
Notification Requirements Applicable to all RCRA Permits (continued)	Section 3005 40 CFR 270.30	(A) Name, address, and telephone number of the owner or operator; (B) Name, address, and telephone number of the facility; (C) Date, time, and type of incident; (D) Name and quantity of material(s) involved; (E) The extent of injuries, if any; (F) An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and (G) Estimated quantity and disposition of recovered material that resulted from the incident.
Reporting of Suspected Releases	40 CFR 280.50	Owners and operators of UST systems must report to the implementing agency within 24 hours, or another reasonable time period specified by the implementing agency, and follow the procedures in § 280.52 for any of the following conditions: (a) The discovery by owners and operators or others of released regulated substances at the UST site or in the surrounding area (such as the presence of free product or vapors in soils, basements, sewer and utility lines, and nearby surface water). (b) Unusual operating conditions observed by owners and operators (such as the erratic behavior of product dispensing equipment, the sudden loss of product from the UST system, or an unexplained presence of water in the tank), unless system equipment is found to be defective but not leaking, and is immediately repaired or replaced; and

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification	Source of Requirement	Requirement
Reporting of Suspected Releases (continued)	40 CFR 280.50	(c) Monitoring results from a release detection method required under § 280.40 and § 280.42 that indicate a release may have occurred unless: (1) The monitoring device is found to be defective, and is immediately repaired, recalibrated or replaced, and additional monitoring does not confirm the initial result; and (2) In the case of inventory control, a second month of data does not confirm the initial result.
Reporting and Cleanup of Spills and Overfills	40 CFR 280.53	(a) Owners and operators of UST systems must contain and immediately clean up a spill or overfill and report to the implementing agency **within 24 hours**, or another reasonable time period specified by the implementing agency, and begin corrective action in accordance with Subpart F in the following cases: (1) Spill or overfill of petroleum that results in a release to the environment that exceeds 25 gallons or another reasonable amount specified by the implementing agency, or that causes a sheen on nearby surface water; and (2) Spill or overfill of a hazardous substance that results in a release to the environment that equals or exceeds its reportable quantity under CERCLA (40 CFR Part 302). (b) Owners and operators of UST systems must contain and immediately clean up a spill or overfill of petroleum that is less than 25 gallons or another reasonable amount specified by the implementing agency, and a spill or overfill of a hazardous substance that is less than the reportable quantity. If cleanup cannot be accomplished **within 24 hours**, or another reasonable time period established by the implementing agency, owners and operators must immediately notify the implementing agency.

TABLE 3
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
(continued)

Notification	Source of Requirement	Requirement
Reporting and Cleanup of Spills and Overfills (continued)	40 CFR 280.53	[Note: Pursuant to §§ 302.6 and 355.40, a release of a hazardous substance equal to or in excess of its reportable quantity must also be reported **immediately** (rather than within 24 hours) to the National Response Center under sections 102 and 103 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and to appropriate state and local authorities under Title III of the Superfund Amendments and Reauthorization Act of 1986.]
Initial Response for UST Systems Containing Petroleum or Hazardous Substances	40 CFR 280.61	Upon confirmation of a release in accordance with § 280.52 or after a release from the UST system is identified in any other manner, owners and operators must perform the following initial response actions **within 24 hours** of a release or within another reasonable period of time determined by the implementing agency: (a) Report the release to the implementing agency (e.g., by telephone or electronic mail); (b) Take immediate action to prevent any further release of the regulated substance into the environment; and (c) Identify and mitigate fire, explosion, and vapor hazards.
Permanent Closure and Changes-in-Service	40 CFR 280.71	(a) At least 30 days before beginning either permanent closure or a change-in-service under paragraphs (b) and (c) of this section, or within another reasonable time period determined by the implementing agency, owners and operators must notify the implementing agency of their intent to permanently close or make a change-in-service, unless such action is in response to corrective action. The required assessment of the excavation zone under § 280.72 must be performed after notifying the implementing agency but before completion of the permanent closure or a change-in-service.

IV. SDWA

TABLE 4
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SAFE DRINKING WATER ACT (SDWA)

Notification/Reporting	Source of Requirement	Requirement
Biennial Report	Section 1424 40 CFR 144.14	All generators of hazardous waste and all owners or operators of hazardous waste management facilities using any class well used to inject waste accompanied by a manifest must comply with these requirements found in 40 CFR 264.75. The owner or operator must prepare and submit a single copy of a biennial report to the Regional Administrator by March 1 of each even numbered year. The biennial report must be submitted on EPA form 8700-13B. The report must cover facility activities during the previous calendar year and must include: (a) The EPA identification number, name, and address of the facility; (b) The calendar year covered by the report; (c) For off-site facilities, the EPA identification number of each hazardous waste generator from which the facility received a hazardous waste during the year; for imported shipments,, the report must give the name and address of the foreign generator; (d) A description and the quantity of each hazardous waste the facility received during the year. For off-site facilities, this information must be listed by EPA identification number of each generator; (e) The method of treatment, storage, or disposal for each hazardous waste; (g) The most recent closure cost estimate and, for disposal facilities, the most recent post-closure cost estimate; and (h) For generators who treat, store, or dispose of hazardous waste on-site, a description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated.

TABLE 4
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SAFE DRINKING WATER ACT (SDWA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Biennial Report (continued)	Section 1424 40 CFR 144.14	(i) For generators who treat, store, or dispose of hazardous waste on-site, a description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984. (j) The certification signed by the owner or operator of the facility or his authorized representative.
Quarterly Reporting Requirements	Section 1424 40 CFR 146.13	(c)(1) Any owner or operator of a Class I (non-hazardous) well shall provide quarterly reports to the Regional Administrator or State Director, as appropriate, on: (i) The physical, chemical and other relevant characteristics of injection fluids; (ii) Monthly average, maximum and minimum values for injection pressure, flow rate and volume, and annular pressure; and (iii) The results of monitoring prescribed under paragraph (b)(4) of this section which includes the type, number and location of wells within the area of review to be used to monitor any migration of fluids into and pressure in the underground sources of drinking water, the parameters to be measured and the frequency of monitoring. (2) Reporting the results, with the first quarterly report after the completion, of: (i) Periodic tests of mechanical integrity; (ii) Any other test of the injection well conducted by the permittee if required by the Director; and

TABLE 4
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SAFE DRINKING WATER ACT (SDWA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Biennial Report (continued)	Section 1424 40 CFR 144.14	(iii) Any well work over.
Annual Report	Section 1424 40 CFR 146.23	(c) Operators of Class II wells shall provide: (1) An annual report to the Director summarizing the results of monitoring required under paragraph (b), section 146.23. Previously submitted information may be included by reference; § 146.23 states that: (b) Monitoring requirements shall, at a minimum, include: (1) Monitoring of the nature of injected fluids at time intervals sufficiently frequent to yield data representative of their characteristics; (2) Observation of injection pressure, flow rate, and cumulative volume at least with the following frequencies; (i) Weekly for produced fluid disposal operations; (ii) Monthly for enhanced recovery operations; (iii) Daily during the injection of liquid hydrocarbons and injection for withdrawal of stored hydrocarbons; and (iv) Daily during the injection phase of cyclic steam operations;

TABLE 4
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SAFE DRINKING WATER ACT (SDWA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Annual Report (continued)	Section 1424 40 CFR 146.23	And recording of one observation of injection pressure, flow rate and cumulative volume at reasonable intervals no greater than 30 days. (2) Owners or operators of hydrocarbon storage and enhanced recovery project may report on a field or project basis rather than an individual well basis where manifold monitoring is used.
Annual Report	Section 1424 40 CFR 146.33	Operators of Class III wells shall provide: o **Quarterly** reporting to the Director on required monitoring; o Results of mechanical integrity and any other periodic test required by the Director reported with the first regular quarterly report after the completion of the test; and o Monitoring may be reported on a project or field basis rather than individual well basis where manifold monitoring is used.
Routine Reporting Requirements	Section 1424 40 CFR 146.69	(a) The owner or operator of any Class I hazardous waste injection wells shall provide **quarterly** reports to the Director containing: (1) Maximum injection pressure; (2) A description of any event that exceeds operating parameters for annulus pressure or injection pressure, as specified in the permit; (3) A description of any event which triggers an alarm or shutdown device pursuant to the operating requirements of 40 CFR 146.67 and the response taken; (4) Total volume of fluid injected;

TABLE 4
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE SAFE DRINKING WATER ACT (SDWA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Routine Reporting Requirements (continued)	Section 1424 40 CFR 146.69	(5) Any change in the annular volume; (6) The physical, chemical, and other relevant characteristics of injected fluids; (7) The results of monitoring prescribed under 146.68; (b) Reporting, **within 30 days or with the next quarterly report, whichever comes later**, the results of: (1) Periodic tests of mechanical integrity; (2) Any other test of the injection well conducted by the permittee if required by the Director; (3) Any well work over.

V. CAA

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)

Notification/Reporting	Source of Requirement	Requirement
Periodic Routine Notifications	Section 111 40 CFR 60.7	(a) Any owner or operator of a new stationary source shall furnish the Administrator written notification as follows: (1) Notification of the date construction (or reconstruction as defined under § 60.15) (see below) of an affected facility is commenced postmarked no later than **30 days** after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form; 60.15(b) states that: (b) "Reconstruction" means the replacement of components of an existing facility to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility; and (2) It is technologically and economically feasible to meet the applicable standards set forth in this part. Standards (c) "Fixed capital cost" means the capital needed to provide all the depreciable components. (d) If an owner or operator of an existing facility proposes to replace components, and the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, he shall notify the Administrator of the proposed replacements. The notice must be postmarked **60 days** (or as soon as practicable) before construction of the replacements is commenced and must include the following information:

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Periodic Routine Notifications (continued)	Section 111 40 CFR 60.7	(1) Name and address of the owner or operator. (2) The location of the existing facility. (3) A brief description of the existing facility and the components which are to be replaced. (4) A description of the existing air pollution control equipment and the proposed air pollution control equipment. (5) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new facility. (6) The estimated life of the existing facility after the replacements. (7) A discussion of any economic or technical limitations the facility may have in complying with the applicable standards of performance after the proposed replacements. (2) Notification of the anticipated date of initial startup of an affected facility postmarked not more than **60 days** nor less than 30 days prior to such date; (3) Notification of the actual date of initial startup of an affected facility postmarked within **15 days** after such date. (4) Notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable subpart or in § 60.14(e) (see below). This notice shall be postmarked **60 days** or as soon as

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Periodic Routine Notifications (continued)	Section 111 40 CFR 60.7	practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change; 60.14(e) states that: (e) The following shall not, but themselves, be considered modifications under this part: (1) Maintenance, repair, and replacement which the Administrator determines to be routine for a source category, subject to the provisions of paragraph (c) of this section and § 60.15. (2) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility. (3) An increase in the hours of operation. (4) Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, as provided by § 60.1, the existing facility was designed to accommodate that alternative use. A facility shall be considered to be designed to accommodate an alternative fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change. Conversion to coal required for energy considerations, as specified in section 111(a)(8) of the Act, shall not be considered a modification.

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Periodic Routine Notifications (continued)	Section 111 40 CFR 60.7	(5) The addition or use of any system or device whose primary function is the reduction of air pollutants, except when an emission control system is removed or is replaced by a system which the Administrator determines to be less environmentally beneficial. (6) The relocation or change in ownership of an existing facility. (5) Notification of the date upon which demonstration of the continuous monitoring system performance commences in accordance with § 60.13(c) postmarked not less than **30 days** prior to such date; (6) Notification of the anticipated date for conducting the opacity observations required for the purpose of demonstrating initial compliance. The notification shall also include, if appropriate, a request for the Administrator to provide a visible emissions reader during a performance test, postmarked not less than 30 days prior to such date; (7) Notification that continuous opacity monitoring system data results will be used to determine compliance with the applicable opacity standard during a performance test required within 60 days after achieving the maximum production rate at which the affected facility will be operating. This notification shall be postmarked not less than **30 days** prior to the date of the performance test. (b) Maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative.

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Periodic Routine Notifications (continued)	Section 111 40 CFR 60.7	(c) Each owner or operator required to install a continuous monitoring system shall submit a written report of excess emissions (as defined in applicable subparts) to the Administrator for every calendar quarter. All quarterly reports shall be postmarked by **the 30th day following the end of each calendar quarter** and shall include the following information: (1) The magnitude of excess emissions computed in accordance with § 60.13(h) (see below), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions; 60.13(h) states that: (h) Owners or operators of all continuous monitoring systems for measurement of opacity shall reduce all data to 6-minute averages and for continuous monitoring systems other than opacity to 1-hour averages. Six minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6-minute period. For continuous monitoring systems other than opacity, 1-hour averages shall be computed from four or more data points equally spaced over each 1-hour period. Data reorder during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this paragraph. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or nonreduced form (e.g., ppm pollutant and percent O_2 or ng/J of pollutant). All excess emissions shall be converted into units of the standard using the applicable conversion procedures specified in subparts.

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Periodic Routine Notifications (continued)	Section 111 40 CFR 60.7	(2) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted; (3) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments; (4) When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report. (d) Any owner or operator subject to the provisions of this part shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this part recorded in a permanent form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, maintenance, reports, and records. (e) If notification substantially similar to that in paragraph (a) (see pages 1 and 2) of this section is required by any other State or local agency, sending the Administrator a copy of that notification will satisfy the requirements of paragraph (a) of this section. (f) Individual subparts of this part may include specific provisions which clarify or make inapplicable the provisions set forth in this section.

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
DOE Facility Reporting Requirements	Section 118 40 CFR 61.94	(1) The owner or operator of any existing source, or any new source to which a standard prescribed under this part is applicable which had an initial startup which preceded the effective date of a standard prescribed under this part shall, within **90 days** after the effective date, provide the following information in writing to the Administrator: (i) Name and address of the owner or operator; (ii) The location of the source; (iii) The types of radionuclides emitted by the stationary source and the annual quantity (in Ci/y for the most recent calendar year) of each radionuclide emitted; (iv) A brief description of the nature, size, design, and method of operation of the stationary source including the operating design capacity of such source. Identify each point of emission for each hazardous pollutant. (v) Estimate of dose equivalent rate to the member of the public at the point of maximum annual air concentration in an unrestricted area where an individual resides or abides; (vi) A description of the existing control equipment for each emission point; (A)Primary control device(s) for radionuclide emissions; (B)Secondary control device(s) for radionuclide emissions;

TABLE 5
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
DOE Facility Reporting Requirement (continued)	Section 118 40 CFR 61.94	(C) Estimated control efficiency (percent) for each control device; (vii) A statement by the owner or operator of the source as to whether he can comply with the standards prescribed in this part within 90 days of the effective date. All information collection provisions in this subpart are not effective until the Office of Management and Budget approves them. (c) In addition to the reporting requirements described here in this section, the Department of Energy shall submit to EPA an annual report, by June 1, 1986, and annually thereafter, that includes the results of monitoring emissions from points subject to this final rule and associated dose calculations. This information shall be based on data collected during the calendar year immediately preceding the required date of submission of the annual report. This report shall be sent to the Assistant Administrator for Air and Radiation (ANR-443), U.S. Environmental Protection Agency, Washington, D.C. 20460.

VI. CWA

TABLE 6
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT (CWA)

Notification/Reporting	Source of Requirement	Requirement
Notification of Discharge	Section 311(b) 40 CFR 110.11	Any person in charge of a vessel or an onshore or offshore facility shall, as soon as he/she has knowledge of any discharge from such vessel or facility in violation of 40 CFR 110.6 (see below), immediately notify the NRC. If direct reporting to the NRC is not practicable, reports may be made to the Coast Guard or EPA predesignated OSC for the geographic area where the discharge occurs. If this is not possible either, reports may be made immediately to the nearest Coast Guard Unit with notification to the NRC as soon as possible.
Discharge Prohibited	Section 311(b) 40 CFR 110.6	No person shall discharge or cause or permit to be discharged into or upon the navigable waters of the United States or adjoining shorelines or into or upon the waters of the contiguous zone or into or upon waters seaward of the contiguous zone in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson Fishery Conservation and Management Act) any oil in such quantities as may be harmful as determined in §§ 110.3, 110.4, and 110.5 (see below), except as the same may be permitted in the contiguous zone and seaward under MARPOL 73/78.
Discharge Into Navigable Waters and Contiguous Zone Such Quantities as May Be Harmful	Section 311(b) 40 CFR 110.3 and 110.4	Discharges of oil into or upon the navigable waters of the United States or adjoining shorelines in such quantities that it has been determined may be harmful to the public health or welfare of the United States, except as provided in § 110.7 of this part (see below), include discharges of oil that: (a)Violate applicable water quality standards, or (b)Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

TABLE 6
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT (CWA)

Notification/Reporting	Source of Requirement	Requirement
Exception for Vessel Engines	Section 311(b) 40 CFR 110.7	Discharges of oil from a properly functioning vessel engine are not deemed to be harmful, but discharges of such oil accumulated in a vessel's bilges shall not be so exempt.
Discharge Beyond Contiguous Zone of Such Quantities as May Be Harmful	Section 311(b) 40 CFR 110.5	Discharges of oil into or upon waters seaward of the contiguous zone in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson Fishery Conservation and Management Act) in such quantities that it has been determined may be harmful to the public health and welfare of the United States, except as provided in § 110.7 (see below), include discharges of oil that: (a)Violate applicable water quality standards, or (b)Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.
Reporting Requirements for NPDES Permits	Section 311(b) 40 CFR 122.41	(j) (1) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (2) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copes of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. (3)Records of monitoring information shall include:

TABLE 6
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT (CWA)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements for NPDES Permits (continued)	Section 311(b) 40 CFR 122.41	(i) The date, exact place, and time of sampling or measurements; (ii) The individual(s) who performed the sampling or measurements; (iii) The date(s) analyses were performed; (iv) The individual(s) who performed the analyses; (v) The analytical techniques or methods used; and (vi) The results of such analyses. (l) (1) The permittee shall give notice to the Director as soon as possible of any planned physical alternations or additions to the permitted facility. Notice is required only when: (i) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in § 122.29(b); or (ii) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under § 122.42(a)(1). (2) The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. (4) Monitoring results shall be reported at the intervals specified elsewhere in this permit.

TABLE 6
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT (CWA)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements for NPDES Permits (continued)	Section 311(b) 40 CFR 122.41	(i) Monitoring results must be reported on a Discharge Monitoring Report (DMR). (ii) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. (iii) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit. (5) Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. (6) Twenty-four hour reporting. (i) The permittee shall report any non-compliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

TABLE 6
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT (CWA)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements for NPDES Permits (continued)	Section 311(b) 40 CFR 122.41	(ii) The following shall be included as information which must be reported within 24 hours under this paragraph. (A) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See § 122.41(g).) (B) Any upset which exceeds any effluent limitation in the permit. (C) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in the permit to be reported within 24 hours. (See § 122.44(g).) (iii) The Director may waive the written report on a case-by-case basis for reports under paragraph (l)(6)(ii) of this section if the oral report has been received with 24 hours. (7) The permittee shall report all instances of noncompliance not reported under paragraphs (l) (4), (5), and (6) of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (l)(6) of this section. (8) Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information. (m) (3) If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least ten days before the date of the bypass.

TABLE 6
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT (CWA)

Notification/Reporting	Source of Requirement	Requirement
Advance Notification by Facility Operators of Lightering Activities	Section 311(b) 33 CFR 156.118	The Captain of the Port (COTP) may require a facility operator to notify the COTP of the time and place of each oil transfer operation at least **4 hours** before it begins for facilities that: o are mobile; o are in a remote location; o have a prior history of oil spills; or o conduct infrequent oil transfer operations. In the case of a vessel to vessel transfer, the COTP may require a vessel operator of a lightering or fueling vessel to notify the COTP of the time and place of each oil transfer operation, as specified by the COTP, at least **4 hours** before it begins. No person may conduct such oil transfer operations until advance notice has been given as specified by the COTP. Note: The notification may be accomplished by submitting a written schedule, periodically updated to be current.
Advance Notification by Vessel Officials of Lightering Activities	Section 311(b) 33 CFR 156.215	The master, owner or agent of each vessel to be lightered must give at least **24 hours** advance notice to the COTP nearest the lightering location or zone, prior to arrival in the lightering location or zone. This advance notice must include: o The vessel's name, call sign or official number, and registry; o The cargo type (if oil) or shipping name (if hazardous material) and approximate amount on board;

TABLE 6
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT (CWA)
(continued)

Notification/Reporting	Source of Requirement	Requirement
Advance Notification by Vessel Officials of Lightering Activities (continued)	33 CFR 156.215	o The number of transfers expected; o The lightering location or zone to be used; o The estimated time of arrival in the lightering location or zone; o The estimated duration of transfer operations; and o The name and destination of service vessel(s). In the event the estimated time of arrival in the lightering location or zone changes by more than six hours, the Master, owner or agent of each vessel to be lightered must advise the COTP of this change **as soon as possible**. Where lightering is conducted as a result of collision, grounding, tank rupture or any similar emergency.
Incident Reporting for Incidents Which May Pose a Threat to Vessels During Lightering	Section 311(b) 33 CFR 156.220	(a) An **immediate** report must be made to the nearest COTP by the service vessel if fire, explosion, collision, grounding or any similar emergency which poses a threat to the vessels involved occurs during lightering. (b) Any discharge of oil or hazardous material into the water shall be reported by the service vessel.

Section 311(b)

VII. AEA

TABLE 7
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE ATOMIC ENERGY ACT

Notification/Reporting	Source of Requirement	Requirement
Reports of Theft, or Loss of Licensed Material	Sections 53, 63, 65, 103-104 10 CFR 20.402	(a) (1) Each licensee shall report any loss or theft of licensed material which has occurred in such quantities and under such circumstances that it appears to the licensee that a substantial hazard may result to person in unrestricted areas. Reporting shall be made **immediately** by telephone. (2) (i) Licensees having an installed Emergency Notification System shall report to the Nuclear Regulatory Commission Operations Center; (ii) All other licensees shall report to the Administrator of the appropriate Nuclear Regulatory Commission Regional Office; (b) **With 30 days** after learning of the loss or theft, the licensee shall make a report to the Nuclear Regulatory Commission, Washington, D.C., and to the appropriate Regional Office.
Incident Notification	Sections 53, 63, 65, 103-104 10 CFR 20.403	(a) Each licensee shall **immediately** report any events involving by product, source or special nuclear material possessed by the licensee which may have caused, or threatens to cause: (1) Exposure of the whole body of an individual to 25 rems of radiation or more; exposure of the skin of the whole body of any individual to 150 rems of radiation or more exposure of the feet, hands, ankles, or forearms of any individual to 375 rems or more of radiation; (2) The release of radioactive materials in concentrations which, if average over a period of 24 hours, would exceed 5,000 times the limits specified for such materials in Appendix B, Table II; (3) A loss of one working week or more of the operation of any facilities affected;

TABLE 7
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE ATOMIC ENERGY ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
		(4) Damage to property in excess of $200,000;
		(b) Each licensee shall, within 24 hours of discovery of the event, report any event involving material possessed by the licensee that may be caused, or threatens to cause:
		(1) Exposure of the whole body of any individual to 5 rems or more of radiation; exposure of the skin of the whole body of an individual to 30 rems or more of radiation; exposure of the feet, hands, or forearms to 75 rems or more of radiation;
		(2) The release of radioactive materials in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified in Appendix B, Table II.
		(3) A loss of one day or more of the operation of any facilities affected.
		(4) Damage to property in excess of 2,000.
		(d) (1) Licenses which have an installed Emergency Notification System shall report to the Nuclear Regulatory Commission Operations Center;
		(2) All other licensees shall report to the administration of the appropriate Nuclear Regulatory Commission Regional Office by telegram, mailgram, or facsimile.

VIII. FIFRA

TABLE 8
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE FEDERAL INSECTICIDE, FUNGICIDE & RODENTICIDE ACT

Notification/Reporting	Source of Requirement	Requirement
Specific Exemption Reports	Section 4 40 CFR 166.32	(a) Any unexpected adverse effects resulting from the use of a pesticide under a specific, quarantine, or public health exemption must be immediately reported to the Agency. (b) A report summarizing the results of pesticide use under a specific, quarantine, and public health exemption must be submitted to the Agency **within 6 months** from the expiration of the exemption unless otherwise specified by the Agency. The information in this report shall include all of the following: (1) Total acreage, amount of commodity or other unit treated and the total quantity of the pesticide used; (2) A discussion of the effectiveness of the pesticide in dealing with the emergency condition; (3) A description of any unexpected adverse effects which resulted from use of the pesticide under the exemption; (4) The results of any monitoring required and/or carried out under the exemption; (5) A discussion of any enforcement actions taken in connection with the exemption; (6) Method(s) of disposition of a food crop, if required to be destroyed under an exemption; and (7) Any other information requested by the Administrator. (c) Records for all treatments involving the first food use of a pesticide will be maintained by the agency to which the emergency exemption was granted for a minimum of 2 years following the date of expiration of the exemption. On request by the Agency these records shall be

TABLE 8
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE FEDERAL INSECTICIDE, FUNGICIDE & RODENTICIDE ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
Specific Exemption Reports (continued)	Section 4 40 CFR 166.32	made available to the Administrator. Records will include all of the following: (1) Locations where the pesticide was applied; (2) Dates of application (range); and (3) Total quantity of the pesticide used.

IX. TSCA

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT

Notification/Reporting	Source of Requirement	Requirement
PCB Disposal Reporting Requirements	Section 6(e) 40 CFR 761.60	Thirty days before any person burns mineral oil dielectric fluid in the boiler, the person gives written notice to the EPA Regional Administrator for the EPA Region in which the boiler is located and that the notice contains the following information: (1) The name and address of the owner or operator of the boiler and the address of the boiler; (2) The boiler rating in units of BTU/hour; (3) The carbon monoxide concentration and the excess oxygen percentage in the stack of the boiler when it is operated in a manner similar to the manner in which it will be operated when mineral oil dielectric fluid is burned; and (4) The type of equipment, apparatus, and procedures to be used to control the feed of mineral oil dielectric fluid to the boiler and to monitor and record the carbon monoxide concentration and excess oxygen percentage in the stack. Prior to any person burning these liquids in the boiler, approval must be obtained from the EPA Regional Administrator for the EPA Region in which the boiler is located and any persons seeking such approval must submit to the EPA Regional Administrator a request containing at least the following information: (1) The name and address of the owner or operator of the boiler and the address of the boiler; (2) The boiler rating in units of BTU/hour;

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Disposal Reporting Requirements (continued)	Section 6(e) 40 CFR 761.60	(3) The carbon monoxide concentration and the excess oxygen percentage in the stack of the boiler when it is operated in a manner similar to the manner in which it will be operated when low concentration PCB liquid is burned; (4) The type of equipment, apparatus, and procedures to be used to control the feed of mineral oil dielectric fluid to the boiler and to monitor and record the carbon monoxide concentration and excess oxygen percentage in the stack; (5) The type of waste to be burned (e.g., hydraulic fluid, contaminated fuel oil, heat transfer fluid, etc.). (f) (1) Each operator of a chemical waste landfill, incinerator, or alternative to incineration approved under paragraph (e) of this section shall give the following written notices to the state and local governments within whose jurisdiction the disposal facility is located: (i) Notice at least thirty days before a facility is first used for disposal of Polychlorinated biphenyls (PCBs) required by these regulations; and (ii) At the request of any state or local government, annual notice of the quantities and general description of PCBs disposed of during the year. This annual notice shall be given no more than thirty days after the end of the year covered.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Disposal Reporting Requirements (continued)	Section 6(e) 40 CFR 761.60	(iii) The Regional Administrator may reduce the notice period required by paragraph (f)(1)(i) of this section from thirty days to a period of **no less than five days** in order to expedite interim approval of the chemical waste landfill located in Sedgwick County, Kansas. (2) Any person who disposes of PCBs under a paragraph (a)(5)(iii) of this section incineration or chemical waste landfilling waiver shall give written notice at least **thirty** days prior to conducting the disposal activities to the state and local governments within whose jurisdiction the disposal is to take place.
PCB Incinerator Reporting Requirements	Section 6(e) 40 CFR 761.70	d) Prior to the incineration of PCBs and PCB Items the owner or operator of an incinerator shall receive the written approval of the Agency Regional Administrator for the region in which the incinerator is located, or the Assistant Administrator for Pesticides and Toxic Substances. Approval from the Assistant Administrator for Pesticides and Toxic Substances may be effective in all ten EPA regions. Such approval shall be obtained in the following manner: (1) The owner or operator shall submit to the Regional Administrator or the Assistant Administrator an application which contains: (i) The location of the incinerator; (ii) A detailed description of the incinerator including general site plans and design drawings of the incinerator; (iii) Engineering reports or other information on the anticipated performance of the incinerator; (iv) Sampling and monitoring equipment and facilities available;

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Incinerator Reporting Requirements (continued)	Section 6(e) 40 CFR 761.70	(v) Waste volumes expected to be incinerated; (vi) Any local, State, or Federal permits or approvals; and (vii) Schedules and plans for complying with the approval requirements of this regulation.
PCB Disposal Reporting Requirements	Section 6(e) 40 CFR 761.75	(c) Prior to the disposal of any PCBs and PCB Items in a chemical waste landfill, the owner or operator of the landfill shall receive written approval of the Agency Regional Administrator for the Region in which the landfill is located. The approval shall be obtained in the following manner: (1) The owner or operator shall submit to the Regional Administrator an initial report which contains: (i) The location of the landfill; (ii) A detailed description of the landfill including general site plans and design drawings; (iii) An engineering report describing the manner in which the landfill complies with the requirements for chemical waste landfills specified in paragraph (b) of this section; (iv) Sampling and monitoring equipment and facilities available; (v) Expected waste volumes of PCBs; (vi) General description of waste materials other than PCBs that are expected to be disposed of in the landfill;

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Disposal Reporting Requirements (continued)	Section 6(e) 40 CFR 761.75	(vii) Landfill operations plan as required in paragraph (b) of this section; (viii) Any local, State, or Federal permits or approvals; and (ix) Any schedules or plans for complying with the approval requirements of these regulations.
Transfer of Property Reporting Requirements	Section 6(e) 40 CFR 761.75	(c) Any person who owns or operates an approved chemical waste landfill must notify EPA at least 30 days before transferring ownership in the property or transferring the right to conduct the chemical waste landfill operation. The transferor must also submit to EPA, at least thirty days before such transfer, a notarized affidavit signed by the transferee which states that the transferee will abide by the transferor's EPA chemical waste landfill approval. Within thirty days of receiving such notification and affidavit, EPA will issue an amended approval substituting the transferee's name for the transferor's name, or EPA may require the transferee to apply for a new chemical waste landfill approval. In the latter case, the transferee must abide by the transferor's EPA approval until EPA issues the new approval to the transferee.
Reporting Requirements Which Apply to PCBs	Section 6(e) 40 CFR 761.180	This section contains recordkeeping and reporting requirements that apply to PCBs, PCB Items, and PCB storage and disposal facilities that are subject to the requirements of the part.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements Which Apply to PCBs (continued)	Section 6(e) 40 CFR 761.180	(a) PCBs and PCB Items in service or projected for disposal. Beginning July 2, 1978, each owner or operator of a facility using or storing at one time at least 45 kilograms (99.4 pounds) of PCBs contained in PCT Container(s) or one or more PCB Transformers, or 50 or more PCB Large High or Low Voltage Capacitors shall develop and maintain records on the disposition of PCBs and PCB Items. These records shall form the basis of an annual document prepared for each facility by July 1 covering the previous calendar year. Owners or operators with one or more facilities that use or store PCBs and PCB Items in the quantities described above may maintain the records and documents at one of the facilities that is normally occupied for 8 hours a day, provided the identity of this facility is available at each facility using or storing PCBs and PCB Items. The records and documents shall be maintained for at least five years after the facility ceases using or storing PCBs and PCB items in the prescribed quantities. The following information for each facility shall be included in the annual document: (1) The dates when PCBs and PCB Items are removed from service, are placed into storage for disposal, and are placed into transport for disposal. The quantities of the PCBs and PCB Items shall be indicated using the following breakdown: (i) Total weight in kilograms of any PCBs and PCB Items in PCB Containers including the identification of container contents such as liquids and capacitors; (ii) Total number of PCB Transformers and total weight in kilograms of any PCBs contained in the transformers; and (iii) Total number of PCB Large High or Low Voltage Capacitors.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements Which Apply to PCBs (continued)	Section 6(e) 40 CFR 761.180	(2) For PCBs and PCB Items removed from service, the location of the initial disposal or storage facility and the name of the owner or operator of the facility. (3) Total quantities of PCBs and PCB Items remaining in service at the end of the calendar year using the following breakdown: (i) Total weight in kilograms of any PCBs or PCB Items in PCB Containers, including the identification of container contents such as liquids and capacitors; (ii) Total number of PCB Transformers and total weight in kilograms of any PCBs contained in the transformers; and (iii) Total number of PCB Large High and Low Voltage Capacitors. (b) Disposal and storage facilities. Each owner or operator of a facility (including high efficiency boiler operations) used for the storage or disposal of PCBs and PCB Items shall by July 1, 1979 and each July 1 thereafter prepare and maintain a document that includes the information required in paragraphs (b)(1) through (4) of this section for PCBs and PCB Items that were handled at the facility during the previous calendar year. The document shall be retained at each facility for at least 5 years after the facility is no longer used for the storage or disposal of PCBs and PCB Items except that in the case of chemical waste landfills, the document shall be maintained at least 20 years after the chemical waste landfill is no longer used for the disposal of PCBs and PCB Items. The documents shall be available at the facility for inspection by authorized representatives of the Environmental Protection Agency. If the facility ceases to be used for PCB storage

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements Which Apply to PCBs (continued)	Section 6(e) 40 CFR 761.180	or disposal, the owner or operator of such facility shall notify **within 60 days** the EPA Regional Administrator of the region in which the facility is located that the facility has ceased storage or disposal operations. The notice shall specify where the documents that are required to be maintained by this paragraph are located. The following information shall be included in each document: (1) The date when any PCBs and PCB Items were received by the facility during the previous calendar year for storage or disposal, and identification of the facility and the owner or operator of the facility from whom the PCBs were received; (2) The date when any PCBs and PCB Items were disposed of at the disposal facility or transferred to another disposal or storage facility, including the identification of the specific types of PCBs or PCB Items that were stored or disposed of; (3) A summary of the total weight in kilograms of PCBs and PCB Articles in containers and the total weight of PCBs contained in PCB Transformers, that have been handled at the facility during the previous calendar year. This summary shall provide totals of the above PCBs and PCB Items which have been: (i) Received during the year; (ii) Transferred to other facilities during the year; and

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
Reporting Requirements Which Apply to PCBs (continued)	Section 6(e) 40 CFR 761.180	(iii) Retained at the facility at the end of the year. In addition the contents of PCB Containers shall be identified. When PCB Containers and PCBs contained in a transformer are transferred to other storage or disposal facilities, the identification of the facility to which such PCBs and PCB Items were transferred shall be included in the document. (4) Total number of any PCB Articles or PCB Equipment not in PCB Containers, received during the calendar year, transferred to other storage or disposal facilities during the calendar year, or remaining on the facility site at the end of the calendar year. The identification of the specific types of PCB Articles and PCB Equipment received, transferred, or remaining on the facility site shall be indicated. When PCB Articles and PCB Equipment are transferred to other storage or disposal facilities, the identification of the facility to which the PCB Articles and PCB Equipment were transferred must be included.
PCB Spill Notification Requirements	Section 6(e) 40 CFR 761.125	(a) Unless expressly limited, the reporting, disposal, and pre-cleanup sampling requirements in paragraphs (a)(1) through (3) of this section apply to all spills of PCBs at concentrations of 50 ppm or greater which are subject to decontamination requirements under the Toxic Substances Control Act (TSCA), including those spills listed under § 761.120(b) which are excluded from the cleanup standards at paragraphs (b) and (c) of this section.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Spill Notification Requirements (continued)	Section 6(e) 40 CFR 761.125	(1) The reporting in paragraph (a)(1) (i) through (iv) of this section is required in addition to applicable reporting requirements under the Clean Water Act (CWA) or the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA). For example, under the National Contingency Plan (NCP) all spills involving 10 pounds or more of PCB material must currently be reported to the NRC (1-800-424-8802). The requirements in paragraphs (a)(1) (i) through (iv) of this section are designed to be consistent with existing reporting requirements to the extent possible so as to minimize reporting burdens on governments as well as the regulated community. (i) Where a spill directly contaminates surface water, sewers, or drinking water supplies, as discussed under § 761.120(d), the responsible party shall notify the appropriate EPA regional office (the Office of Pesticides and Toxic Substances Branch) and obtain guidance for appropriate cleanup measures in the shortest possible time after discovery, but in no case later than **24 hours** after discovery. (ii) Where a spill directly contaminates grazing lands or vegetable gardens, as discussed under § 761.120(d), the responsible party shall notify the appropriate EPA regional office (the Office of Pesticides and Toxic Substances Branch) and proceed with the immediate requirements specified under paragraph (b) or (c) of this section, depending on the source of the spill, in the shortest possible time after discovery, but in no case later than **24 hours** after discovery.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Spill Notification Requirements (continued)	Section 6(e) 40 CFR 761.125	(iii) Where a spill exceeds 10 pounds of PCT material (generally 1 gallon of PCB dielectric fluid) and is not addressed in paragraph (a)(1) (i) through (ii) of this section, the responsible party will notify the appropriate EPA regional office and proceed to decontaminate the spill area in accordance with this TSCA policy in the shortest possible time after discovery, but in no case later than 24 hours after discovery. For purposes of the notification requirement, the 10 pounds are measured by the weight of the PCB-containing material spilled rather than by the weight of only the PCBs spilled. (3) At the completion of cleanup, the responsible party shall document the cleanup with records and certification of decontamination. The records and certification must be maintained for a period of 5 years. The records and certification shall consist of the following: (i) Identification of the source of the spill (e.g., type of equipment). (ii) Estimated or actual date and time of the spill occurrence. (iii) The date and time cleanup was completed or terminated (if cleanup was delayed by emergency or adverse weather: the nature and duration of the delay). (iv) A brief description of the spill location. (v) Precleanup sampling data used to establish the spill boundaries if required because of insufficient visible traces, and a brief description of the sampling methodology used to establish the spill boundaries.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Spill Notification Requirements (continued)	Section 6(e) 40 CFR 761.125	(vi) A brief description of the solid surfaces cleaned and of the double wash/rinse method used. (vii) Approximate depth of soil excavation and the amount of soil removed. (viii) A certification statement signed by the responsible party stating that the cleanup requirements have been met and that the information contained in the record is true to the best of his/her knowledge. (ix) While not required for compliance with this policy, the following information would be useful if maintained in the records: (A) Additional pre- or post-cleanup sampling. (B) The estimated cost of the cleanup by man-hours, dollars, or both. (c) Requirements for cleanup of high-concentration spills and low-concentration spills involving 1 pound or more PCBs by weight (270 gallons or more of untested mineral oil). Cleanup of low-concentration spills involving 1 lb or more PCBs by weight and of all spills of materials shall be considered commplete if all of the immediate requirements, cleanup standards, sampling, and recordkeeping requirements of paragraphs (c) (1) through (5) of this section are met.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Spill Notification Requirements (continued)	Section 6(e) 40 CFR 761.125	(1) The four actions in paragraphs (c)(1) (i) through (iv) of this section must be taken as quickly as possible and within no more than **24 hours** (**or within 48 hours for PCB Transformers**) after the responsible party was notified or became aware of the spill, except that actions described in paragraphs (c)(1) (ii) through (iv) of this section can be delayed beyond 24 hours if circumstances (e.g., civil emergency, hurricane, tornado, or other similar adverse weather conditions, lack of access due to physical impossibility, or emergency operating conditions) so requie for the duration of the adverse conditions. The occurrence of a spill on a weekend or overtime costs are not acceptable reasons to delay response. Owners of spilled PCBs who have delayed cleanup because of these types of circumstances must keep records documenting the fact that circumstances precluded rapid response. (i) The responsible party shall notify the EPA regional office and the NRC as required by § 761.125(a)(1) or by other applicable statutes. (ii) The responsible part shall effectively cordon off or otherwise delineate and restrict an area encompassing any visible traces plus a 3-foot buffer and place clearly visible signs advising persons to avoid the area to minimize the spread of contamination as well as the potential for human exposure.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Spill Notification Requirements (continued)	Section 6(e) 40 CFR 761.125	(iii) The responsible party shall record and document the area of visible contamination, noting the extent of the visible trace areas and the center of the visible trace area. If there are not visible traces, the responsible party shall record this fact and contact the regional office of the EPA for guidance in completing statistical sampling of the spill area to establish spill boundaries. (5) The responsible party shall document the cleanup with records of decontamination. The records must be maintained for a period of 5 years. The records and certification shall consist of the following: (i) Identification of the source of the spill, e.g., type of equipment. (ii) Estimated or actual date and time of the spill occurrence. (iii) The date and time cleanup was completed or terminated (if cleanup was delayed by emergency or adverse weather: the nature and duration of the delay). (iv) A brief description of the spill location and the nature of the materials contaminated. This information should include whether the spill occurred in an outdoor electrical substation, other restricted access location, or in a nonrestricted access area. (v) Precleanup sampling data used to establish the spill boundaries if required because of insufficient visible traces and a brief description of the sampling methodology used to establish the spill boundaries.

TABLE 9
NOTIFICATION AND REPORTING REQUIREMENTS UNDER THE TOXIC SUBSTANCES CONTROL ACT
(continued)

Notification/Reporting	Source of Requirement	Requirement
PCB Spill Notification Requirements (continued)	Section 6(e) 40 CFR 761.125	(vi) A brief description of the solid surfaces cleaned. (vii) Approximate depth of soil excavation and the amount of soil removed. (viii) Postcleanup verification sampling data and, if not otherwise apparent from the documentation, a brief description of the sampling methodology and analytical technique used. (ix) While not required for compliance with this policy, information on the estimated cost of cleanup (by man-hours, dollars, or both) would be useful if maintained in the records.

TABLE 10
EXECUTIVE ORDER 12088
FEDERAL COMPLIANCE WITH POLLUTION CONTROL STANDARDS

Notification/Reporting	Source of Requirement	Requirement
Pollution Control Plan	Section 22 TSCA Section 313 CWA Section 1447 SDWA Section 118 CAA Section 6001 SWDA Section 301 of Title 3, U.S.C.	1.4. Pollution Control Plan. 1-401. Each Executive agency shall submit to the Director of the Office of Management and Budget, through the Administrator, an annual plan for the control of environmental pollution. The plan shall provide for any necessary improvement in the design, construction, management, operation, and maintenance of Federal facilities and activities, and shall include annual cost estimates. The Administrator shall establish guidelines for developing such plans. 1-402. In preparing its plan, each Executive agency shall ensure that the plan provides for compliance with all applicable pollution control standards. 1-403. The plan shall be submitted in accordance with any other instructions that the Director of the Office of Management and Budget may issue.

X. Appendix

APPENDIX A

Environmental Laws and Executive Orders Reviewed

1. Title 42 U.S.C. 2011, et seq., The Atomic Energy Act of 1954, as amended, which authorizes the conduct of atomic energy activities.

2. Title 42, U.S.C. 4321, et seq., The National Environmental Policy Act of 1969, as amended, which establishes broad national environmental policy.

3. Title 42 U.S.C. 7401, et seq., The Clean Air Act, as amended, which provides requirements to protect and enhance the quality of the Nation's air resources to promote the public health and welfare.

4. Title 33 U.S.C. 1251, et seq., The Federal Water Pollution Control Act, as amended, which provides requirements to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

5. Title 42 U.S.C. 6901, et seq., Solid Waste Disposal Act of 1965, as amended, which authorizes the U.S. Environmental Protection Agency (EPA) to regulate hazardous and solid wastes.

6. Title 40 U.S.C. 9601, et seq., The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, which requires the identification, characterization, and cleanup of inactive hazardous waste sites by responsible parties; and, imposes certain response and reporting requirements for operations from which hazardous substances have been released.

7. Title 42 U.S.C. 300, et seq., The Safe Drinking Water Act, as amended, which authorizes EPA to promulgate regulations under two specific programs: the first protects the Nation's public drinking water supplies; the second protects subsurface waters.

8. Title 15 U.S.C. 2601, et seq., Toxic Substances Control Act, as amended, which provides requirements to safely regulate the manufacture, processing, distribution in commerce, use or disposal of chemical substances and mixtures which may present an unreasonable risk to either the public health or the environment.

9. Title 7 U.S.C. 136, et seq., The Federal Insecticide, Fungicide, and Rodenticide Act, as amended, which authorizes EPA to promulgate regulations governing the use and disposal of pesticides.

10. Title 42 U.S.C. 10101, et. seq., The Nuclear Waste Policy Act of 1982, as amended, which provides for the development of repositories for the disposal of high-level radioactive waste and spent fuel, and to establish a program of research, development, and demonstration regarding the disposal of high-level radioactive waste and spent nuclear fuel.

11. Title 42 U.S.C. 2021, et. seq., The Low-Level Radioactive Waste Policy Act, as amended, which establishes procedures for the implementation of compacts providing for the establishment and operation of regional disposal facilities for low-level radioactive waste.

12. Title 42 U.S.C. 7901, et. seq., The Uranium Mill Tailings Radiation Control Act of 1978, as amended, which provides for a remedial action program at selected inactive uranium mill tailings sites.

13. Title 42 U.S.C. 4901, et seq., The Noise Control Act of 1972, as amended, which establishes a means for coordination of Federal noise control research, setting noise emission standards, and providing information to the general public.

14. Title 16 U.S.C. 1451, et seq., The Coastal Zone Management Act of 1972, as amended, which establishes and supports national coastal zone management policies.

15. Title 16 U.S.C. 1531, et seq., The Endangered Species Act of 1973, as amended, which establishes a program for the conservation of endangered species and their ecosystems.

16. Title 16 U.S.C. 661, et seq., The Fish and Wildlife Coordination Act, as amended, which authorizes the Secretary of the Interior to provide assistance to and cooperate with public and private organizations in the development and protection of the Nation's fish and wildlife.

17. Title 16 U.S.C. 470, et seq., The National Historic Preservation Act of 1966, as amended, which establishes the policy of the U.S. Government to protect and preserve historical structures, sites and artifacts.

18. Title 42 U.S.C. 1996, et seq., The American Indian Religious Freedom Act, as amended, which establishes a policy of the U.S. Government to protect and preserve for American Indians their inherent right of freedom of religion, including access to sites.

19. Title 33 U.S.C. 1412, et seq., The Marine Protection, Research, and Sanctuaries Act, as amended, which regulates the dumping of materials into ocean waters.

20. Title 16 U.S.C. 1273, et seq., The Wild and Scenic Rivers Act, as amended, which establishes a national wild and scenic rivers system to preserve and protect selected rivers of the Nation.

21. Executive Order 11988, "Floodplain Management," of 5-24-77, which requires that Federal agencies take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains.

22. Executive Order 11990, "Protection of Wetlands," of 5-24-77, which requires that Federal agencies ensure that projects avoid, to the extent possible, the long- and short-term adverse impacts of destroying or modifying wetlands, and to avoid direct or indirect support of new construction in wetlands if there is a practicable alternative.

23. Executive Order 12088, "Federal Compliance with Pollution Control Standards," of 10-13-78, which requires that all Federal facilities and activities comply with applicable pollution control standards.

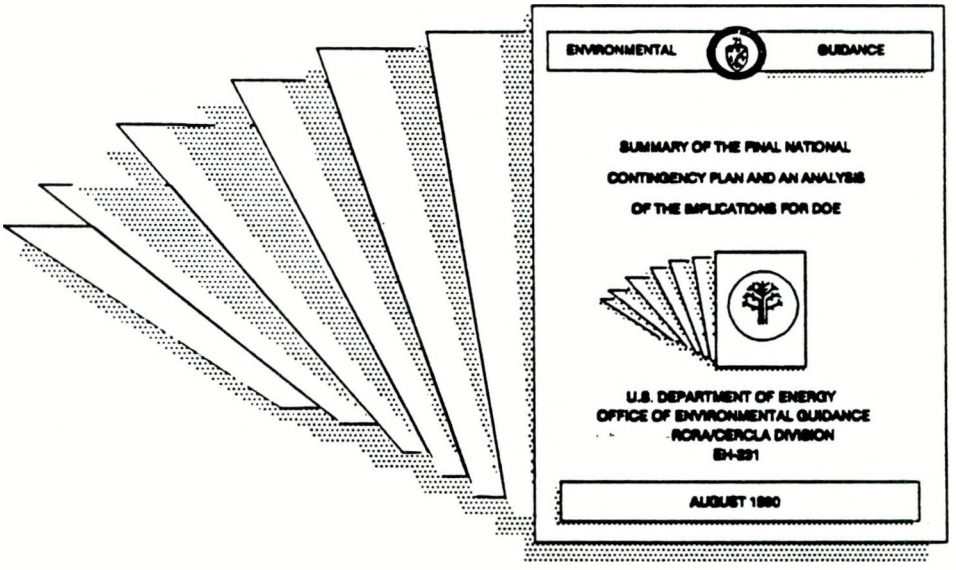
24. Executive Order 12580, "Superfund Implementation," of 1-23-87, which delegates to various Federal officials the responsibilities vested in the President for implementing the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

25. Office of Management and Budget (OMB) Circular No. A-106, "Reporting Requirements in Connection with the Prevention, Control, and Abatement of Environmental Pollution of Existing Federal Facilities," of 12-31-74.

B. Summary of Final NCP and an Analysis of the Implications for DOE

ENVIRONMENTAL GUIDANCE

SUMMARY OF THE FINAL NATIONAL CONTINGENCY PLAN AND AN ANALYSIS OF THE IMPLICATIONS FOR DOE



U.S. DEPARTMENT OF ENERGY
OFFICE OF ENVIRONMENTAL GUIDANCE
RCRA/CERCLA DIVISION
EH-231

AUGUST 1990

Summary of the Final National Contingency Plan and an Analysis of the Implications for DOE

AUGUST 1990

PREPARED BY:

U.S. DEPARTMENT OF ENERGY
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LIST OF ACRONYMS

Acronym	Definition
ACL	Alternate Concentration Limit
ARARs	Applicable or relevant and appropriate requirements
ATSDR	Agency for Toxic Substances and Disease Registry
BDAT	Best Demonstrated Available Technology
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CRP	Community Relations Plan
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
EE/CA	Engineering Evaluation/Cost Analysis
E.O.	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	The Emergency Planning and Community-Right-To-Know Act of 1986
FR	*Federal Register*
FS	Feasibility Study
HRS	Hazard Ranking System
LDR	Land Disposal Restriction
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Contingency Plan
NPL	National Priorities List
NRC	National Response Center
NRT	National Response Team
O&M	Operation and Maintenance
OSC	On-Scene Coordinator
PA	Preliminary Assessment
RA	Remedial Action
RCRA	The Resource Conservation and Recovery Act of 1976
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RRT	Regional Response Team
SAC	Support Agency Coordinator
SARA	The Superfund Amendments and Reauthorization Act of 1986
SI	Site Inspection
SMOA	Superfund Memorandum of Agreement
TAG	Technical Assistant Grant
TBCs	Other information to be considered
USCG	U.S. Coast Guard

1. INTRODUCTION

In 1986 the Congress passed the Superfund Amendments and Reauthorization Act (SARA), which extensively revised and added new authorities to CERCLA. Among these modifications was a requirement that the NCP be revised to implement the regulatory changes required by SARA. On December 21, 1988, the U.S. Environmental Protection Agency (EPA) published in the *Federal Register* (53 FR 51394) a proposal to revise the existing National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The NCP is the regulation that implements the oil and hazardous substance release response provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or "Superfund") and Sect. 311 of the Clean Water Act. On March 8, 1990, the revised NCP was published in the *Federal Register* (55 FR 8666). The new NCP, which was effective April 9, 1990, added new requirements of SARA, was reorganized to conform more accurately to the sequence of CERCLA response actions based on ten years of EPA experience, and more clearly reflects current EPA policy. The preambles to both the proposed and final NCP should be reviewed when issues arise on the meaning or intent of the final rule. Unless directly contradicted or superseded by the preamble to the final rule, the preamble to the proposed rule reflects EPA's intent in promulgating the NCP.

The following report identifies major changes in the new NCP. Chapter 2 of this report briefly outlines the new NCP to familiarize the reader with the new organization of the regulation. Discussion in this chapter is limited to highlights, areas of particular importance to DOE, and modifications made to the old and proposed Plans. In Chapter 3, the major issues of concern to DOE are addressed in greater detail.

2. OUTLINE OF THE FINAL NCP

This section outlines the revised NCP in order to familiarize the reader with the organization of the rule. Reference to new language indicates a change from the original NCP. Unless noted, the final language discussed herein is the same as in the proposed NCP.

2.1 SUBPART A — INTRODUCTION

Subpart A serves as the preface to the NCP. It contains statements of purpose, authority, applicability, and scope, as well as abbreviations and definitions. Although it has been reorganized and the definitions section has been revised, it is similar to the original Subpart A.

2.1.1 Purpose and Objective

Sect. 300.1 has been clarified to indicate that the purpose of the NCP is to provide the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

2.1.2 Authority, Applicability, and Scope

The "Authority" and "Application" sections of the original NCP have been combined as Sect. 300.2 to eliminate redundancies between the two. Sect. 300.3, entitled "Scope," now states simply that the Plan applies to and is in effect for discharges of oil into or on the navigable waters of the United States and for releases of hazardous substances into the environment. The phrase "The NCP applies to Federal agencies and States" found in the proposed revisions of December 21, 1988 (53 FR 51394) has been removed to denote that the NCP also applies to potential responsible parties (PRPs). The remainder of the section enumerates the response elements provided by the NCP in much the same way as the original version did, but with the addition of sections on procedures for involving State governments and other persons in response actions, and on procedures for compiling an administrative record.

2.1.3 Abbreviations and Definitions

The abbreviations section, now Sect. 300.4, has been expanded to include abbreviations commonly used in EPA communications. The definitions section, now Sect. 300.5, has been substantially revised. Several important definitions have been revised or added, as outlined below.

- The definitions of ***"applicable requirements"*** and ***"relevant and appropriate requirements"*** have been broadened to include standards promulgated under both Federal and State law, including State standards that are more stringent than Federal requirements. This revision reflects the fact that SARA amended CERCLA to require the consideration of more stringent State-promulgated standards when determining applicable or relevant and appropriate requirements.

- The definition of ***"lead agency"*** has been revised to reflect Executive Order (E.O.) 12580 (52 FR 2923). This order delegates lead agency authorities to the DOE, the Department of Defense (DOD), and other Federal agencies under certain specific conditions. The expanded definition states:

> *Lead agency* means the agency that provides the OSC/RPM [On-Scene Coordinator/Remedial Project Manager] to plan and implement response action under the NCP. The EPA, the USCG [Coast Guard], another Federal agency, or a State (or political subdivision of a State) ... may be the lead agency for a response action. In the case of a release of a hazardous substance, pollutant, or contaminant, where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of Department of Defense (DOD) or Department of Energy (DOE), then DOD or DOE will be the lead agency. Where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of a Federal agency other than the EPA, the USCG, DOD, or DOE, then that agency will be the lead agency for remedial actions and removal actions other than emergencies. The Federal agency maintains its lead agency responsibilities whether the remedy is selected by the Federal agency for non-NPL [non-National Priority List] sites or by EPA and the Federal agency or by EPA alone under CERCLA Section 120. The lead agency will consult with the support agency, if one exists, throughout the response process.

- The definitions of **"On-Scene Coordinator"** (OSC) and ***"Remedial Project Manager"*** (RPM) have been simplified. They also recognize that other Federal agencies besides EPA, USCG, DOE, and DOD can designate the OSC or RPM, as provided by E.O. 12580.

- A definition for ***"on-site"*** has been added. On-site means "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." "On-site" is broader than the CERCLA definition of facility in order to include adjacent areas necessary for implementing response activities and effectuating the cleanup of facilities. However, it is not as inclusive as the RCRA definition of facility, i.e., the property boundaries (55 FR 8689). The phrase "for permitting purposes" found in the proposed revisions has been omitted in the final rule.

- The definition of ***"State"*** clarifies that it also includes Indian Tribes.

- A definition for ***"support agency"*** has been added. The support agency provides the Support Agency Coordinator (SAC) to furnish necessary data to the lead agency, review response data and documents, and provide other assistance as requested by the OSC or RPM. EPA, USCG, other Federal agencies, or States may be support agencies if operating pursuant to a contract, Memorandum of Agreement, or other agreement. The support agency may also concur on decision documents.

2.1.4 New Sections

Two new sections have been added to Subpart A. Sect. 300.6, "Use of number and gender," specifies that words used in the singular include the plural and those in the masculine gender also include the feminine and vice versa. Sect. 300.7 provides directions on computing prescribed or allowed time periods.

2.2 SUBPART B — RESPONSIBILITY AND ORGANIZATION FOR RESPONSE

Proposed Subpart B describes the responsibilities of Federal agencies for response and preparedness planning and the organizational structure within which the Federal response takes place. No major substantive revisions were made to this subpart. It has, however, been reorganized. Specifically, the new rule combines Subparts B ("Responsibility") and C ("Organization") of the original NCP. Furthermore, the sections are presented so that they better reflect the chronology of response activities.

2.2.1 Presidential Delegations

Sect. 300.100 (previously 300.21) acknowledges that the President delegated certain functions and responsibilities to Federal agencies, as provided in E.O. 11735 and E.O. 12580. The notice of amendment or revocation of E.O. 11735 or 12316 found in the original NCP has been removed.

2.2.2 Organizational Concepts

Sect. 300.105 outlines the overall organization for response. Sects. 300.110 and 300.115 cover the roles of the National Response Team (NRT) and Regional Response Teams (RRTs), respectively, in greater detail. The general roles and responsibilities of the OSC/RPM are described in Sect. 300.120. This section also describes the conditions under which Federal agencies (other than EPA or USCG) or States can be designated as lead agencies and, therefore, can provide the OSC/RPM. This provision recognizes the new authorities granted to Federal agencies by E.O. 12580. *(See the definition of "lead agency" provided under Subchapter 2.1.3 above for a description of these conditions).*

Two new paragraphs have been added to Sect. 300.120. One describes the RPM's responsibilities for Federal-lead, non-Fund-financed responses. Specifically, the RPM coordinates, directs, and reviews the work of other agencies, responsible parties, and contractors to assure compliance with the NCP. These responsibilities are not much different from those of the RPM for Fund-financed responses. The second new paragraph outlines the responsibilities of the SAC. The SAC is the prime representative of a support agency, and responsibilities of the SAC include providing and reviewing data and documents as requested by the OSC/RPM and providing other assistance as requested.

2.2.3 Response Operations

Sect. 300.125 discusses the role of the National Response Center (NRC) and addresses the requirements for notifications of discharges or releases. The title of this section has been changed to "Notification and communication" to reflect the position of the NRC in the NRT/RRT/OSC/RPM system. Once notification has occurred, the process of initiating a response may begin, which is addressed in Sect. 300.130, "Determinations to initiate responses and special conditions." This section discusses the initiation of Federal responses, the response management responsibilities of the NRT co-chairs (EPA and USCG), the special authorities and circumstances that may affect the initiation of a response, and other response authorities.

During the response action, the OSC/RPM has specific responsibilities, which are explained in more detail in Sect. 300.135, "Response operations." Sect. 300.140 covers "Multiregional responses" in the event that a discharge or release moves from one region to another, or covers an area covered by two or more regional contingency plans. Sect. 300.145, "Special teams and other assistance available to OSCs/RPMs," covers the USCG's Strike Teams and emergency task forces; EPA's Environmental Response Team; scientific support coordinators; Radiological Assistance Teams; and other sources of assistance for the OSCs/RPMs. The description of the roles of these entities remains essentially unchanged from the original NCP.

During a response action, the lead agency must assure that a program for occupational safety and health protects workers at the site. Sect. 300.150 contains an updated reference to the provisions of 29 CFR 1910.120, which were mandated by SARA and promulgated by the Occupational Safety and Health Administration (OSHA). In addition, the require-

ments of this section have been expanded to apply to lead agencies conducting any response action under the NCP, not just Federal Fund-financed responses.

The title of Sect. 300.155 has been changed from "Public information" to "Public information and community relations" to indicate that obligations during removal, remedial, and enforcement actions include informing the public and performing community relations activities to encourage public participation in the Superfund process, as specified in Sects. 300.415, 430, and 435. The requirement for a community relations plan (CRP) is mentioned in this section, which stipulates that the OSC/RPM should ensure coordination with any such plans that are already in effect or that may need to be developed during follow-up activities.

Sect. 300.160, which addresses documentation and cost recovery, has also been added to make the NCP conform to the SARA requirement that makes responsible parties liable for the costs of any health assessment or health effects study carried out under CERCLA Sect. 104(i). This section outlines the documentation requirements necessary to assure that these costs will be recoverable.

Sect. 300.165 addresses OSC reports. When removal activities at a major discharge of oil or hazardous substances are completed, the OSC must submit an OSC report to the RRT on the removal operation and the actions taken. The final rule has increased the time allowed to submit this report to within one year after completion of removal activities.

2.2.4 Participation in Responses

The availability of assistance from Federal agencies to the OSCs/RPMs is discussed in Sect. 300.170. Federal agencies may be called upon by an OSC/RPM to provide assistance in their respective areas of expertise, which are described in Sect. 300.175. DOE's role is (1) to provide designated OSCs/RPMs for response actions when releases are on or from any facility under its jurisdiction, custody, or control; and (2) under the Federal Radiological Emergency Response Plan, to provide advice and assistance to other OSCs/RPMs for control of immediate radiological hazards. Incidents that qualify for DOE assistance include those believed to involve source, special nuclear, or by-product materials, or other ionizing radiation sources. State and local participation is discussed under Sect. 300.180. This section outlines how State and local governments can participate in planning and preparedness. Volunteers from nongovernmental groups can also participate in response actions under conditions specified in Sect. 300.185.

2.3 SUBPART C — PLANNING AND PREPAREDNESS

The revised Subpart C summarizes emergency preparedness activities relating to discharges of oil and releases of hazardous substances. It describes the Federal, state, and local planning structure; provides for three levels of Federal contingency plans; and cross-references State and local emergency preparedness activities under SARA Title III, the Emergency Planning and Community Right-to-Know Act of 1986. This subpart revises and is similar to Subpart D of the original rule with no substantive changes other than to formalize

the structure to reflect the requirements of Title III. The regulations implementing Title III itself are codified separately from the NCP at 40 CFR 355, Subchapter J.

2.4 SUBPART D — OPERATIONAL RESPONSE PHASES FOR OIL REMOVAL

New Subpart D outlines the response program for discharges of oil. It contains only minor clarifying and editorial changes to the original Subpart E.

2.5 SUBPART E — HAZARDOUS SUBSTANCE RESPONSE

As in the original NCP, this subpart (formerly Subpart F) establishes methods and criteria for determining the appropriate extent of response authorized by CERCLA when there is a release of a hazardous substance, pollutant, or contaminant. It lays out general procedures for discovery or notification, response, and remediation of releases that pose a threat to human health and the environment. Because of the variety of releases and threats that may be encountered, the exact nature of response actions and cleanup levels must be determined on a site-specific basis. This subpart describes how site-specific decisions on response actions will be made.

The first step in the response process is discovery or notification *(Fig. 1)*. This can occur in a variety of ways. Notice of a release is typically directed to the NRC. Before any response action is taken, a site evaluation is performed to determine the conditions and problems that exist at the site. If there is some reason to believe that prompt response may be necessary, a removal site evaluation will be conducted. In all other cases, a remedial site evaluation will be performed to gather information necessary for scoring the site with the Hazard Ranking System (HRS) to determine if a site should be included on the National Priorities List (NPL). Both types of site evaluations may consist of a preliminary assessment (PA) and a site inspection (SI). While PA/SIs will vary depending on the perceived urgency of the situation, they generally involve a review of existing available information about the site and an on-site evaluation such as field sampling.

If the site evaluation indicates that there is some near-term threat, a removal action should be undertaken. The best technical judgment of the OSC/RPM must be relied upon to determine how quickly a response must be initiated and, therefore, which response authority is appropriate. Removal actions are generally short-term and mitigative in nature. Remedial actions, on the other hand, are long-term responses that generally involve complete cleanup of a site. While removal and remedial activities are described as separate processes, a decision to conduct a removal action may be made during the remedial process and sites initially evaluated for removal may be referred to the remedial program.

Following remedial site evaluation, the lead agency conducts a remedial investigation and feasibility study (RI/FS), if the results of the evaluation indicate that this is appropriate. The purpose of the RI is to gather sufficient data to characterize the conditions at the site in order to assist in determining the appropriate remedial action. The purpose of the FS is to

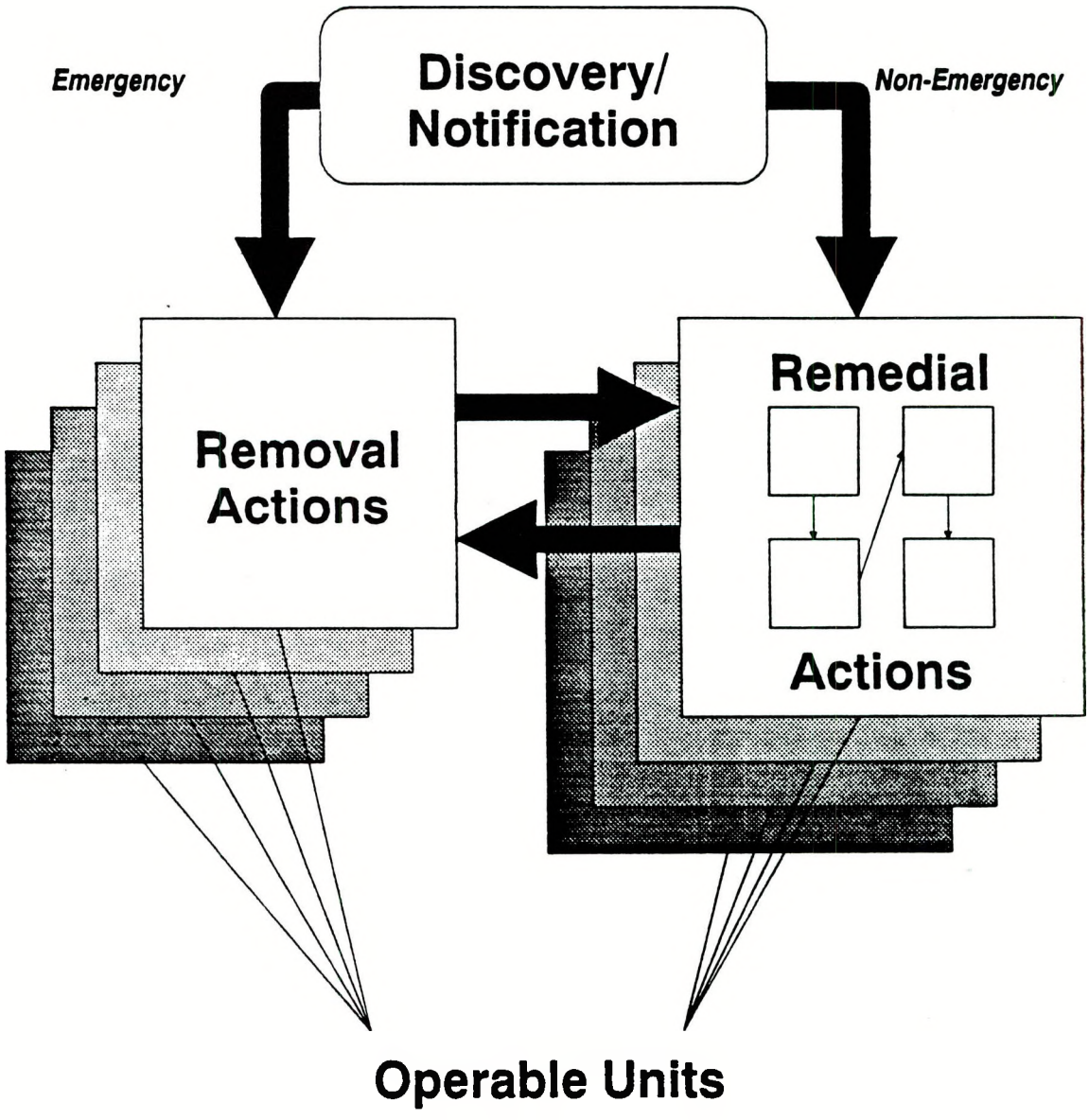

Figure 1. Flow diagram of removal and remedial response actions set forth in the new National Contingency Plan.

develop and analyze alternatives for remedial action. Based on these studies, a remedy is selected and documented in a Record of Decision (ROD).

Once a ROD is finalized, the remedial design (RD) is carried out. This stage includes developing the plans and specifications for the selected remedy. Once the remedial design is complete, the lead agency conducts the construction (implementation) of the remedy or remedial action (RA). Operation and maintenance (O&M) may be needed once the remedial action is finished to maintain the effectiveness of the response action.

2.5.1 General

Sect. 300.400 discusses general information about response actions. It imposes the three SARA-mandated limits on Fund-financed responses. Paragraph (d) of this section describes new authorities for entry and access to vessels, facilities, etc. from which, or to which, a hazardous substance has been, or may have been, released to determine the necessity for response or to implement a response. This section also provides details on the use of administrative orders for such entry and access.

Pursuant to Sect. 121(e) of CERCLA, Paragraph (e) of this section states that permits are not required for response actions conducted entirely "on-site" pursuant to CERCLA Sects. 104, 105, 120, 121, or 122 *(see the definition provided in Subchapter 2.1.3 of this report)*. Paragraph (f) of this section references SARA's requirement for health assessments to be performed by the Agency for Toxic Substances and Disease Registry (ATSDR) at facilities on or proposed to be listed on the NPL. Upon petition to the ATSDR, health assessments may be performed for non-NPL sites. Where available, the lead agency may use these health assessments to assist in determining whether response actions should be taken and/or to identify the need for further studies.

Paragraph (g) provides EPA's policy on identification of applicable or relevant and appropriate requirements (ARARs) of other Federal and (more stringent) State laws. The lead and support agencies are assigned the role of identifying ARARs. If a requirement is determined not to be applicable, it may still be relevant and appropriate. This section lists the eight criteria for determining relevance and appropriateness, based on whether a requirement addresses a chemical, location or action. A new requirement states that, as appropriate, the lead and support agencies may identify other Federal or State advisories, criteria, or guidance "to be considered" (TBCs). Only those State standards that are promulgated, identified by the State in a timely manner, and are more stringent than Federal requirements may be ARAR.

2.5.2 Discovery or Notification

Sect. 300.405 discusses how CERCLA sites may be discovered, the responsibility to report releases, and the details of the notification process. A few minor provisions have been added to the original NCP. Paragraph (a)(6) now allows for release discovery through citizen petitions to EPA or the appropriate Federal facility. Paragraph (d) spells out the type of information needed by the NRC when a release is reported. Paragraph (f)(3) requires

notification of the EPA Radiological Response Coordinator if radioactive substances are present in a release. Finally, Paragraph (g) stipulates that notification made to the NRC does not relieve the owner/operator from additional community and State notification requirements under SARA Title III. While the NCP states that Federal agencies are not legally obligated to comply with the requirements of Title III of SARA, ***it is official DOE policy that DOE facilities will comply with the reporting requirements of SARA Title III.***

2.5.3 Removal Actions

Sect. 300.410 ("Removal site evaluation") revises old Sect. 300.64 ("Preliminary assessment for removal actions"). Removal site evaluations consist of a removal PA and a removal SI *(Fig. 2)*. A removal site evaluation is to be undertaken by the lead agency as promptly as possible, and may be performed in response to petitions by persons who are, or may be, affected by a release. Paragraph (e) discusses when the removal site evaluation can be terminated. Paragraph (g) requires the OSC or lead agency to notify the State and Federal trustees of the affected natural resources if natural resources are or may be injured by the release.

Although not defined in the NCP, there are three categories of removals:

- ***Emergency***, which generally refers to a release or threat of release that requires that removal activities begin on site within hours of the lead agency's determination that a removal action is appropriate.

- ***Time-critical***, where based on the site evaluation, the lead agency determines that a removal action is appropriate and that there is a period of less than six months available before removal activities must begin on site.

- ***Non-time-critical***, where based on the site evaluation, the lead agency determines that a removal action is appropriate and there is a planning period of more than six months before on-site removal activities must begin.

Sect. 300.415 discusses the criteria for determining the appropriateness of a removal action and the requirements that must be met during the removal. It incorporates revisions made necessary by SARA; for example, in Paragraph (b)(5) the statutory limits for Fund-financed removals have been increased from $1 million or 6 months to $2 million or 12 months. A new exemption to these limits has been added for actions consistent with the remedial action to be taken. Furthermore, a requirement has been added for removal actions to contribute, to the extent practicable, to the efficient performance of any long term remedial action.

Paragraph (b)(4) of this section adds a new requirement for the lead agency to conduct an engineering evaluation and cost analysis (EE/CA) when at least six months are available before the removal action should begin (i.e., for a non-time-critical removal). The EE/CA

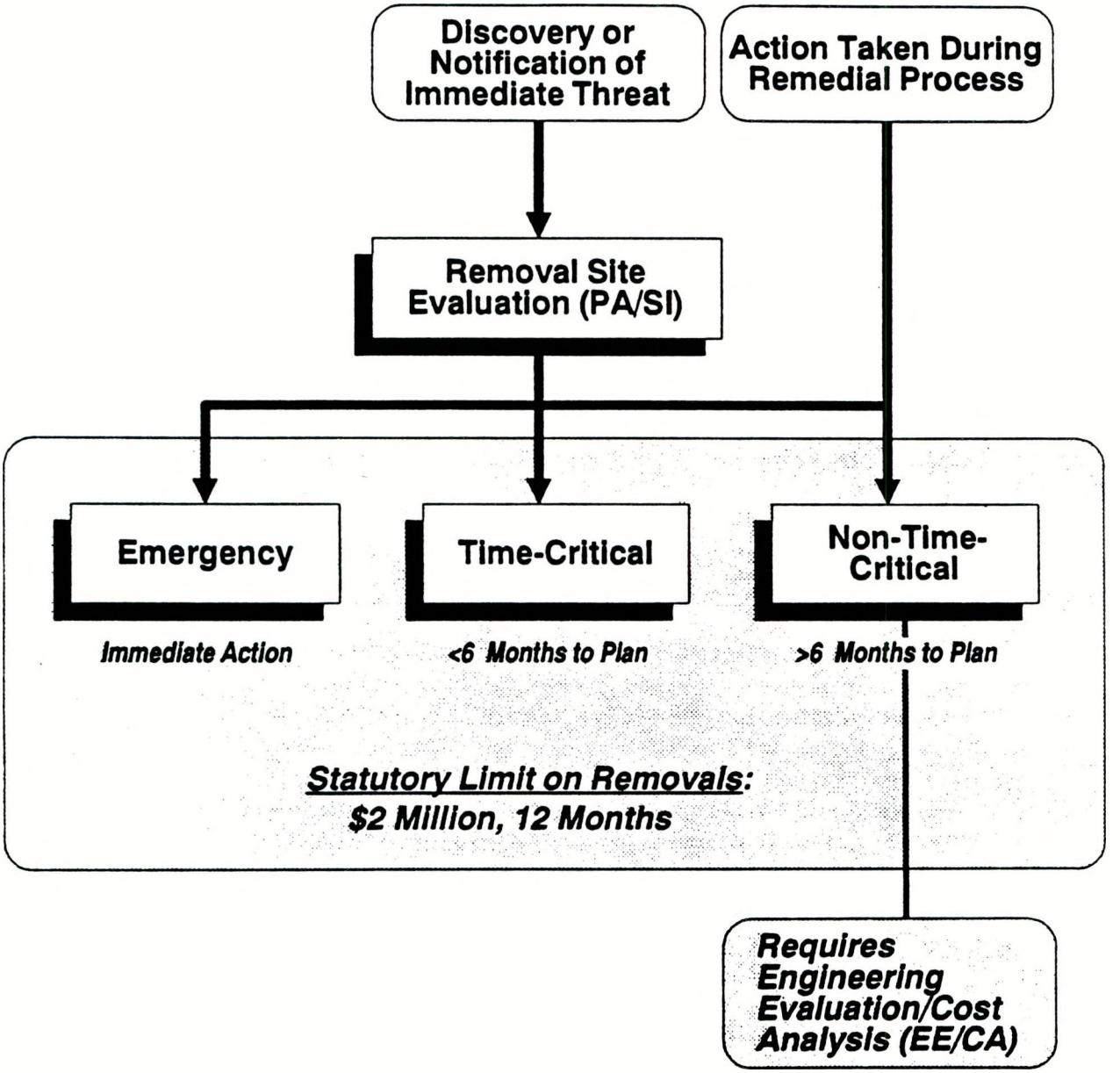

Figure 2. Flow diagram of removal actions as set forth in the new National Contingency Plan.

is an analysis of removal alternatives for the site. It is similar to the RI/FS performed during the remedial action process.

Paragraph (i) requires that Fund-financed removal action pursuant to CERCLA Sect. 104 and removal actions pursuant to CERCLA Sect. 106 attain ARARs to the extent practicable considering the exigencies of the situation. In determining the practicality of complying with ARARs, the urgency of the situation and the scope of the removal action are considered.

Paragraph (m) of this section addresses community relations in removal actions. In all removals, the lead agency must designate a spokesperson. The new requirements for public involvement during removal actions are:

- When less than six months exists before on-site removal activity must begin (i.e., emergency and time-critical removals): (1) an administrative record must be established and a notice of availability of the administrative record to the public must be published within 60 days of initiation of on-site removal activity; (2) as appropriate, a public comment period of not less than 30 days must be provided at the time the administrative record is made available; and (3) a written response to significant comments must be prepared.

- For ***all*** removal actions lasting over 120 days, the lead agency must: (1) conduct interviews with the local public; (2) prepare a formal community relations plan (formerly required for removals over 45 days); (3) establish a local information repository at or near the site; and (4) provide an administrative record file for public inspection at the repository and publish a notice of its availability.

- When at least six months are available prior to initiation of an on-site removal activity (i.e., non-time critical removal actions or expedited response actions), the lead agency must, prior to completion of the EE/CA, conduct the 120-day activities discussed above, and also (1) publish a notice of availability of the EE/CA in a major local newspaper; (2) provide at least a 30-day public comment period on the EE/CA (can be extended 15 days upon request); and (3) provide a written response to significant comments.

2.5.4 Remedial Actions

Sect. 300.420 addresses remedial site evaluations, which may consist of remedial PAs and remedial SIs *(Fig. 3)*. A remedial PA consists of a review of existing information about a release. It should also include an off-site reconnaissance and may now include an on-site reconnaissance, if appropriate. The original purposes of the remedial PA were to eliminate from consideration those releases that did not pose a threat, determine whether removal action was warranted, and establish priorities for SIs. In addition, the new NCP adds a fourth purpose — to gather existing data to facilitate evaluation of the release using the HRS.

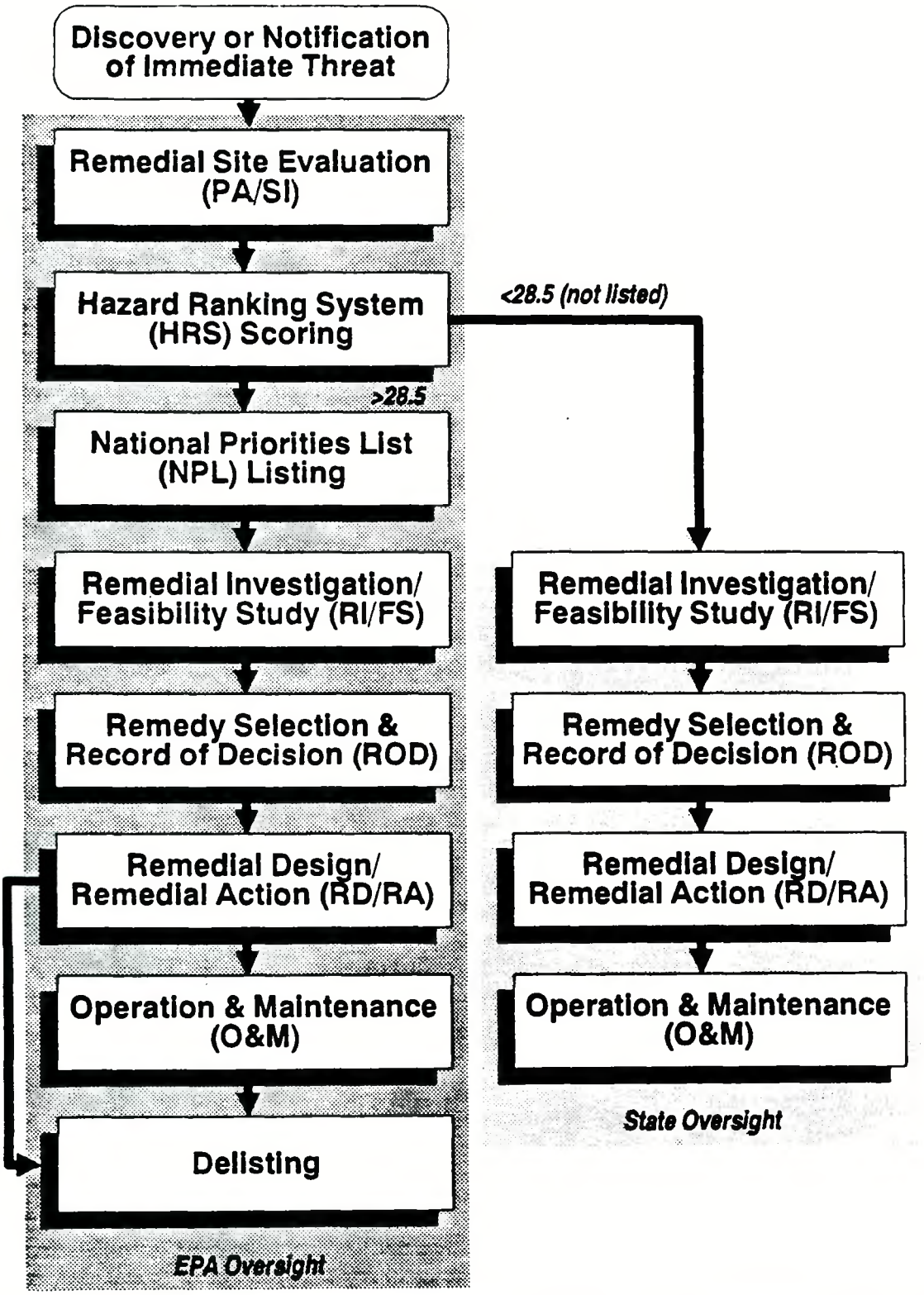

Figure 3. Flow diagram of remedial actions as set forth in the new National Contingency Plan.

Paragraph (b)(4) has been added to this section to require the lead agency to complete a PA report, which includes a description of the release, the probable nature of the release, and a recommendation on the necessity of further action. Paragraph (b)(5) has also been added to conform with new SARA requirements. This paragraph grants any person the right to petition EPA or other lead agency when the release is from a Federal facility to perform a PA if such person is or may be affected by a release. The lead agency must complete a removal or remedial PA within one year of the date of receipt of such a petition unless the lead agency determines that a PA is not appropriate. Criteria for determining appropriateness are listed in Sects. 300.420(b)(5)(iv)(A) and (B)

Paragraph (c) addresses remedial site inspections. The purposes of the remedial SI are the same as for the PA with the addition of collecting data beyond what are needed for HRS scoring to better characterize the release for more effective and rapid response. The remedial SI is built upon the information collected in the PA, but will involve on- and off-site field investigations and sampling, as appropriate. The lead agency is expected to develop sampling and analysis plans to provide a process for obtaining a sufficient quantity and quality of data. This paragraph also requires the lead agency to complete an SI report, which includes a description of waste handling, known contaminants, pathways of contaminant migration; identifies and describes human and environmental targets; and provides a recommendation on whether further action is warranted.

The establishment of remedial priorities, previously combined with the provisions for site evaluation in Sect. 300.66, is now the separate Sect. 300.425. As in the original NCP, this section describes the criteria and procedures for placing sites on and deleting them from the NPL. The new rule incorporates SARA's requirement that Federal facilities be eligible for inclusion on the NPL, although they are not eligible for Fund-financed remedial actions. The old requirement that the proposed NPL be submitted to the NRT for review and comment has been deleted in the new rule. The provisions covering deletion from the NPL have also been substantially expanded.

The RI/FS and selection of remedy are now covered in Sect. 300.430. The new text reflects throughout SARA's statutory preference for remedies with treatment as a principal element and its mandate to use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. For example, in contrast to the text of the proposed rule of December 21, 1988 (53 FR 51394), Paragraph (a) of the final rule contains a greatly expanded discussion of program goals, program management principles, and expectations.

- The ***program goal*** is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste. The ***program management principles*** include (1) cleaning up in operable units when early or interim actions are necessary or appropriate, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite total site cleanup; (2) operable units should not be inconsistent with nor preclude implementation of the final remedy; and (3) data

needs, evaluation, and documentation should reflect the scope and complexity of the site problems being addressed.

- The *expectations* include the use of (1) *treatment* to address principal threats wherever practicable, (2) *engineering controls*, such as containment, for waste that poses a relatively low long-term threat or where treatment is impractical, (3) *a combination of methods* as appropriate to achieve protection of human health and the environment, (4) *institutional controls* such as water use and deed restrictions to supplement engineering controls as appropriate, but not as a substitute for active measures; (5) *innovative technology* when it offers the potential for comparative or superior performance or implementability; and (6) to *return usable groundwaters to their beneficial uses* wherever practicable within a reasonable time frame.

The bias for prompt action and streamlining principles are also included in this section *(see Subchapter 3.3 of this report)*. Lead agencies are directed to consider the program goal, management principles, and expectations in implementing this section.

The basic structure of the remedy selection process has been retained in the new rule. The purpose of the RI/FS is to assess site conditions and evaluate alternatives to the extent necessary to select a remedy. Developing and conducting an RI/FS includes project scoping, data collection, risk assessment, treatability studies, and analysis of alternatives. Community relations requirements are now an integral part of this section rather than residing in a stand alone section, as in the original NCP. Most of the regulatory requirements for complying with Federal and State ARARs, as required by SARA, are also included in this section.

Paragraph (b) of the section spells out the specific responsibilities of lead agencies in project scoping. Several plans are developed during scoping, including a worker health and safety plan and a sampling and analysis plan, which consists of a field sampling plan and a quality assurance project plan. In addition, the lead agency must notify and coordinate with State and Federal natural resource trustees, if necessary. Paragraph (c)(2) enumerates the community relations requirements associated with the remedial action process. Prior to starting field work (RI), the lead agency is to (1) conduct local interviews (previous policy); (2) prepare a community relations plan (previous regulation); (3) establish a local information repository at or near the site (previous policy); and (4) inform the community of the availability of Technical Assistance Grants (TAGs) and put TAG information in the repository (new statutory requirement).

Paragraph (d) covers the RI in detail. The purpose of the RI is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives. To characterize the site, the lead agency conducts field investigations, including treatability studies, and performs a baseline risk assessment. The result of this risk assessment will help establish exposure levels for use in developing remedial alternatives in the FS. Potential ARARs related to the location of and contaminants at the site

should be identified during the RI. Site characterization activities should be integrated with the development and evaluation of alternatives in the FS. In fact, the two processes should proceed concurrently, feeding information into each other.

Paragraph (e) addresses the FS *(Fig. 4)*. The primary objective of the FS is to ensure that appropriate remedial alternatives are developed and evaluated by (1) establishing remedial action objectives and goals; (2) identifying and evaluating potential technologies; and (3) assembling suitable technologies into alternative remedial actions. Paragraph (e)(2) contains an extensive discussion of remedial action objectives and goals that establish acceptable exposure levels protective of human health and the environment. Preliminary goals are developed using readily available information. Final remediation goals are determined when the remedy is selected. The final goals are developed considering ARARs and the following factors: (1) levels for systemic toxicants to which human populations may be exposed without adverse effect during a lifetime or part of a lifetime; (2) for known or suspected carcinogens, levels that represent additional lifetime cancer risk to an individual of between 10^{-4} to 10^{-6} (or between 1 death in 10,000 and 1 death in 1,000,000); (3) factors related to technical limitations, such as detection limits; and (4) factors related to uncertainty.

Also, in developing remediation goals, maximum contaminant level goals (MCLGs) set at levels above zero are to be attained by remedial actions for waters that are current or potential sources of drinking water where the MCLGs are relevant and appropriate for the circumstances. If an MCLG is not relevant and appropriate, the corresponding maximum contaminant level (MCL) will be attained where relevant and appropriate. Where MCLGs are zero, the MCL promulgated for that contaminant must be attained by remedial actions where the MCL is relevant and appropriate. This section also discusses multiple pathways, water quality criteria, alternate concentration limits for hazardous constituents in groundwater and environmental evaluations to assess threats to the environment.

There have also been major changes regarding the ranges of alternative remedial actions that must be developed. Sect. 300.430(e)(3) requires a range of alternatives for source control actions in which treatment that reduces the toxicity, mobility, or volume of hazardous substances is the principal element, as well as one or more alternatives that involve little or no treatment, but protect human health and the environment through the use of engineering or institutional controls that limit exposure. Sect. 300.430(e)(4) requires that, for groundwater response actions, the lead agency develop a limited set of alternatives that attain site-specific remediation levels with different restoration times. Sect. 300.430(e)(5) requires the development of one or more innovative treatment technologies where such a technology might offer the "potential" for superior performance. Sect. 300.430(e)(6) allows the use of a "no action" alternative.

In Sect. 300.430(e)(7), the development and screening of alternatives is to be guided by using the short- and long-term aspects of effectiveness, implementability, and cost criteria to eliminate from further consideration those alternatives that are not effective, not implementable, or whose costs are excessive for the effectiveness and implementability they provide. After screening, a detailed analysis of alternatives is to be conducted on the limited

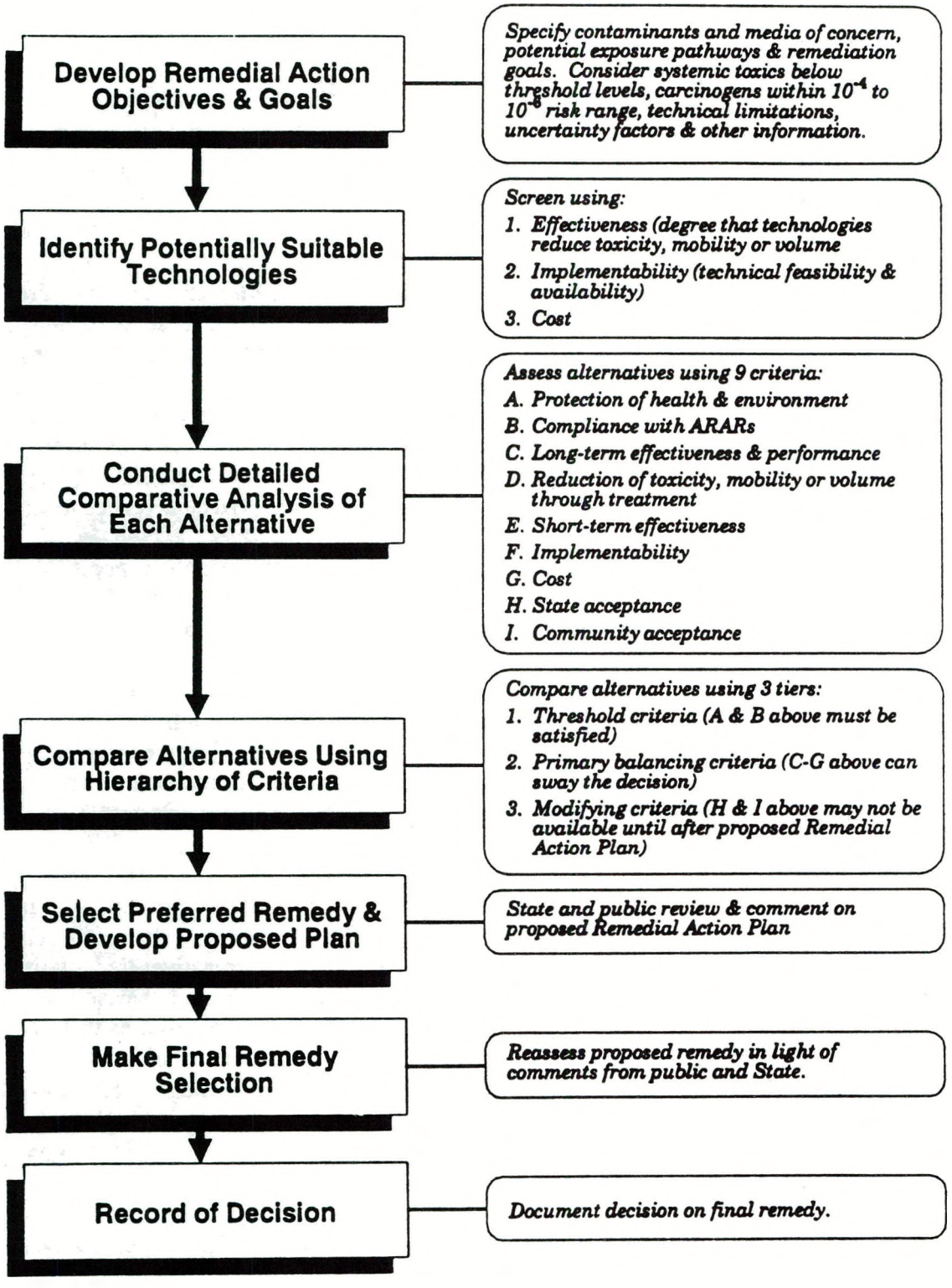

Figure 4. Flow path diagram of the development of remedial action alternatives and selection of the remedy.

number of alternatives that represent viable approaches. ARARs related to specific actions must also be identified. The detailed analysis in Sect. 300.430(e)(9) consists of an individual assessment or profile of the alternatives against each of nine evaluation criteria and a comparative analysis to determine the relative performance of each alternative and identify major trade-offs (advantages and disadvantages) among them. The nine evaluation criteria for this detailed analysis are: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) State acceptance and (9) community acceptance.

Sect. 300.430(f) discusses remedy selection. The selection of a remedial action is a two-step process. First, the lead agency identifies a preferred alternative based on an evaluation of the nine criteria grouped into three major categories, and presents it to the public in a proposed plan, for review and comment. Second, the lead agency reviews the public comments to determine if the preferred alternative remains the most appropriate remedial action. The lead agency makes the final remedy selection decision, which is documented in the ROD. In selecting both the preferred alternative and the final remedy, the lead Agency will group the nine criteria into three major categories to be applied during remedy selection, as follows:

- **Threshold criteria** — (1) Overall protection of human health and the environment and (2) compliance with ARARs.

- **Primary balancing criteria** — (3) Long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume through treatment; (5) short-term effectiveness; (6) implementability; and (7) cost.

- **Modifying criteria** — (8) State acceptance and (9) community acceptance.

Four determinations are made: First, each remedial action must be protective of human health and the environment. Second, on-site remedial actions selected in a ROD must attain those ARARs that are identified at the time of the ROD or provide grounds for invoking one of the waivers found in Sect. 300.430(f)(1)(ii)(C). Third, once both of these ***threshold criteria*** are met, each remedial action selected must be cost-effective. This is determined by calculating the overall effectiveness based on an evaluation of the three balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to ensure the remedy is cost-effective (i.e., costs are proportional to overall effectiveness). Finally, each remedial action must use permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. This is determined by selecting a remedy that provides the best balance of trade-offs among alternatives in terms of the five ***balancing*** criteria. The balancing emphasizes long-term effectiveness and use of treatment, and also consider the preference for treatment and the bias against land disposal of untreated waste. The two ***modifying*** criteria must be considered at this time in making this determination.

The remainder of Paragraph (f) addresses details of the remedy selection process, including the proposed plan, community relations, and the ROD. There is a new requirement that a site where hazardous constituents remain behind must be reviewed at least once every five years to ensure that the site remains safe. The requirements for community relations during remedy selection [300.430(f)(3)] represent a combination of previous NCP requirements, previous EPA policy, and new statutory requirements as follows:

- ❑ Publish a notice of availability of the proposed plan;
- ❑ make the proposed plan available in the administrative record;
- ❑ provide a public comment period of at least 30 days (can be extended another 30 days);
- ❑ provide the opportunity for a public meeting and make the transcript available; and
- ❑ prepare a written responsiveness summary of significant comments to accompany the ROD.

After publication of the proposed plan and before adopting the selected remedy in the ROD, if new information is made available that significantly changes the basic features of the remedy, the lead agency, depending on the circumstances: (1) includes a discussion in the ROD of the significant changes and reason for such changes, ***or*** (2) seeks additional public comment on a revised proposed plan in accordance with procedures in Sect. 300.430(f)(3)(i).

The process for selection of a remedial action at a Federal facility on the NPL, pursuant to CERCLA Sect. 120, provides for joint selection of the remedial action by the head of the relevant agency and EPA; or if mutual agreement is not reached, the remedy selection is made by EPA.

Sect. 300.435(f)(5) discusses documenting the decision to select a remedy. To support the selection of a remedial action, all facts, analyses, and site-specific policy determinations are to be documented in the ROD. After the ROD is signed, the lead agency publishes a notice of availability of the ROD and makes it available for public inspection.

Sect. 300.435 discusses remedial design/remedial action (RD/RA) and operation and maintenance (O&M). This section is entirely new, although it generally follows formerly used procedures, with modifications to accommodate SARA. The RD/RA stage includes development of the actual design of the selected remedy and implementation of the remedy through construction. Also during RD/RA, the lead agency is responsible for ensuring that all ARARs, or the conditions of waivers, are met.

Operation and maintenance measures are initiated after the remedy has achieved the remedial action objectives and remediation goals in the ROD, and is determined to be operational and functional. A remedy becomes "operational and functional" either one year after construction is complete, or when determined to be functioning properly by EPA and the State. An exception is that the operation of groundwater and surface water restoration or treatment measures continues to be considered remedial action for up to 10 years after becoming operational and functional. Source control maintenance and pumping and treating solely for the purpose of providing drinking water supplies are not included in this 10-year provision. Groundwater and surface water restoration activities that continue beyond the 10-year limit are considered O&M. For Federal facilities, the Federal agency finances O&M. For other sites, the State or responsible party, as appropriate, finances O&M.

Several community relations requirements are discussed in Sect. 300.435(c). Prior to initiation of remedial design, the lead agency reviews the community relations plan to determine if it should be revised. After adoption of the ROD, if the remedial action differs significantly from the remedy selected in the ROD, the lead agency either (1) publishes an explanation of significant differences when the differences significantly change, but do not fundamentally alter, the remedy selected in the ROD, or (2) proposes an amendment to the ROD in accordance with procedures in Paragraph (c) if the differences in the remedial action fundamentally alter the basic features of the selected remedy in the ROD. After the completion of the final engineering design, the lead agency issues a fact sheet and, as appropriate, provides a public briefing prior to initiation of the remedial action.

The conflict of interest provisions, Sect. 300.435(d), provide that the lead agency include appropriate language in the contract solicitation for RD/RA and O&M requiring potential prime contractors to submit information on their status as potentially responsible parties at the site.

Sect. 300.440, Procedures for planning and implementing off-site response actions, is reserved as it was in the proposed rule of December 21, 1988.

2.6 SUBPART F — STATE INVOLVEMENT IN HAZARDOUS SUBSTANCE RESPONSE

Sect. 121(f)(1) of CERCLA requires that all States be provided an opportunity for "substantial and meaningful" involvement in pre-remedial, remedial, and enforcement response activities. To meet this requirement and to strengthen the EPA/State partnership, new Subpart F, "State Involvement in Hazardous Substance Response," establishes mechanisms for State involvement and seeks to establish the EPA/State partnership in all aspects of the cleanup program. Although Subpart F is completely new, it combines concepts that were described in the old NCP in Sects. 300.62 ("State role") and 300.68 ("State involvement in remedial action"). Subpart F now codifies in one place all regulatory requirements for State participation and involvement in CERCLA-authorized response activities, including the minimum requirements that EPA will follow to ensure that States are provided an opportunity for "substantial and meaningful" involvement.

As provided in CERCLA Sect. 120(f), the substantive requirements of Subpart F do apply to Federal facility responses, and Federal facilities must involve the States in remedial response actions taken at Federal facilities. EPA intends to further address State involvement at Federal facilities in the proposed Subpart K, currently being drafted.

2.6.1 General

Sect. 300.500 introduces the EPA/State partnership and encourages States to participate in Fund-financed response either by assuming the lead through a cooperative agreement or by becoming the support agency in an EPA-lead remedial response.

2.6.2 Superfund Memorandum of Agreement

The major mechanism for ensuring State involvement is the EPA/State Superfund Memorandum of Agreement (SMOA) (Sect. 300.505), which defines the operating relationship between EPA and a State. The final rule states that the SMOA establishes the nature and extent of EPA and State interaction during both EPA-lead and State-lead responses and requires only that EPA enter into a SMOA if requested by a State. SMOAs are executed by the EPA Regional Administrator and the head of the State agency designated as lead agency for State implementation of CERCLA.

2.6.3 State Involvement in Responses

Sect. 300.510 describes the assurances a State must provide to EPA prior to initiation of a Fund-financed remedial action pursuant to CERCLA Sect. 104(a). A SMOA may not be used for this purpose. The section also codifies the statutory provisions for use of credits to offset a State's required cost share. For a State to apply credit toward its cost share, it must enter into a cooperative agreement or Superfund State contract.

Sect. 300.515, "Requirements for State involvement in remedial and enforcement response," combines existing language from Sects. 300.62 and 300.68 of the old NCP, but includes new language that describes how EPA intends to satisfy SARA requirements for State involvement in remedial and enforcement response actions. EPA will use a cooperative agreement to transfer funds to states, political subdivisions, or Federally-recognized Indian tribes to undertake Fund-financed response activities when EPA determines that such entities have the capability to undertake such actions. The requirements for states, political subdivisions, or Federally-recognized Indian tribes to receive funds in this manner are now addressed at 40 CFR Part 35, Subpart O.

Paragraph (c) describes EPA's mechanism for State involvement in the PA/SI and NPL listing and delisting processes; and Paragraph (d) addresses State involvement in the RI/FS and ARAR identification processes. Paragraph (e) deals with State involvement in remedy selection and provides States with responsibilities in the selection of the remedy when they are acting as the lead agency in either Fund-financed or non-Fund-financed actions. The process of concurrence has been modified to increase EPA involvement at State-lead, non-Fund-financed sites and provide for a greater State role in the selection of remedy process at Fund-financed sites.

Paragraph (f), "Enhancement of remedy," contains provisions under which States may ask EPA to make changes in or expansions of remedial actions. EPA must then decide whether the change or expansion is necessary, and whether it would be consistent with the EPA-selected remedy. EPA may agree to the proposed change or expansion if the State agrees to Fund the entire additional cost and assumes the lead for supervising the State-Funded component. Paragraph (g) deals with State involvement in RA/RD. State responsibilities in the absence of a SMOA are outlined in Paragraph (h). These include annual consultations, identification of ARARs and TBCs, and support agency review of lead agency documents.

Sect. 300.520 addresses State involvement in EPA-lead enforcement negotiations. This section is designed to meet the CERCLA Sect. 121(f)(2) requirement that EPA provide notice to States regarding negotiation with potentially responsible parties. The final rule provides that the State is not foreclosed from signing a consent decree if it does not participate substantially in the negotiations.

State involvement in removal actions is covered in Sect. 300.525. Statutory requirements for removals are not the same as those for remedial and enforcement response and, therefore, State involvement differs significantly. States may undertake Fund-financed removals pursuant to a cooperative agreement with EPA, and these must be conducted in accordance with Sect. 300.415 (Subpart E, Removal action). States are encouraged to provide for post-removal site control. They are also responsible for identifying potential State ARARs for all Fund-financed removals, and providing these to EPA in a timely manner for all EPA-lead removals. EPA will consult with a State on all removal actions conducted in that State.

2.7 SUBPART G — TRUSTEES FOR NATURAL RESOURCES

The primary purpose of Subpart G remains the designation of trustees for natural resources. The trustees for the principal Federal land managing agencies are the Secretaries of the Departments of Commerce, Interior, Agriculture, Defense, and Energy. Revisions to this subpart have primarily clarified trustee agency authorities to conform with SARA. For example, Indian Tribes can be authorized to act as trustees of their own natural resources. Furthermore, the provision for claims against the Fund for damages to natural resources has been eliminated. This subpart also authorizes trustees to conduct investigations at sites where damage to resources is suspected and describes the preliminary activities that trustees conduct to perform their responsibilities.

2.8 SUBPART H — PARTICIPATION BY OTHER PERSONS

Subpart H focuses on the authorities that allow persons other than the Federal government to respond to releases and to receive reimbursement for response costs. This is a new subpart consolidates information from former Sects. 300.25 ("Nongovernment Participation") and 300.71 ("Other Party Responses") with new SARA authorities. In addition, information from the soon-to-be proposed CERCLA response claims regulations is also

incorporated. The proposed revisions are mostly non-substantive and are primarily concerned with describing what other persons must do to act consistently with the NCP during their response actions.

2.9 SUBPART I — ADMINISTRATIVE RECORD FOR SELECTION OF RESPONSE ACTION

Subpart I of the NCP is entirely new and implements CERCLA requirements concerning the establishment of an administrative record. Under CERCLA Sect. 300.113(j) and (k), the administrative record serves two primary purposes: it is the limit for judicial review of any issue concerning the adequacy of a response action, and it is a vehicle for public participation in the selection of the response action. The record contains documents that form the basis for selection of the response action.

CERCLA Sect. 113(k)(2)(B) establishes minimum procedures for public participation in development of the administrative record for remedial actions. Because the nature of removal actions is quite different from that of remedial actions and often involves the need for prompt action, separate and distinct procedures regarding public participation and the establishment of the administrative record are laid out for remedial and removal actions under this subpart, which expands the public participation requirements of Subpart E. The administrative record requirements build upon and formalize existing procedures for the exchange of information on the selection of a response action.

2.9.1 Establishment

Sect. 300.800 addresses administrative records for Federal facilities. Executive Order 12580 authorizes Federal agencies to establish the administrative record for selection of response actions for facilities under their jurisdiction, custody, or control. Federal agencies must compile and maintain records as required under this Subpart. EPA may furnish documents that the Federal agency must place in the record file to ensure that the administrative record includes all documents that form the basis for the selection of the response action. When EPA or USCG is the lead agency at a Federal facility, they compile and maintain the administrative record.

Paragraph (b)(3) requires Federal agencies to provide EPA with a copy of the index of the documents included in the administrative record file, the RI/FS workplan, the RI/FS released for public comment, the proposed plan, any public comments received, and any other documents EPA may request on a case-by-case basis when EPA is involved in remedy selection.

2.9.2 Location

Sect. 300.805 requires that the lead agency establish a docket at an office of the lead agency or other central location. A copy of documents in the administrative record file must also be made available for public inspection at or near the site at issue. This section also lists what information is not included at this second location. The administrative record may be made available to the public in microform.

2.9.3 Contents

Sect. 300.810 specifies which documents should be included in the administrative record file. All documents considered by the decision maker, including those relied upon by the decision maker in selecting the response action, are to be included, such as:

- ❑ factual information/data;
- ❑ policy and guidance documents;
- ❑ documents from or made available to the public;
- ❑ decision documents;
- ❑ enforcement documents; and
- ❑ an index.

There are also provisions for privileged documents and a confidential file in this section.

2.9.4 Public Participation Requirements

Sect. 300.815(a), "Administrative record file for a remedial action," requires that the administrative record developed for remedial actions be available for public inspection at the commencement of the remedial investigation phase (i.e., when the final RI/FS work plan is approved). This section also requires the lead agency to publish a notice of availability of the administrative record file in a major local newspaper of general circulation. Interested persons may submit comments for inclusion in the administrative record file during the public comment period required under 300.430(f)(3). A written response to significant comments must be included in the administrative record file. The lead agency must comply with the public participation procedures of Sect. 300.435(f)(3) and provide documentation in the administrative record.

Sect. 300.820, "Administrative record file for a removal action," requires that the administrative record for a non-time-critical removal action be made available for public inspection when the EE/CA report is made available for public comment. This section also requires that compliance with the public participation requirements set forth in Sect. 300.415(m)(3)(i) through (iii) be documented in the administrative record. For emergency and time-critical removal actions, the record should be made available to the public no later than 60 days after initiation of on-site removal activity. A 30-day public comment period is required and a written response to comments must be put in the administrative record.

Sect. 300.825 specifies the conditions under which documents may be added to the administrative record after the decision document selecting the response action has been signed.

2.10 SUBPART J — USE OF DISPERSANTS AND OTHER CHEMICALS

Subpart J applies to the use of any chemical agents (as defined in Sect. 300.5) to remove or control oil discharges. This subpart is very similar to previous Subpart H, and contains only minor clarifying and editorial changes to make it more understandable and consistent with the rest of the new NCP. Definitions formerly in this subpart have been moved to Sect. 300.5, and a new definition has been added for "miscellaneous oil spill control agents."

2.11 SUBPART K — FEDERAL AGENCIES

Subpart K is still reserved in the final rule. Sect. 120(a) of CERCLA as amended by SARA describes the applicability of the statute and implementing regulations and guidance to facilities owned or operated by Federal departments or agencies. In general, such facilities are subject to the same procedural and substantive requirements as any nongovernmental entity. Sect. 120 also defines the process that Federal agencies must use in undertaking remediation at their facilities. EPA expects to publish the proposed Subpart K in the *Federal Register* in the Fall of 1990.

3. MAJOR ISSUES

On March 23, 1989, DOE submitted comments to EPA on the December 21, 1988, proposed NCP that, to a large extent, addressed questions of DOE's authority under CERCLA and various issues involving radionuclides. The following subchapters highlight major issues of concern to DOE and their resolution in the final rule.

3.1 THE DEFINITION OF "ON-SITE"

One issue addressed in DOE's response to the proposed NCP was the definition of "on-site" for permitting purposes. DOE proposed a definition for "on-site" that would benefit large DOE facilities and expedite response actions through use of centralized treatment or staging areas. EPA had a large number of comments on their proposed definition of "on-site". However, the only change made was to delete the phrase "for permitting purposes" from the final definition.

In response to DOE's comment, EPA noted in the preamble (55 FR 8690) that CERCLA Sect. 104(d)(4) allows EPA broad discretion to treat noncontiguous facilities as one site for the purpose of taking response actions. Once the decision is made to treat two or more facilities as one site, wastes from the different facilities could be managed in a coordinated fashion at one of the facilities and still be an "on-site" action within the permit waiver of CERCLA Sect. 121(e)(1). The preamble stated that EPA will evaluate, on a case-by-case basis, to decide whether it is appropriate to treat two noncontiguous facilities as one (presumably in response to a request from DOE). The preamble also went on to note that the decision to aggregate sites will be subject to public comment on the proposed plan; activities at the aggregated site must still comply with (or waive) ARARs, and even where noncontiguous facilities are treated as one site, movement of hazardous waste from one

facility to another will be subject to Resource Conservation and Recovery Act (RCRA) transportation manifest requirements.

3.2 PUBLIC COMMENT ON REMOVAL ACTIONS

In its comments on the proposed NCP, DOE expressed concern over requirements for public comment on removal activities completed at the time the administrative record is made available and additional community relations requirements for removals exceeding 120 days. DOE requested revisions to Sects. 300.415(m)(2)(ii) and 300.820(b)(2) that allow the requirement for a 30-day public comment period on the administrative record to be waived if "the removal activity has already been completed by that time." In response, EPA stated in the preamble (55 FR 8807) that while a comment period is held only where the lead agency deems it "appropriate," EPA believes it is still appropriate to make the record available to the public.

DOE also felt that for emergency and time-critical removals lasting longer than 120 days, "the public will be sufficiently informed and involved through the public comment process" described in Sect. 300.415(m)(2), and suggested that the additional requirements for interviews and a community relations plan in Sect. 300.415(m)(3) not apply. However, no change was made to this section.

3.3 BIAS FOR PROMPT ACTION

Although the preamble to the proposed NCP stated EPA's intent to "balance the desire of definitive site characterization and alternatives analysis with a bias for prompt action," many of DOE's concerns about the proposed NCP were about the excessive number of administrative requirements that could serve to reduce flexibility and slow the CERCLA remedial action process. DOE asked for the bias for prompt action and streamlining process to be specifically addressed in the sections on remedial actions. EPA addressed these concerns by modifying Sect. 300.430(a)(1) with the addition of a phrase in the first sentence that states that remedial actions are to be implemented "as soon as site data and information make it possible to do so." Also, program goals, program management principles, and expectations were added to Sect. 300.430(a)(1) *(see Subchapter 2.5.4 of this report)*. This new language reflects EPA's promotion of responsiveness and efficiency in the Superfund program "by encouraging action prior to or concurrent with conduct of an RI/FS as information is sufficient to support remedy selection" *(see the preamble at 55 FR 8703-8706)*. In addition to these new sections, EPA says it is their policy and goal to complete the RI/FS process through signing of the ROD "generally within 24 months after initiation" (55 FR 8705).

3.4 AUTHORITIES

DOE's review of the proposed NCP indicated that it was very difficult to determine what requirements specifically apply to DOE and Federal facilities (as "lead" agencies) and what requirements apply only to EPA as the "lead" agency. At issue were eight terms, "Fund-

financed," "non-Fund financed," "Federal-lead non-Fund financed," "State-lead Federally funded," "Federally funded," "Federal Fund-financed," "CERCLA-authorized response," and "Federal agency response action," that could be confused or misconstrued to mean the same thing. These questions concerning vague terms remain largely unanswered by the final NCP because the preamble discussion of the final rule does not specifically address the clarification of such terms, and because EPA intends to address this in Subpart K, "Federal Facilities."

In the preamble to the proposed NCP, EPA made two contradictory statements. First, they indicated that "the requirements of the NCP ... are applicable to Federal agency response actions under CERCLA at NPL and non-NPL sites, ***except where specifically noted that*** ... [they] ***apply only to Fund-financed activities.***" (emphasis added) However, they also stated that "in instances where NCP requirements do not appear strictly to apply to Federal agency response *de facto* compliance may still be necessary." This issue of concern to DOE on what specifically are its responsibilities for non-NPL sites was left largely unanswered in the final NCP.

Clarification was requested by DOE on whether it has the authority to waive the $2 million and 1-year limit on removals under Sect. 300.415(b)(5) without approval of the EPA Assistant Administrator. Again, resolution of this issue is unclear with the reservation of Subpart K and promulgation of Sect. 300.415(b)(5) as proposed.

DOE also requested clarification on whether it can initiate a response action on its own authority under Sect. 300.130(a). In the final rule EPA specifically addressed this issue in the preamble (55 FR 8676) but did not amend Sect. 300.130(a) to clarify DOE's authority. In the preamble they reference the delegation of response authority under E.O. 12580 to appropriate Federal agencies and departments for discharges of **hazardous substances** from vessels and facilities under their jurisdiction, custody, or control.

3.5 REMEDY SELECTION PROCESS

In its comments on the proposed NCP, DOE stressed the need for flexibility in the remedy selection process and highlighted the special problems that are associated with cleanup of radionuclides. For selection of cleanup alternatives and cleanup levels during the FS, DOE preferred a FS alternatives selection scheme "that considers protection of health and environment, cost-effectiveness, and long-term effectiveness as initial screens," over EPA's three-tier scheme because "it maintains structure while adding flexibility in the remedy selection process."

EPA added three initial screens before the detailed analysis of alternatives step in Sect. 300.430(e)(9), *(see Fig. 4)*. These initial screens address some of the concerns raised by DOE. The first initial screen of remedial alternatives is effectiveness [Sect. 300.430(e)(7)(i)]:

> This criterion focuses on the degree to which an alternative reduces toxicity, mobility, or volume through treatment, minimizes residual risks and affords long-term protection, complies with ARARs, minimizes short-term impacts, and how quickly it achieves protection. ***Alternatives providing significantly less effectiveness than other, more promising alternatives may be eliminated. Those that do not provide adequate protection of human health and the environment shall be eliminated from further consideration.*** (emphasis added)

The second initial screen of remedial alternatives is implementability [Sect. 300.430(e)(7)(ii)]:

> This criterion focuses on the technical feasibility and availability of the technologies each alternative would employ and the administrative feasibility of implementing the alternative. ***Alternatives that are technically or administratively infeasible or that would require equipment, specialists, or facilities that are not available within a reasonable period of time may be eliminated from further consideration.*** (emphasis added)

The third initial screen of remedial alternatives is cost [Sect. 300.430(e)(7)(iii)]:

> The costs of construction and any long-term costs to operate and maintain the alternatives shall be considered. ***Costs that are grossly excessive compared to the overall effectiveness may be considered as one of several factors used to eliminate alternatives. Alternatives providing effectiveness and implementability similar to that of another alternative by employing a similar method of treatment or engineering control, but at a greater cost, may be eliminated.*** (emphasis added)

3.6 RISK RANGE

DOE commented on the proposed NCP that the lower limit of acceptable risk should be raised from 10^{-7} to 10^{-6} because the resulting acceptable risk range of 10^{-4} to 10^{-6} "remains protective of human health and the environment, and provides added flexibility for site-specific remedial actions." ***The risk range was revised in the final rule.*** Sect. 300.430(e)(2)(i)(A)(2) has been revised to state:

> For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response.

The 10^{-6} risk level will be used as the point of departure in determining remediation goals for alternatives when ARARs are not available or sufficiently protective *(see preamble FR 8715-8718)*.

3.7 ARARS

In the proposed NCP, EPA reviewed its policy with regard to the application of ARARs to Superfund cleanups. They proposed a narrow interpretation of "placement of hazardous waste into a land-based unit" as it would apply in a CERCLA action. Under the proposed NCP, "placement" of RCRA wastes in the ground during a CERCLA remedial action constituted "land disposal" under RCRA. Thus, the RCRA Land Disposal Restrictions

(LDRs) could be considered ARARs, and the prohibition of land disposal without treatment using Best Demonstrated Available Technology (BDAT) would be in effect. The proposed NCP then offered a number of scenarios in which operations would or would not be considered "placement" (land disposal) during CERCLA response actions. For example, they stated that the movement of hazardous waste entirely ***within*** a land disposal unit does not constitute land disposal, but movement ***into*** a unit (i.e., across a unit boundary) does constitute land disposal (53 FR 51444). (The proposed preamble equated a CERCLA area of contamination to a single RCRA land disposal unit.) If CERCLA wastes were consolidated from different units into one unit or waste is removed and treated outside the unit and then redeposited in the unit, then the LDRs would apply.

On October 10, 1989, EPA revisited this issue and the greater issue of the general applicability of RCRA LDRs to CERCLA remedial actions in a short supplemental notice and request for comment in the *Federal Register* (54 FR 41566). The notice specifically addressed the interpretation of the RCRA term "land disposal" as it might apply in a CERCLA response action, and offered two broadened interpretations. DOE preferred the second interpretation which would allow hazardous waste to be excavated, treated, and redeposited either within the original unit or area of contamination, or elsewhere on the CERCLA site in a different new or existing unit without triggering LDRs. DOE also proposed further broadening the interpretation to allow similar wastes from several different CERCLA sites within a Federal facility boundary to be excavated, stored, and treated at a central treatment unit within the facility boundary without triggering LDRs.

EPA addressed the issue of the applicability of RCRA LDRs to CERCLA actions in the final NCP rule *(see discussion beginning 55 FR 8758)*. First, EPA's position on "placement" and "land disposal" remains the same as in the proposed NCP until such time as a final decision on the issues raised by the supplemental October 1989 (55 FR 8762) notice is made. EPA still maintains that "placement" denotes the placement of hazardous wastes into a unit, not moving wastes within a unit. This interpretation is consistent with a straightforward reading of Sect. 3004(k) of RCRA and with Congressional purpose behind the LDRs. In addition, regarding any movement of wastes within a unit as "placement" or "land disposal" would be "difficult to implement," "could interfere with necessary operations at an operating RCRA facility," and is "clearly an infeasible approach" (55 FR 8759). EPA also states that normal earthmoving and grading operations within a land disposal unit do not constitute "placement into the unit". In this case the RCRA LDRs and other Subtitle C requirements — including obtaining a RCRA permit or the minimum technology requirements — would not be applicable. In summary, EPA states (55 FR 8760):

> EPA does not believe that it is necessary to invoke ARAR waivers of LDRs for any movement of waste within a unit ... nor does EPA believe that the widespread use of such waivers would be practical or desirable.

Following this statement EPA clarifies that it generally equates a CERCLA area of contamination with a single RCRA land-based unit, usually a landfill, because a landfill can include a non-discrete land area on or in which there is generally dispersed contamination.

However, because the term "landfill" would not include discrete, widely separated areas of contamination, the term "unit" would not always encompass an entire CERCLA site.

With respect to the application of RCRA LDRs to CERCLA hazardous substances, EPA announced an important policy decision in the NCP final rule (55 FR 8760). EPA decided that the majority of problems discussed in the supplemental notice and raised by commenters result from treatment standards developed pursuant to the RCRA LDR program that are "generally inappropriate or infeasible when applied to contaminated soil and debris." The problems identified include the inappropriateness of incineration of large volumes (thousands of cubic meters) of low-level contaminated soil and debris generated at CERCLA sites and the inability to achieve noncombustion LDR methods for contaminated soil and debris. Thus, EPA makes the following policy statement (55 FR 8760):

> ... EPA has determined that, until specific standards for soils and debris are developed, current BDAT standards are generally inappropriate or unachievable for soil and debris from CERCLA response actions and RCRA corrective actions and closures. Instead, EPA presumes that, because contaminated soil and debris is significantly different from the wastes evaluated in establishing the BDAT standards, it cannot be treated in accordance with those standards and thus qualifies for a treatability variance from those standards under 40 CFR 268.44.
>
> Accordingly, persons seeking a treatability variance from LDR treatment standards for contaminated soil and debris do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable. As an alternative, persons seeking a treatability variance for soil and debris may meet the appropriate levels or percentage reductions in the currently available guidance (Superfund LDR Guidance #6A, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions", EPA OSWER Directive 9347.3-06FS, July 1989)....

Thus, variance petitions only need to focus on justifying the proposed alternative levels of performance, using the Superfund LDR Guidance #6A containing suggested treatment levels for soil and debris.

In EPA's view, the determination that the BDAT standards are generally inappropriate for contaminated soil and debris addresses many of the concerns raised by comments on the supplemental notice. EPA will respond to comments on the alternatives in the supplemental notice when the Agency makes its final decision.

3.8 EPA'S GROUNDWATER PROTECTION STRATEGY

The proposed NCP introduced the concept of TBCs. TBCs do not meet the definition of ARARs because they are not promulgated, but they may be useful in determining what is protective or in otherwise assisting in remedial responses. Examples given included health effects information with a high degree of credibility (e.g., reference doses), technical information on how to perform or evaluate site investigations or response actions, and EPA policy.

One major TBC that EPA intends to use for remedial actions involving groundwater is their groundwater protection strategy. Under this strategy groundwaters are placed into three classes. Class I groundwaters are special groundwaters that are highly vulnerable to contamination, are irreplaceable drinking water sources for substantial populations, or are ecologically vital for sensitive ecological systems or unique habitats. It is unclear exactly how such designations are made, but the draft 1985 strategy proposes the following:

- ***Highly vulnerable to contamination*** means that either the depth to the water table, recharge rate, aquifer media, or other important parameters indicate vulnerability or professional judgement indicates vulnerability.

- ***Irreplaceable source of drinking water*** means that the groundwater serves populations of 2,500 people or more or the cost of replacing the groundwater source would exceed 0.7 - 1.0 percent of the mean household income or the area served.

- ***Ecologically vital*** means that the groundwater supplies a sensitive ecological system or supplies a habitat for an endangered or a threatened species.

Class II groundwaters are either currently used for drinking water (Class IIA) or are potential drinking water sources (Class IIB). The presence of one or more operating drinking water wells or the presence of one or more water-supply reservoir watersheds that has been designated for water quality protection by a State or a local government is considered sufficient to class groundwater in the area as Class IIA. Groundwater with a sufficient yield (150 gallons/day or greater) or of sufficient quality (less than 10,000 mg/L total dissolved solids) would qualify as Class IIB. Class III groundwaters are either highly to moderately interconnected (Class IIIA) or have a low degree of interconnection (Class IIIB) and in either case are not considered to be potential sources of drinking water because of salinity or previous contamination.

EPA maintained in the proposed NCP that MCLs, rather than MCLGs are generally ARARs for cleanup of Class I and II groundwaters. This policy conflicted directly with CERCLA Sect. 121(d)(2)(A), which specified MCLGs — not MCLs — are ARARs. The new NCP corrected this conflict, mandating cleanup to non-zero MCLGs where "relevant and appropriate" to the circumstances of the release.

EPA groundwater protection strategy further states that alternate concentration limits (ACLs) should be set for remediation of groundwater under CERCLA when MCLGs or MCLs are technically impracticable. Restoration of Class I and II groundwaters should be rapid. Finally, MCLs are neither applicable nor relevant and appropriate for Class III groundwaters. Rather, cleanup of Class III groundwaters should be consistent with exposure-based ACLs as derived under RCRA Subpart F. Additionally, time frames for cleanup of Class IIB and Class III groundwaters can be longer than for Class I and Class IIA groundwaters.

Chapter IV

Examples of CERCLA Information Briefs

A. Complying with Land Disposal Restrictions (LDR) for CERCLA Remedial Actions Involving Contaminated Soil and Debris

Complying with Land Disposal Restrictions (LDR) for CERCLA Remedial Actions Involving Contaminated Soil and Debris

BACKGROUND: **CERCLA Sect. 121(e) requires that remedial actions must comply with at least the minimum standards of all "applicable or relevant and appropriate requirements" (ARARs) of Federal and State laws. EPA has determined that RCRA land disposal restrictions may be ARAR for certain CERCLA remedial actions involving soil and debris. This means that soil and debris contaminated with prohibited or restricted wastes cannot be land disposed if (1) these wastes have not attained the treatment standards set by EPA for a specified waste or (2) have been the subject of a case-by-case extension, national capacity variance, or successful "no migration" petition. RCRA LDR treatment standards are based on "Best Demonstrated Available Technology" (BDAT), not on health-based concentrations. Because the treatment of the soil and debris matrix presents technological difficulties not yet addressed by EPA (BDAT standards are generally set for industrial process wastes), compliance options such as obtaining a Treatability Variance, are available and will generally be necessary for soil and debris wastes. In the recently promulgated revisions to the National Contingency Plan (NCP) for CERCLA implementation, EPA provides important information for CERCLA project managers regarding LDR compliance, particularly for obtaining a treatability variance for land disposal of contaminated soil and debris.**

STATUTES: **Comprehensive Environmental Response Compensation and Liability Act (CERCLA), Section 121; Resource Conservation and Recovery Act (RCRA), Section 3004.**

REGULATIONS: **40 CFR 268.44(h), 53 FR 31199-31200, August 17, 1988.**

REFERENCE: **EH-231 Memorandum, September 25, 1989; Subject: RCRA Land Disposal Restriction Guides for CERCLA Cleanup Actions; Preamble to National Oil and Hazardous Substances Pollution Contingency Plan, 55 FR 8760-8762, March 8, 1990; EH-231 Memorandum, August 21, 1990; Subject: Summary of Final National Contingency Plan and discussion of issues of concern to DOE; EH-231 Catalog of CERCLA ARARs Fact Sheets, July 1990.**

Why must RCRA Land Disposal Restrictions be considered early in environmental restoration project planning?

- It is extremely important to determine whether a CERCLA remedial action is subject to LDR as early as possible in the Remedial Investigation/Feasibility Study (RI/FS) process (e.g., during the project scoping or site characterization stage). Compliance with LDR may affect DOE's ability to land dispose restricted wastes, and could end up "driving" an entire project if not planned sufficiently in advance. This is especially true at sites involving large volumes of waste, such as sites with contaminated soils and debris, which have relatively low levels of contamination and may not be amenable to LDR treatment technologies and requirements.

- If the need for LDR compliance arises much later than the initial screening of the alternatives (which can occur concurrently with site characterization), or after treatability studies are initiated, there could be significant impacts on schedules and budgets if the remedial project needs to be redesigned or if additional alternatives to land disposal need to be evaluated later in the process in order to comply with LDR.

When are CERCLA actions subject to LDR?

- Generally, ***any*** CERCLA response actions involving land disposal of known or suspected hazardous wastes, including mixed waste, are subject (after the appropriate effective date) to LDR when a requirement is determined to be "applicable or relevant and appropriate" to the action.

- When CERCLA actions involve restricted RCRA listed or characteristic wastes, LDR may be "applicable" *(see below)*. When the origin of the hazardous constituents in a waste is unknown and the waste is sufficiently similar to listed or characteristic wastes such that the requirement is well suited to the action, LDR are potentially "relevant and appropriate."

What about CERCLA actions involving soil and debris?

- The prerequisites for LDR "applicability" to CERCLA actions involving land disposal of contaminated soil and debris are: (1) the action involves land disposal which constitutes "placement;" (2) the substance being placed is a RCRA listed or characteristic waste; and (3) the action occurs after the applicable LDR effective date.

What do the prerequisite terms mean?

- ***"Land disposal"*** includes, but is not limited to any "placement" of waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, underground mine or cave, and concrete bunker or vault [RCRA Section 3004(k)].

- ***"Placement"*** (synonymous with "land disposal") includes consolidation of RCRA wastes outside of an area of contamination (AOC) and treatment in a separate unit (e.g., incinerator or tank) with replacement to the AOC. Both of these actions meet the statutory definitions of "placement" or "disposal." However, wastes that are consolidated within the AOC, *in-situ* treatment, or capping of wastes do not constitute placement or disposal.

- ***Listed or characteristic waste:*** In most cases, it is necessary to know the origin of the waste to determine whether it is a listed waste. EPA advises that if such documentation is lacking, the lead agency may assume for CERCLA response actions that it is not a listed waste. EPA also advises that project mangers may use appropriate tests to determine whether a waste exhibits a characteristic, or may use best professional judgement to determine whether testing is necessary by "applying knowledge of the hazard characteristic in light of the materials or processes used."

What are the effective dates?

- The LDR effective dates have been phased in over a period of several years. The effective dates are the dates after which persons who treat, store or dispose of wastes must comply with restrictions or prohibitions on the land disposal (or storage) of specific waste types. ***For planning purposes***, it is important to note that LDR effective dates (for contaminated soil and debris at CERCLA remedial action sites) refer to the date of "placement," not the date of signature on a decision document, such as a Record of Decision (ROD), which incorporates land disposal as an element of the action. Therefore, land disposal restrictions could affect the implementation of a remedy involving "placement" even though the ROD implementing such a remedy is issued prior to the date of "placement."

- Almost all listed or characteristic wastes are now subject to LDR. However, there are some important exceptions for certain wastes, specifically Radioactive Mixed Waste (RMW) containing Thirds waste, including soil and debris wastes from CERCLA response or RCRA corrective actions.

What are the effective dates for soil and debris wastes?

- The effective date for soil and debris containing spent solvents, dioxins, and California list wastes from CERCLA response and RCRA cleanup actions has been extended until November 8, 1990, due to a shortfall in national capacity for treating such waste. (*NOTE:* soil and debris wastes contaminated with certain First Third wastes have an effective date of August 8, 1990; soil and debris contaminated with certain Second Third wastes have an effective date of June 8, 1991; soil and debris contaminated with certain Third Third wastes have an effective date of May 8, 1992 — these are generally the Third wastes whose associated treatment standard is based on incineration.)

- After November 8, 1990, soil and debris from CERCLA response or RCRA cleanup actions contaminated with RMW may continue to be land disposed until May 8, 1992 under a national capacity variance provided that any spent solvents, dioxins, and California list wastes, which may be contained in the RMW, meet the BDAT standard established for the spent solvent, dioxin, or California List waste (the presence of these special waste categories at levels that do not meet established BDAT standards or exceed the statutory prohibition levels renders the soil and debris subject to LDR, regardless of RMW content).

- When such wastes are to be land disposed in surface impoundments or landfills under a "soils and debris-RMW" national capacity variance, the units must comply with RCRA Subtitle C minimum technology requirements (i.e., double liner, leachate collection system, and groundwater monitoring) under RCRA 3005(j)(2) or (j)(4), or the receiving units must have a retrofitting waiver under RCRA 3004(o)(2) or 3005(j) to be considered equivalent to the minimum technology requirements.

Are the LDR BDAT standards "appropriate" for CERCLA actions involving soil and debris?

- The revised NCP indicates that EPA has had substantial problems in achieving the LDR noncombustion BDAT standards for contaminated soil and debris, which at CERCLA sites is usually found in large volumes containing relatively low levels of contamination. Additionally, EPA considers incineration of contaminated soil and debris to be inappropriate or infeasible under circumstances associated with many Superfund sites. EPA has determined that until specific standards for soils and debris are developed, current BDAT standards are generally ***inappropriate*** or unachievable for soil and debris from CERCLA response actions and RCRA corrective actions and closures.

- Instead, EPA presumes that, because contaminated soil and debris is significantly different from the wastes evaluated by EPA in establishing the BDAT standards, it generally cannot be treated in accordance with those standards and, thus, qualifies for a treatability variance from those standards under 40 CFR 268.44.

How should DOE comply with LDR for CERCLA soil and debris in light of EPA's findings on BDAT standards for this medium?

- When remedial actions involving soils and debris must comply with LDR, DOE Environmental Restoration Program Managers (ERPMs) should assume that a treatability variance from BDAT treatment standards is required to comply with LDR for contaminated soil and debris. When doing so for a CERCLA action, they need ***not*** demonstrate on a case-by-case basis that BDAT standards for the prohibited or restricted soil and debris wastes are inappropriate or not achievable. Instead, ERPMs may meet the appropriate levels or percentage reductions in the currently available guidance, Superfund LDR Guide #6A (2nd edition), "Obtaining a Soil and Debris Treatability Variance for Remedial Actions," EPA OSWER Directive 9347.3-06FS, September, 1990.

- While a separate petition process is not needed, the justification for such a variance should be included in the Proposed Plan and Record of Decision when treatment of soil and debris is an element of a CERCLA remedial action.

Questions of policy or questions requiring policy decisions will not be dealt with in EH-231 Information Briefs unless that policy has already been established through appropriate documentation. Please refer any questions concerning the subject material covered in this Information Brief to John Bascietto, RCRA/CERCLA Division, EH-231, FTS 896-7917.

B. Reporting Releases of Hazardous Substances under CERCLA and EPCRA

Reporting Releases of Hazardous Substances under CERCLA & EPCRA

BACKGROUND: Several federal environmental laws require that "releases of hazardous substances to the environment" above certain threshold amounts — Reportable Quantities or RQs — be reported. Current and proposed regulations under these statutes are unclear and make full compliance difficult. Nevertheless, failure to comply could result in civil or criminal penalties. In response to questions raised by several DOE Field Elements, this Information Brief is part of a series that will provide updated information on this and other CERCLA issues. The Environmental Guidance Division (EH-231) has responded to those questions relating the reporting of releases for which EPA has a clearly articulated position. EPA's position on other questions raised by Field Elements has been equivocal; DOE is working with EPA to resolve these outstanding issues. Additional information briefs on reporting releases will be issued as a clear position is defined.

STATUTES: Clean Water Act (CWA), Sect. 311; Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Sect. 103; Emergency Planning and Community-Right-To-Know Act of 1986 (EPCRA) or Title III of the Superfund Amendments and Reauthorization Act (SARA), Sect. 304.

REGULATIONS: 40 CFR 117.21; 40 CFR 302.6; 40 CFR 355.40.

REFERENCE: EH-231 Memorandum, January 10, 1990; Subject: Final Reportable Quantities of Radionuclides and Rules for Reporting Releases of Radionuclides under CERCLA.

What is a hazardous substance?

- Hazardous substances are (1) any elements, compounds, mixtures, solutions, or substances specially designated by EPA under Sect. 311 of the CWA (40 CFR 116.4) or under Sect. 102 of CERCLA (40 CFR 302.4); (2) any toxic pollutants listed under Sect. 307(a) of the CWA; (3) any hazardous substances regulated under Sect. 311(b)(2)(A) of the CWA; (4) any listed or characteristic RCRA hazardous wastes; (5) any hazardous air pollutants listed under Sect. 112 of the Clean Air Act (CAA); or (6) any imminently hazardous chemical substances or mixtures regulated under Sect. 7 of the Toxic Substances Control Act (TSCA).

- EPCRA also establishes emergency reporting requirements for "extremely hazardous substances" (40 CFR 355, Appendix A). The list of extremely hazardous substances is the same list of substances published in Appendix A of the November 1985 "Chemical Emergency Preparedness Program Interim Guidance." All of these substances are also CWA and CERCLA "hazardous" substances.

What is a reportable quantity?

- A reportable quantity (RQ) is the amount of a hazardous substance which, when released to the environment, must be reported to the National Response Center (NRC). Reportable quantities are "action levels" that may trigger an appropriate response to a release under provisions of the CWA, CERCLA, or EPCRA. Because the RQs are set at levels intended to trigger the assessment of possible responses including "no action," the RQ values themselves do not necessarily correspond to unacceptable levels based upon exposures or risk assessments.

- Under Sects. 311 of the CWA and 102(a) of CERCLA, RQs for all hazardous substances were initially set at one pound. However, EPA has statutory authority to adjust RQ levels up or down depending on the relative toxicity or carcinogenicity of individual substances.

- By regulation, the RQ for radionuclides has been redefined in units of the curie (Ci), and specific RQs — ranging from 0.001 to 1000 Ci — have been promulgated for 757 radionuclides (54 FR 22524, May 24, 1989).

- RQs for the same substance are not necessarily set at the same value under each listing. For example, the RQ for hydrofluoric acid is 100 pounds under both the CWA (40 CFR 117.3) and EPCRA (40 CFR 355, Appendix A) but is 5,000 pounds under CERCLA (40 CFR 302.4). This situation is somewhat confusing, and EPA is in the process of revising all three lists in order to set a single RQ value for each substance whenever possible.

What is a release to the environment?

- Currently, EPA considers a "release" to be virtually all conceivable contacts with the environment, including any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment. The abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous substances is also considered a release to the environment. However, EPA has indicated that certain administrative exemptions from reporting hazardous substances "contact" with the environment may be appropriate. This issue will be addressed in future Information Briefs as EPA develops policy on administrative exemptions.

- Some releases are excluded, including (1) releases solely in the workplace, (2) exhaust emissions from vehicles, aircraft, vessels, pumping station engines, etc., (3) normal applications of fertilizer, (4) releases of source, byproduct, or special nuclear material subject to Sect. 170 of the Atomic Energy Act (AEA) or Sects. 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act (UMTRCA), and (5) "federally-permitted" releases.

What is a "federally-permitted" release?

- The general assumption underlying the exemptions from reporting requirements for federally permitted releases is that such releases have been evaluated through the permit process and are not considered to be harmful to human health and the environment. Sect. 101(10) of CERCLA identifies specific types of releases considered to be federally permitted including:

- releases of substances and quantities specified in National Pollutant Discharge Elimination System (NPDES) permits, permit applications, or permit administrative records under the CWA;
- discharges complying with permits for dredge or fill materials under Sect. 404 of the CWA;
- releases in compliance with RCRA final permits;
- releases in compliance with enforceable permits under the Marine Protection, Research, and Sanctuaries Act (MPRSA);
- underground injection of fluids permitted under the Safe Drinking Water Act (SDWA);
- injection of fluids authorized by state law regulating underground injection of fluids used in petroleum product production or recovery;
- air releases complying with permit or control regulations under specific provisions of the Clean Air Act (CAA);
- releases to a publicly owned treatment work (POTW) in compliance with a pretreatment standard and program submitted to EPA for review (must also be in compliance with local limits that take into account site-specific characteristics); and
- releases of source, special nuclear, or byproduct material in compliance with a license, permit, or order issued pursuant to the AEA.

❑ In general, in order to qualify as "federally permitted," the hazardous substances, quantities released, and activities causing the release must be within the scope of a permit. If a release exceeds permitted levels, the excess is not in compliance with the permit and cannot be "federally permitted". Therefore, if the amount of a release that exceeds a permit level (i.e., the portion of the release that is not federally permitted) is equal to or exceeds an RQ, the release must be reported. In cases where no quantitative limits on the amounts of specific hazardous substances that can be released are in the permit, notification is required when the **characteristics** of the release are not in compliance with the permit and an RQ or more of a hazardous substance has been released. Federally permitted releases also do not include releases exempt from regulation under the applicable federal statutes or those to a medium other than the one specified in the permit.

What is a release into the workplace?

❑ EPA has not formally defined what constitutes a release solely in the workplace. However, in the final rule setting RQs for radionuclides (54 FR 22524, May 24, 1989) EPA makes clear that this exemption applies only to releases that occur within a closed space with no emissions to the ambient environment. Thus, spills onto the concrete floor of an enclosed building or plant would qualify as a release solely within the workplace as long as the hazardous substances do not leave the building or structure. In addition, the stockpiling of a hazardous substance in any unenclosed containment structure — surface impoundment, lagoon, tank, or other holding device that has an open side with the contained materials directly exposed to the ambient environment — is a release to the environment.

How are reports made?

❑ For a release of a CWA or CERCLA hazardous substance, the **person in charge** should immediately notify the National Response Center (NRC) in Washington D.C. at (202) 267-2675. Under EPCRA for emergency reporting of releases of "extremely hazardous substances", the facility or vessel **owner or operator** should immediately notify the Community Emergency Coordinator for the Local Emergency Planning Committee (LEPC) for any area likely to be affected and the State Emergency Response Commission (SERC) for any state likely to be affected. Because all SARA Title III extremely hazardous substances are also hazardous substances under the CWA and CERCLA, the NRC should also be immediately notified if the hazardous substance RQ is also exceeded.

Is a determination that a local community or state is likely to be affected based on risk assessment?

❑ No. EPCRA notification requirements are not triggered by risk-based levels of releases. While some analysis of risk may be an inherent part of establishing an RQ, EPA has indicated that the extremely hazardous substance emergency notification program is not based on risk levels. Therefore, there is no acceptability threshold for on-site or off-site impacts that are based on risk. Consequently, all releases of extremely hazardous substances should be reported to the LEPC and SERC if the release exceeds an RQ, if the release is not federally permitted, and if populations may be affected because of exposure to the extremely hazardous substance.

What liabilities exist for not reporting?

The following civil and criminal penalties exist for reporting requirement violations:

❑ Under the CWA, possible $10,000 fine and up to 1 year imprisonment for failure to notify [40 CFR 117.22(a)]; $5,000 fine per each release or discharge in a 24-hour period exceeding an RQ [40 CFR 117.22(b)]; and an additional civil penalty of up to $50,000 or up to $250,000 if the discharge is the result of willful negligence or willful misconduct [40 CFR 117.22(b)].

❑ Under CERCLA, possible fines according to Title 18 of the U.S. Criminal Code and up to 3 years imprisonment/first offense or 5 years imprisonment/subsequent offenses for failure to notify, submitting false or misleading information, or destroying or falsifying evidence [Sect. 103(b)(2)].

❑ Under EPCRA, civil penalties up to $25,000 fine for failing to provide emergency notification; criminal penalties of up to $25,000 and 2 years imprisonment/first offense or $50,000 and 5 years imprisonment/subsequent offenses for willfully failing to provide emergency notification (40 CFR 355.50).

Do routine or continuous releases of hazardous substances need to be reported?

❑ CERCLA Sect. 103(f)(2) provides relief from the reporting requirements of Sect. 103(a) for a release of a hazardous substance that is continuous, stable in quantity and rate, and either is a release from a facility for which notification of known, suspected, or likely releases of hazardous substances has been given under Sect. 103(c) or is a release for which notification has been given under Sect. 103(a) for a period sufficient to establish the continuity, quantity, and regularity of such release. Sect. 103(f)(2) further provides that in such cases, notification shall be given annually or at such time as there is any statistically significant increase (SSI) in the quantity of hazardous substance released. An April 19, 1988, proposed rule on continuous releases further clarifies these reporting requirements (53 FR 12868, April 19, 1988). The proposed rule states that not every release needs to be reported as it occurs; thus, unnecessary release reporting will be reduced. When a release occurs regularly and in relatively stable amounts, federal response officials need not be regularly notified. Notification of such continuous releases shall be given in an annual report and at times when SSIs occur.

Questions of policy or questions requiring policy decisions will not be dealt with in EH-23 Information Briefs unless that policy has already been established through appropriate documentation. Please refer any questions concerning the subject material covered in this Information Brief to Rich Dailey, EH-23, FTS 896-7117.

Chapter V

Examples of Environmental Guidance Memoranda

A. Final Rule Regarding Land Disposal Restrictions for Third Third Scheduled Wastes

OE F 1325.8
(8-89)

United States Government **Department of Energy**

memorandum

DATE: July 9, 1990

REPLY TO ATTN OF: EH-231

SUBJECT: Final Rule regarding Land Disposal Restrictions for Third Third Scheduled Wastes

TO: Distribution

The purpose of this memorandum is to provide Program Offices and Field Organizations with a summary of the Land Disposal Restriction (LDR) requirements promulgated in the Third Third final rulemaking that are pertinent to Departmental hazardous waste management operations. Furthermore, this package furnishes a copy of the Third Third LDR final rule for your utilization and convenience (copy attached). As noted in a previous memorandum (EH-231 memorandum dated May 21, 1990), the Third Third rule was finalized by the Environmental Protection Agency (EPA) on May 8, 1990. It is the last in a series of five LDR rulemakings mandated by Congress under the Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). Although this rulemaking was published in the Federal Register on June 1, 1990 (55 FR 22520), be aware that the effective date of the final rule was May 8, 1990.

The subject rulemaking establishes treatment standards and effective dates for Third Third wastes, which include radioactive mixed waste (RMW) that contains First, Second, and Third Third components, and RCRA characteristic hazardous wastes. This final rule represents an extensive set of new LDR requirements and treatment standards. The attached guidance document ("Review of the Final Rule on Land Disposal Restrictions for Third Third Scheduled Wastes") reviews and summarizes certain provisions likely to impact DOE waste management operations, and identifies sections that may need to be reviewed in more detail (depending on case-specific or waste-specific concerns). This document is not meant to serve as a replacement for examining the preamble and regulations promulgated in the Final Rule. Considering this, the guidance includes references to applicable sections of both the preamble, as well as the implementing regulations. It should be noted that the guidance document does not cover all requirements addressed by this rulemaking that may affect certain DOE activities (e.g., generator notification requirements, waste analysis plans, etc.).

The RCRA/CERCLA Division (EH-231) wishes to again thank those Field Organizations and Program Offices that provided data, information and/or comments relative to the Third Third Rulemaking. The Departmental efforts to influence this rulemaking process resulted in some favorable impacts pertaining to the requirements applicable to RMW and nonradioactive hazardous waste. We look forward to your

involvement in the development process associated with future RCRA rulemakings. If you have any questions related to this memorandum or the Third Third Final Rule itself, please feel free to contact Bill Fortune (FTS 896-7302) or Timothy Harms (FTS 896-6073) of my staff.

for Thomas T. Traceski
Director, RCRA/CERCLA Division
Office of Environmental Guidance

Attachments

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cc: **Other Organizations**

DOE Headquarters Hazardous Waste Regulatory Workgroup
National Low-Level Waste Management Program, EG&G Idaho
Hazardous Waste Remedial Action Program (HAZWRAP)
Pacific Northwest Hazardous Waste Research, Development and Demonstration Center

REVIEW OF THE FINAL RULE ON LAND DISPOSAL RESTRICTIONS FOR THIRD THIRD SCHEDULED WASTES

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REVIEW OF THE FINAL RULE ON LAND DISPOSAL RESTRICTIONS FOR THIRD THIRD SCHEDULED WASTES

I. INTRODUCTION

Effective May 8, 1990, the Environmental Protection Agency (EPA) promulgated Land Disposal Restriction (LDR) requirements applicable to Third Third Scheduled Wastes. The LDR regulations imposed by this rulemaking were developed by EPA as required by the Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). This rulemaking finalizes treatment standards and effective dates for Third Third wastes including radioactive mixed wastes (RMW) that contain First, Second, and Third Third components, and RCRA characteristic waste. In addition, treatment standards have been established for soft hammer First and Second Third wastes, multi-source leachate, and alternate treatment standards have been promulgated for lab pack wastes. One particularly important aspect to DOE operations is that, for the first time, this LDR rulemaking establishes separate treatability groups and associated treatment standards specific to certain RMW.

The purpose of this document is to summarize some of the key provisions of the final rule that are relevant to Departmental waste management activities, and/or are responsive to the DOE comments on the Third Third proposed rulemaking. A copy of the final rule is provided as an Attachment to this document.

II. REVIEW OF SPECIFIC ASPECTS OF THE FINAL RULE

A. Capacity Determinations

A three month national capacity variance from the effective date has been granted for all wastes covered by this rule, except in cases where a longer capacity variance has been specified. Relative to RMW, EPA has determined that insufficient treatment capacity exists, and therefore, has granted a two-year national capacity variance for RMW that contains First, Second, and Third Third Scheduled wastes (55 FR 22644). In addition, EPA has also granted a two-year national capacity variance for soil and debris contaminated with RMW. The final rule recognizes that data submitted by DOE was used in making these capacity determinations. Bear in mind that hazardous wastes that are subject to a national capacity variance must still comply with California list prohibitions, where applicable (i.e., if the wastes contain any California list constituents).

B. Treatment Standards Specific to RMW

In this LDR final rule, for the first time, separate treatability groups have been established for four specific types of RMW (55 FR 22626) . These groups were separated on the basis that such wastes could not be treated using the Best Demonstrated Available Technology (BDAT) for the corresponding nonradioactive hazardous wastes. The four separate RMW treatability groups and their corresponding LDR treatment standards are as follows:

(1) "Vitrification" is the specified technology (i.e., LDR treatment standard) for the high-level waste fraction generated during the reprocessing of fuel rods. For certain remaining low-level radioactive process waste fractions, EPA indicates that it is possible to achieve the promulgated treatment standards with intended treatment processes (e.g., grout stabilization of low-level radioactive supernate solution/salts, incineration of low-level radioactive organic waste containing benzene).

(2) The specified method of treatment for radioactive lead solids (i.e., RMW containing elemental lead) is "macroencapsulation". This separate subcategory does not include lead containing treatment residuals such as hydroxide sludges, other wastewater treatment residuals or, certain organo-lead materials and incinerator ashes.

(3) "Amalgamation" is the treatment standard for RMW containing elemental mercury. This standard may be achieved by utilizing various inorganic reagents that are effective in forming mercury amalgamations (including gold).

(4) "Incineration" (in units operated in accordance with certain RCRA technical operating requirements) is the specified technology for mercury-containing hydraulic oil contaminated with radioactive materials.

For remaining RMW that does not fall into one of the treatability groups listed above, the treatment standards promulgated for the corresponding nonradioactive hazardous wastes apply. According to the Final Rule (and based on information provided by DOE), current DOE practice or planned treatment for certain RMW will, in many situations, achieve the promulgated treatment standards for nonradioactive hazardous waste.

C. Characteristic Hazardous Waste

The treatment standards promulgated in the final rule for characteristic hazardous waste fall into one of four categories: (1) a concentration level equal to or greater than the hazardous characteristic level, (2) "Deactivation" to remove the hazardous

characteristics, (3) concentration levels below the hazardous characteristic level (e.g., for EP toxic pesticide nonwastewaters, reactive cyanides), and (4) specified treatment technologies. For EP toxic metal wastes, the treatment standards have been set at the RCRA characteristic concentration levels, except for selenium which is slightly greater than the characteristic level (55 FR 22555). For corrosive hazardous wastes, and certain ignitable and reactive wastes, the treatment standard has been established as "Deactivation" (required method of treatment) to remove the hazardous characteristic (55 FR 22542). Thus, successful treatment to remove the characteristic for the above wastes will both render the waste non-hazardous under RCRA, as well as satisfy the treatment standards under the LDR program. Note that guidance on suggested technologies that EPA believes will achieve "Deactivation" of hazardous characteristics is provided in new Appendix VI to part 268 (55 FR 22714).

One specific characteristic waste stream addressed in the DOE comments submitted in response to the Third Third proposal is radioactive zirconium fines. Under the final rule, the applicable treatability group for this characteristic waste is the "D001 Ignitable Reactives Subcategory" (55 FR 22627). Stabilization of radioactive zirconium fines (such as the solidification process for zirconium fines described in the DOE report submitted to EPA) now constitutes an acceptable technology for achieving the treatment standard of "Deactivation" for this subcategory.

In the final rule (55 FR 22660), EPA has determined that the Toxicity Characteristic Leaching Procedure (TCLP) should be the analytical method used for measuring compliance with the EP toxic metal standards (i.e., characteristic levels). This approach was taken for several reasons. Use of the TCLP will soon (9-25-90) be required by large quantity generators to assess the toxicity of wastes. Furthermore, the TCLP is the leach test used to measure performance where BDAT is identified as an immobilization technology. There are, however, two exceptions to requiring that the TCLP be used. For lead characteristic nonwastewaters and all nonwastewaters containing arsenic, the waste is in compliance if it achieves the standard based on the EP toxicity test (even if, based on TCLP analysis, the standard is not reached).

Also, it should be noted that due to the requirements finalized for characteristic hazardous wastes, this rulemaking includes certain amendments to the LDR tracking (i.e., notification and certification) provisions contained in 40 CFR 268.7 (55 FR 22662). These amendments include tracking form modifications that address situations where characteristic wastes that no longer exhibit a characteristic are shipped to subtitle D facilities for disposal.

D. Applicability to Newly Identified Toxicity Characteristic (TC) Wastes

In another recently published EPA rulemaking (March 29, 1990; 55 FR 11798), EPA finalized revisions to the toxicity characteristic used in the identification of hazardous

wastes. This rule added 25 organic chemicals to the existing list of EP toxicity constituents, and replaced the EP toxicity test with the TCLP (EH-231 memorandum entitled "Toxicity Characteristic Final Rule", dated 4-9-90). The Third Third final rule clarifies that wastes exhibiting the new toxicity characteristic (based on TCLP analysis), but not the EP toxicity characteristic, are not currently subject to the prohibitions on land disposal (55 FR 22660). This is the case, even where constituents exhibiting the new TC are also constituents regulated under the EP toxicity characteristic. EPA asserts that these TC wastes are newly identified in accordance with RCRA 3004(g)(4). Under this statutory provision, land disposal prohibition determinations are to be made for hazardous wastes that are newly identified or listed after November 8, 1984, within 6 months of the date of identification or listing (for newly identified TC wastes, therefore, LDR determinations are to be made within 6 months of the March 29, 1990 TC final rule). However, TC wastes will not be automatically prohibited from land disposal if EPA fails to make such determinations within six months.

E. Dilution Prohibition

Under the LDR requirements, restricted wastes cannot be diluted as a substitute for adequate treatment, to circumvent an effective date, or to circumvent a statutory or regulatory prohibition. In the Third Third final rule, guidance is provided on the application of the dilution prohibition in certain situations, along with some clarification of when dilution is permissible (vs. impermissible).

Basically, the existing dilution prohibition extends to all restricted hazardous wastes. However, EPA has determined that for characteristic wastes, it is appropriate to exempt certain practices from the prohibition on dilution. EPA believes that the treatment requirements and associated dilution rules existing under the Clean Water Act (CWA) requirements sufficiently implement similar requirements that exist under RCRA. As such, the final rule exempts from the dilution rules characteristic wastes that are treated in accordance with permits or pretreatment requirements of the CWA (55 FR 22657). However, this exemption is not applicable in cases where a method of treatment has been designated as the LDR treatment standard. The final rule also exempts characteristic wastes that are disposed of in underground injection wells (i.e., subject to the Safe Drinking Water Act regulations) from the dilution prohibition, as long as the characteristic is removed before the wastes are disposed (55 FR 22658). In addition, the final rule asserts that for most non-toxic characteristic hazardous wastes (i.e., purely corrosive wastes, and non-toxic ignitable or reactive wastes), mixing of waste streams to eliminate the characteristic is not precluded as an acceptable treatment method.

With respect to centralized treatment methods, the final rule provides the following clarification (55 FR 22664):

- It is not considered impermissible dilution, if prohibited wastes that are aggregated are legitimately treated in centralized treatment systems.

- In general, EPA states that dilution is permissible where it is a legitimate form of treatment (as opposed to inappropriate treatment), or a necessary pretreatment step in a legitimate treatment system.

- When various waste streams are aggregated for purposes of treatment, such aggregation is not considered impermissible dilution provided, (a) all of the wastes are legitimately amenable to the same type of treatment, and (b) such treatment is utilized.

The preamble provides examples on how the dilution prohibition applies to specific scenarios beginning on 55 FR 22666.

F. Alternate Treatment Standards for Lab Packs

Prior to the Third Third final rule, lab packs were required to comply with the treatment standards corresponding to all waste codes the lab packs contained. The Third Third rule provides administrative relief to this regulatory approach by finalizing alternate treatment standards for two categories of lab packs. For lab packs containing certain inorganic and organometallic hazardous wastes the treatment standard has been established as incineration (specified method) followed by a requirement to meet the treatment standards for the EP toxic metals identified in new Appendix IV to Part 268 (55 FR 22713). The specific inorganic and organometallic wastes for which this treatment standard is applicable are listed in Appendix IV. These wastes include inorganic, organometallic, organic, D003 reactive, and D002 corrosive wastes. All of the EP toxic metals are included in this appendix with the exception of mercury (waste code D009).

An additional alternate treatment standard has been promulgated for lab packs containing certain organic hazardous wastes that are identified in new appendix V to part 268 (55 FR 22713). The promulgated treatment standard for lab packs containing only organic hazardous wastes listed in appendix V is incineration. Lab packs with hazardous wastes identified by waste codes other than those listed in appendix IV and V are not eligible for the alternate treatment standards, and must comply with the applicable treatment standards for each waste that the lab pack contains. Where lab packs contain other hazardous wastes, in addition to wastes identified in appendix IV and V, the lab pack must be treated to meet the most stringent treatment standards applicable to the wastes included in such a mixture. In cases where an organometallic lab pack (i.e., appendix IV lab pack) contain listed RCRA hazardous wastes, and the treatment standards for the specific listed wastes

include concentration levels for inorganic constituents that are also EP toxic metals, these lab packs must be treated to the EP toxic metal treatment standard at a minimum.

Other items relevant to generators of lab pack wastes:

- Organometallic (appendix IV) and organic (appendix V) lab packs may include unregulated, nonhazardous wastes (such as glassware and protective clothing), or hazardous wastes that already meet the applicable treatment standards.

- With each shipment of appendix IV and/or appendix V lab packs, the generator must provide a notice to the treatment facility identifying the EPA Hazardous Waste Number(s) of each waste contained in the lab pack.

- Organic (appendix V) lab packs that are incinerated may be placed into a subtitle C disposal facility without an analysis of the treatment residue (since the treatment standard is a specified technology). However, the residues from treating organometallic (appendix V) lab packs containing wastes with EP toxic metal constituents must be analyzed to determine compliance with the EP toxic metal standards.

G. Treatment Standards for Multi-Source Leachate

Under the Third Third Final Rule, EPA has established a separate treatability group for multi-source leachate and is listing this waste group under a new EPA Hazardous Waste Number - F039 (55 FR 22619). EPA is finalizing an approach that establishes BDAT treatment standards for multi-source leachate as a fixed set of nonwastewater standards, and a separate set of wastewater standards. These include concentration-based standards for regulated constituents that represent almost all of the BDAT constituents list (i.e., the list of hazardous constituents for which BDAT performance standards may be established). The final rule defines multi-source leachate as leachate that is derived from treatment, storage, or disposal of more than one listed waste (see section 261.31; 55 FR 22684). Once the final rule becomes effective, wastes meeting the definition of multi-source leachate must be classified as F039, and will be subject to the applicable F039 treatment standard. In other words, classifying a multi-source leachate based on the listed wastes from which it was derived, will not be an option.

The final rule recognizes that not all multi-source leachate contains all of the BDAT constituent list, and that it is unnecessary to analyze for constituents that are not present. With this consideration, the final rule outlines the following implementation procedures: (a) obtain an initial analysis of all F039 regulated constituents, and (b) based on this initial analysis and any other pertinent information available, establish

which constituents should be analyzed for on a regular frequency. The constituents that must be analyzed for and the testing frequency will be determined by the permit writer (as a condition within the facility waste analysis plan). For permits that do not already address multi-source leachate, appropriate modifications to the permit will be required. Also, where applicable, a permit modification will be required to revise the waste analysis plan to include applicable new procedures.

The F039 multi-source leachate standards include regulated concentrations for dioxins and furans. However, leachate derived solely from F020 - F023 and F026 - F028 (i.e., dioxins and furans) wastes, is considered to be a single-source leachate. Such leachate must meet the treatment standards specific to the applicable waste codes, F020 - F023 and F026 - F028.

Separate standards were not promulgated for multi-source leachate that exhibits a characteristic of hazardous waste. EPA believes that the constituents and properties of characteristic wastes are sufficiently addressed by the promulgated standards. Multi-source leachate or the resulting treatment residues do have to meet the treatment standard for a characteristic, if such wastes exhibit a characteristic at the point of disposal.

H. Overlap of Standards for Listed Wastes that also Exhibit a Characteristic

The Third Third rule finalized the following approach relative to situations where characteristic wastes contain more than one waste code (55 FR 22659):

- For wastes that exhibit more than one characteristic of hazardous waste, such wastes must be treated to meet the treatment standard for each characteristic waste code.

- For waste streams that contain listed hazardous wastes in addition to exhibiting one or more of the characteristics of hazardous waste, such waste must be treated to meet the standards for each waste code.

    - However, if the characteristic constituent or property is addressed by the treatment standard associated with the listed waste component(s), such wastes need only to meet the applicable listed waste standards.

- Wastes that exhibit a characteristic of hazardous waste at the point of disposal are prohibited except where the applicable treatment standard for the characteristic component is above the RCRA characteristic level.

I. Applicability of California List Prohibitions after May 8, 1990

A few issues pertaining to the applicability of California list prohibitions are discussed in the final rule (55 FR 22674). As a result of the Third Third final rule, almost all of the California list prohibitions will be superseded by more specific prohibitions and treatment standards. The waste streams for which the California list prohibitions will remain applicable include:

- o Liquid hazardous waste that contain over 50 ppm PCBs
- o HOC-containing characteristic waste identified as hazardous based on a characteristic property that does not involve HOC's
- o Liquid hazardous waste that exhibits a characteristic and also contains greater than or equal to 134 mg/l of nickel and/or 130 mg/l of thallium.

As stated initially in the First Third rulemaking (53 FR 31188), and reiterated in this rulemaking, wastes remain subject to applicable California list prohibitions during the period of a national capacity variance (e.g., during variances granted for any Thirds wastes including RMW). In addition, this final rule explains that EPA is adopting a reading of relevant statutory language, such that, the California list prohibitions do not apply to waste that are newly identified and listed.

J. Reformatted Treatment Standard Tables and Effective Date Table

Also, as part of this notice, EPA has reformatted the treatment standard tables under 40 CFR 268.41, treatment standards expressed as concentrations in waste extract (55 FR 22689); 268.42, treatment standards expressed as specified technologies (55 FR 22692); and 268.43, treatment standards expressed as waste concentrations (55 FR 22701). These reformatted tables include both treatment standards promulgated in earlier LDR rules, as well as those finalized in the Third Third rule. The tables are now arranged in order by RCRA waste code, thereby, placing wastewater and nonwastewater concentrations together (by waste code). These tables also include the CAS numbers (i.e., Chemical Abstracts Service Registry Number) for regulated hazardous constituents and other clarifying features. Note also, that under 268.42, technology-based standards have been placed into tables by RCRA waste code, with specified technologies applicable to RMW identified specifically in Table 3 (55 FR 22700). Table 1 under this section provides a description of the technology-based standards.

The rule also includes two new appendices to part 268 that provide useful information. First, in Appendix VI, a list is provided of some recommended treatment technologies that can be utilized to achieve the treatment standard of "deactivation" to

remove the hazardous characteristics of certain ignitable, corrosive, and reactive wastes (55 FR 22714). New Appendix VII offers a complete list of restricted waste codes (also California list waste categories) and associated waste categories, and provides the corresponding LDR effective dates for surface disposed waste.

K. Waste Identification Requirements

The RCRA hazardous waste determination requirements applicable to generators (specifically section 262.11) previously established a scheme by which a generator did not need to determine whether a waste exhibited any characteristic of hazardous waste if the waste was determined to be a listed waste. Under the Third Third rule, this provision has been revised (55 FR 22659). Now, for purposes of compliance with the LDR program, a generator must determine whether listed waste also exhibits any characteristics of hazardous waste. Furthermore, the regulatory language in sections 261.21 - 261.24 (pertaining to characteristics of hazardous waste) is being amended to indicate that wastes classified as characteristic wastes may also be listed wastes.

L. Storage Prohibition

In the Third Third Proposed Rulemaking, EPA recognized that some legitimate storage technically may be prohibited under the existing interpretation of the LDR storage prohibition. The proposed rule requested comment on alternative interpretations and offered one possible approach. As you are aware, the consolidated DOE comments (EH-231 memorandum dated 2-13-90) provided fairly extensive comments relative to this issue, and urged EPA to allow long term storage when capacity for treatment is legitimately being developed. The final rule, however, explains that the Agency has decided to retain their longstanding interpretation of the storage prohibition and is not finalizing the proposed alternative approach (55 FR 22672). In addition, the final rule notes that the Agency plans to further evaluate the "legal, policy, and factual issues" associated with the applicability of the storage prohibition to RMW. EPA plans to provide policy on these issues within 90 days of the May 8, 1990, signing of the final rule.

EH is currently involved in efforts to reiterate and provide further clarification of the difficulties imposed on RMW management for DOE as a result of the existing storage prohibition interpretation. On June 14, 1990, EH-20 met with the EPA Assistant Administrator for Solid Waste and Emergency Response, to discuss RMW issues related to the prohibitions on storage under the LDR provisions. During this meeting, the Department stressed that the final policy on the mixed waste storage issue should address both DOE, as well as the commercial sector.

B. Waste Reduction Policy Statement

DOE F 1325.8
(8-89)

United States Government **Department of Energy**

memorandum

DATE: JUN 27 1990

REPLY TO ATTN OF: EH-1, EM-1, S-3

SUBJECT: WASTE REDUCTION POLICY STATEMENT

TO: Distribution

DOE Orders 5400.1, 5400.3 and 5820.2A require development and implementation of either a waste minimization or waste reduction program and plan. This policy statement provides an umbrella for consolidating these various requirements under waste reduction and is also the first step in a phased approach to developing a Department-wide pollution prevention program. The required waste minimization program and plan will be in accordance with the implementing guidance issued pursuant to the DOE Orders referenced above (Attachment 1).

It is the policy of the Department of Energy (DOE) to conduct its operations in a safe and environmentally sound manner. Protection of the environment and the public are responsibilities of paramount concern and importance to the Department. To this end, DOE is firmly committed to assuring incorporation of national environmental protection goals in the formulation and implementation of Departmental programs. Accordingly, all DOE Program Offices and DOE Field Organizations shall institute a waste reduction policy to reduce the total amount of waste that is generated and disposed of by DOE operating facilities through waste minimization (source reduction and recycling) and waste treatment.

Waste reduction shall be accomplished by following a hierarchy of environmental protection practices. First, eliminate or minimize the generation of waste through source reduction. Second, recycle (i.e. use, reuse or reclaim) those potential waste materials that cannot be eliminated or minimized. Third, treat all waste that is nevertheless generated to reduce volume, toxicity, or mobility prior to storage or disposal.

This policy statement applies to hazardous, non-hazardous solid, radioactive (transuranic, high level and low level), and radioactive mixed waste. Data and results from waste minimization and treatment activities shall be reported separately from each other, as specified in the attached implementing guidance.

Waste reduction will be a prime consideration in research activities, process design, facility upgrade or modernization, new facility design, facility operations and facility decontamination and decommissioning.

Leo P. Duffy
Director
Office of Environmental
Restoration and Waste Management

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and
Health

John C. Tuck
Under Secretary

Attachment

IMPLEMENTATION GUIDANCE
FOR
DOE ORDER 5400.1

WASTE MINIMIZATION PLAN

AND

WASTE REDUCTION REPORTING

OF DOE HAZARDOUS,

RADIOACTIVE, AND RADIOACTIVE MIXED WASTES

FINAL

MARCH 1990

Attachment 1

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WASTE MINIMIZATION PLAN AND PROGRAM GUIDANCE

1. PURPOSE AND SCOPE

This document provides guidance to DOE Program and Operation Offices and DOE Operations and DOE Contractors for implementing a waste minimization program and plan. This guidance addresses the waste minimization component of the implementation plan for Order DOE 5400.1, General Environmental Protection Program. There are two additional DOE Orders that require DOE operating facilities to develop a waste minimization or reduction program. It is our intention that one program be developed to meet all of these requirements (see Section 5).

The objectives to be achieved through implementation of this guidance are to assure that each DOE operating facility 1) organizes a comprehensive waste minimization program with goals and schedules; 2) develops a method for characterizing and tracking its waste streams; 3) identifies applicable methods and technologies for waste minimization; 4) develops employee training and awareness programs; and 5) complies with Federal and state regulations and DOE requirements for waste minimization.

This guidance focuses on waste minimization -- eliminating or minimizing the generation of waste. Waste minimization consists of source reduction and recycling activities. These two activities are part of the hierarchy of environmental protection practices which encourages source reduction as the highest priority, recycling as the second priority, followed by treatment, storage and disposal.

The management of waste after it is generated -- through treatment, storage and disposal -- is not covered in this guidance, but is contained in the Implementation Guidance for DOE Order 5820.2A.

This guidance is applicable to "DOE Operations" as referenced in paragraph 8(a) of DOE Order 5400.1 and "DOE Contractors" as referenced in paragraph 8(h) of DOE Order 5400.1, hereinafter referred to as "DOE operating facilities," "DOE facilities," or "facilities."

The guidance applies to the following wastes generated by DOE facilities:

- hazardous waste regulated under Subtitle C of RCRA

- radioactive waste (i.e., low-level, high-level and transuranic), and

- radioactive mixed waste

In the future, DOE plans to expand this waste minimization program into a comprehensive pollution prevention program to include non-hazardous solid waste (industrial and municipal garbage), and pollutants such as air emissions or wastewater discharges. If your facility already has additional minimization programs, such as paper or can recycling, these should be included in your waste minimization plan and reporting.

An initial step toward expansion of waste minimization into pollution prevention is creation of awareness. DOE Order 5400.1 requires each Operations Office to develop a Pollution Prevention Awareness Program and to recognize a requirement for pollution prevention in all mission statements and project plans. Where time allows, each facility should include pollution prevention awareness planning in its waste minimization plan (see Section 6.B.).

This guidance applies to all generators of radioactive and mixed waste, regardless of quantity generated, and is applicable to hazardous waste generators under the following conditions: 1) the site meets the definition of a RCRA Large Quantity Generator (see Appendix A), or, 2) the site treated, stored, or disposed of any RCRA hazardous waste on site in units subject to RCRA permitting requirements. These same conditions apply to generators of non-hazardous solid waste.

This guidance is generic and should be modified to fit the needs and capabilities of the individual DOE facility. It is recognized that not all elements of the waste minimization program and plan contained herein, such as cost or waste tracking or numerical goals, will be applicable. However, for ease in collating reporting data, all facilities should follow, as much as possible, the format in Figures 1 and 2, noting those elements that are not applicable with "NA" and an explanation for why they are not applicable.

Likewise, at some facilities, waste minimization plans may currently exist or may be incorporated into a waste management or other plan. In lieu of developing a new, separate plan, the facility could submit a copy of the existing plan along with Figure 1, detailing how the existing plan meets the waste minimization objectives stated above and referencing where each applicable element of Figure 1 is located in the existing plan.

2. BACKGROUND AND DEFINITIONS

The Solid Waste Disposal Act of 1965 was completely replaced by the Resource Conservation and Recovery Act of 1976 (RCRA), and the 1984 Hazardous and Solid Waste Amendments (HSWA) added Section 1003(b), in which Congress declared:

> "... it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible."

Congress went on to say that,

> "Waste that is nevertheless generated, should be treated, stored, or disposed of so as to minimize present and future threat to human health and the environment."

And so Congress established a hierarchy of actions for managing the Nation's growing waste problem, with reduction or elimination of the generation of waste a priority over the treatment, storage and disposal of waste after it is generated.

The Environmental Protection Agency (EPA) has stated its regulatory intent and preference for reducing waste at the source over management of waste after it is generated. In 1988, EPA established a Pollution Prevention Office to implement a multi-media pollution prevention program to reduce or eliminate the generation of pollutants at the source and encourage recycling and reuse. In the January 26, 1989, Federal Register, EPA published a proposed Pollution Prevention Policy Statement which "encourages organizations, facilities and individuals to fully utilize source reduction techniques in order to reduce risk to public health, safety, welfare and the environment, and as a second preference, to use environmentally sound recycling to achieve these same goals."

In the June 12, 1989, Federal Register, EPA issued draft guidance to hazardous waste generators on the elements of a waste minimization program. The guidance contained herein is consistent with EPA's draft waste minimization guidance.

Congress has also recently clarified its preference for source reduction over treatment, storage and disposal. A May 1989 draft report to the House Committee on Science, Space and Technology on DOE's Environmental Program budget contains language that specifically directs DOE to "give greater priority to source reduction in its pollution plan."

As stated in the Environmental Restoration and Waste Management Five-Year Plan, avoidance of waste generation, i.e. source reduction, is the major priority in DOE's waste minimization program. This guidance focuses on source reduction activities that minimize or eliminate the generation of waste, and recycling processes that use, reuse, or reclaim a material from a waste stream. Source reduction will be the first priority as this eliminates the problems associated with handling wastes; recycling will be the second priority. These waste minimization practices minimize or eliminate the amount of waste that must be

treated, stored or disposed, and result in either 1) the reduction of the total volume of waste, 2) the reduction of the toxicity of waste; or both, as long as that reduction is consistent with the general goal of minimizing present and future threats to human health and the environment.

Source reduction activities and techniques include closed-loop (in-process) recycling of hazardous constituents, substitution of less hazardous materials, process optimization or modification, technology changes, administrative changes such as inventory control, and housekeeping practices such as waste segregation.

Recycling allows potential waste materials, or materials destined for disposal, to be put to a beneficial use. Recycling techniques are characterized as use, reuse and reclamation techniques (resource recovery). Recycling via use or reuse involves the return of a potential waste material either to the originating process as a substitute for an input material, or to another process as an input material. Reclamation is the recovery of a useful or valuable material from a waste stream.

According to EPA the following activities are not considered waste minimization: the transfer of hazardous constituents from one environmental medium to another; concentration conducted solely for reducing volume, unless, for example, concentration of the waste allows for recovery of useful constituents prior to treatment and disposal; and dilution as a means of toxicity reduction, unless later recycling steps are involved. The deciding factor in the last two examples is what happens afterwards. If the activity is for the purpose of re-using or recycling the material, then it is considered "in-process recycling", hence source reduction. If the activity is to make the material more amenable for disposal, i.e. reduce volume or toxicity prior to storage or disposal, then it is considered treatment.

Delisting and reclassification of waste are also not considered waste minimization techniques. A delisting petition is approved when the petitioner proves to EPA that the waste is not hazardous because of facility-specific variations in raw materials, processes or other factors. However, no waste is minimized (the amount of waste is unchanged), the category of waste is simply changed; likewise with reclassification activities. DOE facilities can report and explain their reclassification efforts, but these cannot be counted towards the waste minimization goal. However, if delisting or reclassification is the result of treatment to reduce toxicity, these processes can be considered "waste reduction" and the results reported under the treatment category in the Waste Reduction Report (Fig. 2).

3. FACTORS MOTIVATING DOE TO MINIMIZE WASTE

Waste minimization contributes to protection of human health and the environment by reducing risks to potentially exposed people and environmental impacts from releases of pollutants. In addition, an aggressive waste minimization program helps to enhance DOE's credibility and demonstrates the Department's commitment to environmental protection.

There are also regulatory programs which highlight the need to minimize the amount of waste generated at DOE facilities. Most prominent is EPA's program to restrict the land disposal of untreated hazardous wastes -- the "land ban". Under the Land Disposal Restrictions program, many untreated hazardous wastes that were previously sent for disposal will now be incinerated or otherwise treated at costs substantially higher than those for land disposal alone. In addition, it is expected that permitted treatment and disposal capacity will not meet demand for some time. This situation could lead to noncompliance situations for many DOE facilities at current rates of waste generation. While DOE has developed a LDR Strategy to deal with this situation through the development of Federal Facility Compliance Agreements and participation in EPA's LDR rulemaking process, waste minimization offers a long-term solution.

Another regulatory impetus is the regulation of radioactive mixed wastes by EPA and DOE. Under the regulatory structure, EPA will regulate the hazardous portion of a radioactive mixed waste under RCRA or other appropriate environmental laws while DOE will regulate the radioactive portion of the mixed waste. To avoid radiation exposure from the radioactive component, many of the requirements for waste analysis and restrictions on storage under RCRA can lead to costly waste handling situations for radioactive mixed wastes. To avoid unnecessary costs and radiological exposures to waste handlers, it is very important that hazardous waste be segregated from the radioactive portions of a waste stream to the extent possible to minimize or eliminate the generation of radioactive mixed waste.

Beyond protection of the environment and the regulatory impetus, there are financial and liability issues. Waste minimization will reduce storage, treatment, and disposal costs as well as provide more efficient use of resources, thereby reducing operating costs. In some cases, recovery of valuable materials in a waste stream (e.g., silver sludge from photographic solutions) can lead to procurement savings. Waste minimization also serves to reduce a facility's financial liability for future cleanup, remediation, or litigation costs.

4. REGULATORY REQUIREMENTS

There are several reporting requirements for hazardous waste in HSWA that were effective September 1, 1985. These requirements have been codified by EPA in the Code of Federal Regulations, 40 CFR Parts 262, 264, and 265:

o A generator certification on hazardous waste manifests and on permits for treatment, storage, or disposal of hazardous waste is required. The first of these certifications require generators to certify that:

- the generator of the hazardous waste has a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable. (HSWA Section 3005 (h)(1) and Section 3002 (b)(1); and 40 CFR Part 264.73 (b)(9).

o Hazardous waste generators are also required to submit biennial reports describing:

- the efforts undertaken during the year to reduce the volume and toxicity of waste generated; and

- the changes in volume and toxicity of waste actually achieved during the year in question in comparison with previous years, to the extent such information is available. (HSWA Section 3002 (a)(6)(C) and (D); 40 CFR Parts 262.41 (a)(6) and (7); 264.75(h) and (i); and 265.75 (h) and (i).

EPA recently revised the format for the 1989 biennial reports to include only quantitative data on source reduction and recycling activities.

o Title III of the Superfund Amendments and Reauthorization Act (SARA), the Chemical Emergency Preparedness and Community-Right-to-Know program, also has optional waste minimization reporting.

5. DOE REQUIREMENTS - CONSOLIDATION OF DOE ORDERS

DOE Requirements

There are also DOE requirements for waste minimization and waste reduction. DOE Order 5400.1, General Environmental Protection Program, requires development of a waste minimization program plan by May 9, 1990. Each DOE Head of Field Operations is required to:

- Develop a waste minimization program plan by May 9, 1990. The facility will also review the plan annually, revise as needed, and update it every three years.

- Develop goals for minimizing the volume and toxicity of hazardous, radioactive and radioactive mixed waste generated, and other pollutants, if applicable (see p. 4), aiming for annual reductions if programmatic requirements allow.

- Track and compare annual changes in waste volume and toxicity.

- Identify and report on proposed waste minimization techniques that are technically and economically practicable.

DOE Order 5400.1 also contains a provision for a Pollution Prevention Awareness Program. A documented program including elements for employee awareness through specific training, special awareness campaigns, and incentives and award programs will be implemented by each Field Organization. Where time allows, this pollution prevention awareness planning should be included in each facility's waste minimization plan (see Section 6.B.).

DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Program, states that it is the policy of DOE to implement waste minimization measures as specified in RCRA for hazardous and radioactive mixed wastes. This requirement will be satisfied by implementing the waste minimization program required under Order 5400.1.

The policy of waste reduction (i.e. waste minimization plus treatment) is reflected in policy and guidance statements from the Office of Defense Programs and in DOE Order 5820.2A, Radioactive Waste Management, which states:

> "The generation, treatment, storage, transportation, and/or disposal of radioactive wastes, and the other pollutants or hazardous substances they contain, shall be accomplished in a manner that minimizes the generation of such wastes across program office functions. . . ."

DOE Order 5820.2A contains provisions for waste reduction for each of the waste categories: High level, Transuranic and Low level. Following are the directives for each category:

- High Level Waste [Chapter I, 7(a)]

  "For the purpose of economy and enhancing the safety of high-level waste storage, processing programs shall be developed and implemented at the generating site to reduce the quantity of waste being sent to storage, and techniques (e.g., evaporation) shall be implemented to reduce further the waste volume in storage."

- TRU Waste [Chapter II, 3 (b)]

  "Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal. TRU waste reduction efforts shall be based on the implementation of techniques such as process modification, process optimization, materials substitution, decontamination, assay of suspect waste, and new technology development. Volume reduction techniques, such as incineration, compaction, extraction and shredding shall be implemented wherever cost effective and practical."

- Low-Level Waste [Chapter III, 3 (c) and (f)]

  "Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal. Waste reduction efforts shall include consideration of process modification, process optimization, materials substitution and decontamination."

  "All DOE low-level waste generators shall establish programs (goals, incentives, procedures, and reports) to assure that the amount of low-level waste generated and/or shipped for disposal is minimized."

  "Each DOE low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal."

  "Each DOE low-level waste generator preparing a design for a new process or process change shall incorporate principles into the design that will minimize the generation of low-level waste."

  "Waste treatment techniques such as incineration, shredding, and compaction to reduce volume and provide more stable waste forms shall be implemented as necessary to meet performance requirements."

Consolidation of DOE Requirements into One Program

The implementation guidance for Order 5820.2A establishes an administrative structure for a Waste Reduction Program. The program should have a Waste Reduction Manager (contractor) to provide guidance, coordination and accountability for waste reduction at the site. There should also be a DOE Site Waste Reduction Program Monitor (normally at the Operations Office) to have oversight responsibility to assure waste reduction activities are in compliance with regulatory requirements and DOE Orders. The implementation guidance also has a format for reporting waste reduction activities in an appendix to the annual site Waste Management Plan.

The waste minimization program required under Order 5400.1 will be a component of the Waste Reduction Program discussed above. The waste minimization program will be implemented under the Waste Reduction Program administrative structure, with the DOE Site Waste Reduction Program Monitor overseeing the DOE site waste minimization activities, and it will use the same reporting format (with some modifications). This revised format will be used in the January 1, 1991, reporting. See Section 7 for reporting requirements and modified format.

Under recent organizational changes at DOE Headquarters, the Office of Environmental Restoration and Waste Management (EM) has responsibility for waste minimization activities related to waste management. The Office of Waste Operations, Division of Technical Support, is responsible for planning, directing, and integrating waste minimization activities at DOE sites. This Division will provide coordination and program policy for EM's waste minimization program and will also be responsible for implementing the Waste Reduction Program under DOE Order 5820.2A. EM will also have the lead in coordinating the review of plans required under DOE Order 5400.1 and consolidating comments back to the Field.

A second program under EM's Office of Technology Development will plan, direct and coordinate research and development of waste minimization technologies and the subsequent transfer of this technology to DOE facilities.

6. WASTE MINIMIZATION PLAN AND PROGRAM

Waste Minimization Plan

DOE Order 5400.1 requires a waste minimization plan and program in place within 18 months of the effective date of the Order. By May 9, 1990, each Head of Field Organization with operating facilities that generate hazardous, radioactive, or

radioactive mixed waste will prepare a waste minimization plan and submit it to the appropriate Operations Office. The Operations Office may either submit a Field summary plan or the specific plan for each Field Organization (or both) to the Program Secretarial Offices, EM-1 and EH-1 for review. The plan will be reviewed annually and revised as necessary, but in any case, the plan will be updated every three years.

The Field summary plan may contain a 1-2 page description of the waste minimization program for each Field Organization under the Operations Office purview. The specific Field Organization plan should be a summary document of 10-20 pages, rather than a technical or program management plan. Both plans should describe the waste minimization program structure, the program objectives, the budget for waste minimization the activities to-date and schedule of planned activities, and how the program will be evaluated. Where possible, the budget should be presented both as a dollar amount and the percent in the overall budget for that activity (i.e., $10,000 spent on waste minimization training accounts for 50% of the total training budget). Figure 1 gives a suggested plan outline.

Elements of a Waste Minimization Program

A waste minimization program is an organized, comprehensive, and continual effort to systematically reduce waste generation. Waste minimization concepts and awareness should be incorporated into the operating facility's standard operating procedures. These concepts and awareness must also be incorporated into the planning and design of any new production process or facility, or the upgrade of an existing process or facility to take advantage of changes in technology and help prevent future waste management problems. Waste minimization is a Department-wide goal and a line management responsibility. Site/facility managers should plan, and budget, for their waste minimization program and activities.

The application of quality assurance to waste minimization has become increasingly important. Quality assurance program objectives and methods referenced in DOE Order 5700.6B should be identified and incorporated, if applicable.

The basic elements of an effective waste minimization program are:

A. Top Management Support
B. Waste Minimization and Pollution Prevention Awareness
C. Explicit Program Scope, Objectives and Numerical Goals
D. Periodic Waste Minimization Assessments/Audits
E. Accurate Cost Accounting
F. Accurate Waste Accounting

G. Technology Transfer
H. Program Evaluation

These elements are incorporated into the outline for the facility waste minimization plan in Figure 1. Each of these elements is discussed in detail below. The examples for each element may not be appropriate for every DOE facility but are given for the sake of guidance and do not constitute minimum criteria. It is left to the Program and Operations Offices and their facilities to work out the specifics of how to implement these program elements.

A. Top Management Support. Top management support at DOE facilities should be demonstrated by a written policy articulating upper management support for the waste minimization program and a commitment to implement recommendations identified through assessments, evaluations, or other means. Commitment should also be demonstrated by explicitly adding waste minimization activities to funding requests.

EXAMPLES:

- Commitment to waste minimization and implementing recommendations can be demonstrated by formally incorporating waste minimization objectives and accomplishments into written evaluations of top management job performance.

- Facility mission statements, organization goals, project plans and job descriptions can be reviewed by top management to determine if they reflect waste minimization goals and pollution prevention awareness, and revised accordingly.

- Subcontract agreements and directives to operations managers can be revised to address specific waste minimization and handling needs consistent with the waste minimization program.

- Top management can demonstrate a commitment to waste minimization and pollution prevention awareness through a willingness to budget and spend capital on assessments of waste generating processes, recommended waste minimization measures such as new cost accounting systems, new waste minimization data collection systems, process modifications, and reusable clothing and equipment (i.e., launderable "anti-c" clothing, reusable shoe covers, etc.) and pollution prevention awareness campaigns and training.

B. Waste Minimization and Pollution Prevention Awareness. Waste minimization concepts and awareness should be incorporated into management culture and the job ethic so that it is routinely

integrated into each phase of employee operating procedures or design considerations in a manner similar to safety and quality assurance/quality control concepts and awareness. Employees should be involved in waste minimization planning and implementation to the extent feasible. Waste minimization training programs should be instituted to educate all employees. Training programs and employee job assignments should be evaluated regularly to determine whether employees have the necessary tools, equipment, and training to effect waste minimization goals.

An initial step toward expansion of waste minimization into pollution prevention is creating awareness. DOE Order 5400.1 requires each Operations Office to develop a Pollution Prevention Awareness Program and, where appropriate, to recognize a requirement for pollution prevention in all mission statements and project plans. A documented program, included in Operations and Program Office environmental statements, should contain specific training, special awareness campaigns, and incentives and awards programs. In the future, these two awareness programs will be integrated into one comprehensive pollution prevention program. Where time allows, the pollution prevention awareness elements should be included in the waste minimization program plan due May 9, 1990.

EXAMPLES:

- Leadership of a waste assessment team can be incorporated as part of executive training for intermediate-level line executives.

- Waste minimization activities can be included, where appropriate, in development of employee performance standards.

- Waste minimization goals and milestones can be formally included in evaluations of a DOE operating contractor's job performance, including incentives for contractor's Cost Plus Award Fee contracts.

- Employee awareness can be promoted through such activities as signs, dedicated bulletin boards, seminars and meetings, educational programs, and committees to make recommendations for waste minimization projects.

- Incentives such as awards, citations, etc. can be offered to employees that submit promising project proposals or ideas.

- Waste minimization information and graphs that track progress can be published or posted on a regular basis.

C. **Explicit Program Scope, Objectives and Numerical Goals.** A statement of the waste minimization program objectives should be developed and distributed to all facility employees. This statement, which should be revised periodically, should articulate a commitment to evaluate policies, technologies, procedures, and personnel training programs and should include a realistic schedule for these evaluations. Specific numerical goals (i.e., 5% to 15% yearly or a specific percent by a specified year) for reducing the volume or toxicity of each waste stream should be set, after performing an initial assessment of technical and economic feasibility. This initial assessment could be performed on high priority waste streams, i.e., such as waste with high volume or high disposal costs, waste highly regulated or even banned from disposal, availability of technology, etc. The goals should be correlated with production rates. Even if information on waste generation forecasts is fairly imprecise, some waste minimization goals should be established early in the program with the knowledge that these goals will be revised in accordance with future refinements in waste generation projections and waste management analysis.

D. **Periodic Waste Minimization Assessments.** Individual production processes or facilities should be reviewed or audited periodically to identify opportunities to minimize or eliminate waste generation. The results of these assessments should be reported back to the waste generators, i.e., production operations staff. Larger facilities could establish a team of independent experts. This process is not a one-time endeavor but a continuing effort. Once the high priority waste minimization options have been implemented, the lower priority options should be examined for opportunities to further minimize waste generation. [NOTE: The Process Waste Assessments described in the draft Applied Research, Development, Demonstration, Testing and Evaluation Five-Year Plan are equivalent to these waste minimization assessments, and may be substituted at the Program and Operations Offices' discretion.] The waste minimization assessments should, at minimum:

1. Examine the available data on the types, amounts, and hazardous constituents of wastes generated, i.e., characterize the waste streams.

2. Examine where, why, and how these wastes are generated within the production process. Track materials that eventually wind up as waste from the receiving dock to the point at which they become a waste.

3. Determine the true costs of the wastes generated. The Operations Offices should develop some means to calculate the costs of the materials found in the waste stream, perhaps based on the purchase price of those

materials, and the costs of managing the wastes that are generated, including regulatory compliance costs.

4. Perform an assessment of procurement policies. Data on procurement might include unit size, standing order size, non-hazardous substitutes, and surplus availability. Evaluation of such data could lead to greater oversight of procurement and better control on waste generation at the source.

5. Identify opportunities at all points in a production process where materials can be prevented from becoming a waste, i.e., potential source reduction and recycling techniques applicable to those wastes.

EXAMPLES:

- Identify opportunities for recycling materials within the production process.

- Explore ways to optimize or change process parameters, such as flow rates, temperature or residence times, to minimize waste generation.

- Examine process design or operation improvements that may result in reduction in chemicals consumed, increase the life-time of equipment, or avoid the use of hazardous materials.

- Examine ways to eliminate or segregate unnecessary equipment from areas easily contaminated (e.g., hot cells).

-Evaluate technology changes oriented toward equipment modifications. These might include changes in the production equipment, layout or piping, and the use of automation.

- Examine contamination control barriers so that spills can be contained and the material returned to use rather than disposed.

- Evaluate opportunities for extending the service life of filters or exchange columns through operational modifications.

- Develop an assay system so that suspect-contaminated waste can be sorted into contaminated and non-contaminated categories.

E. Accurate Cost Accounting. Departments and managers should be charged for the waste management costs of the wastes they

generate, i.e. collection, handling, packaging, transportation, treatment, storage, and disposal. Liability insurance and regulatory compliance costs, such as personnel, permitting and recordkeeping, should also be charged. The idea is that if department managers are held accountable for the waste they are generating, they will be motivated to avoid generating the waste in the first place. Waste management costs should be explicitly included in proposals, budget planning, and cost accounting.

EXAMPLES:

- One method to ensure precise accounting of costs is to institute a computerized waste tracking system. Such a system tracks waste generation, treatment, storage, and disposal data for purposes of tracking costs, generating shipping manifests, providing information in support of RCRA reporting requirements, and charging generators within a facility or organization. The system can also identify areas for waste minimization efforts, and promote recycling/reuse through identification of stock surpluses.

- Charge-back fees may provide a strong incentive to generators to reduce their waste generation and should be investigated. The goals should be to provide a more equitable distribution of the costs of waste management, increase awareness of these costs, and provide incentives to programs to minimize the generation of wastes.

F. **Accurate Waste Accounting (Waste Stream Characterization).** The types, amounts, and hazardous and radioactive constituents of wastes should be tracked over time. The computerized tracking system for cost accounting can also track purchases of hazardous chemicals and facility waste management practices (i.e., origin of waste, date generated, waste container contents, shipments, etc.). Methods need to be devised to account for classified waste in an unclassified manner.

G. **Technology Transfer.** Technology transfer within an organization is especially important where similar facilities or processes exist. However, technology transfer often fails because there is no mechanism to follow up on it. Therefore, a technology transfer effort, or even a team, needs to be organized to collect "lessons learned" about technologies used and to pass this information on to other programs within the facility or other DOE operating facilities. This should be an ongoing effort or performed on a regular basis. Publicizing success stories can trigger additional ideas. Communicating our successes can also benefit DOE if the public and local residents perceive us to be handling our waste responsibly. Both DOE and EPA have several technology transfer activities underway:

- The Office of Environmental Restoration and Waste Management conducts waste reduction workshops approximately every six months focusing on specific waste minimization activities. CONTACT: Joe Coleman, Acting Director, Division of Technical Support, Office of Waste operations (EM-35), FTS 223-4728.

- The HAZWRAP program at Oak Ridge is setting up a waste reduction bulletin board that DOE field organizations can access to share information. CONTACT: Cathy Fore, Hazardous Waste Remedial Actions Program (HAZWRAP), Martin Marietta Energy Systems, Inc., Oak Ridge, TN. (615) 435-3263.

- EPA has established a waste minimization bulletin board that offers access to an information network on waste minimization and recycling. CONTACT: Myles Morse, EPA, Office of Environmental Engineering and Technology Demonstration (202) 475-7161; FTS 475-7161.

- EPA's Pollution Prevention Office publishes a monthly newsletter of EPA's pollution prevention activities, upcoming conferences, and other items of interest. CONTACT: Priscilla Flattery, EPA, Pollution Prevention Office (202) 245-3557; FTS 245-3557.

EXAMPLES:

- Use newsletters and seminar programs to highlight details of construction features in new facilities or in upgrades of existing facilities.

- Share housekeeping and decontamination efforts within organizations and facilities through written and oral presentations and with other DOE facilities at hazardous waste minimization workshops and meetings.

- Take field trips to other DOE facilities to learn of waste minimization technology and techniques.

H. **Program Evaluation.** Periodically review the overall program effectiveness, vis-a-vis stated program objectives, to uncover potential areas for improvement. Such reviews can be conducted internally or larger facilities may wish to engage the services of outside waste minimization experts.

7. SCHEDULE AND REPORTING REQUIREMENTS

In addition to the waste minimization plan discussed in Section 6, there is a requirement to report annually on the status of each facility's waste minimization program activities. The waste minimization report requirements are incorporated into the report of waste reduction activities required as an appendix to the annual Waste Management Plan under DOE Order 5820.2a, which is due January 1 of every year. The report format has been modified by the following major changes: data on waste minimization technologies will be reported as source reduction and recycling; treatment activities will be reported separately. The data will be organized by waste category (non-hazardous solid, hazardous, radioactive (HL, LL, TRU) and radioactive mixed), waste description, i.e. spent solvent, and also by RCRA waste code, if known. Either mass or volume can reported, as long as the unit of measure is in metric units. If a volumetric measure is used, the density of the waste must also be provided. Figure 2 shows the modified report format.

RCRA also requires hazardous waste generators to report biennially to the RCRA-authorized State or EPA on their waste minimization activities. Accordingly, each facility should send a copy of the waste minimization sections of the RCRA biennial report to HQs Program Offices, EH and EM.

8. OTHER NON-ROUTINE ACTIVITIES THAT GENERATE WASTE

Decontamination and decommissioning, remediation activities, laboratory clean-outs and other non-routine activities will generate waste above and beyond the routine waste generation of the facility's production processes. There may also be opportunities to reduce the waste generated by these activities and these opportunities should be thoroughly investigated. For example, segregate non-hazardous and hazardous wastes, and even one type of hazardous waste from another, during lab clean-outs or D&D activities. There may be opportunities to re-use or recycle these waste materials.

For now, facilities should account for the waste generated by these activities separately, and report any efforts to reduce waste during these activities separately. However, this guidance will be reviewed in the future and may change as we get further into these activities.

Figure 1

Outline of the Waste Minimization Program Plan for DOE Order 5400.1

I. INTRODUCTION/BACKGROUND

Brief description of site/facility's mission

II. PROGRAM OBJECTIVES

a. Statement of management support/commitment
b. Waste minimization policy statement
c. Statement of objectives and numerical goals

III. DESCRIPTION OF PROGRAM

a. Organization and responsibilities of staff (organization chart) and implementation strategy and schedule
b. Program budget
c. Interaction/coordination between production staff (waste generators) and waste management staff, and other DOE program staff, i.e. EM'S R&D staff
d. Method of tracking waste throughout production process to point of discharge or treatment, storage or disposal
e. Method of accounting for waste management costs
f. Quality assurance considerations

IV. DESCRIPTION OF WASTE MINIMIZATION ACTIVITIES TO-DATE AND SCHEDULE OF PLANNED ACTIVITIES

a. Employee awareness program
b. Employee training program
c. Employee incentives/awards program
d. Waste minimization assessments/audits performed
- Results, if applicable [See Section 7 for format]
e. Waste minimization technologies implemented
- Results, if applicable [See Section 7 for format]

V. DESCRIPTION OF TECHNOLOGY TRANSFER ACTIVITIES

VI. DESCRIPTION OF PROGRAM PERFORMANCE EVALUATION

Figure 2

OUTLINE FOR ANNUAL WASTE REDUCTION REPORT

This outline modifies the format in the implementing guidance for DOE Order 5820.2A. **Bold** lettering denotes changes made to accommodate the waste minimization reporting under DOE Order 5400.1. One report, incorporated into the report of waste reduction activities required as an appendix to the annual Waste Management Plan under DOE Order 5820.2a, which is due January 1 of every year, will satisfy reporting requirements for DOE Orders 5400.1 and 5820.2A. If your operating facility has additional minimization or reduction programs, such as paper or can recycling, these should be included in this report.

1. PROGRAM ADMINISTRATION

   a. Structure of waste reduction program
   b. Organization and responsibilities - organization chart
   c. Program documentation -- collection and analysis of program data
   d. Modifications to program administration

2. PROGRAM DESCRIPTION

   a. Describe the waste minimization assessments performed during the past year, the results and the schedule for planned assessments.

   b. Describe and explain the merits (benefits, including cost savings) of the waste reduction techniques used. **Report by source reduction, recycling, or treatment techniques, and waste categories (hazardous, radioactive (HL, LL, TRU) and radioactive mixed), waste description, and RCRA waste code (if known).**

   c. Highlight operating experiences, (i.e successes and failures), of the waste reduction techniques implemented. **Report by source reduction, recycling, or treatment techniques, and waste categories (hazardous, radioactive (HL, LL, TRU) and radioactive mixed), waste description, and RCRA waste code (if known).**

   d. Indicate administrative "background" radiation limits already applied in waste segregation efforts.

   e. Describe incentive, **training, and employee awareness programs** -- their function and effectiveness **(results).**

3. PROGRAM PERFORMANCE

a. Describe measures used to gauge the performance of waste minimization and reduction activities, and the factors influencing these measures.

b. Report performance results. **Report by source reduction, recycling, or treatment techniques, and waste categories (hazardous, radioactive (HL, LL, TRU) and radioactive mixed), waste description, and RCRA waste code (if known).** Use the following parameters:

1. data for current year, i.e. **changes in volume and/or toxicity, and/or the amount of waste generation avoided**

2. volume of waste generated (excluding non-routine activities) and disposed, and trend over previous years **(percent increase or decrease)**

3. radionuclide concentration of waste generated and disposed (Ci/metric unit)

4. costs for waste generation (handling, packaging, shipping, **collection, treatment, storage, and regulatory compliance costs**) and disposal; reported as $/metric unit and $/Ci

5. projection of future goals and objectives

c. Report all those non-routine activities that generate waste and for which new activities resulted in waste reduction, such as decontamination and decommissioning, remediation activities, lab clean-outs; and the results of activities to reduce the amount of waste generated by these activities. Report by source reduction, recycling, or treatment techniques, and waste categories (hazardous, radioactive (HL, LL, TRU) and radioactive mixed), waste description, and RCRA waste code (if known).

APPENDIX A

Definition of a RCRA Large Quantity Generator

The site is a large quantity generator, if the site met **any** of the following criteria:

a) The site generated in any single month 1,000 kg (2,200 lbs) or more of RCRA hazardous waste; **or**

b) The site generated in any single month or accumulated at any time, 1 kg (2.2 lbs) of RCRA acute hazardous waste; **or**

c) The site generated or accumulated at any time more than 100 kg (220 lbs) of spill cleanup material contaminated with RCRA acute hazardous waste.

NOTE: Wastes treated in exempt units are not to be counted in determining if a site is a Large Quantity Generator. However, if a site is required to file the Waste Minimization Report, wastes treated in exempt units are to be reported.

SOURCE: U.S. EPA. 1989 Waste Minimization Report, Instructions and Forms. OMB#: 2050-0024

APPENDIX B

References

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"Proceedings of the Department of Energy Defense Programs Hazardous and Mixed Waste Minimization Workshop." Sponsored by U.S. Department of Energy, Office of Defense Waste and Transportation Management. Document #DOE/HWP-71, September 1988.

"Proceedings of the Second Department of Energy Defense Programs Waste Reduction Workshop." Sponsored by U.S. Department of Energy, Office of Defense Waste and Transportation Management. Document #DOE/HWP-82, April 1989.

U.S. Environmental Protection Agency:

Bridges, James S. (U.S. EPA), McComas, Foeck, and Swain. "Results from a Cooperative Federal, State, and Trade Association Waste Minimization Research Program". In: Hazardous Waste and Hazardous Materials, Vol. 6, No. 1, 1989.

U.S. EPA. "Pollution Prevention Benefits Manual," Office of Policy Planning and Evaluation, Regulatory Innovations Staff, (due by March 1990).

U.S. EPA. "Waste Minimization: Environmental Quality with Economic Benefits," EPA 530-SW-026, Office of Solid Waste and Emergency Response, October 1987.

U.S. EPA. "Waste Minimization in Metals Parts Cleaning," EPA 530-SW-89-049, Office of Solid Waste and Emergency Response, August 1989.

The following documents can be ordered from EPA by calling 513) 569-7562 or FTS 684-7562 and giving the EPA document number:

U.S. EPA. "Solvent Waste Reduction Alternatives," EPA/625/4-89/021, Office of Solid Waste and Emergency Response, September 1989.

U.S. EPA. "Waste Minimization Opportunity Assessment Manual," EPA/625/7-88/003, July 1988.

Project Summaries:

"Waste Minimization in the Printed Circuit Board Industry - Case Studies," EPA/600/S2-88/008, March 1988.

"Waste Minimization Audit Report: Case Studies of Minimization of Solvent Wastes and Electroplating Wastes at a DOD Installation," EPA/600/S2-88/010, March 1988.

"Waste Minimization Audit Report: Case Studies of Minimization of Mercury-Bearing Wastes at a Mercury Cell Chloraklaki Plant," EPA/600/S2-88/011, March 1988.

"Waste Minimization Audits at Generators of Corrosive and Heavy Metal Wastes," EPA/600/S2-87/055, November 1987.

"Waste Minimization Audit Report: Case Studies of Minimization of Cyanide Waste from Electroplating Operations," EPA/600-S2-87/056, January 1988.

"Waste Minimization Audit Report: Case Studies of Minimization of Solvent Waste from Parts Cleaning and from Electronic Capacitor Manufacturing Operations," EPA/600/S2-87/057, November 1987.

APPENDIX C

Glossary of Terms

Pollution Prevention - To fully utilize source reduction techniques in order to reduce risk to public health, safety, welfare and the environment, and as a second preference, to use environmentally sound recycling to achieve these same goals.

Recycling - Recycling techniques are characterized as use, reuse and reclamation techniques (resource recovery). Use or reuse involves the return of a potential waste material either to the originating process as a substitute for an input material, or to another process as an input material. Reclamation is the recovery of a useful or valuable material from a waste stream. Recycling allows potential waste materials to be put to a beneficial use rather than going to treatment, storage or disposal.

Source Reduction - The elimination or reduction of waste generation at the source, usually within a process. Source reduction activities and techniques include closed-loop (in-process) recycling of hazardous constituents, substitution of less hazardous materials, process optimization or modification, technology changes, and administrative changes such as inventory control and housekeeping practices such as waste segregation. Source reduction results in reducing the amount of potential waste material exiting from a process.

Treatment - Technological processes which reduce the volume, toxicity or mobility of waste. Examples include, but are not limited to, incineration, vitrification, neutralization, chemical extraction, physical separation, and solidification/ stabilization technologies.

Waste Minimization - Elimination or minimization of the generation of waste prior to treatment, storage or disposal. Waste minimization is any source reduction or recycling activity that results in either (1) reduction of total volume of hazardous waste; (2) reduction of toxicity of hazardous waste; or (3) both, as long as that reduction is consistent with the general goal of minimizing present and future threats to human health and the environment. Waste minimization results in avoiding the generation of waste.

Waste Reduction - Reduction of the total amount of waste that is generated and disposed of by DOE operations through waste minimization and treatment activities.

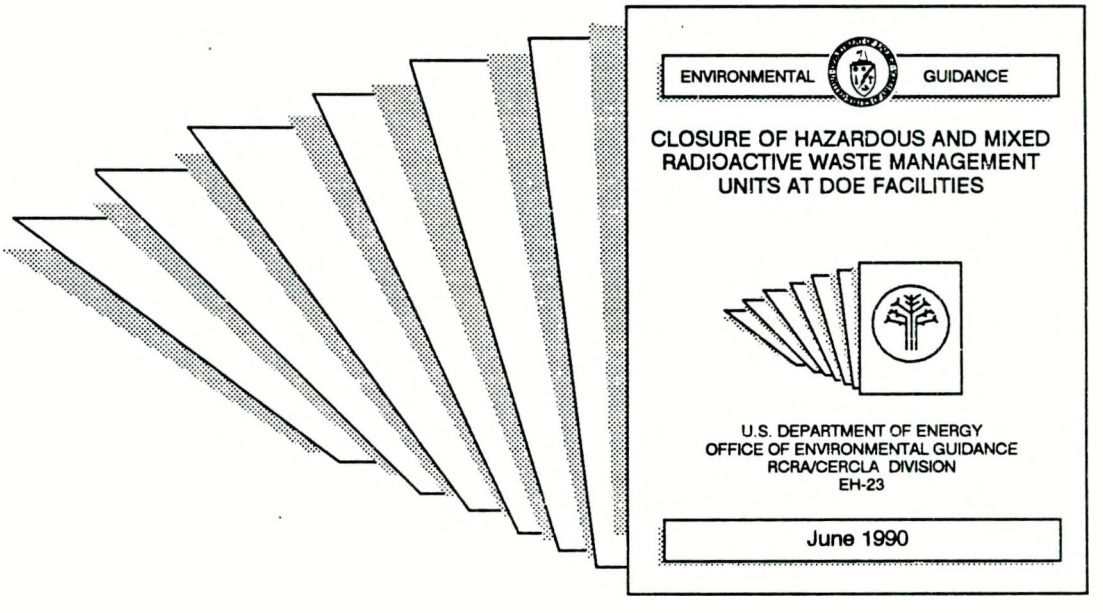
Chapter VI

Examples of RCRA Guidance

A. Closure of Hazardous and Mixed Radioactive Waste Management Units at DOE Facilities

ENVIRONMENTAL GUIDANCE

CLOSURE OF HAZARDOUS AND MIXED RADIOACTIVE WASTE MANAGEMENT UNITS AT DOE FACILITIES



U.S. DEPARTMENT OF ENERGY
OFFICE OF ENVIRONMENTAL GUIDANCE
RCRA/CERCLA DIVISION
EH-23

June 1990

EGD (RCRA)-002/0690

CLOSURE OF HAZARDOUS AND MIXED RADIOACTIVE WASTE MANAGEMENT UNITS AT DOE FACILITIES

June 1990

PREPARED BY:

U.S. DEPARTMENT OF ENERGY
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GLOSSARY

Active life -- The period from the initial receipt of hazardous waste at the facility until the Regional Administrator receives certification of final closure.

Ancillary equipment -- Any device including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps, that is used to distribute, meter, or control the flow of hazardous waste from its point of generation to a storage or treatment tank(s), between hazardous waste storage and treatment tanks to a point of disposal on-site, or to a point of shipment for disposal off-site.

Atomic Energy Act -- Authorizes DOE to regulate radioactive material operations at many government-owned facilities and several inactive sites that contain radioactive contamination.

Bathtub effect -- The liquid buildup and eventual overflow due to precipitation which enters the unit through the cover but cannot escape through the bottom liner.

Byproduct materials -- Any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to radiation incident to the process of producing or utilizing special nuclear material; and the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

California wastes -- A group of liquid hazardous wastes, including ones with PCB's, heavy metals, and halogenated organic compounds that EPA had to evaluate by July 8, 1987, to determine if they should be banned from land disposal or if restrictions should be placed on the land disposal of these wastes.

Characteristic waste -- A solid waste defined as hazardous because it exhibits one of the following four characteristics: ignitability, corrosivity, reactivity, or toxicity.

Clean closure -- Removal and/or decontamination of all wastes from a disposal facility.

Closed portion -- That portion of a facility which an owner or operator has closed in accordance with the approved facility closure plan and all applicable closure requirements.

Container -- Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Culvert -- Directs surface run-on and run-off away from the disposal area and prevents surface water from infiltrating the cover.

Disposal -- The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

Disposal facility -- A facility or part of a facility at which hazardous waste is intentionally placed into or on any land or water, and at which waste will remain after closure.

Drainage layer -- Design to promote the rapid and efficient transport of water from the cover to an exit drain. May be comprised of either granular or geosynthetic materials.

Effluents -- Waste materials discharged into the environment.

Elementary neutralization unit -- A device which: (1) Is used for neutralizing wastes which are hazardous wastes only because they exhibit the corrosivity characteristic defined in 40 CFR §261.22, or are listed in Subpart D of Part 261 only for this reason; and, (2) Meets the definition of tank, container, transport vehicle, or vessel in 40 CFR §260.10.

Equivalency demonstration -- For interim status facilities to show that closure satisfies all the requirements specified for permitted facilities in Part 264, even if the facility was otherwise subject to the interim status requirements.

Evapotranspiration -- Loss of water from the soil both by evaporation and by transpiration from the plants growing thereon.

Facility -- (40 CFR 260.10) -- All contiguous land, structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combinations of them).

Final closure -- The closure of all hazardous waste management units at the facility in accordance with all applicable closure requirements so that hazardous waste management activities under 40 CFR Parts 264 and 265 are no longer conducted at the facility unless subject to the provisions in 40 CFR §262.34.

Flanges -- Part of ancillary equipment used in tank systems.

Gunnite -- Type of liner.

Hazardous waste -- (40 CFR 261.3) -- A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may--(a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Hazardous Waste Management Unit -- A contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system and a container storage area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed.

High-level radioactive waste -- The material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid, that contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation.

Incinerator -- Any enclosed device using controlled flame combustion that neither meets the criteria for classification as a boiler nor is listed as an industrial furnace.

In-situ (waste treatment) -- Literally means on-site.

Intake -- The amount of substance taken into the body per unit body weight per unit time and is calculated separately for each environmental medium--air, ground water, surface water, and soil.

Interim status -- Established under Section 3005(e) of RCRA. It allows owners and operators of facilities in existence by November 19, 1980 (or brought under Subtitle C due to an amendment) who meet certain conditions to continue operating until a final permit application is approved or denied.

Isogram plan -- Type of plan prepared to guide the level of cleanup required at various areas within a container storage system.

Landfill -- A disposal facility or part of a facility where hazardous waste is placed in or on land and which is not a pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground mine, or a cave.

Leachate -- Any liquid, including any suspended components in the liquid, that has percolated through or drained from hazardous waste.

Listed waste -- A solid waste characterized as hazardous because it has been place on one of three lists developed by the EPA: Non-specific source wastes; Specific source wastes; Commercial chemical products.

Low-level radioactive waste -- Waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or spent nuclear fuel, or byproduct material.

Maximum Contaminant Level -- Represents the maximum permissible concentration of fourteen specific constituents in drinking water supplies as promulgated by the EPA under the SDWA.

Miscellaneous unit -- A hazardous waste management unit where hazardous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with appropriate technical standards under 40 CFR Part 146, or unit eligible for a research, development, and demonstration permit under §270.65.

Open dump -- Any facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under Section 4004 and which is not a facility for disposal of hazardous waste.

Partial closure -- Closure of a hazardous waste management unit at a facility that contains other active hazardous waste management units.

Permit-by-rule -- A RCRA permit issued under the authorization of another statute (e.g., the Safe Drinking Water Act, the Clean Water Act, or the Marine Protection, Research, and Sanctuaries Act).

Pile -- Any non-containerized accumulation of solid, nonflowing hazardous waste that is used for treatment or storage.

Placement -- Also referred to as land disposal. For landfill closures, a facility must investigate whether closure activities constitute land disposal. Waste removed from a unit, treated, and placed back in to the unit, is considered land disposal and the waste is subject to the LDRs.

Plat (survey plat) -- A small piece of land; or a plan, map, or chart of a piece of land.

Pozzolonic materials -- Cement kiln flyash or flyash from fossil fuel power plants, and other such materials; often used in combination with Portland cement as a stabilization technique.

Primacy -- Exists in a State which has an approved UIC program.

Replacement unit -- A unit that is taken out of service, cleared of waste, and then put back into service.

Settlement -- Uniformly distributed recession of a landfill due to compression of the foundation, liner, or waste or the dewatering of the waste. May primarily occur prior to cover construction.

Sanitary landfill -- A facility for the disposal of solid waste which meets the criteria published under Section 4004.

Sintering machine -- Type of pyrometallurgical device included in category of smelting, melting, and refining furnaces.

Sludge -- Any solid, semisolid or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant.

Slurry -- A watery mixture of insoluble matter.

Small quantity generator -- A generator who generates less than 1000 kg of hazardous waste in a calendar month.

Solid waste -- Any garbage, refuse, sludge, from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or byproduct material as defined by the AEA of 1954, as amended (68 Stat. 923).

Source material -- Uranium, thorium, or any other material which is determined by the Atomic Energy Commission pursuant to the provisions of Section 61 of the AEA to be source material; or ores containing one or more of the foregoing materials, in such concentration as the AEC may by regulation determine from time to time.

Special nuclear material -- Plutonium, uranium enriched in the isotope 233 or 235, and any other material which the AEC, pursuant to the provisions of Section 51 of the AEA, determines to be special nuclear material; or any material artificially enriched by any of the foregoing, but does not include source material.

Specific conductance -- A measure of conductance per cubic centimeter which represents the ratio of current flowing through a cube (having sides of one centimeter) divided by the change in electrical potential from one side to the other side, assuming the current is flowing between opposite sides.

Speculative accumulation -- The accumulation of wastes that are potentially recyclable, but for which no feasible recycling market exists (i.e., recycling less than 75% of accumulated wastes during a one year period).

Storage -- (in connection with hazardous waste) -- The containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste.

Subsidence -- Unevenly distributed settlement after closure. May threaten the integrity of a cover by creating cracks and depressions.

Surface impoundment -- A facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials, which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well.

Tank -- A stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials which provide structural support.

Tank system -- A hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.

Thermal treatment -- The treatment of hazardous waste in a device which uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the hazardous waste.

Transuranic waste -- Without regard to source or form, waste that is contaminated with alpha-emitting transuranium radionuclides with half-lives greater than 20 years and concentrations greater than 100nCi/g at the time of assay.

Treatment -- (in connection with hazardous waste) -- Any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume. Includes any activity or processing designed to change the physical form or chemical composition of hazardous waste so as to render it nonhazardous.

T-Test protocol -- Methodology governing the determination of concentrations of hazardous constituents in excess of background levels by statistically significant amounts. Applicable T-Tests pursuant to 40 CFR §264.97 are: parametric analysis of variance (ANOVA), analysis of variance based on ranks, tolerance or prediction interval, control chart approach, or other statistical test method approved by the Regional Administrator.

Underground injection -- The subsurface emplacement of fluids through a bored, drilled or driven well; or through a dug well, where the depth of the dug well is greater than the largest surface dimension.

Vadose zone -- (unsaturated zone) -- The zone of soil between the land surface and water table.

Wastewater treatment unit -- A device which: (1) Is part of a wastewater treatment facility which is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act; and (2) Receives and treats or stores an influent wastewater which is a hazardous waste as defined in §261.3 of this chapter, or generates and accumulates a wastewater treatment sludge which is a hazardous waste as defined in §261.3 of this chapter, or treats or stores a wastewater treatment sludge which is a hazardous waste as defined in §261.3 of this chapter; and (3) Meets the definition of tank in 260.10 of this chapter.

Waterwall(s) -- Part of primary energy recovery section(s) of a boiler's combustion chamber.

LIST OF ACRONYMS

ACL	Alternate Concentration Limit
AEC	Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
ARAR	Applicable, Relevant and Appropriate Requirements
ASTM	American Society for Testing Materials
ATSDR	Agency for Toxic Substance & Disease Registry [of the Center for Disease Control]
BDAT	Best Demonstrated Available Technology
BRC	Below Regulatory Concern
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COCA	Consent Order/Compliance Agreement
CPF	Carcinogenic Potency Factor
CQA	Construction Quality Assurance
CSF	Carcinogenic Slope Factor
EP	Extraction Procedure
FFCA	Federal Facility Compliance Agreement
FML	Flexible Membrane Liner
GWPS	Groundwater Protection Standard
HELP	Hydrologic Evaluation of Landfill Performance model
HSWA	Hazardous and Solid Waste Amendments of 1984
INEL	Idaho National Engineering Laboratory
LDR	Land Disposal Restriction
LLW	Low-Level Waste
MCL	Maximum Contaminant Level
mrem(/year)	millirem/year (measure of radioactive activity)
MTR	Minimum Technology Requirement
NARM	Naturally-occurring or Accelerator-produced Radioactive Material
NCC	National Computer Center
NEPA	National Environmental Policy Act
NRC	Nuclear Regulatory Commission
NTIS	National Technical Information Service
PNL	Pacific Northwest Laboratories
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
SARA	Superfund Amendments and Reauthorization Act of 1986
SDWA	Safe Drinking Water Act
SOC	Schedule of Compliance
SQG	Small Quantity Generator
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TSDF	Treatment, Storage, and Disposal Facility
UIC	Underground Injection Control (program)
USLE	Universal Soil Loss Equation
UST	Underground Storage Tank
WES	U.S. Army Corps of Engineers, Waterways Experiment Station
WIPP	Waste Isolation Pilot Plant

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1. INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

In carrying out its national security missions, the U.S. Department of Energy (DOE) must generate and manage large volumes of hazardous and mixed radioactive wastes as part of its routine operations. Recognizing the potential environmental threat posed by these wastes, DOE and the U.S. Environmental Protection Agency (EPA) reached an agreement[1] in February of 1984 which stipulated that DOE facilities that manage hazardous waste or hazardous components of radioactive mixed wastes must comply with all EPA regulations governing the generation and management of these wastes.

The requirement that DOE facilities comply with the Resource Conservation and Recovery Act (RCRA) was formalized on April 13, 1984, when the U.S. District Court of Tennessee ruled in LEAF v Hodel (586 F. Supp. 1163) that "RCRA requirements are not inconsistent with the Atomic Energy Act (AEA)." This ruling was reinforced in May of 1987, when DOE issued an interpretive rule clarifying that RCRA applied to the hazardous component of byproduct material (52 FR 15937), while the radioactive component was regulated under the AEA (10 CFR 962).

The RCRA Subtitle C regulations, found in Chapter 40 of the Code of Federal Regulations, Parts 260 - 272, set "cradle-to-grave" standards for the generation, transport, treatment, storage, and disposal of hazardous wastes. Included among the many facility design and operating standards that must be specified in RCRA permits are strict closure and post-closure care requirements for hazardous or radioactive mixed waste management units. These standards are designed to protect human health and the environment from future releases of hazardous constituents.

This document is intended to provide guidance on how to comply with the RCRA Subtitle C closure and post-closure care requirements at DOE facilities. It is intended for DOE Operations staff, DOE facility staff, and facility contractor staff responsible for compliance and oversight of RCRA hazardous and mixed waste compliance activities at the many DOE facilities located throughout the U.S.

1.2 SCOPE OF THIS DOCUMENT

This document addresses the Federal regulations governing the closure of hazardous and mixed waste units subject to RCRA requirements. It provides a brief overview of the RCRA permitting program and the extensive RCRA facility design and operating standards. It provides detailed guidance on the procedural requirements for closure and post-closure care of hazardous and mixed waste management units, including guidance on the preparation of closure and post-closure plans that must be submitted with facility permit applications. This document also provides guidance on technical activities that must be conducted both during and after closure of each of the following hazardous waste management units regulated under RCRA:

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[1] Environmental Protection Agency/Department of Energy Memorandum of Understanding on Responsibilities for Hazardous and Radioactive Mixed Waste Management, Signed February 22, 1984.

- Landfills
- Waste piles
- Container storage areas
- Incinerators
- Underground injection wells
- Surface impoundments
- Land treatment units
- Tanks
- Miscellaneous units
- Thermal treatment units
- Chemical, physical, and biological treatment

While this document provides significant detail on the regulatory requirements governing closure as well as presenting the technical activities that must be conducted at closure, it should not be viewed as a "cookbook" that includes all relevant information necessary for conducting closures. Closing hazardous waste management units is an extremely complex undertaking that will involve considerable interaction among DOE Operations Offices and facilities, EPA Regions, and States. No single document can contain all the information relevant to closure of hazardous waste management facilities, especially those containing radioactive mixed wastes. Accordingly, this document includes a comprehensive set of references in each section that will direct the reader to additional detailed guidance on various aspects of closure. This document should therefore be viewed as a general reference for guidance on RCRA closures at DOE facilities, but not as the only reference needed for conducting RCRA closures. Additional guidance can be found in *"Guidance on Stabilization and Closure of U.S. DOE Mixed and Low Level Radioactive Waste Disposal Facilities," DOE/LLW-82, June 1990.*

This document does not address the integration of RCRA and National Environmental Policy Act (NEPA) compliance; however, when applicable, owners or operators of DOE facilities should consider coordinating data collection efforts required for closure and post-closure care plans under RCRA to facilitate compliance with NEPA. In addition, this manual does not address closures and cleanups under CERCLA; however, to the extent that RCRA requirements are considered applicable or relevant, and appropriate requirements (ARARs), this manual may be a useful reference.

Under RCRA, States may be authorized for implementing RCRA Subtitle C upon demonstrating that they have promulgated State regulations that are no less stringent than the Federal standards. To date, many States have been authorized to implement the "base" RCRA program (see Chapter 2 Exhibit 2-2). In "authorized States," the State standards supersede the Federal regulations. In "unauthorized States," the Federal standards are implemented by the EPA Regional Office; any other State standards pertaining to hazardous waste may also be applicable at DOE facilities. It is important to note that States must apply separately for authorization to regulate mixed wastes and to implement the requirements established under the Hazardous and Solid Waste Amendments (HSWA) of 1984 (e.g, corrective action). Depending upon the authorization status of a State, regulation of mixed wastes may involve several regulatory authorities or may not yet be regulated at all under RCRA (see Section 2.1.1.2).

In this document, references to the "Regional Administrator" can be replaced by "State Director" for States with RCRA Subtitle C authorization. This document does not address individual State standards pertaining to RCRA closure activities. While most State standards are quite similar to the RCRA regulations found in 40 CFR Parts 260 - 270, it is important that persons using this guidance consult all applicable State regulations in authorized States.

1.3 ORGANIZATION OF THIS DOCUMENT

This document is organized into three sections following this introduction.

- **Chapter 2** provides an overview of the requirements pertaining to the management of hazardous and radioactive mixed wastes. It focuses on those general RCRA requirements that must be understood as background for the RCRA closure program, found in 40 CFR Parts 261, 262, 264, 265, 268, and 270. It provides an overview of the Atomic Energy Act and a number of applicable DOE Orders. Finally, it discusses the differences in authority for managing mixed wastes that result from a State's RCRA authorization status.

- **Chapter 3** outlines the procedural requirements for closing hazardous and mixed waste units. This section focuses on the general closure and post-closure care requirements found in Subpart G of 40 CFR Parts 264 and 265, which present the general closure performance standard, requirements for preparing closure and post-closure plans, and schedules for conducting closure activities.

- **Chapter 4** presents technical guidance on closing hazardous and mixed waste management units. It is divided into the following nine separate sections:

  -- 4.1 Landfills
  -- 4.2 Surface impoundments
  -- 4.3 Waste piles
  -- 4.4 Land treatment units
  -- 4.5 Container storage areas
  -- 4.6 Tanks
  -- 4.7 Incinerators
  -- 4.8 Miscellaneous units
  -- 4.9 Underground injection wells

Whenever appropriate, each chapter also contains a list of references for additional information.

"Guidance on Stabilization and Closure of U.S. DOE Mixed and Low Level Radioactive Waste Disposal Facilities," DOE/LLW-82, June 1990.

2. *OVERVIEW OF HAZARDOUS AND RADIOACTIVE MIXED WASTE MANAGEMENT REQUIREMENTS*

This chapter presents a general overview of the statutes, regulations, and policies governing the management of hazardous and radioactive mixed wastes at DOE facilities. This chapter discusses the requirements established by EPA pursuant to RCRA, the requirements established by DOE pursuant to the Atomic Energy Act of 1954 as amended, and various DOE Orders that affect closures of DOE facilities. It provides an overview of those aspects of the RCRA program especially relevant to the closure of hazardous waste management units. In addition, it outlines the procedures for determining whether a waste is a hazardous waste or a radioactive mixed waste.

2.1 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

Subtitle C of RCRA establishes standards for generators and transporters of hazardous wastes and for owners and operators of hazardous waste treatment, storage, and disposal facilities. Through the RCRA regulations, EPA regulates hazardous waste from the time it is generated until its ultimate disposal. RCRA was originally signed into law on October 21, 1976 [Public Law 94-580] and has since been reauthorized twice. The most extensive changes to the original Act were those enacted in 1984 under the Hazardous and Solid Waste Amendments (HSWA). These amendments included new requirements for land disposal restrictions, underground storage tanks, surface impoundments, corrective action, and permitting deadlines.

RCRA, as amended by HSWA, is divided into ten subtitles.

- ***Subtitle A -- General Provisions.*** Contains Congressional findings related to solid waste, defines the objectives of RCRA, and describes integration between RCRA and other statutes.

- ***Subtitle B -- Office of Solid Waste; Authorities of the Administrator.*** Establishes the Office of Solid Waste and defines the responsibilities of the Administrator.

- ***Subtitle C -- Hazardous Waste Management.*** Establishes a management system that regulates hazardous waste from the time it is generated until its ultimate disposal.

- ***Subtitle D -- State or Regional Solid Waste Plans.*** Establishes a Federal program to promote the environmentally sound disposal of solid waste (i.e., wastes not defined as hazardous).

- ***Subtitle E -- Duties of the Secretary of Commerce in Resource and Recovery.*** Requires the Secretary of Commerce to encourage greater commercialization of proven resource recovery technologies.

- ***Subtitle F -- Federal Responsibilities.*** Stipulates that Federal facilities shall be subject to all applicable RCRA requirements.

- ***Subtitle G -- Miscellaneous Provisions.*** Establishes standards and procedures for employee protection, citizen suits, imminent hazard protection, public participation, judicial review, etc. related to RCRA.

- ***Subtitle H -- Research, Development, Demonstration, and Information.*** Encourages special studies, new programs, and innovative technologies, and provides for coordination, collection, and dissemination of information related to solid waste.

- ***Subtitle I -- Regulation of Underground Storage Tanks.*** Regulates petroleum products and hazardous substances (as defined by CERCLA) stored in underground storage tanks.

- **Subtitle J -- Medical Wastes.** Establishes a two-year demonstration program for tracking medical waste in participating States.

Under RCRA, EPA has the authority to promulgate regulations as necessary to protect human health and the environment. EPA promulgated hazardous waste regulations, which carry the force of law, in the following Parts of Chapter 40 of the Code of Federal Regulations (CFR):

- ***40 CFR Part 261: Definition of Hazardous Waste***
- ***40 CFR Part 262: Generator Standards***
- ***40 CFR Part 263: Transporter Standards***
- ***40 CFR Part 264: Standards for Permitted Units***
- ***40 CFR Part 265: Standards for Interim Status Units***
- ***40 CFR Part 266: Standards for Specific Hazardous Wastes and Facilities***
- ***40 CFR Part 267: Standards for New Land Disposal Units (Superseded by Part 264)***
- ***40 CFR Part 268: Land Disposal Restrictions***
- ***40 CFR Part 270: Permit Program***

Chapter 2 of this guidance document focuses on the RCRA Subtitle C regulations for identification, treatment, storage, and disposal of hazardous waste. In particular, it addresses the general requirements governing treatment, storage, and disposal facilities handling hazardous and radioactive mixed wastes that are relevant to DOE facilities. The rest of the document focuses on the closure and post-closure care requirements found in this regulatory program.

2.1.1 The RCRA Permitting Program (40 CFR Part 270)

Who Must Have a Permit? All facilities that treat, store, or dispose of hazardous or mixed wastes are required to obtain a RCRA permit (Section 2.1.2 discusses how to determine if a waste is a hazardous waste and thus subject to a permit). There are, however, several exclusions to this requirement. These include (40 CFR §270.1(c)):

- Generators who store waste on-site in tanks or containers for less than 90 days;

- Farmers who dispose of their own pesticides on-site;

- Small quantity generators;
- Owners or operators of totally enclosed treatment facilities;
- Owners or operators of wastewater treatment units (tanks) and elementary neutralization units (tanks or containers);
- Transporters who store manifested wastes at a transfer facility for less than 10 days;
- Persons combining waste and absorbent material in a container, provided that this combination occurs at the time the waste is first placed in the container; or
- Owners or operators of solid waste (i.e., non-hazardous) disposal facilities that only handle small quantity generator waste (e.g., municipal solid waste landfills).

Types of Permits. EPA issues several different types of permits for hazardous waste management.

- *Treatment, storage, or disposal permits* are the standard form of permit required for most hazardous waste management facilities. These permits include the administrative and technical performance standards (including closure and post-closure requirements) that a hazardous waste management facility must meet. The permit also serves as the basis for any enforcement actions deemed necessary by EPA to bring a facility that is not complying with these standards into compliance.
- *Research, development, and demonstration (RD&D) permits* are issued by EPA to encourage the use of alternative treatment technologies. To be eligible for a RD&D permit, national standards must not exist for the experimental treatment technology. Permits are issued for one year, although they may be renewed up to three times. RD&D facilities can only receive wastes that are necessary to determine the efficacy of the treatment technology.
- *Post-closure permits* are issued to facilities closing with wastes in place. These permits specify the post-closure care responsibilities of the facility, including ground-water monitoring requirements, corrective action (if appropriate), and other maintenance activities as necessary. The permit also serves as the basis for any enforcement actions deemed necessary by EPA to bring a facility that is not complying with these standards into compliance.
- *Permits-by-rule* are provided by EPA when a facility must be permitted both under RCRA and another statute with similar permitting regulations. The goal of a permit-by-rule is to avoid duplication and streamline the permit application process. Certain facilities with permits under the Safe Drinking Water Act, Clean Water Act, or Marine Protection, Research, and

Sanctuaries Act, need only meet selected Subtitle C requirements in addition to those for which they are already in compliance, in order to receive a RCRA permit-by-rule. Examples of such facilities include underground injection wells and ocean dumping barges.

- *Emergency permits* are issued to a non-permitted facility, or to a permitted facility for hazardous waste activities not covered under the existing permit in the event there is an "imminent and substantial endangerment of human health or the environment." An emergency permit is typically issued for a period of 90 days or less.

- *Trial burn and land treatment demonstration permits* are issued to new incinerator and land treatment units respectively. The purpose of these permits is to allow these facilities to demonstrate their ability to perform up to operating standards. Once the demonstration period is complete, owners or operators of these facilities can apply for a final RCRA permit.

2.1.1.1 Permit Applications

Interim Status. Although RCRA requires treatment, storage, and disposal facilities to operate under the conditions of a permit, Congress recognized that it would take many years for EPA to issue all of the necessary permits. Thus Congress established *interim status* under Section 3005(e) of RCRA, which allows owners or operators of facilities in existence on November 19, 1980 (or brought under Subtitle C due to an amendment), who meet certain conditions, to continue operating under interim status until a final permit application is approved or denied.

Eligible facilities were granted interim status as long as they submitted a Part A application by November 19, 1980. Part A of the application is a short standard form that collects general information about the facility, the wastes handled, and the waste management activities conducted at the facility. These facilities are subject to the RCRA interim status standards (40 CFR Part 265) until a Part B application is filed and a final decision on a permit has been made. Disposal facilities that close prior to receiving a RCRA permit must comply with interim status post-closure requirements until their post-closure permit is issued. *DOE facilities with units containing radioactive mixed wastes became subject to the interim status requirements of 40 CFR Part 265 upon promulgation of the May 1, 1987, byproduct rule, and had to submit Part A of their permit application by November 1, 1987 (40 CFR 270.10(e)).*

The second part of the permit application -- the Part B -- provides detailed facility information, including the closure plans, and if appropriate, post-closure plans, for all hazardous waste management units at the facility. Closure and post-closure plans, once submitted, become a part of the permit. Existing facilities with interim status must submit the Part B either when requested by EPA or a State Agency or on the date mandated by RCRA (see Exhibit 2-1), whichever is earlier. If the Part B applications are not submitted by the following deadlines, the facility loses interim status and therefore must close.

Exhibit 2-1

Loss of Interim Status Provisions (40 CFR §270.73)

Facility Type	Submit Part B By:	Or Lose Interim Status On:
Land disposal	November 8, 1985	November 8, 1985
Incinerator	November 8, 1986	November 8, 1989
All other facilities	November 8, 1988	November 8, 1992

Interim status regulated units (landfills, surface impoundments, waste piles, and land treatment units receiving waste after July 26, 1982) must submit additional information in their Part B applications. These additional information requirements are located in 40 CFR §270.14(c) and include a detailed description of the ground-water monitoring system, complete characterizations of any plumes of contamination, and the development of a corrective action plan in the event such a plume is detected.

Parts A and B of the permit application must be submitted at least 180 days before construction of any new facility. In most cases there is no standard form to follow for preparing the Part B application, so owners or operators of hazardous waste management units should rely on 40 CFR Parts 264 and 270 for guidance. In addition, EPA has provided listings and general descriptions of what must be included in a Part B application in *EPA 530-SW-84-004, "Permit Applicants' Guidance Manual for Hazardous Waste Land Treatment, Storage, and Disposal Facilities, Final Draft," May 1984.*

If a permit application is not complete, a Notice of Deficiency Letter that describes the missing information is sent to the owner or operator. Once a completed permit application (both Parts A and B) is submitted by the owner or operator of a facility, the permit is reviewed, and either approved or denied by the EPA Regional Administrator. In practice, the administrative review portion of the permit application process may involve several iterations of submission, review, comment, resubmission, etc.

If a facility submitted a Part B permit application to EPA before November 8, 1984, EPA is required to either approve or deny the application in accordance with the following schedule set out under HSWA:

- *Land Disposal Facilities* by November 8, 1988
- *Incinerators* by November 8, 1989
- *All other TSDFs* by November 8, 1992.

HSWA did not place any time limitations on EPA for the review of permit applications submitted after November 8, 1984. The duration of the permit review period is dependent upon the type of permit and the Region in which it is reviewed. In general, a facility should expect that the evaluation of its permit application will take from 1 to 3 years. If a permit is reviewed and denied, EPA sends the owner or operator a Notice of Intent to Deny. The owner or operator may appeal this decision to the EPA.

After a permit application is approved, EPA prepares a draft permit. The draft permit incorporates applicable technical requirements and other conditions pertaining to the operation of the facility. EPA must then give public notice and allow 45 days for written comments. After the comment period expires, the Regional Administrator issues a final permit decision. This decision is binding, but may be appealed in the U.S. Court of Appeals.

Periodically, all hazardous waste management facilities are inspected. If compliance problems are uncovered during these inspections, EPA may modify the conditions of a permit, revoke and reissue a permit, or terminate a permit. Termination of a permit occurs because of either facility non-compliance with the terms of the permit, failure on the part of the permittee to disclose relevant information, or the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by terminating operations.

2.1.1.2 State Authorization

RCRA Section 3006(b) allows States to apply to EPA for authorization to administer and enforce a hazardous waste program pursuant to Subtitle C. Authorized State programs are carried out in lieu of the Federal program. Forty-three States and one U.S. territory are authorized for the base RCRA program (see Exhibit 2-2). It should be noted, however, that approved State programs are not static; EPA may initiate the revision of a State's program, withdraw its approval, or transfer a State's responsibilities back to the Federal government when necessary. For example, HSWA made many changes to the RCRA program. For this reason, the Federal government enforces HSWA requirements in States that are authorized only for the base RCRA program until these States receive HSWA authorization.

On July 3, 1986, EPA promulgated a rule that required States authorized for base RCRA to revise their programs to demonstrate the capability to regulate the hazardous components of radioactive mixed wastes. The deadline for compliance with this rule was July 3, 1987 (or July 5, 1988 for States requiring statutory amendments). States applying for base RCRA authorization after July 3, 1986 had to apply for mixed waste authorization at the same time (40 CFR 271.3(f)). As of May 30, 1990, only nineteen States and one territory have received mixed waste authorization (see Exhibit 2-2).

The incomplete authorization of State programs has led to a confusing mosaic of regulatory authority and has created some regulatory "loopholes" as well. Facilities in States without base RCRA authorization are subject to Federal RCRA and radioactive mixed waste requirements. Such facilities are also subject to State requirements, if any exist. ***However, in States with base RCRA authorization and without radioactive mixed waste authorization, mixed waste is not defined as hazardous waste, and thus the hazardous component is not regulated under RCRA. Note that the hazardous component could be subject to State regulations (51 FR 24504).*** In addition, after September 25, 1990, mixed waste that exhibits the toxicity characteristic is always defined as hazardous waste, regardless of the authorization status of a State. This is because mixed waste containing toxicity characteristic constituents is regulated under HSWA, and thus the EPA Regions are responsible for implementing all requirements pertaining to such waste (see Section 2.1.2.1 for a discussion of the toxicity

characteristic). In States that are authorized for both base RCRA and mixed waste, facilities are subject only to State regulations. Because HSWA and mixed waste are completely separate programs, a State's mixed waste authorization status is totally independent and unaffected by its HSWA authorization status.

Exhibit 2-2

Status of RCRA State Authorizations (As of 05/30/90)

States and Territories Authorized for the RCRA Base Program

• Alabama	• Arizona	• Arkansas*
• Colorado*	• Delaware	• D.C.
• Florida	• Georgia*	• Idaho*
• Illinois *	• Indiana	• Kansas
• Kentucky*	• Louisiana	• Maine
• Maryland	• Massachusetts	• Michigan*
• Minnesota*	• Mississippi	• Missouri
• Montana	• Nebraska*	• Nevada
• New Hampshire	• New Jersey	• New Mexico
• New York*	• North Carolina*	• North Dakota
• Ohio*	• Oklahoma	• Oregon*
• Pennsylvania	• Rhode Island	• South Carolina*
• South Dakota	• Tennessee*	• Texas*
• Utah*	• Vermont	• Virginia
• Washington*	• West Virginia	• Wisconsin
• Guam*		

States and Territories Not Authorized for the RCRA Base Program

• Alaska	• Amer. Samoa	• California
• Connecticut	• Hawaii	• Iowa
• N. Marianas	• Puerto Rico	• Virgin Islands
• Wyoming		

* = Authorized for mixed wastes.

Note that 11 of DOE's 18 primary facilities are located in States with mixed waste authorization, and thus the hazardous components of any radioactive mixed waste located at these facilities are subject to RCRA requirements as administered by the State (see Exhibit 2-3 below).

Primary DOE Facilities

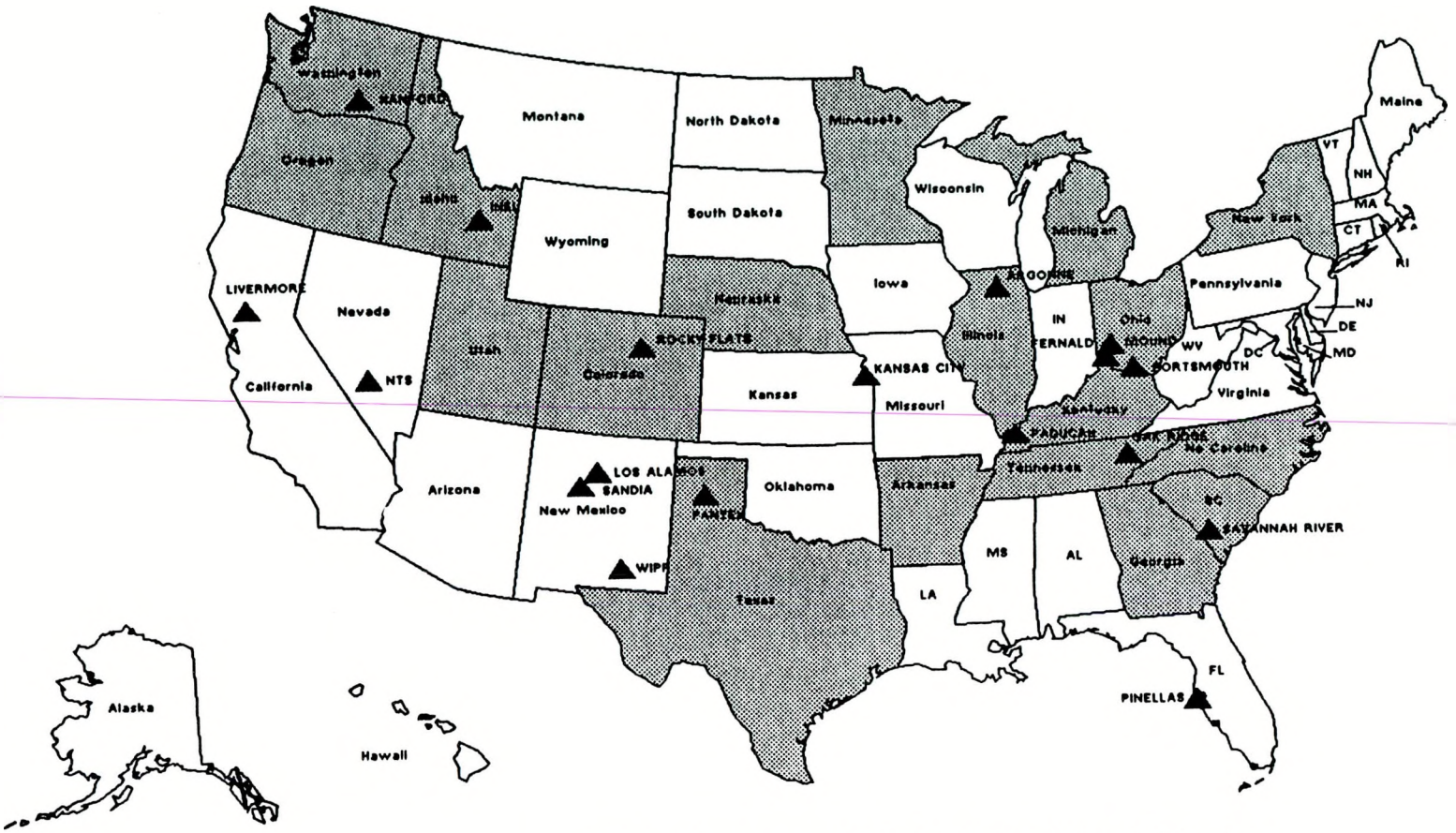

Exhibit 2-4 below summarizes the requirements for interim status and permitted facilities that handle radioactive mixed wastes according to the authorization status of the State in which they are located.

Exhibit 2-4

Requirements for TSDFs Handling Mixed Wastes

Facility Located in:	Applicable Requirements
State not authorized for base RCRA program or mixed waste.	Mixed wastes are subject to Federal RCRA Subtitle C requirements and RCRA permit conditions. State may also have additional requirements.
State authorized for base RCRA program but not for mixed waste.	RCRA Subtitle C requirements do not apply to mixed wastes. State may have requirements.
State authorized for both base RCRA program and mixed waste.	Mixed wastes are subject to State RCRA permitting requirements.

2.1.2 Identification and Listing of Hazardous Wastes (40 CFR Part 261)

The regulations defining solid and hazardous wastes are found in 40 CFR Part 261. Determining whether or not a waste is hazardous is complex. However, it is crucial for determining whether it is subject to Subtitle C and whether the facility handling the waste is subject to a RCRA permit. Under RCRA, it is the responsibility of the facility owner or operator to determine whether a waste is hazardous. The following sections provide guidance on how to determine whether a waste stream is hazardous and whether it is considered a radioactive mixed waste. Also included in this section is a discussion of procedures for "delisting" a waste stream in order to exclude it from regulation under RCRA Subtitle C. These issues will be critical when determining how to dispose wastes excavated during closure or contaminated media (e.g., ground water) removed as a part of closure or corrective action.

2.1.2.1 Definition of Solid Wastes

Under RCRA, hazardous wastes are defined as a subset of solid wastes; *therefore, unless waste is first a solid waste, it cannot be a hazardous waste.* Solid wastes are defined in 40 CFR §261.1 as any material that is disposed of, burned or incinerated, recycled, or "considered inherently waste-like," regardless of whether it is a solid, semi-solid, or liquid. The terms "recycled" and "inherently waste-like" can both be interpreted widely, and depending on the interpretation, will determine whether or not wastes will be subject to RCRA regulations.

Inherently Waste-Like. EPA designated six categories of waste (located in 40 CFR §261.2(d)) to be "inherently waste-like" and thus also classified as "solid wastes" when recycled in any manner. These wastes (FO20-FO23, FO26, and FO28) are not likely to be generated at many DOE facilities because they are derived from the formulation and production of pesticides.

Recyclable Materials. EPA has determined that the following information should be used to determine whether a recyclable material is a solid waste and therefore subject to RCRA:

- The nature of the material; and
- The manner in which it will be recycled.

Exhibit 2-5 below illustrates conditions under which a recyclable material will be considered a solid waste. If a material is not classified as a solid waste, then it is not be subject to Subtitle C as a hazardous waste.

Exceptions. 40 CFR §261.4(a) lists materials that are not considered solid wastes regardless of whether they fit the definition given above (i.e., material that is disposed of, burned or incinerated, recycled or considered inherently waste-like). Examples of exceptions include domestic sewage, irrigation return flows, and source[2], special nuclear[3] and byproduct materials[4] as defined by the Atomic Energy Act. The exception for source, special nuclear, and byproduct material applies only to the radioactive portion of the wastes and will be discussed in section 2.1.2.6.

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[2] Source material is defined jointly by EPA and the Nuclear Regulatory Commission (NRC) as "(1) uranium, thorium, or any other material which is determined by the Atomic Energy Commission pursuant to the provisions of section 61 of the AEA to be source material, or (2) ores containing one or more of the foregoing materials, in such concentration as the AEC may by regulation determine from time to time" (52 FR 11147).

[3] Special nuclear material is defined jointly by EPA and NRC as "(1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the AEC, pursuant to the provisions of Section 51 of the AEA, determines to be special nuclear material; or (2) any material artificially enriched by any of the foregoing, but does not include source material" (52 FR 11147).

[4] Byproduct materials are defined jointly by EPA and NRC as "(1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content" (52 FR 11147).

Exhibit 2-5

DETERMINATION OF WHETHER A RECYCLABLE MATERIAL IS A SOLID WASTE BASED ON MATERIAL TYPE AND RECYCLING ACTIVITY

[Yes = defined as a solid waste; No = not defined as a solid waste]

Material	Use Constituting Disposal a/	Burning for Energy Recovery or Use to Produce a Fuel	Reclamation b/	Speculative Accumulation c/
Spent Materials d/ (both listed & non-listed/characteristic)	Yes	Yes	Yes	Yes
Sludges (listed in 40 CFR §§261.31 or 261.32)	Yes	Yes	Yes	Yes
Sludges (nonlisted/characteristic)	Yes	Yes	No	Yes
Byproducts e/ (listed in 40 CFR §§261.31 or 261.32)	Yes	Yes	Yes	Yes
Byproducts e/ (nonlisted/characteristic)	Yes	Yes	No	Yes
Commercial chemical products (listed in 40 CFR §261.33 but not applied to land or burned as fuel)	Yes	Yes	No	No
Scrap Metal	Yes	Yes	Yes	Yes

a/ Use constituting disposal is the direct placement of wastes (or products that contain wastes as an ingredient) onto the land.

b/ Reclamation is waste regeneration or the recovery of material from wastes, but does not include use or reuse of the waste without preprocessing) as an ingredient in a manufacturing process.

c/ Speculative accumulation is the accumulation of potentially recyclable wastes for which no feasible market exists (i.e., recycling less than 75 percent of accumulated wastes during a one year period).

d/ Chemical, not nuclear, spent materials.

e/ Chemical, not nuclear, byproducts.

Source: 40 CFR §261.2, Table I.

2.1.2.2 Definition of Hazardous Waste

Exhibit 2-6

Definition of Hazardous Waste (40 CFR §261.3)

To determine whether a solid waste qualifies as hazardous waste, consider the following questions:

- Does the waste exhibit any one of the four *characteristics* of a hazardous waste identified in 40 CFR Part 261 Subpart C?
- Has the waste been listed as a hazardous waste in 40 CFR Part 261 Subpart D?
- Is the waste a *mixture* containing a listed hazardous waste and a non-hazardous solid waste?
- Is the waste *derived from* the treatment of a listed hazardous waste?
- Is the waste not *excluded* from regulation as a hazardous waste?
- Is the waste a hazardous waste *contained-in* an environmental medium such as ground water or soil?

If the answer is yes to any one of the preceding questions, the solid waste is a hazardous waste.

Characteristic Wastes. EPA identified four characteristics of hazardous wastes in Part 261 Subpart C: ignitability, corrosivity, reactivity, and toxicity. To determine if a solid waste is a characteristic waste, compare its properties with those listed in the regulations. Although generators are required to determine whether or not their solid wastes are hazardous, they are not specifically required to perform any tests on their wastes; instead they may rely on their knowledge of the materials and processes used in generating the wastes. The following is a brief description of the four characteristics of hazardous wastes:

- *Ignitability* (40 CFR §261.21). A solid waste is considered ignitable if it has the following properties: it is a liquid, except an aqueous solution containing less than 24 percent alcohol, that has a flash point of less than 60°C (140°F); it is a non-liquid capable, under normal circumstances, of spontaneous and sustained combustion; or it is an ignitable compressed gas or an oxidizer per Department of Transportation (DOT) regulation.

- *Corrosivity* (40 CFR §261.22). A solid waste is considered corrosive if it is an aqueous material with a pH less than or equal to 2.0 or greater than or equal to 12.5, or if it is a liquid that corrodes steel at a rate greater than 1/4 inch per year at 55°C (130°F).

- *Reactivity* (40 CFR §261.23). A solid waste is considered reactive if it has the following properties: it is normally unstable and reacts violently without detonating; it reacts violently, forms an explosive mixture, or generates toxic gases, vapors, or fumes when mixed with water; it contains cyanide or sulfide and generates toxic gases, vapors, or fumes at a pH of between 2.0 and 12.5; it is capable of detonation if heated under confinement, subjected to strong initiating force, or at standard temperature and pressure; it or is listed as a DOT Class A or B explosive.

- *Toxicity* (40 CFR §261.24). A solid waste exhibits the toxicity characteristic (TC) if after conducting the Toxicity Characteristic Leaching Procedure (TCLP) test described in detail in 40 CFR Part 261 Appendix II, the extract from the waste contains any of the 39 hazardous constituents listed in Table I of 40 CFR §261.24 at a concentration level equal to or greater than is specified in the same table.

On March 29, 1990 the EPA adopted a rule that replaced the Extraction Procedure (EP) with the TCLP and expanded the list of toxic constituents from 14 to 39. This new rule (51 FR 21648) has a major impact on whether a solid waste is designated as a hazardous waste. This rule significantly increases the amount of wastes DOE facilities must handle as hazardous or radioactive mixed wastes. Exhibit 2-7 below presents the 14 original constituents covered and the 25 additional constituents now covered under the TC rule. Because revision of the EP toxicity standard was a HSWA requirement (Section 3001(g)), mixed waste exhibiting the toxicity characteristic is considered HSWA regulated. Therefore, after September 25, 1990, a State's authorization status does not affect the definition of TC-contaminated mixed waste; it is always considered a hazardous waste.

Listed Wastes. Any solid waste listed in Subpart D of 40 CFR Part 261 is considered hazardous. There are four separate lists of hazardous wastes:

- Wastes from non-specific sources (40 CFR §261.31) -- identified as "F" wastes. These wastes include many solvent wastes (F001 - F005) generated at DOE facilities that may be mixed radioactive wastes.

- Wastes from specific sources (40 CFR §261.32) -- this listing identifies individual waste streams from specified industrial processes. These wastes are frequently referred to as "K" wastes.

- Discarded and off-specification commercial chemical products and residues from these products identified as acutely hazardous (40 CFR §261.33(e)) -- referred to as "P" wastes.

- Discarded and off-specification commercial chemical products and residues from these products identified as toxic (40 CFR §261.33(f)(6)) -- referred to as "U" wastes.

Exhibit 2-7

Toxicity Characteristic Constituents

Constituents under the Extraction Procedure rule:

- Arsenic
- Barium
- Cadmium
- Chromium
- Lead
- Mercury
- Selenium
- Silver
- Endrin
- Lindane
- Methoxychlor
- Toxaphene
- 2,4-D
- 2,4,5-TP Silvex

Additional constituents under the Toxicity Characteristic rule:

- Benzene
- Carbon Tetrachloride
- Chlordane
- Chlorobenzene
- Chloroform
- o-Cresol
- m-Cresol
- p-Cresol
- 1,4 Dichlorobenzene
- 1,2 Dichloroethane
- 1,1 Dichloroethylene
- 2,4 Dinitrotoluene
- Heptachlor
- Hexachlorobenzene
- Hexachlorobutadiene
- Hexachloroethane
- Methyl ethyl ketone
- Nitrobenzene
- Pentachlorophenol
- Pyridine
- Tetrachloroethylene
- Trichloroethylene
- 2,4,5-Trichlorophenol
- 2,4,6-Trichlorophenol
- Vinyl Chloride

The "P" and "U" lists are extremely limited in scope. These lists cover only those products generically identified using the name of a single listed constituent and include only unused portions of these products. Other materials that contain "P" or "U" listed constituents are not considered hazardous unless they are listed elsewhere in the regulations or exhibit a hazardous characteristic.

Mixture Rule (40 CFR §261.3(a)(2)). Waste mixtures containing a *listed* hazardous waste and a non-hazardous solid waste are also defined as hazardous wastes unless the mixture is specifically delisted under 40 CFR §§260.20 and 260.22. If the mixture contains a hazardous waste that is listed in 40 CFR Part 261 Subpart D solely because it exhibits one or more of the characteristics listed in Subpart C and the resultant mixture no longer exhibits the characteristic(s) for which it was originally listed, the mixture is not a hazardous waste. (By definition, a mixture of a characteristic waste and a non-hazardous solid waste is hazardous if it exhibits a characteristic).

Derived From Rule (40 CFR §261.3(c)). Any solid waste *derived from* the treatment, storage, or disposal of a listed hazardous waste is a hazardous waste (e.g., spill residue, incinerator ash, emission control dust, and leachate), unless it has been delisted under 40 CFR §§260.20 and 260.22. (By definition, a solid waste derived from the treatment of a characteristic waste is hazardous if it exhibits a characteristic).

Contained-in Policy. Under the "contained-in" policy, environmental media containing a listed waste (e.g., contaminated soils and ground water) must be managed as if they were hazardous wastes, so long as they

continue to contain the listed hazardous waste. However, the "derived from" rule does not apply to contaminated environmental media. As a result, such media do not have to be delisted if they are treated so that they no longer contain the listed waste above health-based contaminant concentrations (see Appendix A, EPA Memorandum, "RCRA Regulatory Status of Contaminated Ground Water," 11/13/86, and EPA Memorandum, "Status of Contaminated Ground Water and Limitations on Disposal and Reuse," 1/24/89).

2.1.2.3 Wastes Excluded From Subtitle C Regulation

A number of common waste streams are excluded from regulation under RCRA's hazardous waste program, including household wastes, municipal resource recovery wastes, agricultural wastes, and mining overburden returned to the mine site. Oil and gas wastes, mining wastes, and cement kiln dust are also currently exempted from Subtitle C regulation. Used oil that is generated by small quantity generators, or used oil that exhibits a hazardous characteristic, but is recycled in some way other than being burned for energy recovery, is also exempt. Used oil burned for energy recovery is exempt from Subtitle C, but is regulated under 40 CFR 266.

2.1.2.4 Hazardous Constituents Regulated Under RCRA

In addition to hazardous wastes, RCRA identifies a large number of "hazardous constituents." These constituents potentially pose a threat to human health and the environment and form the basis for *listing* a solid waste as "hazardous." These constituents play an important role in the RCRA closure regulations, although by themselves, their presence in a waste stream does not automatically define that wastestream as hazardous under RCRA. Other constituent lists play an important role in the RCRA ground-water monitoring program. The four constituent lists, described below, are presented in Exhibit 2-8.

Exhibit 2-8

Hazardous Constituent Lists

- 40 CFR Part 261, Appendix VII -- Hazardous Waste Constituents
- 40 CFR Part 261, Appendix VIII -- Hazardous Constituents
- 40 CFR Part 264, Appendix IX -- Ground-Water Monitoring List
- 40 CFR Part 265.92(b)(1)-(3) -- Interim Status Monitoring Parameters

Hazardous Waste Constituents. Hazardous waste constituents are defined in 40 CFR §260.10 as any constituent listed in Part 261 Appendix VII or in Table I of 40 CFR §261.24. EPA used the Appendix VII constituents as a basis for the listing of specified "F" and "K" wastes. Table I of §261.24 represents those constituents that define a waste as hazardous by the toxicity characteristic. Hazardous waste constituents are used as ground-water *assessment monitoring parameters* under the interim status monitoring program (Part 265 Subpart F). These parameters are relevant at DOE facilities that are not yet subject to the permitted facility standards of Part 264. In some cases, however, DOE facilities may have previously conducted a clean closure

using Appendix VII constituents; in such cases, it will be necessary to submit an equivalency demonstration using Appendix VIII constituents (this is described in Section 4.2).

Hazardous Constituents. Part 261 Appendix VIII lists a set of over 350 constituents identified as hazardous under RCRA. This list represents chemicals that have toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life forms. During clean closures, facilities must demonstrate that no Appendix VIII constituents remain above health-based levels in affected environmental media (this is discussed more fully in Section 4.2).

Ground-Water Monitoring List. EPA created a shortened and modified version of Appendix VIII for use in the Part 264 Subpart F ground-water monitoring program. This list, Appendix IX of Part 264, contains over 200 constituents that must be monitored for in ground water pursuant to Part 264, Subpart F. These will be relevant during most DOE closure activities where wastes are left in place and at facilities operating with a RCRA permit.

Interim Status Monitoring Parameters. 40 CFR §§265.92(b) contain 31 parameters that must be monitored for to establish background ground-water quality at interim status facilities. These constituents are used to determine the suitability of ground water as source of drinking water, the general quality of ground water, and the presence of ground-water contamination. During the detection monitoring phase at an interim status facility, the owner or operator must only monitor for the 10 constituents contained in 40 CFR §265.92(b)(2) and (b)(3) (see Section 2.1.3.2 for a discussion of ground-water protection).

2.1.2.5 Delisting Petitions

Over 90 industrial waste streams are listed as hazardous in 40 CFR Section 261, Subpart D. Because a listed waste from a particular facility may not pose a threat to human health and the environment, 40 CFR §§260.20 and 260.22 include procedures for petitioning EPA to exclude that waste from regulation. These delisting petitions are subject to public notice and comment. These procedures also may be used for delisting the hazardous component of a mixed waste. If the owner or operator of a facility is able to delist the hazardous component of a mixed waste, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by DOE.

If a facility owner or operator is able to delist the contents of a hazardous waste management unit that will be closed, the wastes which are removed during closure do not have to be disposed as hazardous wastes and are not subject to the Land Disposal Restrictions program (discussed in Section 2.1.4).

EPA has published a guidance document instructing petitioners on how to prepare a complete delisting petition. This document is entitled: *"Petitions to Delist Hazardous Wastes - A Guidance Manual," U.S. EPA, Office of Solid Waste, (EPA/530-SW-85-003), April 1985* and is available from the National Technical Information Service (NTIS).

2.1.2.6 Definition of Radioactive Mixed Wastes

DOE has defined radioactive mixed wastes as follows:

> *Radioactive mixed waste is waste containing both radioactive and hazardous components regulated by the AEA and RCRA, respectively. The term "radioactive component" refers only to the actual radionuclides dispersed or suspended in the waste substance. (DOE 5400.3: Hazardous and Radioactive Mixed Waste Program (2/22/89))*

Any waste containing both a radioactive component regulated by the AEA and a hazardous component regulated by RCRA is radioactive mixed waste; the hazardous component is subject to RCRA regardless of further subclassification as high-level, low-level, or transuranic waste. *Mixed waste is not limited to low-level radioactive waste (LLW).* Some examples of mixed waste include LLW containing organic lab liquids, cleaning solvents, and heavy metals. *If the waste is located in a State which has base RCRA authorization but is not authorized for mixed waste,* the hazardous component of the mixed waste is not subject to RCRA, but only to non-RCRA State regulations, if any exist. The radioactive component is always subject to AEA regulations.

RCRA specifically excludes from regulation source, special nuclear, and byproduct material as defined by the AEA. On July 3, 1986, EPA clarified RCRA's authority to regulate only the hazardous component of mixed waste (51 FR 24504). DOE clarified in a May 1, 1987, Federal Register notice (52 FR 15937), that DOE radioactive byproduct material which is hazardous under RCRA is subject to regulation under both RCRA and the AEA. This rule (the DOE byproduct rule, 10 CFR 962) applies only to "part (1)" of the definition of byproduct materials, not the tailings and ore residuals defined in "part (2)." Under the final rule, DOE specified that "... the exclusion appears directed only to the radioactive component of a nuclear waste..." RCRA does not apply to the radioactive component of such a waste; instead the AEA applies to that radioactive component. *Finally, if the application of both regulatory regimes proves conflicting in specific instances, RCRA yields to the AEA."* (52 FR 15940).

2.1.3 Facility Design and Operating Standards (40 CFR Parts 264 and 265)

The administrative and non-technical requirements for interim status and permitted treatment, storage, and disposal facilities are found in Subparts A through E of 40 CFR Parts 264 and 265. Subparts F and G contain technical requirements for ground-water protection, corrective action, and closure and post-closure care.[5] Unit-specific requirements are included in Subparts I through O and X of 40 CFR Part 264 and Subparts I through Q of Part 265. The remaining portion of Section 2.1.3 gives a brief overview of the administrative and non-technical standards of Subparts A through E and H, and then provides somewhat greater detail on subparts F and G. The unit-specific requirements are addressed in Chapter 4. Exhibit 2-9 lists where these standards are located in the regulations and references the discussions in this guidance manual.

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[5] 40 CFR Parts 264 and 265, Subpart H include financial assurance requirements which do not apply to Federal facilities.

Exhibit 2-9

Standards that Apply to Particular DOE Waste Management Methods

Standards	Regulatory Citation Permitted (Part 264)	Interim Status (Part 265)	Discussed in Section
General requirements	Subparts A - E	Subparts A - E	2.1
Ground-water monitoring and corrective action	Subpart F	Subpart F	2.1
Closure and post-closure care	Subpart G	Subpart G	3
Financial assurance	Subpart H	Subpart H	2.1
Containers	Subpart I	Subpart I	4.5
Tanks	Subpart J	Subpart J	4.6
Surface impoundments	Subpart K	Subpart K	4.2
Waste piles	Subpart L	Subpart L	4.3
Land treatment	Subpart M	Subpart M	4.4
Landfills	Subpart N	Subpart N	4.1
Incinerators	Subpart O	Subpart O	4.7
Thermal treatment	NA	Subpart P	4.8
Chemical, physical, and biological treatment	NA	Subpart Q	4.8
Miscellaneous units	Subpart X	NA	4.8
Underground injection wells	Part 144	Part 144	4.9

2.1.3.1 Administrative and Non-Technical Standards

The administrative and non-technical standards for interim status and permitted facilities are virtually identical and are located in Subparts A through E of 40 CFR Parts 265 and 264 respectively. Subpart A outlines who is subject to treatment, storage, and disposal regulations. Subpart B contains general facility standards in the following areas: conducting waste analysis; installing security systems; conducting inspections; managing ignitable, reactive, and incompatible wastes; training facility personnel; and location standards. Subparts C and D discuss emergency preparedness and contingency planning. Lastly, Subpart E covers proper manifesting, recordkeeping, and reporting requirements.

2.1.3.2 Ground-Water Protection and Corrective Action

Ground-water monitoring is required only for owners and operators of land disposal units used to manage hazardous waste. In addition, tank systems that eventually close as landfills are subject to ground-water monitoring requirements. Interim status ground-water monitoring standards are located in 40 CFR 265, Subpart F, while permitted ground-water monitoring standards are found in 40 CFR 264 Subpart F. Interim

status landfills, surface impoundments, waste piles and land treatment units, upon receiving either an operating permit or a post-closure permit, become subject to the Part 264 ground-water monitoring requirements.

The ground-water monitoring and corrective action requirements for interim status facilities are located in Part 265 Subpart F and are generally less stringent than for permitted facilities. Interim status facilities were required to implement a ground-water monitoring program by November 19, 1980. At interim status facilities, the owner or operator must monitor for parameters establishing ground-water quality and contamination (40 CFR §§265.92(b)(2) and (b)(3)) as well as parameters characterizing the suitability of the ground water as a source of drinking water (40 CFR 265 Appendix III). Presently there are no corrective action requirements for interim status facilities in the regulations; however, RCRA §3008(h) states that the Regional Administrator can authorize a corrective action order against an interim status facility if he deems that such action is necessary to protect human health or the environment. The §3008(h) interim status corrective action enforcement authority can be used to order cleanups of releases from all solid waste management units (SWMUs) to all media including off-site releases.

The ground-water protection program for interim status facilities is divided into five phases as follows:

- ***Development and Installation of Monitoring System*** (40 CFR §265.91). The monitoring system must consist of *at least* four wells, one upgradient from the unit and three downgradient. The upgradient well(s) provide(s) background data for comparing the data from the downgradient wells. Through this comparison, any contamination of ground water can be detected.

- ***Establishing Background Ground-Water Quality*** (40 CFR §265.92). Monitoring at the upgradient well(s) must take place for one full year to establish background data. Background data are collected for three parameters: 1) drinking water parameters (located in 40 CFR §265.92 Appendix III), 2) ground-water quality parameters (located in §265.92(b)(2)), and 3) ground-water contamination parameters (located in §265.92(b)(3)).

- ***Detection Monitoring*** (40 CFR §265.92). Routine monitoring examines ground water for elevated levels of indicator constituents that suggest that contamination may be occurring. Statistically significant changes in indicator parameters must be reported to the Regional Administrator within seven days of detection. The owner or operator must only monitor for ground-water quality parameters (located in §265.92(b)(2)), and ground-water contamination parameters (located in §265.92(b)(3)).

- ***Assessment Program*** (40 CFR §265.93). If contamination is suspected, the owner or operator must institute an assessment program to determine the nature, extent, and rate of the ground-water contamination. If it is determined that no contamination has occurred, the owner or operator continues routine monitoring. If contamination has occurred, assessment must continue on a quarterly basis until the facility is closed or additional monitoring is required due to the permitting process. If the initial

assessment occurred during the post-closure period, no further action is required until the facility is issued a post-closure permit.

- ***Reporting Requirements*** (40 CFR §265.94). During the first year of establishing background concentrations, quarterly reports must be submitted. Following that, only annual reports are required from both up- and downgradient monitoring wells.

Interim status facilities that have submitted Part B permit applications are subject to the ground-water information regulations of 40 CFR §270.14. Regardless of the status of the facility, a ground-water monitoring program must include the following additional information:

- A summary of the ground-water monitoring data obtained during the interim status period under §§265.90 through 265.94 where applicable;

- Identification of the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property, including ground-water flow direction and rate;

- A topographic map including the waste management area, the property boundary, the proposed point of compliance, and the proposed location of ground-water monitoring wells;

- A description of any plume of contamination; and

- Detailed plans and an engineering report describing the proposed ground-water monitoring program.

If hazardous constituents have not been detected, the owner or operator must submit sufficient information to establish a detection monitoring program which meets the requirements of 40 CFR §264.98. If hazardous constituents have been detected at the point of compliance, the owner or operator must submit sufficient information to establish a compliance monitoring program that meets the requirements of 40 CFR §264.99. If hazardous constituents have been measured in the ground water which exceed the concentration limits established under 40 CFR §264.94, or if ground-water monitoring conducted at the waste boundary during the permit application period indicates the presence of hazardous constituents in excess of background concentrations, the owner or operator must submit sufficient information to establish a corrective action program which meets the requirements of 40 CFR §264.100. Information regarding the establishment of a corrective action program does not need to be submitted if the owner or operator can demonstrate to the Regional Administrator that alternate concentration limits will protect human health and the environment after considering the criteria listed in 40 CFR §264.94(b).

Part 264 Subpart F contains EPA's ground-water monitoring and corrective action program for permitted facilities. All units subject to Subpart F (landfills, surface impoundments, waste piles, land treatment units, and under certain conditions, tanks) must continue monitoring throughout the closure and post-closure periods, if applicable. The program for permitted facilities is divided into three phases as follows:

- *Detection Monitoring* (40 CFR §264.98). The ground water at the downgradient edge of the unit must be monitored for indicator parameters or constituents specified in the permit. If the unit has upgradient ground water that has been contaminated by a non-adjacent source or unit, the contaminants present are considered background levels for the purposes of detection monitoring. If two units are adjacent, the background levels are determined at a point upgradient from both units (i.e., the units are treated as a single unit for the purposes of detection monitoring). Background levels must be established for each of the indicator parameters and constituents. These levels are established by sampling, on a quarterly basis at the upgradient well(s), for one full year. These samples are then compared with downgradient samples taken during the active life of the facility and the post-closure care period, if applicable, to determine if ground-water contamination has occurred. Monitoring must continue during the lifetime of the unit as well as during the post-closure care period, unless compliance monitoring is triggered.

- *Compliance Monitoring* (40 CFR §264.99). This phase of the program is triggered when a release is detected at the waste management unit boundary under the detection monitoring program. The owner or operator is required to perform additional investigations to characterize the nature and extent of contamination during compliance monitoring. The constituent levels detected during compliance monitoring are compared against a ground-water protection standard (GWPS) which has been established for each constituent listed in Appendix IX of Part 264 that is included in the permit. The GWPSs are set at either background levels, maximum contaminant levels (MCLs),[6] or alternate concentration limits (ACLs).[7] The owner or operator must also submit a ground-water monitoring plan (i.e., corrective action plan) that demonstrates the effectiveness of the corrective action program described below.

- *Corrective Action* (40 CFR §§264.100). Any owner or operator required to establish a corrective action program must ensure that regulated units are in compliance with the ground-water protection standard under §264.92. The Regional Administrator will specify the ground-water protection standard in the facility permit, which will include the following: a list of hazardous constituents identified under §264.93; concentration limits under §264.94 for each of those hazardous constituents; the compliance point under §264.95; and the compliance period under §264.96. The corrective action program must prevent hazardous constituents from exceeding their

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[6] MCLs represent the maximum permissible concentration of 14 specific constituents in drinking water supplies as promulgated by EPA under the Safe Drinking Water Act. The constituents and their MCLs are listed in §264.94.

[7] ACLs are determined by EPA based on site-specific circumstances.

respective concentration limits at the compliance point by removing the hazardous waste constituents or by treating them in place so that they do not exceed the concentration limits. The owner operator must establish and implement a ground-water monitoring program to demonstrate the effectiveness of the corrective action program which must be as effective as the program specified under §264.99 in determining the ground-water protection standard under §264.92. The owner or operator must conduct the corrective action program to remove or treat in place hazardous constituents that exceed concentration limits beyond the facility boundary to protect human health and the environment unless the owner or operator demonstrates to the satisfaction of the Regional Administrator that he was unable to obtain the necessary permission to undertake such action. The owner or operator must continue the corrective action measures during the compliance period to ensure that the ground-water protection standard is not exceeded.

Corrective Action for Solid Waste Management Units (40 CFR §264.101).

HSWA added two new authorities, Sections 3004(u) and 3004(v), that greatly expanded EPA's authority to address releases of hazardous waste from solid waste management units (SWMUs) at facilities subject to the RCRA permitting requirements. Section 3004(u) requires the owner or operator of a facility seeking a permit to institute corrective action for releases from SWMUs to all environmental media, through a permit schedule of compliance (SOC) if necessary. Section 3004(v) extends this far-reaching corrective action provision to include requirements for addressing releases that have migrated beyond the facility boundary. EPA codified the statutory regulations in 40 CFR §264.101.

EPA has defined SWMU to include any discernible unit that managed hazardous or solid waste, regardless of whether the unit was intended for managing such wastes (this definition includes "regulated units" subject to the ground-water protection requirements of 40 CFR §§264.90 - 264.100). 40 CFR §264.101 requires investigation and, if necessary, cleanup of releases to all environmental media from all SWMUs, except for releases to ground water from "regulated units," which are covered by §264.100.

Since codifying HSWA sections 3004(u) and 3004(v), EPA has been implementing the corrective action program largely through guidance. In addition, it has issued guidelines on the use of the interim status corrective action order authority (HSWA section 3008(h)), which authorizes EPA to issue orders for corrective action at interim status facilities with releases from solid waste management units. At present, corrective action is typically implemented through the following stages:

- ***RCRA Facility Assessment (RFA)***: EPA Regions will conduct a RFA prior to permitting in order to identify releases from SWMUs to be investigated through the permit SOC. RFAs may be conducted by DOE personnel or contractors at DOE facilities.

- ***RCRA Facility Investigation (RFI)***: Based on conditions in the final permit SOC, the owner or operator will conduct a RFI to determine the rate, extent, and direction of movement of all contaminants released from SWMUs at the facility.

- *Corrective Measures Study (CMS):* When hazardous constituents are identified at levels posing a threat to human health and the environment, the owner or operator will conduct a CMS to evaluate various alternatives for remediating the site.

- *Remedy Selection:* Upon completion of the CMS, EPA selects a remedy to be instituted by the owner or operator, which must be specified in the permit through a permit modification (which requires public comment).

- *Corrective Measures Implementation (CMI):* After remedy selection, the owner or operator will implement the remedy and conduct the remedial actions specified in the modified permit.

EPA intends to propose regulations providing detailed procedures and standards for conducting corrective action for releases from solid waste management units (SWMUs) at permitted RCRA facilities. The new corrective action regulations are expected to be proposed as 40 CFR Part 264, Subpart S. These regulations are expected to provide new regulatory definitions, define contaminant levels triggering cleanup, define cleanup standards, and set standards for source control and the management of wastes generated during the cleanup. Pending issuance of these regulations, EPA will continue to implement the corrective action program through 40 CFR §264.101 and accompanying guidance. In addition, Appendix B contains recent guidance on DOE procedures for complying with these RCRA corrective action requirements. Exhibit 2-10 summarizes the RCRA corrective action provisions.

Exhibit 2-10

RCRA Corrective Action Provisions

Statutory Authority	Regulatory Authority	Permitting Status	Type of Units	Environmental Media Addressed
§3008(h)	NA	Interim Status	All SWMUs	All media
Pre-HSWA	§§265.90-265.94	Interim Status	Regulated units	Ground water
Pre-HSWA	§264.100	Permitted	Regulated Units	Ground water
§3004(u)	§264.101	Permitted	All SWMUs	All media (except releases from regulated units to ground water)
§3004(v)	§264.101	Permitted	All SWMUs	All media for off-site releases

2.1.3.3 Closure and Post-Closure Care

The closure and post-closure care requirements for hazardous waste treatment, storage, and disposal facilities (TSDFs) are found in Subpart G of Parts 264 and 265 and in specific sections of Subparts I through O and X as applicable to process-specific requirements. The regulations apply only to those units at a facility that treated, stored, or disposed of wastes after November 19, 1980.

All facilities that treat, store, or dispose of hazardous wastes on-site for longer than 90 days must comply with all applicable closure requirements. In addition, owners or operators of hazardous waste disposal units[8] must conduct monitoring and maintenance activities for 30 years after closure to ensure that pollutants are not released to the environment. The Regional Administrator has the authority to extend or reduce the period for post-closure care on a case-by-case basis. Generators accumulating waste on-site for 90 days or less are subject to EPA's general closure performance standard and facility decontamination requirements (40 CFR §265.114), specifying that all contaminated equipment, structures, and soils must be properly disposed of or decontaminated.

The general Subpart G closure and post-closure care requirements for permitted and interim status facilities are specified in 40 CFR §§264.110 through 264.120 and 40 CFR §§265.110 through 265.120. These requirements apply uniformly to all types of hazardous waste management units and are discussed in Chapter 3. The process-specific Subparts provide further detail and additional standards, as necessary, for the proper closure and post-closure care of hazardous waste management facilities. The requirements are explained separately in Chapter 4 for each RCRA hazardous waste management unit and underground injection wells.

2.1.3.4 Financial Assurance Requirements

40 CFR §§264.140(c) and 265.140(c) stipulate that States and the Federal government are exempt from the financial assurance requirements contained in Subpart H. Therefore, operators of DOE facilities are not subject to RCRA financial assurance requirements.

2.1.3.5 Location Standards

HSWA required EPA to promulgate standards for location of hazardous waste management facilities, which are to be proposed as Part 264 Subpart Z. The promulgation date of these standards is uncertain. These new standards may have a dramatic impact on facility operations by forcing some owners or operators to close or remove all waste from their facilities based on the sensitivity of their location. For more information on the potential impact of proposed location standards on DOE facilities see Appendix F, *DOE Memorandum, EH-231, "Environmental Protection Agency Proposal to Broaden Restrictions for the Siting of RCRA Hazardous Waste Facilities," 3/13/89.*

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[8] Disposal units are those units at which wastes are left in place after closure including landfills, land treatment units, and surface impoundments, waste piles, and tank systems that cannot be "clean closed" and must be closed as landfills.

2.1.4 Land Disposal Restrictions (40 CFR Part 268)

The land disposal restrictions (LDRs) program restricts the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes include all solvent- and dioxin-containing wastes, "California list" wastes (i.e., certain metals, corrosives, cyanides and halogenated organic compounds as defined in HSWA), as well as "First Third," "Second Third," and "Third Third" scheduled wastes.

With HSWA, Congress established a rigid schedule for the implementation of the land disposal restrictions. To enforce this rigid schedule, Congress also prescribed "hammer" dates -- deadlines beyond which land disposal would be automatically prohibited. Congress directed that treatment standards be set for solvent- and dioxin-containing wastes by November 8, 1986, and "California list" wastes by July 8, 1987. Congress also directed that EPA rank all remaining listed and characteristic wastes by volume and intrinsic hazard and divide the list into thirds, promulgating treatment standards according to the following schedule: "First Third" scheduled waste by August 8, 1988; "Second Third" scheduled waste by June 8, 1989; and all remaining waste by May 8, 1990. Congress' final direction was that any waste for which treatment standards were not set by May 8, 1990, is automatically prohibited from land disposal; this is referred to as the "hard hammer."

EPA met the Congressionally imposed schedule. The LDRs are codified in 40 CFR Part 268 and have been incorporated into the RCRA program through a series of final rules:

- The "Schedule" rule (May 28, 1986; 51 FR 19300);
- The "Solvent and Dioxin" rule (November 7, 1986; 51 FR 40572, and corrections on June 4, 1987; 52 FR 21010);
- The "California List" rule (July 8, 1987, 52 FR 25760); and
- The "First Third" rule (August 17, 1988; 53 FR 31138) the "Second Third" rule (June 23, 1989; 54 FR 26594) and the "Third Third" rule (May 8, 1990; 55 FR 22520).
- Treatment standards promulgated for solvent- and dioxin-containing wastes and California list wastes apply to mixed waste that falls into these categories. Treatment standards for all other categories of mixed waste are contained in the "Third Third" rule.

LDRs require that if a waste is to be placed in or on the land (e.g., in a surface impoundment, landfill, waste pile), the waste must comply with the specified treatment standards. For example, where treatment standards are expressed as concentration levels for a waste, the waste cannot be placed in or on the land unless the concentration of regulated constituents is below the promulgated standards, usually after treatment. Thus, LDRs are "triggered" when waste is placed in or on the land. If placement does not occur (e.g., in-situ treatment, capping in place), the LDRs do not apply to the waste management activity. Diagrams on the definition of placement have been included as Appendix C.

HSWA states that the LDR treatment standards are to be protective of human health and the environment and must substantially diminish the toxicity of a waste or substantially reduce the likelihood that hazardous constituents would migrate from the waste. EPA has set and continues to set treatment standards based on the Best Demonstrated Available Technology (BDAT) approach where "best" identifies the treatment technology that offers the greatest reduction of toxicity, volume, or mobility of the waste. "Demonstrated" signifies that the technology is performed at full-scale operation, and "available" ensures that the technology is commercially viable (i.e., available for purchase or lease). Using the BDAT approach, EPA has set treatment standards for wastes as (1) concentration levels which must be attained prior to land disposal, (2) specified treatment technologies which must be employed, and (3) "no land disposal" in cases where a waste either can be totally recycled without generating a prohibited residue, or is not currently being land disposed, or is no longer being generated and the waste is not anticipated to be generated during a RCRA or CERCLA corrective action.

EPA has not made a distinction in setting treatment standards between RCRA hazardous waste and mixed waste. Thus, the treatment standards promulgated for a particular waste code, such as F011, apply to mixed F011 waste as well. Currently, the treatment standards promulgated for solvent- and dioxin-containing waste and California list waste apply to mixed waste that falls into these categories.

The case for all other wastes, however, is different. In the August 17, 1988, "First Third" final rule, EPA postponed treatment standards for mixed waste and leachate (and thus mixed leachate waste) derived from RCRA hazardous waste until the "Third Third" rule, which was promulgated on May 8, 1990. In the "Third Third" rule, EPA granted a 90-day lack of national treatment capacity extension (until August 8, 1990) of the effective date for all provisions in the "Third Third" rule. Certain wastes restricted in the rule were granted an additional national capacity variance from the LDRs for up to two years. National capacity variances were not granted a delay in the effective date, and will therefore extend from May 8, 1990 to May 8, 1992. The wastes receiving a national capacity variance are listed in Exhibit 2-11.

LDRs must be addressed in a facility's closure plan. If complete closure, or partial removal of wastes is planned, the plan must specify whether the wastes are subject to the LDRs, and if so, how they will be managed in accordance with the restrictions. Closure plans prepared prior to the promulgation of LDRs may need to be amended. For landfill closures, the owner or operator must investigate whether closure activities constitute land disposal (also referred to as "placement"). Movement of a waste within a unit, in-situ waste treatment, and capping wastes in place does not constitute land disposal; however, if wastes are removed from the unit, treated (e.g., stabilized), and placed back into the unit, it is considered land disposal and the wastes are subject to the LDRs.

Variances, extensions, and petitions to several components of the hazardous waste land disposal restrictions are allowed. These variances, extensions, and petitions do not exempt the petitioner from the LDRs; instead, they provide alternative methods of compliance with the restrictions. For example, wastes granted a two year capacity variance on the effective date of the "Third Third" rule are "restricted" (e.g., these wastes must be handled at a facility that meets minimum technology requirements) during the period for which the variance is granted. EPA has developed the following supporting guidance on how to prepare variances, extensions, and petitions: *No-Migration Variances to the Hazardous Waste Land Disposal Prohibitions (DRAFT: December 1987)*; *Generic Quality Assurance Project Plan for the Land Disposal Restrictions Program (EPA/530-SW-87-011)*; *Case-by-Case Extensions: A Guidance Document to Support the Land Disposal Restrictions (Working Draft: 1988)*, and *Treatability Variance Equivalency Demos on LDRs*.

Exhibit 2-11

Surface Disposed Wastes Receiving Two-Year National Capacity Variances

Technology	Waste Code a/
All	All scheduled mixed hazardous/radioactive wastes and inorganic debris
Vitrification	D004, K031, K084, K101, K102, P010, P011, P012, P036, P038, U136
Combustion of Sludge/Solids	F039 b/, K048-K052 c/
Acid Leaching and Chemical Precipitation (low mercury) and mercury retorting (high mercury)	D009, K106, P065, P092, U151
Secondary Smelting	D008 d/
Thermal Recovery	P015 and P087
Incineration, vitrification, and mercury retorting	Soil and Debris

a/ Variances are granted only to the nonwastewater forms.
b/ Multi-source leachate.
c/ Capacity extension only until November 8, 1990.
d/ D008 lead-acid batteries.

2.2 ATOMIC ENERGY ACT

The Atomic Energy Act (AEA), together with the Energy Reorganization Act (ERA), authorizes DOE to regulate radioactive material operations at many government-owned facilities and several inactive sites that contain radioactive contamination. DOE carries out its regulatory responsibilities for radioactive mixed wastes through selected DOE Orders (discussed below).

2.3 DOE ORDERS

DOE Orders contain many requirements applicable to the management of radioactive mixed wastes. These requirements are in addition to those stipulated under RCRA. An overview of Orders relevant to the

closure of units containing radioactive mixed wastes at DOE facilities is provided in the following sections as background information for the hazardous component of radioactive mixed waste.

2.3.1 *DOE 5400.1: General Environmental Protection Program (11/9/88)*

DOE Order 5400.1 authorizes DOE facilities and personnel to comply with the requirements under RCRA and other Federal environmental statutes. Mixed wastes are not specifically addressed (clarified in DOE 5400.3 -- described below); however, the Order makes reference to specific environmental protection standards which are required for DOE operations unless an exemption can be obtained. These standards include:

- 40 CFR 190, "Environmental Protection Standards for Nuclear Power Operations;"
- 40 CFR 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Wastes;"
- 40 CFR 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings;" and
- 40 CFR 193 (when final) "EPA Draft on LLW Standards."

Other information in DOE Order 5400.1 includes procedural requirements for long range environmental protection planning, notification and reporting, and environmental monitoring.

2.3.2 *DOE 5400.3: Hazardous and Radioactive Mixed Waste Program (2/22/89)*

This Order clarifies DOE 5400.1 as it applies to mixed wastes. It specifies that all DOE hazardous and mixed wastes will be managed according to Subtitle C of RCRA and specifies that RCRA applies *to the extent it is not inconsistent with the AEA*. The Order also specifies that the radioactive component of the mixed waste is subject to the requirements of DOE 5820.2A. The Order also directs the Assistant Secretary for Environment, Safety, and Health (EH-1) to develop and issue policies, guides, requirements, and procedures for implementing the requirements of RCRA at DOE facilities and integrating them with the requirements of CERCLA and NEPA.

2.3.3 *DOE 5400.5: Radiation Protection of the Public and the Environment (2/8/90)*

This order establishes standards and requirements for the operations of the DOE and DOE contractors with respect to protection of the public and the environment against undue risk from radiation. The order updates the portions of DOE 5480.1A that address public and environmental radiation protection standards and control practices. This order adopts and implements radiation protection dose standards consistent with the recommendations of the International Commission on Radiological Protection (ICRP). The order requires the DOE to comply with legally applicable rules and regulations of other Federal, State and local agencies.

2.3.4 DOE 5480.11: Radiation Protection for Occupational Workers (12/21/88)

DOE 5480.11 establishes the requirements for radiation protection of various population groups. Specifically, the Order addresses exposure to occupational workers, unborn children, students, minors, and on-site members of the public. According to the order, it is DOE's policy to limit exposures to radiation to levels that are As Low As Reasonably Achievable (ALARA).[9] Guidelines on achieving the objective of the ALARA process are found in PNL-6577, "Health Physics Manual of Good Practices for Reducing Radiation Exposure to Levels that are As Low As Reasonably Achievable (ALARA)." Radiation protection standards to be used for determining radiation doses are specified in the order. Additional information is provided on contamination control, monitoring, and safety training.

2.3.5 DOE 5820.2A: Radioactive Waste Management (9/26/88)

DOE 5820.2A replaces DOE 5820.2, Radioactive Waste Management of 2/6/84. The purpose of the Order is to establish policies and guidelines for managing the DOE's high-level waste and any other material which, because of their highly radioactive nature (level of health risk, longevity of health risk and thermal activity), require similar handling (DOE Order 5820.2A, p.I-1). The Order is divided into three sections, one for each of the following types of radioactive wastes: high-level waste,[10] transuranic waste,[11] and low-level waste.[12] Specific information is provided related to the generation, treatment, and disposal of these waste types.

2.3.5.1 High-Level Radioactive Waste

According to DOE 5820.2A, all high-level radioactive wastes are considered to be radioactive mixed wastes and subject to the AEA and RCRA unless demonstrated to the contrary. The following guidance is provided for the management of high level waste.

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[9] ALARA is defined as "an approach to radiation protection to control or manage exposures (both individual and collective to the work force and general public) as low as social, technical, economic, practical, and public policy considerations permit. As used in this Order [DOE 5480.11], ALARA is not a dose limit but a process, which has the objective of dose levels as far below applicable limits of the Orders as reasonably achievable."

[10] High-level waste is "the highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid, that contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation."

[11] Transuranic waste is defined as, "Without regard to source or form, waste that is contaminated with alpha-emitting transuranium radionuclides with half-lives greater than 20 years and concentrations greater than 100 nCi/g at the time of assay. Heads of field elements can determine that other alpha contaminated wastes, peculiar to a specific site, must be managed as transuranic wastes."

[12] Low-level waste is "waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or spent nuclear fuel or ... byproduct material... "

Waste Characterization. Liquid and solidified high-level waste must be characterized consistent with radiation protection requirements to determine its hazardous components, per 40 CFR 261 and 40 CFR 264. Characterization shall satisfy requirements of paragraph 3b(1)(b) and may reflect knowledge of waste generating processes, laboratory testing results, and/or the results of periodic sampling and analysis. Examples of required information are chemical composition, physical properties, radionuclide concentrations, and pH (DOE Order 5820.2A, p I-2).

Storage & Transfer Operations. The Order requires segregation of waste by type (sludge, salt, high activity, and low activity) to make accessibility for future processing easier. It also specifies that "*each facility shall utilize remote maintenance features and other appropriate techniques to minimize personnel radiation exposure in accordance with DOE 5481.1B.*"

Disposal. Wastes will be processed and the high-level waste fraction disposed of in a geological repository according to the requirements of the Nuclear Waste Policy Act of 1982. Interim storage for high-level waste awaiting transport to the repository must comply with the above storage requirements.

2.3.5.2 Management of Transuranic Waste

Guidance on the management of transuranic wastes (mixed and non-mixed) in DOE 5820.2A is summarized below.

Disposal. Mixed transuranic waste meeting the requirements of the Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria are to be are to be sent to the WIPP (wastes will be placed in interim storage until the WIPP becomes operational). Information on WIPP waste acceptance criteria certification is provided in DOE 5820.2A, Radioactive Waste Management, September 26, 1988.

Temporary/Interim Storage. Segregation of transuranic waste from low-level and high-level radioactive waste is required. Other requirements such as contingency plans, monitoring, etc., are detailed in the Order.

Waste Characterization. The determination of whether the transuranic waste exhibits any hazardous characteristics or contains listed hazardous wastes may be based upon knowledge of the waste generating process when the performance of a chemical analysis would significantly increase the radiation hazard to personnel. Transuranic wastes shall be assayed or otherwise evaluated to determine the kinds and quantities of transuranic radionuclides present prior to storage.

Treatment. The Order specifies that mixed transuranic wastes must be treated, where feasible and practical, to destroy the hazardous waste component. Also specified in the Order are requirements for buried transuranic-contaminated waste. Inactive wastes sites containing buried transuranic-contaminated waste are located at INEL, Los Alamos, Oak Ridge, the Savannah River Plant, and the Hanford Site. The Order specifies three site-closure strategies for these sites:

- Dispose of waste in place with enhanced monitoring;
- Dispose of waste in place, with enhanced confinement or in-situ immobilization techniques, and enhanced monitoring; and
- Retrieval, processing, and isolation of the transuranic waste at the WIPP.

2.3.5.3 Management of Low-Level Waste

Guidance on the management of low-level wastes (mixed and non-mixed) in DOE 5820.2A is summarized below. (See Appendix H, NRC-EPA Guidance on Siting of Mixed Low-Level Radioactive and Hazardous Waste Units).

DOE Performance Standards. Low-level waste must be managed to protect public health and safety in accordance with standards specified in applicable DOE Orders and to assure that:

- External exposure to the waste and concentrations of radioactive material which may be released into the surface water, ground water, soil, plants and animals results in an effective dose equivalent that does not exceed 25mrem/yr to any member of the public. Releases to the atmosphere shall meet the requirements of 40 CFR 61. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable. and

- The committed effective dose equivalents received by individuals who inadvertently may intrude into the facility after the loss of active institutional control (100 years) will not exceed 100 mrem/yr for continuous exposure or 500 mrem for a single acute exposure.

Waste Segregation. Each DOE low-level waste generator will separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal.

Waste Characterization. Waste characterization data contained on manifests include the physical and chemical characteristics of the waste, volume and weight (total of waste and any solidification or adsorbent media), major radionuclides and their concentrations, and packaging date, package weight, and external volume. "The concentration of a radionuclide may be determined by direct methods or by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements" (DOE Order 5820.2, p.III-3).

Waste Treatment. Treatment must meet DOE performance standards referred to above. Waste treatment techniques such as incineration, shredding, and compaction to reduce volume and provide more stable waste forms shall be implemented as necessary to meet performance requirements. Use of waste treatment techniques to increase the life of the disposal facility and improve long-term facility performance, by improved site stability and reduction of infiltrating water, is required to the extent it is cost effective.

Disposal. Field organizations with disposal sites must prepare and maintain a site-specific "radiological performance assessment" for the disposal of waste for the purpose of demonstrating compliance with the performance standards shown above. The performance assessment model is used to develop stabilization, packaging, etc. programs for low-level wastes. Additional disposal requirements include:

- Liquid wastes, or wastes containing free liquids, must be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonably achievable, but, in no case, shall the liquid exceed 1.0 percent of

the volume of the waste when the waste is in a disposal container, or 0.5 percent of the volume of the waste processed to a stable form.

- Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to waste in a gaseous form which must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C.

- Waste containing amounts of radionuclides below regulatory concern, as defined by Federal regulation *may be disposed without regard to radioactivity content.*

- Disposal sites must be selected in accordance with NEPA process.

Closure. During closure and the post-closure care period, residual radioactivity levels for surface soils shall comply with existing DOE decommissioning guidelines.[13] Corrective measures must be applied if conditions occur or are forecasted that could jeopardize attainment of the performance objectives of this Order.

Environmental Monitoring. Environmental monitoring program must conform with DOE 5484.1B. It must measure, at a minimum: operational effluent releases; migration of radionuclides; disposal unit subsidence; and changes in disposal facility and disposal site parameters which may affect long-term site performance.

2.4 FEDERAL FACILITY COMPLIANCE AGREEMENTS

Federal agencies must comply with all provisions of Federal environmental statutes and regulations as well as all applicable State and local requirements, with minor exceptions. Federal facilities, including DOE facilities operating under the Atomic Energy Act of 1954, are required by Section 6001 of RCRA to comply with all of the requirements of RCRA to the same extent as any private person or entity. EPA has interpreted the term "facility" when applied to federally owned properties, to mean the entire site under the control of an individual Federal department or Agency.

When incidents of non-compliance occur at Federal facilities, regulating agencies issue notices of violations. Non-compliance is generally identified during normal inspections, although DOE may identify non-compliance through self-assessment as well. While some violations are minor and can be quickly corrected once identified, some violations may require extensive action or require additional time or funds to be allocated to bring a facility back into compliance. To better address these major compliance issues, DOE generally seeks to negotiate compliance agreements with the relevant regulatory agency(ies) that commit DOE to specific activities and schedules to achieve compliance. This is because, according to the Department of Justice, a Federal agency cannot issue an "order" to another agency. *(RCRA 3008(h) for corrective action is*

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[13] Decommissioning refers to actions taken to reduce the potential health and safety impacts of DOE contaminated facilities, including activities to stabilize, reduce, or remove radioactive materials or to demolish facilities.

an exception to this rule; EPA can issue an order by consent to another Federal agency for RCRA cleanup at interim status facilities). Compliance agreements are formal, enforceable administrative actions that, as long as commitments are met, generally make other types of enforcement actions unnecessary.

Compliance agreements between DOE facilities and EPA or State agencies to address RCRA non-compliance are established primarily through Consent Orders and/or Federal Facility Compliance Agreements (FFCAs). Whether a Consent Order or a FFCA is negotiated with a DOE facility depends on two factors: (1) whether the State has authorization to implement RCRA regulations in lieu of EPA and (2) what type of RCRA violation has been cited if EPA is the authority enforcing the RCRA regulations.

For a facility located in a State authorized to implement the RCRA requirements that are identified in a notice of non-compliance, the activities needed to achieve compliance are generally conducted pursuant to a Consent Order with the State. If the facility is located in a State without RCRA authorization or without authorization to enforce the particular RCRA requirement identified in the notice of non-compliance (e.g., HSWA corrective action), then compliance activities are conducted pursuant to either a Consent Order or a FFCA with EPA. Compliance activities that involve RCRA Section 3008(h) interim status corrective action are addressed in a Consent Order with EPA. All other needed compliance activities are conducted under a FFCA with EPA. Therefore, closure violations and other compliance problems involving on-going operations of TSDFs are addressed under FFCAs with EPA. Cleanup of releases from solid waste management units are handled under the permit under 3004(u) and (v) authorities.

Depending on the nature of the violations at a DOE facility, compliance activities may be undertaken under multiple authorities. For example, if a State is authorized to enforce closure regulations but not corrective action, and the violation includes both closure and corrective action components, the State would negotiate a Consent Order to cover the closure violations and EPA would negotiate a Consent Order under 3008(h) authority to cover corrective action activities for the interim status units. This particular situation would preferably be addressed pursuant to a single three-party Consent Order/FFCA. Therefore, at a particular facility, there may be multiple enforcement mechanisms and multiple parties involved in the agreements depending on the type of actions required and the specific legal and regulatory authorities involved.

In general, orders or agreements include, at a minimum, the following information:

- Legal authorities which are the basis for the order or agreement;
- Description of alleged violation (e.g., inadequate closure plan);
- Compliance plan;
- Schedules for compliance; and
- Procedures for dispute resolution
- Sanctions for continued noncompliance.

Exhibit 2-12 illustrates the types of compliance agreements used by EPA or States.

Exhibit 2-12

Compliance Agreements and Orders

RCRA Provision	EPA Administers	State is Authorized
RCRA requirements for active units	FFCA	Consent Order
Corrective action under 3008(h)	Consent Order	Consent Order
Corrective action under 3004(u) and 3004(v)	HSWA Permit	HSWA Permit

REFERENCES: CHAPTER 2

DOE 5400.1, "General Environmental Protection Program," November 9, 1988.

DOE 5400.3, "Hazardous and Radioactive Mixed Waste Program," February 22, 1989.

DOE 5400.5, "Radiation Protection of the Public and the Environment," February 8, 1990.

DOE 5480.11, "Radiation Protection for Occupational Workers," December 21, 1988.

DOE 5484.1B, "Safety Analysis and Review System," May 19, 1987.

DOE 5820.2A, "Radioactive Waste Management," September 26, 1988.

DOE's Byproduct Rule, 10 CFR 962.

DOE Memorandum, "Corrective Action Plan, Interim Measures Guidance, National Strategy, and Model Consent Order," 1/2/90.

EPA/530-SW-84-004, "Permit Applicants' Guidance Manual for Hazardous Waste Land Treatment, Storage, and Disposal Facilities, Final Draft," May 1984.

EPA/530-SW-85-003, "Petitions to Delist Hazardous Wastes--A Guidance Manual," U.S. EPA Office of Solid Waste, April 1985 (available from NTIS).

EPA/530-SW-87-011, "Generic Quality Assurance Project Plan for the Land Disposal Restrictions Program."

EPA's "Case-by-Case Extensions: A Guidance Document to Support the Land Disposal Restrictions," Working Draft, 1988.

EPA's "No-Migration Variances to the Hazardous Waste Land Disposal Prohibitions," Draft, December 1987.

PNL-6577, "Health Physics Manual for Good Practices for Reducing Radiation Exposure to Levels that are As Low As Reasonably Achievable (ALARA)."

3. *PROCEDURAL REQUIREMENTS FOR CLOSING HAZARDOUS AND MIXED WASTE UNITS*

This chapter provides a brief overview of the general requirements for closure and post-closure care of hazardous and mixed waste facilities found in 40 CFR Parts 264 and 265 Subpart G. The Subpart G requirements are applicable to all facilities at which hazardous wastes (including the hazardous waste component of mixed waste) have been treated, stored, or disposed. The unit-specific technical requirements for closure and post-closure care at hazardous and mixed waste units are discussed in Chapter 4.

The closure and post-closure care regulations apply only to those hazardous waste management units at the facility that treated, stored, or disposed of hazardous wastes on or after November 19, 1980. A hazardous waste management unit is defined in 40 CFR §260.10 as a contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is a significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system, and a container storage area.[14] If a unit (e.g., a landfill cell) or any part of a unit (e.g., several containers of waste in a single storage shed) was active on the effective date of the regulations, the entire unit is subject to the closure and post-closure care regulations. In addition, if the unit has released hazardous constituents to the environment, the unit may be subject simultaneously to corrective action under 40 CFR §264.100 or §264.101.

Exhibit 3-1 on the following page summarizes the key provisions of the closure and post-closure care regulations and references to the sections of this chapter that provide more detailed information. A supplemental discussion to this guidance document on the closure and post-closure care requirements for hazardous waste facilities can be found in the *Draft RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements, January 1987, U.S. Environmental Protection Agency, OSWER Policy Directive #9476.00-5.*

3.1 THE SUBPART G CLOSURE REQUIREMENTS

The closure requirements are found in §§264.111 - 264.116 for permitted facilities and §§265.111 - 265.116 for interim status facilities. The closure requirements apply to all hazardous waste management facilities and are virtually identical except for procedural matters for both permitted and interim status facilities. In addition, the closure performance standards found in 40 CFR §§264.111 and 265.111 incorporate by reference, unit-specific requirements, some of which differ between permitted and interim status facilities. As explained in Chapter 2 of this document, if a facility that handles radioactive mixed waste is located in a State without base RCRA authorization, the waste is subject to Federal RCRA and radioactive waste requirements, as well as State requirements if any exist. For facilities located in States with base RCRA authorization and without radioactive mixed waste authorization, the mixed waste is not even defined as hazardous waste, and thus the hazardous component of the mixed waste is not regulated under RCRA. State regulations, however, may apply. After September 25, 1990, if the mixed waste exhibits the toxicity characteristic, it is defined as hazardous waste regardless of the authorization status of the State (see Section 2.1.2.1). If the facility is located in a State with mixed waste authorization, then only State regulations apply.

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[14] A container alone does not constitute a unit; the unit includes the containers and the land or pads upon which they are placed.

Exhibit 3-1

Summary of Subpart G Closure and Post-Closure Care Requirements

All hazardous and mixed waste TSDFs must comply with the closure performance standard and with the unit-specific technical requirements.

Section 3.1.1

All hazardous and mixed waste TSDFs must prepare closure and, if applicable, post-closure plans.

Section 3.1.2 and 3.2.2

All closures must be in accordance with specified deadlines.

Section 3.1.3

All partial and final closures must include removal or decontamination of contaminated facility equipment, structures, and, if appropriate, soils.

Section 3.1.6

Completion of closure and post-closure care must be certified by an independent registered professional engineer.

Sections 3.1.7 and 3.2.3

Survey plats and post-closure notices must be submitted after closure of each disposal unit.

Section 3.1.8

All disposal units require 30 years of post-closure monitoring and maintenance. Alternate post-closure care periods may be approved by the Regional Administrator.

Section 3.2.1

Owners or operators of permitted storage surface impoundments and waste piles not designed in accordance with specified liner design standards, and all tank systems without secondary containment must prepare contingent closure and post-closure plans describing activities required to close the unit as a landfill and conduct post-closure care.

Section 3.3

Hazardous and mixed waste facilities not otherwise required to have contingent closure and post-closure plans must revise their closure plans and prepare post-closure plans if all hazardous wastes cannot be removed at closure and the unit must be closed as a landfill.

Section 3.3

3.1.1 The Closure Performance Standard

40 CFR §§264.111 and 265.111 provide the general performance standard that facilities must satisfy at closure and incorporate by reference the unit-specific technical standards (which are discussed in Chapter 4 of this document). The general closure performance standard requires that hazardous and mixed waste facilities be closed in a manner that:

- Minimizes the need for further maintenance, and
- Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.
- Complies with the closure requirements of Subpart G, including, but not limited to, the requirements of §§264.178, 264.197, 264.228, 264.280, 264.310, 264.351, and 264.601-603.

In order to be in compliance with §§264.111 and 265.111, facilities must comply with both the general performance standard and the technical closure standards -- one does not override the other. The unit specific technical requirements specify the particular activities that must be included in the closure plan and conducted as part of closure of that type of unit.

3.1.2 The Closure Plan

All hazardous and mixed waste facilities, in accordance with 40 CFR §§264.112 and 265.112, must have written closure plans describing how each unit at the facility will be closed. The regulations specify the required contents of the closure plan but do not require the owner or operator to adhere to any particular format when developing the plan. 40 CFR §§264.112(b) and 265.112(b) describe the minimum information to be included in the closure plan (see Exhibit 3-2).

The information presented below is a summary of the minimum information required in a closure plan for any type of unit or facility. The precise information that must be included in the plan varies depending on the type of units being closed.

3.1.2.1 Facility Description

The facility description should include the following types of information:

- Facility location;
- General description of hydrogeologic conditions:
- Description of hazardous waste management units at the facility; and
- References to other environmental permits and exemptions.

Exhibit 3-2

Closure Plan Requirements

Contents of the Closure Plan	Regulatory Citation
Facility description	§§264.112(a)(2) and 265.112(a)(2)
Partial closure activities	§§264.112(b)(1) and 265.112(b)(1)
Estimate of maximum extent of operations and maximum inventory	§§264.112(b)(2) and 265.112(b)(2)
Treating, removing, or disposing of the maximum inventory	§§264.112(b)(3) and 265.112(b)(3)
Facility decontamination	§§264.112(b)(4) and 265.112(b)(4),
Ground-water monitoring	§§264.112(b)(5) and 265.112(b)(5)
Unit-specific closure activities	§§264.112(b)(5) and 265.112(b)(5)
Partial and final closure schedule	§§264.112(b)(6) and 265.112(b)(6)

3.1.2.2 Partial Closure Activities

Closure of a hazardous waste management unit at a facility that contains other active hazardous waste management units is defined as partial closure. Examples of partial closures include closure of a tank (including its associated piping and underlying containment systems) or a landfill cell (40 CFR §260.10). Removing a drum or container from a container storage building is not a partial closure; however, closing the entire storage area at a facility that continues to operate other types of waste management units does qualify as a partial closure. Closure plans must describe in detail the proposed procedures for closing all units at the facility, including all partial closures. This description should include all decontamination, removal, treatment, monitoring, capping, and other activities necessary for closure of the unit.

3.1.2.3 Estimate of Maximum Extent of Operation

The closure plan must include an estimate of the maximum extent of operation that will be open at any time during the active life[15] of the facility. The purpose of this estimate is to indicate the largest area of the facility that would need to be closed if the facility were forced to close unexpectedly. At some facilities, the estimate of the maximum extent of operations may be equivalent to the maximum design capacity of the facility. At other facilities, owners or operators may reduce the size of the maximum area ever open at one time by periodically performing partial closures during the course of operations. For example, if no more than two cells of a landfill are ever open at one time, then the maximum extent of operation is two cells.

3.1.2.4 Estimate of Maximum Inventory

The closure plan must include an estimate of the maximum inventory ever on-site over the life of the facility. This estimate should include:

- All hazardous wastes, including residues, from all management units and
- Contaminated soils and residues from routine drips and spills.

The amount of inventory on site should never exceed the estimate in the closure plan. If the owner or operator increases the amount of inventory, he must revise the estimate upwards or justify to the Regional Administrator that the inventory accumulation was caused by an unlikely contingency and that the inventory will be reduced in a short time to levels not exceeding the original estimate. The maximum inventory of hazardous wastes ever on-site should also take into account events such as adverse weather conditions that affect landfilling activities or periods of reduced activities while conducting routine maintenance.

3.1.2.5 Treating, Removing, or Disposing of the Maximum Inventory

The closure plan must include a detailed description of how an owner or operator will handle all hazardous wastes during closure. The procedures must be consistent with the estimate of the maximum extent of inventory. An owner or operator may handle the inventory through on-site treatment or disposal or off-site treatment, storage, or disposal.

- ***On-site Management.*** Wastes may be handled on-site if capacity will be available (either in the unit to be closed or in another unit at the facility) at the time the unit is closed. The owner or operator may expand or create a new unit at closure if he submits a revised Part A application and the Regional Administer determines that the increase in design capacity is necessary due to a lack of available capacity, or the changes are necessary to protect human health and the environment, or to satisfy Federal, State or local requirements.

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[15] §260.10 defines "active life" as the period from the initial receipt of hazardous waste at the facility until the Regional Administrator receives certification of final closure.

- *Off-site Management.* The closure plan must include an estimate of the quantity of waste to be sent off-site; a description of any treatment to be performed prior to transport; an estimate of the distance to the final TSDF; and a description of treatment or disposal methods at the final TSDF.

3.1.2.6 Facility Decontamination

The closure plan must describe procedures for decontaminating the facility. This description should include some indication of the extent of contamination at the facility, such as a list of contaminated equipment, structures, and soils, procedures for cleaning equipment, removing contaminated soils, and sampling and testing surrounding soils, and criteria for evaluating decontamination. For example, if the owner or operator is planning to clean close a unit, the closure plan should identify the nature and extent of contamination at the unit, the procedures for eliminating the contamination, and the criteria for determining when the unit is considered "clean". See Section 4.2 for a further discussion of procedures for determining "how clean is clean."

3.1.2.7 Ground-Water Monitoring

Facilities with surface impoundments, landfills, waste piles, or land treatment units must have ground-water monitoring systems in accordance with Part 264 Subpart F (for permitted facilities) and Part 265 Subpart F (for interim status facilities) throughout the active life of the facility, including the partial and final closure period.[16] The ground-water monitoring activities undertaken during closure and described in the closure plan (as required by 40 CFR §§264.112(b)(5) and 265.112(b)(5)) likely will be consistent with the monitoring conducted during the operation of the unit. (See Section 2.1 for more information on ground-water monitoring).

3.1.2.8 Unit-Specific Closure Activities

Other unit-specific activities necessary to address the closure performance standard may include leachate management, a final cover, gas monitoring, run-on and run-off control, and security provisions. Most of these activities are a necessary part of the operating requirements for a unit or facility and will need to be continued throughout the closure period. These activities are described in greater more detail in Chapter 4.

- Leachate management includes leachate monitoring, collection, removal, and treatment.[17]

- A final cover is necessary for units in which hazardous wastes will remain after closure. A description of the final cover should include drawings, specifications that demonstrate that the cover will satisfy the performance standard, and procedures for cover installation. The specifications of the

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[16] In accordance with 40 CFR §265.90(a), interim status waste piles are not required to conduct ground-water monitoring throughout the active life of the facility.

[17] Leachate collection systems are required for new units, lateral expansions, and replacement units of existing permitted and interim status landfills, surface impoundments, and waste piles (40 CFR §§264.221, 264.251, 264.301, 265.221, 265.251, and 265.301).

cover, such as the type of cover materials and the thickness of materials, should also be described.

- Gas monitoring may involve gas collection and control systems for controlling and venting the movement of produced gases.

- Run-on and run-off control may be necessary to ensure that rain or melting snow do not infiltrate or erode the final cover on a unit. The description of run-on and run-off control should identify activities for treating, removing, or disposing, of the excess water that may accumulate from run-on and run-off.

- Security systems must be maintained throughout the closure period unless the owner or operator demonstrates that access of persons or livestock onto the facility will not cause damage to human health or the environment (see §§ 264.14 and 265.14). Security devices may include signs with "Danger Unauthorized Personnel Keep Out" notices on them, and fences. The closure plan should specify exactly what type of security devices will be used.

3.1.2.9 Partial and Final Closure Schedule

In accordance with §§264.112(b)(6) and 265.112(b)(6), the closure plan must include a schedule for closure of each hazardous waste management unit and for final closure of the facility. At a minimum, the plan must include:

- The total time required to close each hazardous waste management unit, and

- The time required for intervening closure activities, e.g., the time required to place a final cover over a landfill unit.

This schedule must be consistent with the closure deadlines imposed by §§264.113 and 265.113 (discussed in Section 3.1.4 of this guidance manual).

3.1.2.10 Amendments to Closure and Post-Closure Plans

Owners and operators must amend closure and post-closure plans as necessary to remain consistent with facility conditions. Closure and post-closure plans must be amended if:

- A change in operating plans or facility design affects the closure or post-closure plan;

- An unexpected event occurs while conducting closure activities that affects the closure or post-closure plan;

- An unexpected event occurs during the active life that affects the closure or post-closure plan; or

- There is a change in the expected year of closure for units required to include an expected closure date in the closure plan (i.e., interim status facilities without approved closure plans).

3.1.3 Notification of Closure

An owner or operator must notify the Regional Administrator prior to the date he expects to begin closure. These notification deadlines vary according to the type of the unit to be closed and whether the unit is permitted or operating under interim status. 40 CFR §§264.112(d) and 265.112(d) specify these deadlines which are summarized in Exhibit 3-3.

Exhibit 3-4 provides a sample format for the notification of closure. For facilities without approved plans, the owner or operator also must submit with the notification of closure the closure plan for approval if it has not already been submitted.

40 CFR §§264.112(e) and 265.112(e) allow the owner or operator to remove hazardous wastes and decontaminate or dismantle equipment in accordance with the approved closure plan any time before or after notification of partial or final closure. This allowance enables the owner or operator to eliminate, as quickly as possible, potential threats that may be caused by hazardous wastes. However, all such activities undertaken must be conducted in accordance with the approved closure plan (or in the case of interim status facilities without approved plans, in accordance with the subsequently approved plan) and EPA retains the authority to ensure that such activities are not inconsistent with the closure regulations.

3.1.4 Triggers of Closure

The date on which an owner or operator *expects to begin closure, and thus triggers the closure notification requirement,* is either:

- No later than 30 days after the date on which any hazardous waste management unit receives the known final volume of hazardous wastes, or

- One year after the date of receipt of the most recent volume of hazardous wastes.

If the owner or operator can demonstrate to the Regional Administrator that the facility has the capacity to receive additional hazardous wastes and that all steps have and will be taken to prevent any threats to human health and the environment, the Regional Administrator may approve an extension to this one-year limit.

Exhibit 3-3

Notification of Closure

Types of Units	Notification Deadlines
Permitted Facility:	
Disposal unit	60 days prior to unit closure
Non-disposal unit	No notification required until final closure of entire facility
Final closure of disposal facility	60 days prior to final closure
Final closure of non-disposal facility	45 days prior to final closure
Interim Status, No Approved Closure Plan:	
Disposal unit	180 days prior to unit closure
Non-disposal unit	No notification required until final closure
Final closure of disposal facility	180 days prior to final closure
Final closure of non-disposal facility	45 days prior to final closure
Interim Status, With Approved Closure Plan:	
Disposal unit	60 days prior to unit closure
Non-disposal unit	No notification required until final closure
Final closure of disposal facility	60 days prior to final closure
Final closure of non-disposal facility	45 days prior to final closure

Exhibit 3-4

SAMPLE FORMAT FOR NOTIFICATION OF CLOSURE

Regional Administrator
US EPA, Region _____
City, State

I am the [owner or operator] of the following hazardous waste management facility [or facilities]:

[Insert name, address, and EPA identification number of each facility]

This letter provides notice, as required under (40 CFR §§264.112(d) or 265.112(d)), that I intend to begin closure of the [type of facility or unit, e.g., surface impoundment, waste pile, etc.] [facility or unit] on [date].

[signature of owner or operator]

[date]

In addition, landfills and land treatment units, and surface impoundments that meet the minimum technical requirements relating to liners and leachate collection systems, may delay closure to receive only non-hazardous waste if the facility owner or operator complies with the following requirements (40 CFR 264.113 and 265.113; see 54 FR 33376, August 14, 1989):

- Submits a permit modification request, or a revised Part B application if the unit has interim status;
- Update facility plans to reflect the continued receipt of non-hazardous wastes (e.g., waste analysis plan and closure plan);
- Continue to comply with all applicable Part 264 and Part 265 requirements, including all closure and post-closure requirements;
- Demonstrate that delaying closure will be protective of human health and the environment; and
- Notify the Regional Administrator and begin closure following the final receipt of non-hazardous waste in accordance with the deadlines in §§ 264.112(d) and 265.112(d).

Owners and operators of surface impoundments that were forced to cease receipt of hazardous waste on November 8, 1988, because they did not meet the MTR liner and leachate collection system provisions, may also delay closure of these units if, in addition to the above conditions, they comply with the following:

- Submit a contingent corrective measures plan that addresses procedures for expediting corrective action in the event of a release of hazardous constituents;
- Submit a plan for removing all hazardous liquids and sludges, to the extent practicable without impairing the integrity of the liner(s);
- Remove all hazardous liquids and all sludges to the extent practicable without impairing the integrity of the liner(s) following the final receipt of hazardous waste; and
- Implement corrective measures in the event of a release in accordance with an approved corrective action plan. Continued receipt of nonhazardous waste after the detection of a release is allowed only if the owner or operator has an approved corrective measures plan that demonstrates that continued receipt of waste will not impede the corrective action. The owner or operator may be required to close the impoundment after detection of a release if no substantial progress has been made in the corrective action within a year.

3.1.5 Time Allowed for Closure Activities

In addition to the deadlines described above for notifying the Regional Administrator that the unit has received its final volume of waste and is ready to be closed, the regulations also impose deadlines for undertaking these closure activities. For all permitted facilities and interim status facilities with approved closure plans, 40 CFR §264.113 and 265.113 specify that within 90 days after receiving the final volume of hazardous wastes (or non-hazardous wastes if the unit receives non-hazardous waste after its final receipt of hazardous waste in accordance with §§264.113(d) or 265.113(d)), the owner or operator must treat, remove from the unit or facility, or dispose of on-site, all hazardous wastes in accordance with the approved closure plan. For interim status without approved closure plans, the 90-day deadline begins upon the approval of the closure plan if that is later than the final receipt of waste.

The owner or operator must complete the partial or final closure activities in accordance with the approved plan within 180 days after receiving the final volume of hazardous (or non-hazardous, if applicable) wastes. Similarly, for interim status without approved closure plans, the deadline begins with the approval of the plan if that is later than the final receipt of waste.

The Regional Administrator may extend these closure deadlines in the following specific cases:

- The closure activities will of necessity take longer than the allowable time to complete; *or*
- The hazardous waste management unit has the capacity to receive additional wastes; *and*
- There is reasonable likelihood that operation of the unit or facility will recommence within one year; *and*
- Closure of the unit or facility would be incompatible with continued operation of the site.

If, at the time the owner or operator is developing a closure plan, he knows that he will need to exceed the 90- or 180-day deadline, the owner or operator should include in the closure plan a justification for an extension of the deadline(s).

3.1.6 Disposal or Decontamination of Equipment, Structures and Soils

40 CFR §§264.114 and 265.114 require proper disposal or decontamination of all contaminated equipment, structures and soils during partial and final closure of the facility. If, however, the owner or operator chooses to remove any of the hazardous wastes or hazardous constituents, he would be considered a hazardous waste generator and in such case, would be required to handle the wastes or constituents in accordance with the applicable requirements of 40 CFR Part 262 (i.e., generator standards) and 268 (i.e., land disposal restrictions).

The Subpart G closure regulations do not outline the specific activities that must be followed to ensure that contaminated equipment, structures, and soils are treated or disposed of properly. Nonetheless, the closure plan must describe how these disposal and decontamination activities will proceed. The activities

described in the closure plan must satisfy the closure performance standard of §§264.111 and 265.111. Because drips and spills should be cleaned up as they occur (as a routine maintenance practice), many of the activities that should be included in the closure plan for removing or decontaminating soils should be similar to those conducted during the operating life of the facility as part of routine operations. Decontamination activities should include a description of the criteria for evaluating whether decontamination is complete (i.e., how clean is clean?). These activities are discussed in greater detail in Chapter 4.

3.1.7 Certification of Closure

40 CFR §§264.115 and 265.115 require facility owners or operators to submit a certification signed by the owner or operator and an independent registered professional engineer certifying that closure activities have been conducted in accordance with the approved closure plan. EPA defines an independent engineer as one who is not a direct employee (i.e., not on the payroll) of the facility owner or operator, or the owner or operator himself. Owners or operators of surface impoundments, waste piles, land treatment, and landfill units must submit certifications after closure of each unit. Owners and operators of incinerators, tanks, or container storage areas may submit closure certifications of these units at final closure (i.e., after closure of the last unit at the facility). The closure certification must be sent, by registered mail, to the Regional Administrator within 60 days of the completion of closure.

The certification of closure for a land treatment unit may be signed by an independent qualified soil scientist in lieu of an independent registered professional engineer (40 CFR §§264.280(b) and 265.280(e)). The regulations do not specify the type of professional engineer (or soil scientist) that may certify closure. The owner or operator should choose an appropriate professional engineer or soil scientist based on qualifications such as training and experience.

The regulations require that documentation supporting the professional engineer's or soil scientist's certification be furnished to the Regional Administrator upon request. Supporting documentation for non-disposal facilities may include sampling, testing, and analysis results that prove that the closure was complete and that the facility is considered "clean" according to the criteria provided in the closure plan. Because of the many technical factors involved in demonstrating clean closure, such as providing statistically valid soil sampling data, this documentation may be an extensive report. In many cases, EPA Regional staff may request additional sampling information, statistical analyses, and in some cases, additional soil removal.

Facilities should maintain the supporting documentation until the closure certification has been accepted by the Regional Administrator. Disposal facilities, however, are encouraged to maintain the supporting documentation for a longer period of time because information on past practices will be useful if corrective action is required after closure.

Sample certifications are provided as Exhibits 3-5 and 3-6. Exhibit 3-5 is a sample owner or operator closure certification; Exhibit 3-6 is a sample independent registered professional engineer closure certification.

3.1.8 Survey Plats and Post-Closure Notices

After closure of each disposal unit (i.e., each unit at which wastes remain in place after closure), owners or operators must submit to the local zoning authority, or to the authority with jurisdiction over local land use, and to the Regional Administrator, a survey plat. This plat must identify the location and

Exhibit 3-5

SAMPLE OWNER OR OPERATOR CLOSURE CERTIFICATION

The undersigned, _____(Name of Owner or Operator)_____, a (1) Corporation, incorporated under the laws in the State of _____ and licensed to do business in _____, or (2) (Partnership, Individual, Municipality or Other Entity), with its principal place of business at _____(Address)_____, which formerly owned or operated a hazardous waste (Description of Hazardous Waste Activity) (hereinafter "Facility") known as ___(Name of Hazardous Waste Facility)___ and located at _____ _____(Location)_____in _____ County, _ (State) _, has completed and permanently ceased the active operation of the facility and has fully implemented all measures relating to the closure of the facility as set forth in the Closure Plan approved by ___(Region or State)___ for said facility.

NOW, THEREFORE, I(we) _____(Name of Owner/Operator)_____ hereby swear and affirm that the above-named hazardous waste facility has been closed in accordance with the facility's Closure Plan approved in writing by (name of Regional Administrator of State Director) on _____, 19_, that all measures relating to the closure of the facility required by the Closure Plan and the rules and regulations of (regulatory citation) have been fully implemented, and that to the best of my (our) knowledge, no violations continue to exist that may have arisen prior to closure.

_____
Signature

_____
(Title)

_____
(Address)

Taken, sworn and subscribed before me, this
___ day of _____ A.D. 19_
_____
_____
(Notary)

Exhibit 3-6

SAMPLE INDEPENDENT REGISTERED PROFESSIONAL ENGINEER CLOSURE CERTIFICATION

I, _____(Name)_____, a Professional Engineer registered pursuant to the Professional Engineers Registration Law, _____, hereby certify that I have reviewed the Closure Plan for the _____(Type of Facility)_____ at _____(Name of Hazardous Waste Facility)_____ ("facility"), located at _____(Location)_____, that I am familiar with the rules and regulations of (regulatory citation) pertaining to closure of such facility, and that I personally have made visual inspection(s) of the aforementioned facility, and that the closure of the aforementioned facility has been performed in full and complete accordance with the facility's closure plan approved in writing by (Regional Administrator or State Director) on _____, 19_, and the rules and regulations of (regulatory citation).

_____ _____(Date)_____
(Signature)

_____
(Professional Engineering License Number)

_____
(Business Address) (Seal)

_____
(Telephone Number)

dimensions of each disposal unit with respect to permanently surveyed benchmarks, and must be prepared by a professional land surveyor. The plat must be submitted no later than the submission of the certification of closure of each disposal unit. The requirement for a survey plat is found in §§264.116 and 265.116.

40 CFR §§264.119 and 265.119 require owners or operators of disposal units to submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Regional Administrator, a record of the type, location, and quantity of hazardous wastes disposed of within each disposal unit (e.g., disposal cell or trench) of the facility. This record must be filed within 60 days after certification of closure of each disposal unit. For mixed waste units, a record of the hazardous components of the mixed waste is necessary.

Also, within 60 days after certification of closure of the first hazardous waste disposal unit and within 60 days after certification of closure of the last hazardous waste disposal unit, the owner or operator must record a notation on the deed to the facility property, noting the following to potential purchasers:

- That the land has been used to manage hazardous wastes;
- That its use is restricted by regulation; and
- That the survey plat and record of wastes have been filed with the land use authorities and the Regional Administrator.

The facility owner or operator must also submit a signed certification to the Regional Administrator after certification of closure of the first and last disposal unit stating that the deed notation has been recorded.

Exhibit 3-7 provides a sample deed notation.

3.2 THE SUBPART G POST-CLOSURE CARE REQUIREMENTS

The post-closure care requirements are included in 40 CFR §§264.117-264.120 for permitted facilities and §§265.117-265.120 for interim status facilities. These closure requirements apply to the owners and operators of:

- All hazardous waste landfills, disposal surface impoundments, and land treatment unit; and
- Tank systems, waste piles, and surface impoundments that cannot remove or decontaminate all waste residues, contaminated soils, materials, components, subsoils, and structures, and must be closed as a landfill.

Because the hazardous waste component of radioactive mixed waste is subject to RCRA Subtitle C regulation, owners and operators of mixed waste facilities must comply with the post-closure requirements of 40 CFR Subpart G for the hazardous component of the mixed waste.

Exhibit 3-7

SAMPLE NOTICE IN DEED

TO WHOM IT MAY CONCERN:

I, _____(owner or operator)_____ the undersigned, of

_____(street address)_____, City of _____ _, County of _____, State of _____, hereby give the following notice as required by 40 CFR §§264.119 or 265.119:

1. I am, and since _____, 19_ have been in possession of the following described lands ___(legal description)_____ _____ _____.

2. Since _____, 19_, I have disposed of hazardous chemical wastes under the terms of regulations promulgated by the United States Environmental Protection Agency on/in the above-described land.

3. The future use of the above-described land is restricted under the terms of 40 CFR Subpart G: the post-closure use of the property must never be allowed to disturb the integrity of either the containment system or the facility's monitoring system, unless the Regional Administrator or State Director determines that the proposed use (1) will not increase the potential threat to human health or the environment, or (2) is necessary to reduce the threat to human health or the environment.

4. Any and all future purchasers of this land should inform themselves of the requirements of the regulations and ascertain the amount and nature of wastes disposed of on/in the above-described property.

5. I have filed a survey plat with the (name and address of local land authority) and with the Regional Administrator of EPA, Region (#) (or State Director, State of ___ _____), at (address of Regional Administrator or State Director) showing the location and dimensions of landfill cells and a record of the type, location and quantity of waste disposal within each area of the facility.

3.2.1 Length of the Post-Closure Period

The regulations require 30 years of post-closure care for each disposal unit, beginning after completion of closure of the unit. The Regional Administrator has the authority to shorten or extend the length of the post-closure care period, if he finds that altering the length of the period is sufficient or necessary, respectively, to protect human health and the environment. In addition, the owner or operator or any member of the public may petition the Regional Administrator to alter the length of the post-closure care period (40 CFR §§124.5(a), 265.118(g), 270.41, and 270.42). If the owner or operator believes that an extension or reduction in the length of the period will be necessary for a unit, he should include a justification for the alternative length of post-closure care in the post-closure plan.

Because the regulations do not specify the criteria that must be used to determine whether to alter the length of the post-closure care period, such decisions are based on site-specific facility conditions. For example, if some disposal units at a facility close earlier than other units, unless each unit has its own separate ground-water monitoring system, the Regional Administrator may extend the length of the post-closure care period for the units that closed earlier because of the interrelationship of the monitoring system.

Broad technical evaluation criteria and site-specific technical factors that should be considered when evaluating the appropriate length of the post-closure care period follow:

- Containment -- How long will the unit or facility contain the wastes after closure?
- Detection -- Will the systems currently in place at the unit or facility detect releases of hazardous waste?
- Migration and Attenuation -- Will the wastes migrate off site, and will the leachate be attenuated in the environment?
- Risk Potential -- Who potentially will be exposed to a waste release, how toxic are the waste constituents, and consequently, what risks are involved?
- Facility Characteristics -- Examples include process type, facility design, waste management (operational) practices, and corrective action activities.
- Waste Types and Characteristics -- Waste characteristics are defined by the physical and chemical properties of the wastes, including degradability, volatility, solubility, adsorptivity, bioaccumulation, kinematic viscosity, and toxicity.
- Environmental and Health Considerations -- Includes information about the unsaturated zone (soil), the saturated zone (ground water), topography and geography, and climatological conditions.

3.2.2 The Post-Closure Plan

All hazardous waste disposal units must have a written post-closure plan, in accordance with 40 CFR §§264.118 and 265.118, describing the activities that will be conducted after closure of each disposal unit and the frequency of these activities. Exhibit 3-8 provides an overview of the activities that must be described in the post-closure plan and the regulatory citation for each requirement.

Exhibit 3-8

Post-Closure Plan Requirements

Contents of the Post-Closure Plan	Regulatory Citation
Monitoring activities and their frequency	§§264.118(b)(1) and 265.118(c)(1)
Maintenance activities and their frequency	§§264.118(b)(2) and 265.118(c)(2)
Identification of contact person or office	§§264.118(b)(3) and 265.118(c)(3)

In addition, §§264.118(b) and 265.118(b) reference the technical post-closure care requirements that are described in detail in Chapter 4 of this document. The information necessary for inclusion in the plan varies depending on the type of unit. Since predicting with complete accuracy all the activities that will be necessary at a unit or facility for a period extending 30 years after closure may be extremely difficult, the owner or operator may wish to include a wide range of possible activities in the post-closure plan to reduce the future likelihood of having to modify the facility permit or the approved post-closure plan. The information presented below represents the minimum information necessary in a post-closure plan.

3.2.2.1 Monitoring Activities

The monitoring activities described in the post-closure plan should be consistent with the current conditions at the unit or facility. Monitoring activities should include ground-water monitoring activities (e.g., number, location, and depth of wells; frequency and procedures for sampling; types of analyses), soil monitoring, leak detection monitoring, and gas monitoring, as appropriate. If the monitoring activities described in the post-closure plan are not consistent with the current conditions at the facility (i.e., if monitoring activities will differ during the post-closure period), then the owner or operator should include in the plan an explanation of the reasons for the change.

3.2.2.2 Maintenance Activities

The owner or operator must include in the post-closure plan a description of the maintenance activities that will be conducted at the unit or facility throughout the post-closure care period, and the frequency with which these activities will be conducted. The maintenance activities described must include those activities necessary to ensure the integrity of the hazardous waste containment systems and the function of the monitoring equipment. The plan should include a description and schedule of the following types of activities:

- ***Routine Facility Inspections***, including inspections of the final cover, run-on and run-off control system, surveyed benchmarks, ground-water monitoring system, leachate collection system, leak detection system, unsaturated zone monitoring system, and security system, as applicable.

- ***Maintenance of Waste Containment Systems***, including mowing, fertilizing, reseeding and mulching eroded areas, sprinkling, replacing soil lost to erosion, maintaining drainage channels and culverts which direct surface run-on and run-off away from the disposal area and prevent surface water from infiltrating the cover, and controlling rodents as necessary to counter infestations.

- ***Maintenance of the Monitoring Systems***, including replacing or redrilling monitoring wells, replacing seals, piping, and caps, repairing or replacing pumps, and other kinds of routine equipment maintenance.

- ***Leachate Management*** including procedures for collecting, handling, and disposing of leachate during the post-closure care period. In most cases, leachate management procedures are a continuation of activities conducted during the operating life of the unit. For example, if leachate is routinely collected in a tank for periodic removal, the plan should estimate the quantity of leachate to be removed and specify how it will be treated or disposed.

- ***Maintenance of the Security System*** (e.g., fences, warning signs), if applicable[18], including, for example, replacement of sections of fences due to normal wear, severe weather conditions, and vandalism, and periodic replacement of warning signs for similar reasons.

- ***Continuation of Hazardous Waste Degradation at Land Treatment Facilities***, including disking, fertilizing, liming to ensure proper pH balance, irrigating, controlling run-on and run-off from the treatment fields, repairing erosion

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[18] Some disposal units or facilities will be required by the Regional or State office to maintain security devices throughout the post-closure period. The post-closure plan should describe such security or provide supporting justification for why such provisions are not needed to ensure the protection of human health and the environment.

damage, regrading and replanting as needed, and controlling wind dispersal of particulates.

3.2.2.3 Contact Person or Office

40 CFR §§264.118(b)(3) and 265.118(c)(3) specify that the post-closure plan must identify the name, address, and phone number of the person or office to contact about the disposal unit or facility during the post-closure care period. The identification of this contact person serves to ensure that access to the facility will be possible after closure and in the case of emergency.

3.2.3 Certification of Completion of Post-Closure Care

40 CFR §§264.120 and 265.120 require that within 60 days after the completion of the 30-year post-closure care period for each landfill, surface impoundment, land treatment unit, or other unit required to closure as a landfill (e.g., waste pile or tank), the owner or operator must submit a certification to the Regional Administrator that post-closure care was completed in accordance with the approved post-closure plan. The certification requirements (e.g., signed by the owner or operator and an independent registered professional engineer) are the same as the certification of closure discussed previously in Section 3.1.7. Post-closure certifications are <u>not</u> required annually; rather they are required at the end of the entire post-closure care period for each unit.

The independent registered professional engineer will have to rely on a review of the documents generated by the unit or facility during the post-closure care period (e.g., inspection reports, ground-water monitoring results, invoices for maintenance activities) and a visual inspection of the unit or facility to certify adequate completion of post-closure care. These documents, the engineer's account of the visual inspection, and potentially a summarization report of the engineer's findings would be considered supporting documentation for the certification and should be maintained by the owner or operator.

As with the certification of closure, the regulations also require that documentation supporting the professional engineer's certification be furnished to the Regional Administrator upon request. Facilities should maintain any supporting documentation (e.g., information regarding activities conducted during inspections, field reports documenting each on-site visit, in-house records that were reviewed) until the Regional Administrator accepts the post-closure certification.

3.3 CONTINGENT CLOSURE/POST-CLOSURE PLANS

The Subpart G regulations require an owner or operator of certain tank systems, surface impoundments, and waste piles to prepare a contingent closure plan and post-closure plan describing closure activities that will be necessary if it is not possible to remove all wastes at closure and the unit must be closed as a landfill. This contingent closure plan is in addition to the standard closure plan describing clean closure activities (40 CFR §§264.228(c)(1), 264.258(c)(1), 264.197(c)(1) and (2), and 265.197(c)(1) and (2)).

The types of units subject to the contingent closure plan requirements are:

- Permitted storage surface impoundments and waste piles that are not designed in accordance with the specified liner design standards of 40 CFR

§§264.221(a) and 264.251(a) (e.g., synthetic liners), and that are not exempt from these design standards, and

- Permitted and interim status tanks that do not have secondary containment and that are not exempt from the secondary containment requirements.

Owners or operators of surface impoundments that failed to satisfy the November 8, 1988, HSWA deadline to meet the MTRs for surface impoundments (and were not granted an exemption from the standards) and thus were required to cease the receipt of hazardous wastes, are required to include a contingent closure and post-closure plan in their plan submissions.

Surface impoundments and waste piles may be exempted from the liner design standards if the facility owner or operator adequately demonstrates to the Regional Administrator that an alternate design and operating practice, together with location characteristics, will prevent the migration of any hazardous constituents into the ground water or surface water at any future time. Similarly, tanks may be exempted from secondary containment requirements if the facility owner or operator adequately demonstrates to the Regional Administrator that an alternate design and operating practice, together with location characteristics, will prevent the migration of any hazardous waste or hazardous constituents into the ground water or surface water as least as effectively as secondary containment during the active life of the tank system or that in the event of a release that does not migrate to ground water or surface water, no substantial present or potential hazard will be posed to human health or the environment. Underground tanks, however, may not be exempted from the secondary containment requirement through such a demonstration.

Owners or operators of surface impoundments, waste piles, and tanks not subject to the contingent plan requirements must amend their closure plan, prepare a post-closure plan, and comply with the post-closure care regulations if the owner or operator or Regional Administrator determines that the unit must be closed as a landfill. These plans should closely resemble closure and post-closure plans of landfills and any of the preceding units closed as a landfill must comply with all the landfill specific closure and post-closure care standards contained in 40 CFR §§264.310 and 265.310.

REFERENCES: CHAPTER 3

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," U.S. EPA, January 1987.

4. *TECHNICAL REQUIREMENTS FOR CLOSING HAZARDOUS AND MIXED WASTE UNITS*

This chapter presents the technical requirements for closing hazardous and mixed waste units at DOE facilities. General management and procedural requirements for mixed waste units are located in Chapters 2 and 3 respectively. For each of the RCRA-regulated hazardous waste management units, this chapter provides detailed guidance on the preparation of closure and post-closure plans (where appropriate), on technologies and procedures for conducting closure activities, on activities to be conducted in demonstrating closure, and on activities to be conducted during the post-closure period for each unit. In addition, it outlines the statutory and regulatory requirements pertaining to the closure of each unit, to make it clear which requirements are mandatory rather than recommended guidance.

This chapter is organized into nine separate sections, each one addressing an individual RCRA-regulated hazardous waste management unit. Exhibit 4-1 outlines the organization of this chapter in greater detail.

Exhibit 4-1

Organization of Chapter 4

Section 4.1	• Landfills
Section 4.2	• Surface Impoundments
Section 4.3	• Waste Piles
Section 4.4	• Land Treatment Units
Section 4.5	• Container Storage Areas
Section 4.6	• Tanks
Section 4.7	• Incinerators
Section 4.8	• Miscellaneous Units (including: chemical, physical, thermal, & biological treatment, burning or detonation, geologic repositories, deactivated missile silos, etc.)
Section 4.9	• Underground Injection Wells

These sections are intended to provide both an overview of the applicable requirements and detailed technical information on the closure of each type of unit. While each of the nine sections are largely independent, many of them reference the discussions on Landfills (Section 4.1) and Surface Impoundments (Section 4.2). These sections explain in greater detail the procedures for conducting landfill closures and clean closures, respectively, components of which are relevant to closing other units.

Given the complexity of closure activities, this chapter should not be used as a "cookbook" for conducting closures. In order to assist DOE personnel and contractors, this chapter includes numerous EPA and periodical references, where appropriate, that provide more detailed information than can be presented in one manual.

4.1 *LANDFILLS*

This section presents the requirements for closure and post-closure care of landfills containing hazardous and radioactive mixed wastes located at DOE facilities. A hazardous waste landfill is defined in 40 CFR §260.10 as a disposal facility or part of a facility where hazardous waste is placed in or on land and which is not a pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground mine, or a cave. A landfill commonly consists of a number of cells, which are defined (in 40 CFR §260.10) as discrete volumes of a hazardous waste landfill which use a liner to provide isolation of wastes from adjacent cells or wastes. Some examples of landfill cells are trenches and pits.

4.1.1 What Are the Closure Requirements for Landfills?

Exhibit 4.1-1 provides an overview of the key closure requirements for landfills and references to where in this section more detailed information is provided.

Exhibit 4.1-1

Overview of Applicable Statutory and Regulatory Requirements

The owner or operator must prepare a written closure plan describing all closure activities for landfill units.

Section 4.1.2.1

Each landfill unit must be closed with a final cover that meets specified design and performance standards.

Section 4.1.2.2 - 4.1.2.5

The owner or operator must prepare a written post-closure care plan and conduct post-closure care, including ground-water monitoring, for 30 years.

Section 4.1.2.6 - 4.1.2.7

4.1.1.1 Statutory Requirements

Section 3005(i) of RCRA states that interim status units that have received hazardous or mixed wastes since July 26, 1982, must conduct corrective action and ground-water monitoring activities that apply to new facilities. Therefore, interim status landfills (that have received waste since July 26, 1982) that undergo closure must comply with the monitoring and corrective action requirements for permitted units.

An overview of the relevant ground-water monitoring and corrective action requirements for closure is located in Chapter 2 of this manual; ground-water monitoring and corrective action regulatory requirements are found in 40 CFR Parts 264 and 265, Subpart F.

4.1.1.2 Regulatory Requirements

The regulatory requirements for closure of hazardous waste landfills are found in 40 CFR Parts 264 and 265, Subpart N. Under these hazardous waste management regulations, owners or operators of facilities with landfills are required to perform "landfill closure."[19] The landfill closure performance standards of §§264.310 and 265.310 require the owner or operator to design and construct a low-permeability cover over the unit to minimize the migration of liquids into the waste. In addition, the owner or operator must provide 30 years of post-closure maintenance and care for the unit in order to prevent waste or constituent migration into the environment. The owner or operator must have written closure and post-closure plans that identify the steps necessary to perform closure of the landfill and maintain it after closure.

EPA's landfill closure performance standards and post-closure requirements apply to both interim status and permitted units. Because interim status landfill units that received waste prior to May 8, 1985, are not required to have a double liner and a leachate collection and removal system, continued collection of leachate during the post-closure period is required only of permitted units. Otherwise, the closure and post-closure requirements are identical for permitted and interim status units.

4.1.2 Closure of Landfills

The technical requirements for closure of hazardous waste landfills are found in 40 CFR §§264.310 and 265.310 (for permitted and interim status units, respectively). These requirements are expressed as a performance standard that provides for the long-term minimization of leachate generation and the control of contaminant migration into the environment. The primary requirement for landfill closure is the design and construction of a final cover.

The following activities are required for closure of a hazardous waste landfill:

- Prepare closure plan (Section 4.1.2.1);
- Design final cover (Section 4.1.2.2); and
- Conduct closure (Sections 4.1.2.3 - 4.1.2.5).

These activities are discussed in detail in the subsections that follow.

4.1.2.1 Preparing Landfill Closure Plans

A written closure plan is required for closure, as described in Chapter 3 of this manual. An outline of a sample closure plan for a landfill is presented in Exhibit 4.1-2. As indicated in the exhibit, the closure

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[19] This type of closure is also an option for the closure of other land disposal units (i.e., surface impoundments, waste piles).

plan should include detailed information about facility and waste characteristics, plans for decontamination and/or disposal during closure, final cover design, ground-water monitoring, security systems, survey plats, closure certification, and the schedule of partial and final closure.

EPA's "Permit Applicants' Guidance Manual for Hazardous Waste Land Treatment, Storage, and Disposal Facilities," Final Draft, May 1984, EPA-530-SW-84-004 recommends that an analysis of the final cover design be presented in the basic portion of the closure plan and that details be provided in an attachment on "cover design." This EPA guidance suggests that the analysis of the final cover design should describe how the proposed design minimizes liquid migration, promotes drainage while controlling erosion, minimizes maintenance needs, accounts for potential settlement and subsidence, has a permeability equal to or less than the permeability of the bottom liners or natural subsoil, and accounts for freeze/thaw effects. Specific information related to the design of the final cover that this EPA guidance recommends for inclusion in the plan consists of:

- Detailed drawings of the proposed layers;
- Common name, species, and variety of the cover crop;
- Description of the synthetic liner in the final cap, including the type of liner, its chemical properties, and manufacturer specifications for thickness and strength;
- Description of any protective materials placed above or below the synthetic liner;
- Characterization of any clay liner placed beneath the synthetic liner, including thickness and permeability;
- Construction plans for any clay liner;
- Analysis of surface drainage and discussion of erosion control;
- Procedures for installing each layer, with emphasis on the installation of the synthetic membrane; and
- Specifications of the drainage layer, including hydraulic conductivity.

The closure plan should also include results from consolidation tests performed on soil samples, data on potential settlement due to consolidation of the liner and foundation soils, compression of the landfill material, and biological oxidation of organics. These demonstrations should include all the raw data, assumptions, construction plans, and drawings that are necessary to support the analysis provided in the plan.

Exhibit 4.1-2

LANDFILL CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Facility Conditions	• Facility description; • Landfill description; • Hydrogeological conditions; • Estimate of maximum number of cells or trenches ever open; • References to other environmental permits; and • Anticipated waivers or exemptions.
Inventory and Decontamination	• Estimation of maximum waste volume; and • Procedures for handling, decontamination and/or disposal of other removed inventory (e.g., equipment and contaminated soils).
Final Cover Design	• Engineering drawings; • Installation procedures; • If a design other than that suggested by EPA is used, include engineering calculations demonstrating that cover will provide long-term minimization of the migration of liquids through the landfill and that infiltration is equivalent to or less than cover design provided by EPA; and • Demonstration that cover will function effectively with minimum maintenance.
Ground-Water Monitoring	• Procedures for monitoring analysis; and • Number, location, and frequency of samples.
Security Systems	• General description.

Exhibit 4.1-2 (Continued)

LANDFILL CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Survey Plat	• Surveyed benchmarks.
Closure Certification	• Activities to be conducted; and Documentation.
Schedule of Partial & Final Closure	• Expected year of closure (only for interim status facilities without approved closure plans); • Frequency of partial closure(s); • Time required for waste treatment, removal, decontamination, and final closure; and • Support for deadline extensions, if applicable.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

4.1.2.2 Designing Final Landfill Covers

At closure, a final cover must be placed on a landfill to minimize long-term infiltration of precipitation and run-off into the closed landfill. This final cover must be designed and constructed to meet or exceed the performance standard stated in EPA's regulations. As discussed later in this section, it may be appropriate to design covers that also meet NRC standards for mixed waste facilities (see Appendix D). Exhibit 4.1-3 below presents the performance requirements for the design and construction of a final cover for a hazardous waste landfill under 40 CFR §§264.310(a) and 265.310(a).

Exhibit 4.1-3

Final Cover Requirements for Landfills

A final cover must:

- Provide long-term minimization of the migration of liquids through the closed landfill;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the final cover;
- Accommodate settling and subsidence so that the cover's integrity is maintained; and
- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

These cover requirements are performance standards that allow some flexibility in design. Final covers must be designed with a permeability equal to or less than the permeability of the bottom liner system or natural subsoils. This is to prevent the "bathtub effect," i.e., the liquid buildup and eventual overflow due to precipitation which enters the unit through the cover but can not escape through the bottom liner. In addition, the standards require that covers minimize erosion or abrasion and accommodate settling and subsidence. Several guidance documents on interpreting the regulatory requirements for final covers and on their design are available from EPA, including:

- *"Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," EPA/530-SW-89-047, July 1989*;
- *"Evaluating Cover Systems for Solid and Hazardous Waste," EPA# SW-867, GPO# 055-000-00228-2, 1982* (This manual provides a guide to examining soil, topographical, and climatological data and recommends cover evaluation procedures.);

- *"Design and Construction of Covers for Solid Waste Landfills," EPA-600/2-79-165, August 1979*; and

- *"Covers for Uncontrolled Hazardous Waste Sites," EPA/540/2-85/002, September 1985.*

- *"Seminar Publication, Requirements for Hazardous Waste Landfills: Design, Construction, and Closure," EPA 625/6-88/022, August 1989.*

When closing a landfill that contains mixed waste, the owner or operator may face additional considerations related to minimizing leachate generation and testing and handling of leachates. Guidance on these mixed waste leachate considerations may be found in the following NRC/EPA guidance document (see Appendix D):

- *"Joint NRC-EPA Guidance on a Conceptual Design Approach for Commercial Low-Level Radioactive and Hazardous Waste Disposal Facilities," August 3, 1987.*

EPA's Recommended Final Cover Design. EPA's technical guidance for final covers, referenced above, describes a recommended cover design that will meet the final cover performance standard. However, because the final cover design described in this guidance is only recommended, any design that can be demonstrated to meet or exceed the regulatory performance standard can be used in place of the recommended system. EPA's recommended cover is comprised of three layers: a top layer, a drainage layer, and a low permeability layer. Exhibit 4.1-4 illustrates the components of the recommended cover system. The three layers of the recommended cover system are described in detail below.

The ***two-component top layer*** consists of an upper vegetative layer (or other surface treatment) underlain by soil. The upper component should be designed to impede erosion while allowing surface runoff from major storms. Unless the prevailing climate precludes the use of vegetation because of difficulty in establishing or maintaining vegetative cover, EPA recommends that this upper component consist of locally adapted perennial plants with the following characteristics:

- Resistance to drought and temperature extremes;

- Roots which will not disrupt the low-permeability layer;

- Ability to thrive in low-nutrient soil with minimal nutrient additions;

- Sufficient density to minimize cover soil erosion to no more than 2 tons/acre/year;[20] and

- Ability to survive and function with little or no maintenance.

In environments where it is not practical to maintain vegetation of this nature, EPA recommends that armoring material be used in place of vegetation as the upper component of the top layer. Armoring material should possess the following characteristics:

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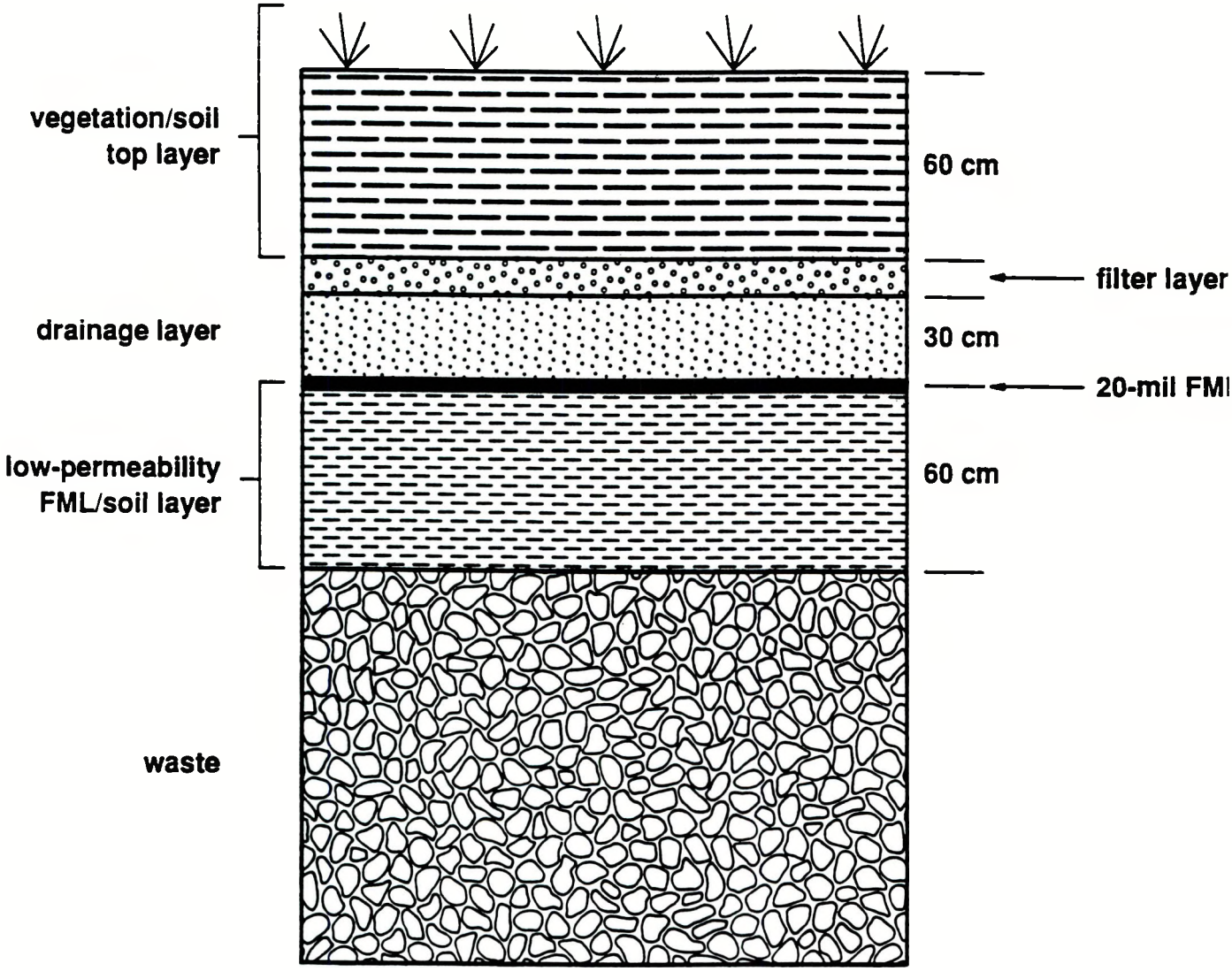
[20] Calculated using the USDA Universal Soil Loss Equation (USLE).

Exhibit 4.1-4

EPA'S RECOMMENDED THREE-LAYER COVER SYSTEM



Source: EPA/530-SW-89-047, "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989.

- Ability to minimize water and wind erosion of itself and the underlying soil during severe weather and to control the annual rate of soil erosion of the cover to no more than 2 tons/acre/year (calculated using the USLE);

- Ability to accommodate settlement without compromising performance; and

- A surface slope approximately the same as the underlying soil (at least a 3 percent slope).

EPA recommends that the lower component of the top layer have the following characteristics:

- A minimum thickness of 60 cm (24 in.), including 15 cm (6 in.) of topsoil (to support vegetation);

- Medium texture (to support seed germination and root development);

- A final top slope, after allowance for settling and subsidence, of at least 3 percent, but no greater than 5 percent (to assist run-off while minimizing erosion); and

- Minimum compaction (to support root development and sufficient infiltration to maintain plant growth during dry periods).

EPA's "*Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989* provides a more detailed discussion of this layer as well as references to assist in the choice of appropriate vegetation or other erosion-impeding materials. Use of the USLE to estimate annual erosion rates is described briefly in the section below.

The ***drainage layer*** is intended to promote the rapid and efficient transport of water from the cover to an exit drain. Water that infiltrates through the top layer should be removed from the cover by the drainage layer, thus minimizing the amount and residence time of water coming into contact with the low-permeability layer. The drainage layer can be comprised of either granular material such as sand or of geosynthetic materials. The Agency recommends that a granular drainage layer (e.g., sand) have the following characteristics:

- A minimum thickness of 30 cm (12 in.) and a minimum slope at the bottom of the layer of 3 percent, or greater slope and/or thickness if necessary as determined by hydrologic modeling (see discussion below on using the Hydrologic Evaluation of Landfill Performance [HELP] model to demonstrate compliance with the performance standard);

- Hydraulic conductivity of no less than 1×10^{-2} cm/sec (at the time of installation);

- A maximum particle size of 3/8 inch, classified by the Unified Soil Classification System as a SP sand (i.e., smooth and rounded containing no debris that might damage the underlying membrane liner); and

- Overlain by a filter layer, granular or geosynthetic, between the top layer and the drainage layer to prevent clogging of the drainage layer.

If the drainage layer is composed of geosynthetic materials, EPA recommends the following characteristics:

- The same minimum flow capability as a granular drainage layer (i.e., a hydraulic transmissivity of $3x10^{-5}$ m^2/sec or greater);
- A geosynthetic filter layer above the drainage material to prevent clogging of the drainage layer by soil material; and
- A geosynthetic bedding beneath the drainage layer, if necessary, to provide sufficient friction to minimize slippage between the drainage layer and the underlying membrane and to prevent intrusion of the membrane into the drainage layer.

The ***low-permeability layer*** provides the cover system with a permeability of less than or equal to the permeability of the landfill's bottom liner system or natural subsoils present. This layer should be placed at a depth below the maximum frost penetration depth and consist of, at least, an upper flexible membrane liner (FML) component and a bottom soil component. EPA recommends an upper FML component which has the following characteristics:

- At least 20 mils thick;
- A minimum 3 percent slope;
- An even surface (i.e., without local depressions);
- Material and seam specifications such as those required for liners;
- Protection by an overlying drainage layer (as described above);
- Direct contact with the underlying compacted soil component; and
- A minimal number of properly sealed, designed penetrations (e.g., gas vents), no stressed conditions, and no excessive slack.

The bottom soil component should have the following characteristics:

- 60 cm (24 in.) of compacted, low-permeability soil (in-place saturated hydraulic conductivity of $1x10^{-7}$ cm/sec or less);
- Free of clods, rocks, stone, debris, cobbles, rubbish, roots, etc.;
- An upper surface with a slope of 3 percent; and
- Constructed entirely below the maximum frost penetration depth upon completion of the cover system.

Designing Equivalent Covers. EPA recognizes that its recommended cover system may not be appropriate for all landfill units or all sites, and that alternative cover designs may fulfill the regulatory performance standard for final covers. Alternative designs must provide long-term performance at least

equivalent to the recommended design including, minimizing infiltration and providing resistance to erosion and abrasion at least as well as the analogous layers of the recommended cover system. Alternative designs should also require minimal maintenance and be as durable as the recommended system. Exhibit 4.1-5 below discusses minimum requirements for alternative cover designs.

Exhibit 4.1-5

Alternative Design Requirements for Each Layer of a Final Cover

Alternatives to the recommended top layer should promote runoff while minimizing erosion and also partially provide the cover necessary to position the low-permeability layer below the frost penetration depth. Proposed designs with slopes greater than 5 percent may be acceptable if it can be demonstrated (by the USLE or another method) that erosion will be controlled to 2 tons/acre/year or less. (Use of the USLE is described in the next section.)

Alternatives to the recommended drainage layer must have a transmissivity great enough to remove infiltration that might be expected during a reasonably probable storm event (i.e., a 24-hour, 25 year storm). The HELP model, or a similar model, can be used to demonstrate the ability to provide this drainage. (Use of the HELP model is described in the next section.)

Alternatives to the recommended low-permeability layer must provide a level of long-term infiltration control that will preclude the "bathtub effect" from occurring. Interim status units that do not have flexible membrane liners may be able to meet this requirement without the inclusion of an FML in their final cover. Additionally, in arid environments the compacted soil component of this layer may provide sufficient infiltration control without the recommended maximum hydraulic conductivity of $1x10^{-7}$. In both of these instances, or for any proposed alternative design of the low-permeability layer, infiltration control must be demonstrated by using the HELP model or a similar system.

Demonstrating Compliance with the Performance Standard. In order to demonstrate that the proposed final cover design complies with the regulatory performance standard, it may be necessary to model the hydrologic performance and erosion potential of the proposed cover. Data demonstrating that the proposed cover design will prevent the collection of water in the closed unit (the "bathtub effect") also must be provided in the closure plan. EPA suggests that the HELP model be used for these demonstrations (*"User's Guide for the Hydrologic Evaluation of Landfill Performance (HELP) Model," EPA/530-SW-84-009*).[21] Exhibit 4.1-6

[21] The mainframe version of the HELP model is maintained on the National Computer Center (NCC) IBM Computer System. A PC version is also available. Contact National Technical Information Services (NTIS) at (703) 487-4807 to obtain an NCC account. The U.S. Army Engineer Waterways Experiment Station (WES) can answer questions regarding the use of the model (mainframe or PC version), establish the model on your NCC account, or send you the PC version of the model. Contact WES at (601) 634-3709 (commercial) or 542-3709 (FTS).

below briefly describes this model and its recommended use for demonstrating the hydrologic performance of a final cover.

Exhibit 4.1-6

Using the HELP Model to Demonstrate Infiltration Protection

Description of the HELP Model

The Hydrologic Evaluation of Landfill Performance (HELP) model estimates the amounts of surface runoff, subsurface discharge, and leachate that may be expected to result from the operation of a wide variety of possible landfill designs. The model uses a quasi-two-dimensional approach to simulate the effects of hydrologic processes such as precipitation, surface storage, runoff, infiltration, percolation, evapotranspiration, soil moisture storage, and lateral drainage.

Site-specific input data are encouraged, but default data for various soil types, geographic areas, and vegetation types are available. Output is available for daily results, monthly totals, annual average totals, and average monthly totals. Average monthly totals and annual average totals for precipitation, runoff, evapotranspiration, percolation through the base of each subprofile of the landfill (e.g., the cover or the waste and liner), and lateral drainage from each subprofile are provided.

Using the HELP Model

With site-specific input on climate, rainfall, soil characteristics, and landfill design (i.e., the planned profiles of the cover and landfill), the HELP model estimates the drainage and infiltration from the cover and the head on and infiltration through the landfill liner. Climatological and rainfall input should reflect long-term averages and model output should describe infiltration control (e.g., adequate drainage and evapotranspiration, minimal infiltration) resulting in a minimal head of leachate on the bottom liner over a long-duration modeling period.

Data demonstrating that the proposed design will not result in excessive erosion of the cover may be needed to support the choice of the slope and surficial cover material (vegetative or armoring). Guidance on using the USLE to assess erosion potential is described in *EPA's "Evaluating Cover Systems for Solid and Hazardous Waste," Report No. SW-867, 1982* and *"Design and Construction of Covers for Solid Waste Landfills," EPA-600/2-79-165, August 1979.* EPA's *"Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989* recommends a slope of between 3 and 5 percent or a demonstration by the USLE that total erosion will be less than 2.0 tons/acre/year. Exhibit 4.1-7 below describes the USLE and its application to estimating the erosion potential of landfill covers.

Exhibit 4.1-7

Using the Universal Soil Loss Equation (USLE) to Estimate Erosion Potential

Description of the USLE

The USLE estimates annual average soil loss as a function of six site-specific factors:

A = RKLSCP, where

A = average annual soil loss (tons/acre),
R = rainfall and run-off erosivity,
K = soil erodability factor (tons/acre),
L = slope-length factor,
S = slope-steepness factor,[1]
C = cover/ management factor, and
P = practice factor.

Using the USLE

The closure plan should demonstrate, by use of this or a similar equation, that the predicted rate of soil loss will be less than 2 tons/acre/year.[2] Results of analyses using the USLE are highly dependent on assumptions about the various factors on which the rate of soil loss depends. EPA provides guidance on determining values for these factors in *"Design and Construction of Covers for Solid Waste Landfills," EPA-600/2-79-165, August 1979, Section 10, pages 127-133.* This reference also explains how the USLE can be used for evaluating cover designs and options available for designing water erosion control.

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[1] The USLE is derived from data on slopes up to 18 degrees. Use of the equation for steeper slopes may not be appropriate.

Optional Cover System Features. In addition to the cover system features discussed above, some situations will require the addition of other features to the cover system. Two relatively common optional cover components include a gas venting system and a biotic barrier.

If the landfilled waste is likely to produce gases, it is advisable to install a gas venting system above the waste layer during closure to prevent future build up of pressure under the final cover. Generation of gases is most likely in units containing significant quantities of organic waste materials. *EPA's "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989* recommends that a gas venting layer, installed between the waste and the low permeability layer of the cover, should have the following characteristics:

- A minimum thickness of 30 cm (12 in.);

- Composed of coarse-grained porous materials (similar to a drainage layer), or if geosynthetic materials are used, equivalent performance to a granular system must be demonstrated;

- Venting to an exterior collection point for disposal or treatment, provided by laterally patterned, horizontal perforated pipes channeled to vertical risers which extend through the cover; and

- A minimal number of vertical risers located at high points of the cover.

Further information on the design of gas venting layers is provided in EPA's *"Design and Construction of Covers for Solid Waste Landfills," EPA-600/2-79-165, August 1979.*

If deep plant roots or burrowing animals may threaten the integrity of the proposed cover, it is advisable to include a biotic barrier layer in the cover design. *EPA's "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," EPA/530-SW-89-047, July 1989* recommends the use of physical barriers to discourage or reduce threats of plants or animals to the performance of the cover. The recommended design calls for either three feet of cobbles or six inches of gravel over two and one-half feet of cobbles. This layer should lie directly under the soil component of the top layer of the cover (perhaps separated by a filter layer). Further information on protecting covers from biological intrusions can be found in:

- Hakonson, T.E., "Evaluation of Geologic Materials to Limit Biological Intrusion into Low-level Radioactive Waste Disposal Sites," Los Alamos National Laboratory Report LA-10286-MS, February 1986;

- Hakonson, T.E., J.F. Cline, W.H. Rickard, "Biological Intrusion Barriers for Large Volume Waste Disposal Sites," in Proceedings, Low-Level Disposal: Facility Design, Construction, and Operating Practices, NUREG/CP-0028, CONF 820911, Vol. 3, U.S. Nuclear Regulatory Commission, Washington, D.C., 1983; and

- Foxx, T.S., G.D. Tierney, J.M. Williams, "Rooting Depths of Plants on Low-Level Waste Disposal Sites," Los Alamos National Laboratory Report LA-10253-MS, November 1984.

4.1.2.3 Preparing a Landfill for Installation of a Cover

Before construction of a landfill cover can begin, the landfill should be properly prepared for installation of the cover. The two primary steps in preparing the landfill are (1) compacting the waste to the maximum degree practical and (2) installing a foundation layer.

Waste Compaction -- Settling and Subsidence. Because landfilled waste can be prone to settlement and subsidence,[22] it may be necessary to stabilize the landfill as much as possible by compacting the waste. To minimize the detrimental effects of an unstable (spongy) base for a cover, *EPA's "Design and Construction of Covers for Solid Waste Landfills," EPA-600/2-79-165, August 1989* recommends that a conservative waste compaction effort be conducted prior to cover construction. This guidance suggests, as an example, that four passes of equipment over the waste be used as a first cut until experience indicates a change is warranted. Additional practical and theoretical information on settlement and subsidence are provided in the following EPA reports:

- *"Settlement and Cover Subsidence of Hazardous Waste Landfills," EPA-600/2-85/035, 1985*;
- *"Prediction/Mitigation of Subsidence Damage to Hazardous Waste Landfill Covers," EPA/600/2-87/025, 1987*; and
- *"Covers for Uncontrolled Hazardous Waste Sites," EPA/540/2-85/002, September 1985.*

When a significant amount of settlement and subsidence is expected within two to five years, *EPA's "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," EPA/530-SW-89-047, July 1989* proposes that interim covers may be appropriate. After settlement occurs, a final cover could be built atop the interim cover, or the interim cover could be replaced with a final cover. An interim cover must meet the general performance standards of 40 CFR §264.111.

The *"Joint NRC-EPA Guidance on a Conceptual Design Approach for Commercial Low-Level Radioactive and Hazardous Waste Disposal Facilities," August 3, 1987* suggests that, when closing landfills containing mixed wastes, it may be acceptable to place wastes in high integrity waste containers (HICs). Spaces between containers would then be filled with a cohesionless, low compressible fill material. In such a case, compaction may be necessary. Other options include placement of wastes in an engineered reinforced concrete vault, steel fiber polymer impregnated concrete vault, or double-lined high integrity containers that are hermetically sealed. Appendix D includes technical information regarding appropriate designs for mixed waste disposal facilities subject to NRC and EPA requirements. Although NRC requirements do not apply at DOE facilities, the guidance contained in these two materials may be applied to mixed waste disposal units as appropriate.

Foundation Layer. Prior to cover construction, a foundation layer may be installed to provide (1) support for the cover, (2) sufficient strength and rigidity to support the compaction of the low-permeability layer, and (3) proper bedding material for the lower, soil component of the low-permeability layer. *EPA's "Handbook: Remedial Action at Waste Disposal Sites (Revised), EPA/625/6-85/006, October 1985* recommends that this layer be installed in 6-inch lifts over the waste and compacted to its maximum achievable density to increase its strength. This guidance suggests that the ability of this layer to support the cover and cover construction process be evaluated using the following tests:

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[22] Settlement refers to uniformly distributed recession of the landfill due to compression of the foundation, liner, or waste or the dewatering of the waste. Settlement may primarily occur prior to cover construction. Subsidence refers to unevenly distributed settlement after closure. Subsidence can threaten the integrity of a cover by creating cracks and depressions.

- unconfined compressive strength tests (by ASTM D2166),
- triaxial compression tests (by ASTM D2850),
- direct shear tests (by ASTM D3080), and
- grain size analyses (by ASTM D421, D422, and D1140).

Achievement of the desired compaction is primarily a function of the compactive effort and the water content of the soil at the time of compaction. For a discussion of these variables and their control to optimize compaction of a foundation layer, refer to *EPA's "Covers for Uncontrolled Hazardous Waste Sites," EPA/540/2-85/002, September 1985.*

EPA's "Handbook: Remedial Action at Waste Disposal Sites (Revised)," EPA/625/6-85/006, October 1985 also suggests that the base underlying the low-permeability layer be composed of fine to medium grade fill that will not abrade the liner. This base, or foundation layer, must be sufficiently fine-grained to prevent the fine grains of the compacted soil portion of the low-permeability layer from falling into the foundation layer. Appropriate grain sizes for the foundation (bedding) layer are specified in *"Evaluating Cover Systems for Solid and Hazardous Waste," EPA, Report Number SW-867, 1982.* Alternatively, a fabric filter of suitably fine mesh can be placed between the two layers.

4.1.2.4 Installation of a Landfill Cover

Once a suitable foundation has been established for the cover, installation can begin. A cover is installed by following these steps:

- Placing and compacting the soil component of the low-permeability layer;
- Placing and seaming the Flexible Membrane Liner (FML);
- Placing and compacting the drainage layer (including filter components);
- Placing the soil component of the top layer; and
- Seeding the surface of the cover or placing the armoring material.

In addition, any optional layers specified in the design should be placed (and compacted as needed).

The *soil component of the low-permeability layer* should be placed in 6-inch lifts and compacted with appropriate equipment (e.g., bulldozer, sheepsfoot roller). *EPA's "Handbook: Remedial Action at Waste Disposal Sites [Revised]," EPA/625/6-85/006, October 1985* recommends that this component should be compacted to over 90 percent of its dry density at its optimum water content as determined by ASTM D1557 or another suitable test method. The permeability of this layer should be tested at least twice each acre for each lift. Results of the compaction and permeability tests determine the type of compaction equipment and the number of passes needed. The remainder of the cover should be constructed as soon as possible after completion of this layer to prevent excessive drying (or wetting from precipitation) of this layer.

The *FML* should be placed and seamed according to the cover design and manufacturer specifications. This component can be spread by hand or machine and seamed by a variety of methods. *EPA's "Covers for Uncontrolled Hazardous Waste Sites," EPA/540/2-85/002, September 1985* provides a discussion of the advantages and disadvantages of the various approaches to these operations.

A granular *drainage layer* should be placed in six-inch lifts and compacted to an appropriate degree. The permeability and compaction of this layer should be tested to assure compliance with design specifications. If called for in the cover design, a geosynthetic drainage layer can be placed directly atop the FML. Alternatively, a geosynthetic bedding layer might need to be lain between the FML and the drainage layer component. After placement (and compaction) of the drainage component of this layer, the filter layer can be placed (and compacted if necessary). If the filter layer is composed of granular material, it should be placed in lifts, compacted, and tested to demonstrate appropriate compaction and permeability.

The *top layer* is constructed by spreading the soil component evenly over the drainage layer and seeding this layer with the selected cover vegetation. This layer should not be overly compacted. Seeding, and possibly mulching, should take place as soon as possible after this layer is spread in favorable weather conditions.

4.1.2.5 Construction Quality Assurance

EPA recommends that a Construction Quality Assurance (CQA) program be implemented for the purposes of ensuring that the final cover system meets all design criteria, plans, and specifications. Technical guidance on CQA programs has been provided by the EPA and is available in *EPA-530/SW-85-021, "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, Public Comment Document" (1985)*. Section 2.3.7 of that document specifies construction inspection activities for overseeing the construction of final cover systems. That section is summarized in the paragraphs below.

Preconstruction. Preconstruction quality assurance activities include screening materials for the system components and constructing test fills to assure that the cover design and manufacturers' specifications are met. In addition, the presence of adequate quantities of topsoil, fertilizer, soil conditioners, and seeds of the quality specified in the cover design should be verified. Before closure, experimental plots of proposed cover vegetation might be planted to demonstrate its viability under expected conditions.

Construction. The construction of each component of the final cover should be observed and evaluated with respect to conformance with the specifications of the cover design. Inspection of the foundation layer should include:

- Inspection of subcomponents that are installed into the waste or foundation layer (e.g., gas vents); and

- Testing and observation of the thickness, coverage, slope, density, and bearing strength to check conformance with the design.

Inspection of the low-permeability layer soil component should include:

- Evaluation of test fills to demonstrate achievement of required permeability and to determine the relationship between soil density, moisture content, compactive effort, and permeability;

- Testing of seals around penetrations (e.g., gas vent pipes and leachate collection system standpipes);

- Survey of surface slope to assure conformance with design and absence of depressions; and

- Inspection of surface conditions with respect to suitability as base for the FML.

Inspection of the FML should include:

- Checking delivery tickets and manufacturers' quality control documents;

- Observing placement of the FML to assure conformance with the plan;

- Observing that seaming is conducted according to the plan and that weather conditions are suitable;

- Testing seams; and

- Inspecting the installation of anchors and seals (around penetrations).

Inspections of the drainage layer should include:

- Observing the filling process around vents and standpipes to prevent their damage or misalignment;

- Inspecting thickness and slope for conformance to cover design; and

- Observing the placement of the filter layer for conformance to cover design.

Inspections of the top layer should include:

- Monitoring the uniformity of the application process;

- Inspecting thickness and slope for conformance to cover design;

- Observing that penetrations are not disturbed by placement or tilling; and

- Observing the seeding process, including rate of seed and mulch application, amount and uniformity of coverage, and watering.

4.1.2.6 Preparing Post-Closure Care Plans

Owners or operators of landfills are required to conduct post-closure care for 30 years after closure and must comply with all post-closure procedural requirements contained in 40 CFR §§264.117 through 264.120 and §§265.117 through 265.120, including maintenance and monitoring throughout the post-closure care period.

Provisions for the kinds of monitoring and maintenance activities that reasonably can be expected during the post-closure care period must be specified in a post-closure plan. A post-closure plan should describe, at a minimum, the frequency and scope of inspections; procedures for making repairs to the cover;

procedures for maintaining run-on and run-off controls; procedures for leachate collection, removal, and treatment; the frequency of sampling and monitoring; maintenance of monitoring systems; and maintenance of surveyed benchmarks. Exhibit 4.1-8 presents an outline of a sample post-closure care plan.

Exhibit 4.1-8

LANDFILL POST-CLOSURE CARE PLAN SAMPLE OUTLINE

Section	Elements
Ground-Water Monitoring	• Number, location, and depth of wells; • Frequency of sampling; and • Types and procedures for analysis.
Soil Monitoring	• Number and frequency of samples; • Sampling procedures; and • Types of analysis conducted.
Leachate Monitoring and Removal	• Frequency and procedures for monitoring; • Estimated quantity of leachate; • Procedures for collection and removal of leachate; and • Leachate treatment and disposal procedures.
Inspections	• Frequency and • Scope
Maintenance Activities	• Final cover; • Monitoring systems; and • Security systems.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

4.1.2.7 Post-Closure Care Requirements for Landfill Closures

The post-closure care period is 30 years from the date of closure, unless the Regional Administrator establishes an alternate period. The regulatory requirements for post-closure care of hazardous waste landfills (40 CFR §§264.310(b)-(c) and 265.310(b)-(c)) are summarized in Exhibit 4.1-9.

Exhibit 4.1-9

Post-Closure Care Requirements for Landfills

At final closure, the owner or operator must comply with all post-closure requirements in 40 CFR §§264.117 - 264.120 and 265.117 - 265.120 as well as the following:

- Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;
- Continue to operate the leachate collection and removal system until leachate is no longer detected (for interim status units, this requirement is triggered upon issuance of the post-closure permit);
- Maintain and monitor the ground-water monitoring system and comply with all other applicable requirements of Subpart F of this Part;
- Prevent run-on and run-off from eroding or otherwise damaging the final cover; and
- Protect and maintain surveyed benchmarks used in complying with 40 CFR §264.309 (refers to surveying and record keeping).

During the post-closure care period for a permitted landfill, if liquid leaks into a leak detection system installed under 40 CFR §264.302 in accordance with the HSWA amendments, the owner or operator must notify the Regional Administrator of the leak within seven days. The Regional Administrator will modify the permit to require compliance with the requirements of Subpart F of Part 264.

The frequency of monitoring and maintenance activities is dependent on the specific site conditions, i.e., climate, waste type, soil, vegetation, etc. For units containing radioactive mixed wastes, the RCRA requirement to collect and remove leachate will require special consideration to ensure that exposures to personnel are kept as low as practicable.

EPA's ground-water monitoring requirements are described in Section 2.1.3.2. In addition to these specific requirements for landfill closure, all other generic Subpart G closure and post-closure care requirements also apply to the closure of landfills. These general requirements are discussed in Chapter 3.

4.1.3 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.1:

DOE 5484.1, "Environmental, Safety, and Health Protection Information Reporting Requirements," February 24, 1981.

EPA/530-SW-84-004, "Permit Applicants' Guidance Manual for Hazardous Waste Land Treatment, Storage, and Disposal Facilities," Final Draft, May 1984.

EPA/530-SW-84-009, "User's Guide for the Hydrologic Evaluation of Landfill Performance (HELP) Model."

EPA/530-SW-85-021, "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, Public Comment Document," 1985.

EPA/SW-867, "Evaluating Cover Systems for Solid and Hazardous Waste," 1982 (GPO#055-000-00228-2).

EPA/530-SW-88-028, "RCRA Corrective Action Plan," Interim Final, June 1988 (OSWER Directive 9902.3).

EPA/530-SW-88-029, "RCRA Corrective Action Interim Measures Guidance," Interim Final, June 1988 (OSWER Directive 9902.4).

EPA/530-SW-89-047, "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989.

EPA/540/2-85-002, "Covers for Uncontrolled Hazardous Waste Sites," September 1985.

EPA/600/2-79-165, "Design and Construction of Covers for Solid Waste Landfills," August 1979.

EPA/600/2-85-035, "Settlement and Cover Subsidence of Hazardous Waste Landfills," 1985.

EPA/600/2-87-025, "Prediction/Migration of Subsidence Damage to Hazardous Waste Landfill Covers," 1987.

EPA/625/6-85-006, "Handbook: Remedial Action at Waste Disposal Sites (Revised)," October 1985.

EPA/625/6-89-022, "requirements for hazardous waste Landfills: Design, Construction, and Closure," August 1989.

EPA/625/4-89-020, "Corrective Action: Technologies and Applications," September 1989.

Foxx, T.S., G.D. Terney, J.M. Williams, "Rooting Depths of Plants on Low-Level Waste Disposal Sites," Los Alamos National Laboratory Report LA-10235-MS, November 1984.

Hakonson, T.E., "Evaluation of Geologic Materials to Limit Biological Intrusion into Low-level Radioactive Waste Disposal Sites," Los Alamos National Laboratory Report LA-10286-MS, February 1986.

Hakonson, T.E., J.F. Cline, W.H. Rickard, "Biological Intrusion Barriers for Large Volume Waste Disposal Sites," in Proceedings, Low-Level Disposal: Facility Design, Construction, and Operating Practices, NUREG/CP-0028, CONF 820911, Volume 3, U.S. NRC, Washington, D.C., 1983.

"Joint NRC-EPA Guidance on a Conceptual Design Approach for Commercial Low-Level Radioactive and Hazardous Waste Disposal Facilities," August 3, 1987.

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," U.S. EPA, January 1987.

OSWER Policy Directive #94800-14, Combined NRC_EPA Siting Guidelines for Disposal of Commercial Mixed Low-Level Radioactive and Hazardous Waste," U.S. EPA, June 1987.

OSWER Policy Directive #9950.1, "RCRA Ground-water Monitoring Technical Enforcement Guidance (TEGD)," September 1986.

OSWER Policy Directive #9500.00-60, "Interim Final RFI Guidance," Vol. 1-4, U.S. EPA, May 1989.

4.2 *SURFACE IMPOUNDMENTS*

This section presents the requirements for closure and post-closure care of surface impoundments containing hazardous and radioactive mixed wastes located at DOE facilities. A surface impoundment is defined in 40 CFR §260.10 as a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons. If a unit is self-supporting when not surrounded by earthen materials it is a tank, otherwise it is a surface impoundment.

4.2.1 What are the Closure Requirements for Surface Impoundments?

Exhibit 4.2-1 provides an overview of the key closure requirements for surface impoundments and references to where in this section more detailed information is provided.

Exhibit 4.2-1

Overview of Applicable Statutory and Regulatory Requirements

All surface impoundments not in compliance with the *Minimum Technology Requirements* (MTRs) must retrofit or cease receipt of hazardous wastes after 11/8/88. Some surface impoundments not meeting MTRs may be eligible to delay closure and receive only non-hazardous wastes.

Section 4.2.1.1

Options for closure are *"clean closure"* or *"closure as a landfill."*

Sections 4.2.2 - 4.2.4

Closure as a landfill must also include 30 years of *post-closure care.*

Section 4.2.4.4

Contingent landfill closure and post-closure plans are required for any permitted surface impoundment not designed in accordance with the liner design standards.

Section 4.2.3.2

Units clean closed under previous interim status requirements must submit an *"equivalency demonstration"* demonstrating that closure satisfies Part 264 standards. If clean closure cannot be demonstrated, a *post-closure permit* must be obtained.

Section 4.2.3.4

4.2.1.1 Statutory Requirements

The Hazardous and Solid Waste Amendments (HSWA) of 1984 contained several changes to the original Act which affect the operation and closure of surface impoundments. Perhaps most important was the requirement that all surface impoundments that were in existence on November 8, 1984, and qualified to operate under interim status[23], must either:

- Retrofit to meet the minimum technological requirements (MTRs) for surface impoundments; or
- Obtain a variance from these requirements; or
- Stop receiving, treating, and disposing of hazardous wastes by November 8, 1988 (see following section on delayed closure of certain surface impoundments).

The MTRs for surface impoundments are as follows:

- Installation of a double liner system to minimize the potential for soil and ground water contamination;
- Leachate collection system (between the liners); and
- Part 264 ground-water monitoring.

The application deadline for exemptions to the retrofit requirements for interim status facilities has passed (the deadline was November 8, 1986), as has the deadline for meeting the requirements to retrofit (November 8, 1988). *Therefore, any surface impoundment (interim status or permitted) currently not in compliance with the minimum technological requirements and for which a variance has not been obtained, must stop receiving hazardous wastes* (HSWA Section 3005(j)).

Variances from MTRs may be granted if it can be demonstrated that alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents into the groundwater or surface water at least as effectively as such liners and leachate collection systems (HSWA Section 3004(o)). While exemptions were also granted for interim status impoundments, the application deadlines for these exemptions have already passed.

Guidance on MTRs and their requirements can be found in *EPA's "Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments: Design, Construction, and Operation," May 24, 1985, EPA/SW-870, "Lining of Waste Impoundment and Disposal Facilities,"* and *EPA/530-SW-86-017, "Interim Status Surface Impoundments Retrofitting Variances," July 8, 1986.*

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[23] This requirement includes facilities that: (1) qualified for interim status in November 8, 1984 and are either still operating under interim status or are now operating under a RCRA Part B permit; and (2) were in existence on November 19, 1980.

4.2.1.2 Regulatory Requirements

The technical requirements pertaining to surface impoundments are found in 40 CFR Parts 264 and 265, Subpart K, §§264.228 and 265.228, respectively. These requirements are in addition to the procedural requirements found in Subpart G, which are discussed in Chapter 3 of this manual. Exhibit 4.2-2 outlines the closure options for surface impoundments.

Exhibit 4.2-2

Surface Impoundment Closure Options (§§ 264.228 and 265.228)

Under the current regulations, owners or operators of both interim status and permitted surface impoundments have two options for closure and post-closure care:

- ***Clean Closure***
  - All hazardous wastes and contaminated equipment/ materials decontaminated or removed from the site
  - No post-closure care required
- ***Closure as a Landfill***
  - Liquids removed
  - Remaining hazardous wastes stabilized
  - Impermeable cap placed over the unit
  - 30-year post-closure care period required

The decision as to which closure option to select is left up to each individual installation (assuming all standards can be met).

When the regulations for permitted units were first issued, they were more stringent than the interim status technical requirements. The regulations required owners or operators of permitted units to monitor ground water for all hazardous constituents listed in Appendix VIII of 40 CFR Part 261 which may have been generated, used, stored, or disposed at the site. In contrast, interim status units were only required to monitor for those hazardous wastes listed in Appendix VII of 40 CFR Part 261, a considerably smaller list. On March 19, 1987, EPA published a final regulation amending the interim status requirements for closure of hazardous waste surface impoundments (52 FR 8704) to conform to those requirements already in existence for permitted surface impoundments (40 CFR §264.228). *Both interim status and permitted facilities are now required to sample for Appendix VIII constituents to demonstrate that they have been removed* (40 CFR 270.1(c)).

Closure Triggers for Surface Impoundments. As discussed above, HSWA requires all surface impoundments in existence on November 8, 1984, and qualified to operate under interim status, to retrofit to meet the MTRs by November 8, 1988, obtain a variance from these requirements, or stop receiving, treating, and disposing of hazardous wastes (HSWA Section 3005(j)). In addition, all units must comply with the RCRA Subpart G closure standards, which trigger the closure requirements 30 days after final receipt of hazardous waste or no later than one year after the date on which the unit received the most recent volume of hazardous waste, if the unit is likely to receive additional hazardous waste (40 CFR §§264.112(d)(2) and 265.112(d)(2)). However, closure may not begin until the closure plan has been approved. *Owners or operators of surface impoundments not meeting MTRs must either have their closure plan approved and begin closure, or discontinue receiving hazardous waste and begin receiving non-hazardous waste providing the surface impoundment meets the criteria for delayed closure discussed below.*

Delayed Closure. EPA recently issued regulations (40 CFR §264.113) that allow surface impoundments to delay closure following final receipt of hazardous waste in order to receive non-hazardous waste (54 FR 33376). Owners and operators of surface impoundments that were forced to cease receipt of hazardous waste on November 8, 1988, because they did not meet the MTR liner and leachate collection system provisions, may also delay closure of these units under this rule. To be eligible to delay closure under these new requirements, an owner or operator of such a surface impoundment must do the following:

- Make several demonstrations and update facility plans as necessary to reflect changes due to the receipt of non-hazardous waste;
- Submit a contingent corrective measures plan (to expedite corrective action in the event of a release of hazardous constituents); and
- Submit and implement a plan for removing all hazardous liquids and all sludges without impairing the integrity of the liner(s), if any are present.

The demonstrations, plan updates, and the contingent corrective action measures plan become a part of the surface impoundment's operating permit, and the unit must continue to operate in compliance with RCRA Subtitle C requirements.

Equivalency Demonstrations. Any interim status surface impoundment that received wastes after July 26, 1982, and clean closed under Part 265 prior to March 19, 1987, must submit an "equivalency demonstration" showing that the closure satisfies all the requirements specified for permitted facilities in Part 264, even if the facility was otherwise subject to the interim status requirements.[24] If clean closure cannot be demonstrated, then a post-closure permit must be obtained for the unit. Information on how to perform an equivalency demonstration is found in Section 4.2.3.4. EPA guidance on equivalency

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[24] EPA requires the equivalency demonstration for facilities closed prior to March 19, 1987, because after that date the requirements for interim status facilities were made identical to those for permitted facilities. Section 3005(i) of HSWA requires all surface impoundments that received wastes after July 26, 1982, to comply with the ground-water monitoring, unsaturated zone monitoring, and corrective action requirements applicable to new units.

demonstrations is found in *OSWER Policy Directive #9476.00-18, "Guidance on Demonstrating Equivalence of Part 265 Clean Closure with Part 264 Requirements," May 12, 1989 (included as Appendix G).*

4.2.2 Selecting Surface Impoundment Closure Options

It is up to the individual facility operator to decide which closure option to implement. Clean closure is generally the preferred option because it eliminates the need for post-closure care; however, there are cases in which clean closure either may be technically or economically infeasible or impractical. Some factors which should be considered when selecting a closure option are listed in Exhibit 4.2-3.

In general, clean closure is most appropriate at relatively small impoundments where contaminant migration has been found to be minimal. Clean closure is also a good option when:

- The waste in the unit may be removed easily and treated for final disposal at a relatively low cost;
- The waste is generating gases that cannot be economically controlled;
- The foundation of the surface impoundment is in poor condition and requires costly repair; or
- Liners have been damaged beyond repair, yet extensive migration of leachate has not occurred.

Surface impoundments with ground water contamination remaining at closure are not allowed to clean close. To the extent that the ground water can be remediated to acceptable levels during the closure period, it may be possible to certify clean closure. However, if contamination has been detected in the unit's Subpart F ground-water monitoring system, the unit is subject to corrective action under 40 CFR §264.100. In that case, closure and corrective action activities must be coordinated. If the unit has interim status, it will be necessary to fully characterize the nature and extent of any contamination in the Part B permit application under 40 CFR §270.14(c). Clean closure is also not usually an option at large surface impoundments, due to the sheer volume of material to be removed, and units in which the physical and/or chemical characteristics of the waste preclude or limit treatment or stabilization. Because hazardous wastes excavated during clean closures are subject to the LDRs, the cost of treatment to BDAT may be an important consideration when selecting clean closure verses landfill closure.

Exhibit 4.2-3

Assessing the Ability to Successfully Complete Clean Closure

Factors to consider when deciding whether to clean close or close as a landfill include:

- Potential for ground water to be contaminated with hazardous constituents. Facilities with ground water contamination may not be allowed to clean close. If unable to clean close, these facilities must close as a landfill and implement a corrective action program
- Amount of contaminated subsoil to be excavated;
- Physical and chemical characteristics of the waste;
- Permeability of underlying strata;
- Depth to the ground-water table;
- Length of time the facility has been in use;
- Mobility of the potential contaminants in the subsurface environment; and
- Relative costs of each option, comparing all aspects of closure, including the costs of sampling, waste removal, alternate disposal, equipment decontamination, ground-water monitoring, and post-closure care.

These factors should be identified during characterization of the waste and site and during other sampling and monitoring programs.

The following section outlines the requirements and additional guidance on clean closure of surface impoundments. Section 4.2.4 outlines the requirements and guidance pertaining to landfill closure of surface impoundments.

4.2.3 Clean Closure of Surface Impoundments

The goal of clean closure is to remove or decontaminate all materials on-site that could potentially lead to future contamination. The technical requirements for clean closure are found in 40 CFR §§264.228(a)(1) and 265.228(a)(1). *Under these requirements, all waste residues, containment system components, liners, subsoils, contaminated equipment, and structures must be decontaminated or removed from*

the site. These components must then be managed as hazardous waste unless specifically exempted under 40 CFR §261.3 (i.e., if they do not exhibit hazardous waste characteristics or they have been delisted).

The following is an overview of the required activities for owners or operators of surface impoundments who plan to clean close their unit(s):

- Prepare closure plan (Section 4.2.3.1);
- Prepare contingent closure plan, if appropriate (Section 4.2.3.2);
- Conduct closure (i.e., remove or decontaminate all wastes, equipment, etc.) (Section 4.2.3.3); and
- Demonstrate clean closure (Section 4.2.3.4).

The following sections provide guidance on how to properly perform each of these activities.

4.2.3.1 Preparing Surface Impoundment Clean Closure Plans

A written closure plan is required for all closures, including clean closures. Exhibit 4.2-4 summarizes the information requirements for a clean closure plan.

Establishment of Contamination Cleanup Targets. The closure plan must include a listing of the exposure limits for all hazardous constituents which may have been generated, used, stored, or disposed at the unit. These constituents include, but are not limited to, those listed in 40 CFR Part 261, Appendix VIII. The exposure limits will be used as standards at the time of closure for assessing whether or not removal and decontamination activities are complete. The exposure limits chosen in the plan for the hazardous component of a mixed waste should be an EPA recommended limit if one exists. Exhibit 4.2-5 provides sources of information on EPA's recommended exposure limits for hazardous constituents:

Exhibit 4.2-4

SURFACE IMPOUNDMENT CLEAN CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Facility Conditions	• Facility location and size; • Topographic map; • List of other hazardous waste management units and wastes handled in each; • Hydrogeological information; • Surface impoundment description (volume, size, type of liner system, etc.); • Description of past releases and corrective measures taken; • References to other environmental permits; and • Anticipated waivers or exemptions.
Inventory and Decontamination	• Estimates of inventory to be removed; • Procedures for handling removed inventory; • Procedures for decontamination or disposal of equipment, rinsewater, containment systems and soil; and • Major radionuclides and their concentrations.
Clean Closure Demonstration	• Listing of exposure limits for Appendix VIII constituents; • Background levels at the site; and • Description of the testing to determine if liner, equipment, etc. are hazardous.
Ground-Water Monitoring	• Procedures for monitoring analysis; and • Number, location, and frequency of samples.
Security Systems	• General description.

Exhibit 4.2-4 (Continued)

SURFACE IMPOUNDMENT CLEAN CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Survey Plat	• Surveyed benchmarks.
Closure Certification	• Activities to be conducted; and • Documentation.
Schedule of Closure	• Expected year of closure (only for interim status facilities without approved closure plans); • Time required for waste treatment, removal, decontamination, and final closure; and • Support for deadline extensions, if applicable.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

Exhibit 4.2-5

EPA Recommended Exposure Limits

- Water quality standards and criteria (Ambient Water Quality Criteria 45 FR 79318, November 28, 1980; 49 FR 5831, February 15, 1984; and 50 FR 30784, July 29, 1985);
- Health-based limits based on verified reference doses (RfDs) developed by the Agency's Risk Assessment Forum (*"Verified Reference Doses of USEPA," ECAO-CIN-475, January 1986*);
- Carcinogenic Potency Factors (CPFs) developed by the Agency's Carcinogen Assessment Group (*"Health Assessment Document for Tetrachloroethylene (Perchloroethylene)," USEPA, July 1988*); and
- Site-specific EPA-approved health advisories issued by the EPA for the Agency for Toxic Substance and Disease Registry (ATSDR) of the Center for Disease Control.

While the radioactive component of the waste is not subject to RCRA regulation, it may be appropriate to address these contaminants in the closure plan. The cleanup of radioactive materials is discussed later in this section. The application of chemical exposure limits and EPA risk assessment guidelines require the establishment of intake assumptions, such as those presented in Exhibit 4.2-6. Intake is the amount of substance taken into the body per unit body weight per unit time and is calculated separately for each environmental medium, i.e., air, ground-water, surface water, and soil. Intakes for each individual chemical exposure pathway are summed for each exposed population at risk, resulting in a total oral exposure, total inhalation exposure, etc. The intake assumptions presented in Exhibit 4.2-6 may be varied to incorporate site-specific conditions. The standard values presented assume 24-hour exposure over the duration of contamination and therefore do not take into account reduced human activity at the site. Additional guidance on intakes may be provided by the *Exposure Assessment Group, Office of Research and Development, U.S. EPA, Washington D.C., 20460.*

If no EPA recommended limits exist for the contaminants of concern in the impoundment, the owner or operator may wish to consider these additional options:

- Remove the constituent to background levels; or
- Submit toxicity data on the constituent using the procedures outlined in the Toxic Substance Control Act to show that contaminants do not pose a threat at the point of exposure; or
- Close the impoundment as a landfill.

Exhibit 4.2-6

STANDARD INTAKE ASSUMPTIONS[a/]

Environmental Medium	Intake Assumption
Soil	0.1 g/day for 70 kg adult 0.2 g/day for 16 kg child
Ground-Water	2 liters/day for 70 kg adult
Surface Water	2 liters/day for 70 kg adult
Air	20 m^3 air/day for 70 kg adult

[a/] As an example of how to apply the standard intake assumption, if contaminant concentration is 3 mg/liter in drinking water:

(3 mg/liter x 2 liters/day water consumption) ÷ 70 kg body weight = 0.086 mg/kg/day intake

Source: OSWER Policy Directive #9502-00-60, "RCRA Facility Investigation Guidance," May 1989.

Radiation Exposure Limits. Although not required by RCRA, DOE requires that external exposure to the radioactive component of mixed waste from all environmental medium, plants, and animals not exceed an effective dose equivalent of 25 mrem/year to any member of the public. The concentration of a radionuclide may be determined by either direct methods or by indirect methods such as scaling factors that relate the inferred concentration of one radionuclide to another that is measured, or radionuclide accountability. Radiation standards and concentration guides applicable to DOE operations are found in *DOE 5480.11, Radiation Protection for Occupational Workers, December 21, 1988.*

Wastes containing amounts of radionuclides below regulatory concern (BRC) may be disposed without regard to radioactivity content (*DOE 5820.2A, Radioactive Waste Management, September 26, 1988*). The NRC is developing a rule governing the disposal of radioactive waste determined to be below regulatory concern. It is expected that such a rule may establish a risk or dose value that would represent generic regulatory cut-off levels for radioactive wastes. If DOE does not adopt this rulemaking, this requirement will not be applicable.

Establishing Background Concentrations. The subsoil at the facility should be sampled and analyzed when the Part B application is prepared and the results should be included in the closure plan. The results may later be used as target levels for demonstration of clean closure. Background levels must be established for ground-water, soil, and surface water (if appropriate), and must reflect the natural or existing local conditions unaffected by operations of the unit:

- *Ground-Water Quality* -- To establish background ground-water quality, monitoring wells must be placed upgradient from the unit as provided in 40 CFR Parts 264 and 265, Subpart F. The wells should be located in an area unaffected by the closing unit and of comparable subsurface strata. The number of wells and samples to be collected is dependent upon the particular site. However, a minimum of one year of data (quarterly samples) must be collected. The use of clustered wells will help ensure that a complete vertical profile of ground-water quality is obtained.

- *Soil Quality* -- Soil should also be sampled in an area unaffected by operations at the impoundment to obtain accurate background levels. Sampling should be performed at depths comparable to the depth of soil directly below the surface impoundment.

- *Surface Water Quality* -- Background levels for surface waters need only be established if there is a potential for surface water contaminant migration. In those cases where it is needed, surface waters upgradient from the surface impoundment should be sampled. The sampling should also be located upstream from any surface-water run-off discharge points.

Owners or operators of interim status surface impoundments that received waste after July 26, 1982, and permitted surface impoundments, must comply with the permitted facility ground-water monitoring requirements (40 CFR §§264.90 - 264.101) during the active life of the facility, including the closure and post-closure periods. Guidance on data collection requirements and evaluation procedures are found in *OSWER Policy Directive 9950.1, "RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD)," September 1986.*

If the impoundment contains mixed wastes, the monitoring program should also comply with the requirements found in *DOE 5484.1. Environmental, Safety, and Health Protection Information Reporting Requirements, February 24, 1981*, in addition to the Orders listed in Section 2.3. At a minimum, the migration of radionuclides and impoundment subsidence should be monitored.

4.2.3.2 Contingent Closure and Post-Closure Plans

Contingent closure plans, which describe how the impoundment will be closed as a landfill if clean closure cannot be achieved, must be prepared for any permitted surface impoundment that was not designed in accordance with the liner design standards specified in 40 CFR §264.221(a) or is not exempt from them in accordance with 40 CFR §264.221(b).[25] In addition, a post-closure plan describing 30 years of post-closure monitoring and maintenance activities is also required. Owners or operators of interim status facilities are also encouraged to prepare contingent closure and post-closure plans, especially if it appears that clean closure of the facility is not likely to be achieved. Contingent closure and post-closure plans may also be required if the EPA Regional Administrator determines that a surface impoundment not subject to the contingent plan requirement must be closed as a landfill. Surface impoundments not meeting the November 8, 1988, deadline for retrofitting must have already submitted a closure plan that included a contingent closure plan.

The following information should be included in contingent closure and post-closure plans:

- *Final cover design*: including engineering drawings, area covered, cover characteristics, installation procedures, and erosion control procedures;
- *Ground-water monitoring*: including information on well installation, types of analyses to be performed, and maintenance of equipment;
- *Security systems*: including a description of the existing system and any proposed changes for the post-closure period;
- *Closure schedule*: including a milestone chart showing cover installation, vegetation planting, and total time to complete closure; and
- *Post-closure*: including provisions for the kinds of monitoring and maintenance activities that will be expected during the post-closure care period.

Section 4.2.4 contains more information on closure and post-closure plans for landfill closure.

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[25] Under the liner design standards, storage impoundments are required to have a liner that allows seepage into, but not out of, the liner during the life of the facility (e.g., synthetic liner). In addition, the standards address the chemical characteristics of liners, liner strength and thickness, liner foundations, and liner lateral extent.

4.2.3.3 Implementing Clean Closure of Surface Impoundments

In order to properly clean close a surface impoundment, all wastes, waste residues, contaminated containment system components (e.g., liners), contaminated subsoils,[26] and structures and equipment contaminated with waste and leachate must be either removed or decontaminated.

All removed materials (e.g., liquids, sludges, etc.) must be managed as hazardous waste unless the wastes have been delisted (specified in 40 CFR §261.3(d) and discussed in Section 2.1.2.4). In addition, if these materials are mixed wastes, they must be managed in accordance with *DOE 5280.2A, Radioactive Waste Management, September 26, 1988.* In addition, if the waste to be removed and disposed is prohibited from land disposal under the land disposal restrictions (LDRs), it must be treated by a method that meets the treatment standards of 40 CFR §§268.40 to 268.44.

Liquids Removal. All free liquids must be removed from the impoundment. In general, the liquids will be present in the upper layer of the impoundment above the waste solids and will have a relatively low suspended solids content. There are several options available for the removal of free liquids, including evaporation, underdrainage, and mechanical removal. The most common method is mechanical removal by pumping. Evaporation is not often used due to the long drying times required. In general, sludges with a solids content less than 8 to 10 percent are pumpable. In order to remove liquids with a solids content greater than 8 to 10 percent, either additional liquid must be added to lower the solids content or the sludge must be dewatered in place. The specific type of pump chosen for the operation is dependent on the physical and chemical characteristics of the waste.

Another common technique for liquids removal is evaporative drying with gravitational or vacuum assisted drainage or with progressive trenching. Other methods of liquids removal include filtration (using either a filter press or pressure filter), centrifuging, and thermal drying. Detailed guidance on dewatering and equipment selection and costs is provided in *EPA/625/6-85/006, "Handbook on Remedial Actions at Waste Disposal Sites," October 1985.*

Sludge Removal. Sludge removal should begin before removal of the liner to ensure that the liner's integrity is maintained and to minimize leakage of waste or leachate. The sludge may either be removed in its wet form or air dried first and then removed. The dry method requires that the sediment be air dried and then excavated. Although this method requires more time, it minimizes the amount of waste that ultimately requires disposal. The drying process may be shortened by plowing, disking, or using a similar method.

The most common method of excavating the wastes is by mechanical means. Excavation of the wastes can be accomplished using a crane (with attachments such as a clam shell bucket), backhoe, or bulldozer. A crane or backhoe should be used to remove plastic or semisolid sediments and a bulldozer can be used to break down any solidified materials prior to excavation. To prevent the generation of dust during waste removal, water sprays should be used. The selection of equipment is again dependent on the

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[26]EPA interprets "soils" to include both unsaturated soils and soils containing ground water. For this reason, a clean closure must include consideration of potential ground-water contamination under both Parts 264 and 265 (53 FR 8705 and 53 FR 9944).

waste materials; however, detailed guidance on the selection of equipment for sludge removal is provided in Section 7.1 of *EPA/625/6-85/006, "Handbook on Remedial Actions at Waste Disposal Sites," October 1985.*

The sludge must be disposed in a manner consistent with RCRA requirements. Contaminated sludges are subject to the land disposal restrictions program discussed in Section 2.1.4.

Liner Removal. The impoundment liner should be removed following waste removal and before removal of any subsoils to minimize the potential for additional contamination of the subsoil. Normal excavation methods can be used to remove liners made of clay and soil. However, concrete or gunnite liners should first be broken up and then removed. Flexible membrane liners should be removed in small subsections, in a similar manner in which they were installed. Detailed guidance on liner removal is provided in *EPA/SW-873, "Closure of Hazardous Waste Surface Impoundments," 1982.*

Soils Removal. Following removal of the liner, soils underlying the surface impoundment must be tested to determine the extent of contamination. Any soils which have been determined to contain contaminants in excess of the exposure limits specified in the closure plan must be removed. The soil should be removed in layers and sampling conducted following removal of each layer. This procedure will help minimize the amount of soil removed. Excavation should be completed as quickly as possible to reduce the probability of rain transporting contaminants through the unsaturated zone.

Equipment Decontamination. The regulations require owners or operators of surface impoundments to decontaminate all equipment, tools, supplies, etc., involved in operating, maintaining, and closing the unit. Guidance on procedures for equipment decontamination are provided in *EPA/600/2-85/028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.*

4.2.3.4 Demonstrating Clean Closure (40 CFR 270.1)

Exhibit 4.2-7

How Clean is Clean?

To demonstrate clean closure, the soil and ground water surrounding the impoundment must be tested to document that the contaminants left in the subsoils will not impact the ground water, surface water, or the atmosphere in excess of the exposure limits specified in the facility's approved closure plan. For the purposes of making a clean closure demonstration, the potential point of exposure at which the specified exposure limits must be met is directly at or within the unit boundary for all routes of exposure. Migration, attenuation, fate, or transport factors may not be considered.

EPA's policy regarding the requirements applicable to units undergoing clean closure is most clearly expressed in 52 FR 8704 and 53 FR 9944).

Ground-Water Pathway. To demonstrate clean closure with respect to the ground-water pathway, the following actions must be taken:

- Remove contaminated soil and saturated subsoils to demonstrate that constituent levels in ground water do not exceed EPA-established chronic health levels (based on Reference Dose (RfD) or Carcinogenic Slope Factor (CSF) values); and

- Show that residual contaminant levels remaining in the soil will not contribute to any future contamination of ground water by showing that levels of constituents found in leachate are not above the EPA-established exposure levels. Levels of constituents in leachate may be estimated based on known characteristics of the waste constituents or determined by the results of actual soil leaching tests.

Direct Contact Pathway. To demonstrate clean closure with respect to the direct contact pathway, contaminant levels in soils must be below levels established by EPA as acceptable for ingestion or dermal contact. Soil core samples must be collected at random sampling points over the entire area of the unit. Locations for the samples may be determined using two-dimensional random sampling. Total waste constituent levels in soil should be used for this analysis.

Air Exposures. The analysis of potential air exposures should assess contaminants migrating from the soils into the atmosphere. The demonstration should include:

- Emission calculations;

- Available monitoring data; and

- Safe inhalation levels based on EPA-established exposure levels.

Surface Water Exposures. The potential surface water exposure analysis should compare EPA-established water quality standards and criteria (45 FR 79318, November 28, 1980) with the levels of constituents that may leach from the residual contaminated soil. The surface water exposure analysis should also consider existing surface water contaminant concentrations.

Clean Closure Equivalency Demonstrations. A special requirement applies to all surface impoundments that received wastes after July 26, 1982, and certified clean closure under the Part 265 requirements prior to March 19, 1987. These units must submit an *equivalency demonstration*, which demonstrates that the closure satisfies all the requirements specified for permitted facilities in Part 264, even if the facility has operated under, and is otherwise subject to, the Part 265 interim status requirements. 40 CFR Sections 270.1(c)(5) and (6) outline the procedures for determining if the closure met Part 264 standards. Clean closure may be demonstrated in one of the following ways:

- If the owner or operator submitted a Part B application for a post-closure permit, he can request a determination based upon the information contained in the application; or

- If the owner or operator has not submitted a Part B application for a post-closure permit, he may petition the Regional Administrator for a determination of equivalency. The petition must include all the data necessary to demonstrate that closure by the removal or decontamination standards in §264.228 were met or that the unit closed under State requirements that are at least as stringent as §264.228.

The owner or operator will be notified within 90 days of the submission as to whether or not the demonstration has been approved (40 CFR §270.1). If upon review of the equivalency demonstration, EPA determines that the closure does not meet the Part 264 standards, a post-closure permit application addressing all applicable Part 264 requirements (including ground-water monitoring, corrective action, and post-closure care) must be submitted (see section 4.2.4 on landfill closure of surface impoundments for guidance on post-closure permits and procedures). Additional information in support of the equivalency demonstration may be submitted to the Regional Administrator along with a request that the demonstration be reevaluated. This request must be submitted within 30 days of receipt of a notice of denial by the Regional Administrator. A final determination will be provided within 60 days of a second submittal.

EPA guidance on equivalency demonstrations is provided in *OSWER Policy Directive #9476.00-18, "Guidance on Demonstrating Equivalence of Part 265 Clean Closure With Part 264 Requirements," May 12, 1989 (see Appendix G)*. If clean closure cannot be demonstrated, the unit must be closed as a landfill and a post-closure permit must be obtained for the unit (see Section 4.2.4).

4.2.4 Landfill Closure of Surface Impoundments

The requirements for landfill closure of surface impoundments are found in 40 CFR §§264.228(a)(2),(b); 265.228(a)(2),(b); and 265.310 (requirements for closure of interim status hazardous waste landfills). The EPA has established a combination of design and operational requirements with the purpose of minimizing leachate generation and the potential migration of contaminants into the environment. Under these requirements, all liquid wastes must be either removed or solidified and the remaining wastes stabilized. The regulations specify that a final cover must be installed that meets the following specifications:

- Provide long-term minimization of the migration of liquids through the closed impoundment;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the final cover;
- Accommodate settling and subsidence so that the cover's integrity is maintained; and
- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

In addition, closure of a surface impoundment as a landfill requires 30 years of post-closure care during which the unit is monitored and maintained to ensure that no additional contamination occurs.

Following is an overview of the required activities for owners or operators of surface impoundments who plan to close their unit(s) as a landfill:

- Prepare closure plan (Section 4.2.4.1);
- Prepare post-closure plan (Section 4.2.4.2);
- Conduct closure (i.e., eliminate free liquids, stabilize wastes, and install a final cover) (Section 4.2.4.3); and
- Conduct post-closure care (Section 4.2.4.4).

4.2.4.1 Preparing Landfill Closure Plans

A written closure plan is required for closure, as described in Chapter 3 of this manual. An outline of a sample closure plan for a surface impoundment closing as a landfill is presented in Exhibit 4.2-8. As indicated in the exhibit, the closure plan should include detailed information on how free liquids will be removed or solidified and how the remaining wastes will be stabilized. Analysis should also be provided in the plan that demonstrates that the selected stabilization method will provide adequate support for the final cover. Representative samples of the waste should be stabilized using the planned method and analyzed to determine its bearing strength (the strength of the stabilized waste can be determined using *ASTM method D21166-66*, the *U.S. Army's method specified in "Engineering and Design - Laboratory Soils Testing, Appendix VII," (EM 1110-2-1906)*, or an equivalent method).

Additional information related to the design of the final cover should be discussed in the closure plan:

- If the EPA's recommended cover design (see Section 4.2.4.3) is not used, data demonstrating that the proposed design provides equivalent, or more, protection against infiltration than the EPA design must be provided. EPA suggests that the HELP model be used for this demonstration (*"User's Guide for the Hydrologic Evaluation of Landfill Performance (HELP) Model," EPA 530 SW 84009*);
- Data demonstrating that the proposed design will not result in erosion of the cover. Guidance on appropriate slopes is found in *EPA's "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989*. A description of the types of material to be used in the drainage layer of the final cover and its permeability, the potential for clogging, and the direction of drainage should also be included;

Exhibit 4.2-8

LANDFILL CLOSURE PLAN SAMPLE OUTLINE FOR SURFACE IMPOUNDMENTS

Section	Elements
Facility Conditions	• Facility description; • Surface impoundment description; • Hydrogeological conditions; • References to other environmental permits; and • Anticipated waivers or exemptions.
Removal of Inventory	• Estimation of maximum waste volume and • Detailed information on how free liquids will be removed/solidified.
Facility Decontamination	• Procedures for handling, decontamination and/or disposal of other removed inventory (e.g., equipment and contaminated soils).
Waste Stabilization	• Detailed plans describing how the wastes will be treated/stabilized; and • Results from analyses demonstrating that stabilized wastes provide sufficient permanent support for the cover and other loadings.
Final Cover Design	• Engineering drawings; • Installation procedures; • If a design other than that suggested by EPA is used, include engineering calculations demonstrating that cover will provide long-term minimization of the migration of liquids through the closed impoundment and that infiltration is equivalent to or less than cover design provided by EPA; and

Exhibit 4.2-8 (Continued)

LANDFILL CLOSURE PLAN SAMPLE OUTLINE FOR SURFACE IMPOUNDMENTS

Section	Elements
Final Cover Design (Continued)	• Demonstration that cover will function effectively with minimum maintenance.
Ground-Water Monitoring	• Procedures for monitoring analysis; and • Number, location, and frequency of samples.
Security Systems	• General description.
Survey Plat	• Surveyed benchmarks.
Closure Certification	• Activities to be conducted and Documentation.
Schedule of Closure	• Expected year of closure (only for interim status facilities without approved closure plans); • Time required for waste treatment, removal, decontamination, and final closure; and • Support for deadline extensions, if applicable.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

- Results from consolidation tests performed on soil samples. In addition, data on potential settlement due to consolidation of the liner, foundation soils, compression of the impounded waste material, and biological oxidation of organics (See *"Technical Screening Guide for CERCLA Soils and Sludges," EPA 540/2-08-004, September 1988*);

- Documentation showing that the permeability of the final cover is less than or equal to the permeability of the bottom liner system; and

- Information on the effects of extreme temperatures on the proposed cover.

4.2.4.2 Preparing Post-Closure Plans

Owners or operators of surface impoundments that are closed as landfills are required to conduct post-closure care for 30 years after closure and must comply with all post-closure procedural requirements contained in 40 CFR §§264.117 through 264.120 for permitted facilities and 40 CFR §§265.117 through 265.120 for interim status facilities, including maintenance and monitoring throughout the post-closure care period. The EPA Regional Administrator has the authority to extend or reduce the period for post-closure care on a case-by-case basis.

Provisions for the kinds of monitoring and maintenance activities that reasonably can be expected during the post-closure care period must be specified in a post-closure plan, which must be included in the Part B application. The plan must include a description of all planned monitoring activities and the frequency, including the following information (40 CFR §264.118(b)):

- Frequency and scope of inspections;

- Procedures for making repairs to the cover;

- Procedure for leachate collection, removal, and treatment;

- Frequency of sampling and monitoring;

- Maintenance of monitoring systems; and

- Name, address, and phone number of contact person during the post-closure period.

Further guidance is provided in *EPA/SW-867, "Evaluating Cover Systems for Solid and Hazardous Waste."*

4.2.4.3 Implementing Landfill Closure of Surface Impoundments

Exhibit 4.2-9

Landfill Closure Activities

There are four basic steps to completing a landfill closure:

- Eliminate free liquids present in the surface impoundment;
- Stabilize remaining wastes;
- Install a final cover over the unit; and
- Conduct post-closure care.

Elimination of Free Liquids. When closing a surface impoundment as a landfill, first eliminate all free liquids from the unit by either removing or solidifying them in order to minimize future leachate migration. Liquids removal is important for landfill closure because free liquids will not adequately support a final cover. Methods for liquids removal are discussed in Section 4.2.3.3. Additional liquids removal methods include mechanical dewatering using a filter press and thermal drying. The advantage of thermal drying over dewatering is that no filtrate is produced; however, the process is energy-intensive and problems related to air emissions may result. Further guidance is provided in *"Guidelines for Dewatering/Densifying Confined Dredged Material," U.S. Waterways Experiment Station Technical Report DS-78-11*

In order to improve the stability of the radioactive component of the mixed waste, DOE requires the liquid wastes to be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonably achievable (*DOE 5820.2A, Radioactive Waste Management, September 26, 1988*). Specifically, liquids cannot exceed 1 percent of the waste volume when the waste is in a disposal container, or 0.5 percent of the volume of the waste processed to a stable form.

Stabilization of Wastes. All remaining wastes and waste residues in the impoundment must be stabilized. The stabilized material must be strong enough to support the final cover and must be able to immobilize contaminants. Problems may occur if the final cover settles differentially over the unit, creating channels through which liquids can enter the unit. This may eventually lead to leaching of the waste constituents into the ground water. The stabilization method chosen should be determined by testing. Testing is needed because the effectiveness of any one method is dependent on several factors, including the thickness of the waste residues; anticipated load; climate; leachability of waste constituents; site geology; and final cover design. Stabilization methods include the following:

- ***Portland-cement based process*** -- The most common method used for stabilization is the Portland-cement based process. Portland cement is

composed of a combination of calcium silicates, calcium aluminates, and calcium ferro-aluminates, which hydrate and harden when mixed with water. The resulting material incorporates the waste into a solidified mass. Cement is added to the waste in a ratio ranging from 0.2:1 to 1:1. Portland cement is effective in solidifying most organic and inorganic solids; however, it has not been found to be effective for binding sludges containing more than 20 percent organic liquids. Although it is less costly to perform stabilization in the unit itself, the process is usually more effective when the wastes are removed to allow for more thorough mixing.

Portland cement treatment has been estimated to result in up to a 100 percent increase in volume, depending on the initial solids content of the waste material. Therefore, the additional volume required for containment should be examined when considering this process.

- ***Biological pre-treatment*** -- Units containing a large portion of organic materials may require biological pretreatment (e.g., land treatment and composting) to reduce the organic content of the wastes prior to stabilization. Biological pretreatment; however, may add an additional few weeks, or even months, to the closure process.

- ***Pozzolonic materials*** -- Portland cement is often used in combination with a pozzolonic material, such as cement kiln flyash or flyash from fossil fuel power plants. Other materials such as clay, gypsum, sodium silicate, or calcium chloride may be added to control the setting reaction or to produce a residual with special characteristics. The addition of bentonite clay or the use of excess flyash can produce a soil-like residual which can easily be handled with conventional earth moving equipment.

- ***Other methods*** -- Other stabilization techniques include thermoplastic methods, organic polymer, surface encapsulation, and vitrification.

Guidance on stabilization technologies is found in *EPA's "Guide to the Disposal of Chemically Stabilized and Solidified Waste," SW-872 (September 1982).*

Final Cover. The surface impoundment must be covered with a final cover to provide long term minimization of precipitation and run-off into the closed impoundment (the standards for final covers are discussed in detail in Section 4.1.2.2). Before construction of the cover can begin, the wastes must be tested to verify that solidification and compaction are complete. If the wastes are likely to emit gases, it is advisable to install a gas venting system in the waste layer at this time to prevent future build up of pressure under the final cover. In addition, a foundation of backfill should be placed on the waste surface before construction to provide support and a good working surface.

The cover requirements are performance standards which allow some flexibility in design. Final covers for both interim status and permitted units must be designed with a permeability equal to or less than the permeability of the bottom liner system or natural subsoils. This is to prevent the "bathtub

effect," i.e., liquid buildup and eventual overflow due to precipitation that enters the unit through the cover but cannot escape through the bottom liner. In addition, covers which minimize erosion or abrasion and can accommodate settling and subsidence are required (40 CFR §§264.228(a)(2) and 265.228(a)(2)). Exhibit 4.2-10 outlines EPA's recommended final cover design for surface impoundments closed as landfills.

Exhibit 4.2-10

EPA Recommended Final Cover Design

The final cover requirements are performance based, allowing flexibility in the design of the cover. Although not required by regulation, EPA guidance recommends the following multilayer design (from top to bottom):

- ***Vegetative layer*** to provide erosion control, preserve slope stability, and provide protection from the elements. The slope of the final cover should be between three and five percent. May be composed of vegetation, gravel mulch, etc. This layer should be at least 24 inches thick;

- ***Drainage layer*** to prevent ponding on the underlying layer and to remove water infiltrating through the top layer. The material of construction should be porous with a hydraulic conductivity of at least 1×10^{-3} cm/sec. The drainage layer should be topped with a graduated granular medium or synthetic fabric filter to prevent clogging from the vegetative layer. EPA recommends that the slope of this layer be no less than two percent after settling and that it be no less than one foot thick; and

- ***Low permeability layer*** to provide added backup for minimizing liquid infiltration of the impoundment. This layer of the cover is actually composed of two layers, an upper synthetic membrane and a lower soil (clay) layer. The clay liner acts as a backup in the event that the synthetic liner breaks. It should be a minimum of two feet thick and have a maximum conductivity of 1×10^{-7} cm/sec. The synthetic membrane need only be 20-mil thick.

In the event that EPA's recommended closure system does not meet the specific needs of a site, an alternate design may be proposed. The design of the final cover must account for settlement and subsidence of the waste in the impoundment which may affect the integrity of the final cover. *EPA-600/2-85/035 "Settlement and Cover Subsidence of Hazardous Waste Landfills" (1985)* provides guidance on this topic. In general, the final cover design should account for the total estimated settlement, including consolidation of soils, foundation materials, the leachate collection system, and final cover.

EPA also recommends that a Construction Quality Assurance (CQA) program be implemented for the purposes of ensuring that the final cover system meets all design criteria, plans, and specifications. Technical guidance on CQA programs has been provided by the EPA and is available in *EPA-530/SW-85-021, "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, Public Comment Document' (1985).*

Several guidance documents are available from the EPA on interpreting these requirements and on the design of final covers, including:

- "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," EPA/530-SW-89-047, July 1989.

- "Draft RCRA Guidance Document on Surface Impoundments Liner Systems, Final Covers, and Freeboard Control," July 1982; and

- "Evaluating Cover Systems for Solid and Hazardous Waste," EPA# SW-867, GPO# 055-000-00228-2. This manual provides a guide to examining soil, topographical, and climatological data and recommends cover evaluation procedures.

4.2.4.4 Post-Closure Care Activities for Landfill Closure of Surface Impoundments

The post-closure care period begins upon closure of each unit and is required for 30 years thereafter, unless a different period is established by the Regional Administrator. Activities to be performed during the post-closure care period include:

- Maintenance of the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;

- Maintenance and monitoring of the leak detection and leachate collection systems at permitted units, in cases where such systems are present;

- Maintenance and monitoring of the ground-water monitoring system and comply with all other applicable requirements of 40 CFR Part 264 Subpart F for permitted facilities and interim status facilities that received waste after July 26, 1982. At a minimum, the detection monitoring wells must be capable of sampling specific conductance, total organic carbon, total organic halogen, and other applicable waste constituents; and

- Prevention of erosion and other damage to the final cover from run-on and run-off.

The frequency of monitoring and maintenance activities is dependent on the specific site conditions, e.g., climate, waste type, soil, and vegetation.

4.2.5 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.2

DOE 5480.11, "Radiation Protection for Occupational Workers," December 21, 1988.

DOE 5484.1, "Environmental, Safety, and Health Protection Information Reporting Requirements," February 24, 1981.

DOE 5820.2A, "Radioactive Waste Management," September 26, 1988.

"Draft RCRA Guidance Document, Landfill Design, Liner Systems and Final Cover," July 1982.

"Draft RCRA Guidance Document on Surface Impoundments, Liner Systems, Final Covers, and Freeboard Control," July 1982.

ECAO-CIN-475, "Verified Reference Doses of U.S. EPA," January 1986.

EPA/530-SW-84-009, "User's Guide for the Hydrologic Evaluation of Landfill Performance (HELP) Model."

EPA/530-SW-85-021, "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, Public Comment Document," 1985.

EPA/530-SW-86-017, "Interim Status Surface Impoundments Retrofitting Variances," July 8, 1986.

EPA/530-SW-89-047, "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989.

EPA/540/2-88-004, "Technical Screening Guide for CERCLA Soils and Sludges," September 1988.

EPA/600/2-85-028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.

EPA/600/2-85-035, "Settlement and Cover Subsidence of Hazardous Waste Landfills," 1985.

EPA/625/6-85-006, "Handbook: Remedial Action at Waste Disposal Sites (Revised)," October 1985.

EPA/SW-867, "Evaluating Cover Systems for Solid and Hazardous Waste," 1982 (GPO#055-000-00228-2).

EPA/SW-870, "Lining of Waste Impoundment and Disposal Facilities," July 8, 1986.

EPA/SW-872, "Guide to the Disposal of Chemically Stabilized and Solidified Waste," September 1982.

EPA/SW-873, "Closure of Hazardous Waste Surface Impoundments," 1982.

EPA's "Health Assessment Document for Tetrachloroethylene (Perchloroethylene)," July 1988.

EPA's "Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments: Design, Construction, and Operation," May 24, 1985.

EPA's "RCRA Ground-water Monitoring Compliance Order Guidance (Final)," August 1985.

EPA's "RCRA Ground-water Monitoring Enforcement Guidance, Part II: RCRA Ground-water Monitoring Technical Enforcement Guidance Document (TEGD)."

"Guidelines for Dewatering/Densifying Confined Dredged Material," U.S. Waterways Experiment Station Technical Report DS-78-11.

NRC's "Alternate Concentration Limit Workshop," October 21, 1988.

OSWER Policy Directive #9285.4-1, "Superfund Public Health Evaluation Manual," 1986.

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," January 1987.

OSWER Policy Directive #9476.00-18, "Guidance on Demonstrating Equivalence of Part 265 Clean Closure with Part 264 Requirements," May 12, 1989.

OSWER Policy Directive #9502-00-60, "RCRA Facility Investigation Guidance," May 1989.

OSWER Policy Directive #9950.1, "RCRA Ground-water Monitoring Technical Enforcement Guidance (TEGD)," 1986.

U.S. Army's, "Engineering and Design--Laboratory Soils Testing, Appendix VII," (EM 1110-2-1906).

4.3 WASTE PILES

This section presents the requirements for closure and post-closure care of waste piles containing hazardous and radioactive mixed wastes located at DOE facilities. According to 40 CFR §260.10, a hazardous waste pile is defined as a non-containerized accumulation of solid, non-flowing hazardous waste that is used for treatment or storage. The purpose of a waste pile is not to intentionally dispose of wastes; waste piles are used to accumulate waste before shipment, treatment, or disposal. Waste piles are generally small and are often composed of a single material.

4.3.1 What Are the Closure Requirements for Waste Piles?

Exhibit 4.3-1 presents an overview of the key closure requirements for waste piles and references to where in this section more detailed information is provided.

Exhibit 4.3-1

Overview of Applicable Statutory and Regulatory Requirements

Closure of waste piles involves a *two-tiered* procedure - clean closure must first be attempted. If all hazardous waste cannot practicably be removed or decontaminated, the waste pile is subject to landfill closure and post-closure care.

Section 4.3.2

Waste piles closed under interim status prior to March 19, 1987, must submit an *"equivalency demonstration"* indicating that the closure satisfies Part 264 standards. If clean closure cannot be demonstrated, a *post-closure permit* must be obtained.

Section 4.3.2.4

Waste piles that do not comply with the double liner requirements and are not exempt must prepare *contingent closure* and *post-closure plans* describing how the unit will be closed as a landfill and maintained during the post-closure period.

Section 4.3.2.2

4.3.1.1 Statutory Requirements

There are no specific statutory requirements addressing the closure of waste piles. The statutory requirements for waste piles focus upon basic design and operating standards, which affect the applicable requirements during the post-closure period, if post-closure care is required. RCRA Section 3005(i) requires

that all interim status waste piles that received hazardous waste after July 26, 1982, comply with ground-water monitoring and corrective action standards that apply to new facilities.

An overview of the relevant ground-water monitoring and corrective action requirements for closures is located in Chapter 2 of this manual; ground-water monitoring and corrective action regulatory requirements are found in 40 CFR Parts 264 and 265, Subpart F.

Section 3004(p) states, however, that the Regional Administrator can exempt a waste pile from the preceding requirements if it:

- Does not receive or contain liquid waste and is designed and operated to exclude run-off;
- Utilizes multiple leak detection systems during the entire active life of the facility (including the closure and post-closure periods); and
- The Regional Administrator concludes that hazardous constituents will not migrate outside of the facility before the post-closure monitoring period ends.

4.3.1.2 Regulatory Requirements

The technical requirements pertaining to the closure of permitted and interim status waste piles are found in 40 CFR §§264.258 and 265.258 respectively. Exhibit 4.3-2 describes the closure procedure for waste piles.

Exhibit 4.3-2

Waste Pile Closure Procedures (40 CFR §§264.258 and 265.258)

Owners or operators of all waste piles must:

- ***Clean Close the Waste Pile***
  - Remove or decontaminate all waste residues, containment system components, subsoils, structures and equipment
  - No post-closure care required

If after attempting a clean closure, the owner or operator of a waste pile finds that not all contaminated subsoils can be practicably decontaminated or removed, then the owner or operator must:

- ***Close the Waste Pile as a Landfill***
  - Stabilize subsoils, if necessary;
  - Place impermeable cap over the unit; and
  - Conduct 30 years of post-closure care.

These requirements are in addition to the general and procedural requirements found in Subpart G, which are discussed in Chapter 3 of this manual.

Design Requirements. Both permitted and new units, replacement units, or lateral expansions of existing interim status waste piles are required to meet certain design standards set forth in §264.251. According to these standards a waste pile must have:

- A liner designed to prevent migration of wastes out of the pile into the soil, ground-water, or surface water for the duration of the waste pile's active life;
- A leachate collection and removal system;
- Run-on control and run-off management systems; and
- A wind dispersion control system, where appropriate.

Liner Requirements and Contingent Closure Plans. If a permitted waste pile does not comply with these liner requirements and is not exempt because it is inside or similarly protected from precipitation (§264.250(c)) nor granted exempt status by the Regional Administrator (§264.251(b)), the owner or operator must prepare both a contingent closure and post-closure plan describing how the waste pile will be closed. Owners or operators of waste piles designed in accordance with the liner standards are not required to prepare contingent plans. More information on contingent closure and post-closure plans can be found in Section 4.3.2.2.

Equivalency Demonstrations. Any interim status waste pile that received wastes after July 26, 1982, and clean closed under Part 265 prior to March 19, 1987, must submit an "equivalency demonstration" showing that the closure satisfies all the requirements specified for permitted facilities in Part 264, even if the facility was otherwise subject to the interim status requirements. If clean closure cannot be demonstrated, then a post-closure permit must be obtained for the unit. More information on equivalency demonstrations can be found in Section 4.3.2.4.

4.3.2 Clean Closure of Waste Piles

In order to close a waste pile, clean closure must be attempted first. The goal of clean closure is to remove or decontaminate all materials on-site that could potentially lead to future contamination. The technical requirements for clean closure are found in 40 CFR §§264.258 and 265.258, and are roughly equivalent under the current regulations for permitted and interim status facilities. Under these requirements, all waste residues, containment system components, liners, subsoils, contaminated equipment, and structures must be decontaminated or removed from the site. These components must then be managed as hazardous waste unless specifically exempted under 40 CFR §261.3.

The following is an overview of the required clean closure activities for owners or operators of waste piles:

- Prepare closure plan (Section 4.3.2.1);
- Prepare contingent closure and post-closure plans, if appropriate; (Section 4.3.2.2);

- Conduct closure (Section 4.3.2.3); and

- Demonstrate clean closure (Section 4.3.2.4).

The following sections provide guidance on how to properly perform the activities listed above.

4.3.2.1 Preparing Waste Pile Clean Closure Plans

A written closure plan for a waste piles must contain the general information required by 40 CFR Parts 264 and 265, Subpart G, in addition to the technical information found in Subpart L. An outline for a sample closure plan for a waste pile is presented in Exhibit 4.3-3.

Establishment of Contamination Cleanup Targets. The closure plan must include a listing of the exposure limits for all hazardous constituents which may have been generated, used, stored, or disposed at the unit. These constituents include, but are not limited to, those listed in 40 CFR Part 261, Appendix VIII. The exposure limits will be used as standards at the time of closure for assessing whether or not removal and decontamination activities are complete. The exposure limits chosen in the plan for the hazardous component of the mixed waste should be an EPA recommended limit if one exists. While the radioactive component of the waste is not subject to RCRA regulation, it may be appropriate in many cases to address these contaminants in the closure plan.

If no EPA recommended limits exist for the contaminants of concern at a waste pile, other options the owner or operator may wish to consider are:

- Remove the constituent to background levels; or

- Submit toxicity data on the constituent using the procedures outlined in the Toxic Substance Control Act to show that contaminants do not pose a threat at the point of exposure; or

- Close the waste pile as a landfill.

Radiation Exposure Limits. Although not required under RCRA, DOE requires that external exposure to the radioactive component of low level mixed waste from all environmental medium, plants, and animals, not exceed an effective dose equivalent of 25 mrem/year to any member of the public. The concentration of a radionuclide may be determined by direct methods or by indirect methods such as the use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. Radiation standards and concentration guides applicable to DOE operations are found in *DOE 5480.11, Radiation Protection for Occupational Workers, December 21, 1988.*

Exhibit 4.3-3

WASTE PILE CLEAN CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Facility Conditions	• Facility location and size; • Topographic map; • List of other hazardous waste management units and wastes handled in each; • Hydrogeological information; • Waste pile description (number, size, type of liner system, etc.); • References to other environmental permits; and • Anticipated waivers or exemptions.
Removal of Inventory	• Estimates of inventory to be removed; and • Procedures for handling removed inventory.
Facility Decontamination	• Procedures for decontamination or disposal of pad, liner, containment area, equipment and soil; • Major radionuclides and their concentrations; and • Procedures for leachate management.
Clean Closure Demonstration	• Listing of exposure limits for Appendix VIII constituents; • Background levels at the site; and • Description of the testing to determine if liner, equipment, etc. are hazardous
Ground-Water & Monitoring Evaluation	• Procedures for monitoring analysis; and • Number, location, and frequency of samples.
Security Systems	• General description.
Survey Plat	• Surveyed benchmarks.
Closure Certification	• Activities to be conducted; and • Documentation.

Exhibit 4.3-3 (Continued)

WASTE PILE CLEAN CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Schedule of Closure	• Expected year of closure (only for interim status facilities without approved closure plans); • Time required for waste treatment, removal, decontamination, and final closure; and • Support for deadline extensions, if applicable.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

Wastes containing amounts of radionuclides below regulatory concern (BRC) may be disposed without regard to radioactivity content (*DOE 5820.2A, Radioactive Waste Management, September 26, 1988*). The NRC is developing a rule governing the disposal of radioactive waste determined to be below regulatory concern. It is expected that such a rule may establish a risk or dose value that would represent generic regulatory cut-off levels for radioactive wastes. If DOE does not adopt this rulemaking, this requirement is not applicable.

The subsoil at the facility should be sampled and analyzed when the Part B application is prepared and the results should be included in the closure plan. The results may later be used as target levels for demonstration of clean closure. Background levels must be established for ground-water, soil, and surface water (if appropriate), and must reflect the natural or existing local conditions unaffected by operations of the unit.

If the waste pile contains mixed wastes, the monitoring program should also comply with the requirements found in *DOE 5484.1. Environmental, Safety, and Health Protection Information Reporting Requirements, February 24, 1981.*

4.3.2.2 Preparing Contingent Closure and Post-Closure Plans

The owner or operator of any permitted waste pile that is not designed in accordance with the liner design standards specified in §264.251(a), and is not protected from precipitation and therefore exempt under §264.251(c), or has not been exempted by the Regional Administrator in accordance with §264.251(b), must prepare a contingent closure plan. This plan describes how the waste pile will be closed as a landfill if clean closure cannot be achieved. In addition, a contingent post-closure plan describing 30 years of post-closure monitoring and maintenance activities is also required. Outlines for sample contingent closure and post-closure plans for a waste pile are presented in Exhibit 4.3-4 and 4.3-5 respectively. Owners or operators of interim status facilities without ground-water monitoring systems in place will be required to install such a system at closure if post-closure care is required.

The owner or operator of a waste pile that complies with the liner design standards specified in §264.251(a), or is exempt from them in accordance with §264.251(b) or §264.251(c), need not prepare a post-closure plan unless clean closure cannot be achieved and the unit must be closed as a landfill. Note that a revised closure plan will also be required (see Section 4.3.3.1).

4.3.2.3 Implementing Clean Closure of Waste Piles

In order to properly clean close a waste pile, all wastes, waste residues, contaminated containment system components (e.g., liners), contaminated subsoils, and structures and equipment contaminated with waste and leachate must be either removed or decontaminated (Section 4.2.3.4 may be a useful reference).

All removed materials must be managed as hazardous waste unless the wastes has been delisted (specified in 40 CFR §261.3(d) and discussed in Section 2.1.2.5). In addition, if these materials are mixed wastes, they must be managed in accordance with *DOE 5280.2A, Radioactive Waste Management, September 26, 1988.* Mixed wastes containing transuranic materials must be managed at the Waste Isolation Plant (WIPP), unless the wastes do not meet acceptance criteria. Information on WIPP acceptance criteria is provided in *DOE 5820.2A, Radioactive Waste Management, September 26, 1988.*

Exhibit 4.3-4

WASTE PILE CONTINGENT CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Inventory Removal	• Estimates of inventory to be removed and • Procedures for handling removed inventory.
Facility Decontamination	• Procedures for decontamination or disposal of pad, liner, containment area, equipment, and soil.
Final Cover Design	• Engineering drawings and area covered; • Cover characteristics (e.g., material type, permeability, depth, slope, drainage structures, and vegetation; • Installation procedures; • Erosion control procedures; and • Procedures for soil stabilization.
Ground-Water Monitoring	• Well installation; • Types of analysis; and • Equipment maintenance.
Security Systems	• General description and • Description of proposed changes.
Survey Plat	• Surveyed benchmarks.
Closure Certification	• Activities to be conducted and • Documentation
Closure Schedule	• Milestone chart showing closure cover installation, vegetation planning, and total time to complete closure.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

Exhibit 4.3-5

WASTE PILE CONTINGENT POST-CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Ground-Water Monitoring	• Number, location, and depth of wells installed; • Frequency of sampling; and • Types and procedures for analyses.
Soil Monitoring	• Number and frequency of samples; • Sampling procedures; and • Types of analyses conducted.
Leachate Monitoring and Removal	• Frequency and procedures for monitoring; • Estimated quantity of leachate; • Procedures for collection and removal of leachate; and • Leachate treatment and disposal procedures.
Inspections	• Frequency; and • Scope.
Maintenance Activities	• Final cover; • Monitoring systems; and • Security systems.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

Before disposing of any of the wastes in a landfill, injection well, or any other land disposal unit, the owner or operator should determine if the wastes are prohibited from land disposal under the land disposal restrictions (LDRs). If the waste is restricted from land disposal, it must be treated by a method that meets the treatment standards of 40 CFR §§268.40 through 268.44.

Liner Removal. The waste pile liner should be removed following waste removal and before removal of any subsoils to minimize the potential for additional contamination of the subsoil. Normal excavation methods can be used to remove liners made of clay and soil. However, concrete or gunnite liners should first be broken up and then removed. Flexible membrane liners should be removed in small subsections, in a similar manner in which they were installed. Guidance on liner removal can be found in EPA/SW-873, "Closure of Hazardous Waste Surface Impoundments," 1982.

Soils Removal. Soils underlying the waste pile must be tested at this point to determine the extent of contamination. Any soils which have been determined to contain contaminants in excess of the exposure limits specified in the closure plan must be removed. The soil should be removed in layers and sampling conducted following removal of each layer. This procedure will help minimize the amount of soil removed. Excavation should be completed as quickly as possible to reduce the probability of rain transporting contaminants through the unsaturated zone.

Equipment Decontamination. The regulations require owners or operators of waste piles to decontaminate all equipment, tools, supplies, etc., involved in operating, maintaining, and closing the unit. Guidance on procedures for equipment decontamination are provided in *EPA/600/2-85/028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.*

4.3.2.4 Demonstrating Clean Closure

To demonstrate clean closure, the owner or operator must test the soil and ground water surrounding the waste pile to document that the contaminants left in the subsoils will not impact the ground water, surface water, or the atmosphere, in excess of the exposure limits specified in the facility's approved closure plan.

Ground-Water Pathway. To make the demonstration of clean closure with respect to the ground-water pathway, the following actions must be taken:

- Remove contaminated soil and saturated subsoils to demonstrate that constituent levels in ground water do not exceed EPA-established chronic health levels (based on RfD or CSF values); and

- Show that residual contaminant levels remaining in the soil will not contribute to any future contamination of ground-water by showing that levels of constituents found in leachate are not above the EPA-established exposure levels. Levels of constituents in leachate may be estimated based on known characteristics of the waste constituents or determined by the results of actual soil leaching tests.

Direct Contact Pathway. To make the demonstration of clean closure with respect to the direct contact pathway, demonstrate upon closure that contaminant levels in soils are less than levels established by EPA

as acceptable for ingestion or dermal contact. Soil core samples must be collected at random sampling points over the entire area of the unit.

Air Exposures. The analysis of potential air exposures should assess contaminants migrating from the soils into the atmosphere. The demonstration should include:

- Emission calculations;
- Available monitoring data; and
- Safe inhalation levels based on EPA-established exposure levels.

Surface Water Exposures. The potential surface water exposure analysis should compare EPA-established water quality standards and criteria (45 FR 79318, November 28, 1980) with the levels of constituents that may leach from the residual contaminated soil. The surface water exposure analysis should also consider existing surface water contaminant concentrations.

Preparing Equivalency Demonstrations. A special requirement applies to all waste piles that received wastes after July 26, 1982, and certified clean closure under the Part 265 requirements prior to March 19, 1987. These units must submit an *equivalency demonstration*, which demonstrates that closure satisfies all the requirements specified for permitted facilities in Part 264, even if the facility has operated and is otherwise subject to the Part 265 interim status requirements. Sections 270.1(c)(5)-(6) outline the procedures for determining if the closure met Part 264 standards. Basically, clean closure may be demonstrated in one of the following ways:

- If the facility has submitted a Part B application for a post-closure permit, it is possible to request a determination based upon the information contained in the application; or
- If the facility has not submitted a Part B application for a post-closure permit, it is possible to petition the Regional Administrator for a determination. The petition must include all the data necessary to demonstrate that closure by the removal or decontamination standards in §264.228 were met or that the unit closed under State requirements that meet or exceed §264.228.

The owner or operator will be notified within 90 days of submission as to whether or not the demonstration has been approved (40 CFR §270.1). If upon review of the equivalency demonstration, EPA determines that the closure does not meet the Part 264 standards, the facility will be required to submit a post-closure permit application addressing all applicable Part 264 requirements, including ground-water monitoring, corrective action, and post-closure care (see section on landfill closures for guidance on post-closure permits and procedures). The facility may submit additional information to the Regional Administrator in support of the equivalency demonstration along with a request that the demonstration be reevaluated. This request must be submitted within 30 days of receipt of notice of denial by the Regional Administrator. A final determination will be provided within 60 days of the second submittal.

EPA guidance on equivalency demonstrations is provided in *OSWER Policy Directive #9476.00-18, "Guidance on Demonstrating Equivalence of Part 265 Clean Closure With Part 264 Requirements," May 12, 1989.*

If clean closure cannot be demonstrated or if after attempting to clean close a waste pile it becomes apparent that clean closure is not practicable due to widespread contamination, the unit must be closed as a landfill and a post-closure permit must be obtained for the unit (see Section 4.3.3).

4.3.3 Landfill Closure of Waste Piles

Waste piles without liners are likely to require landfill closure because of the probable contamination of large amounts of subsoil. Waste piles that have liners installed in accordance with 40 CFR §264.251 that later fail, may have contaminated underlying ground water and would also require landfill closure. The following is an overview of the required activities for owners or operators of waste piles who, *after first attempting clean closure*, must close their unit(s) as a landfill:

- Revise closure plan (Section 4.3.3.1);
- Prepare post-closure plan (Section 4.3.3.2);
- Conduct closure (Section 4.3.3.3); and
- Conduct post-closure care (Section 4.3.3.4).

4.3.3.1 Preparing Landfill Closure Plans at Waste piles

A written plan for a landfill closure of a waste pile will contain much of the same information as did the original clean closure plan. Some revisions to take into account the elements particular to landfill closure will also be required. Moreover, the revised closure plan will be essentially the same as the contingent closure plan required for waste pile units with substandard liners, if such a plan was required (see Exhibit 4.3-4). Thus the revised closure plan of a waste pile that requires landfill closure need not involve an excessive amount of work.

4.3.3.2 Landfill Closure Post-Closure Plan Requirements

Owners or operators of waste piles which are closed as landfills are required to conduct post-closure care for 30 years after closure and must comply with all post-closure procedural requirements contained in 40 CFR §§264.117 through 264.120, including maintenance and monitoring throughout the post-closure care period. The EPA Regional Administrator has the authority to extend or reduce the period for post-closure care on a case-by-case basis. Exhibit 4.3-6 outlines closure activities for waste piles closed as landfills.

As is the case for landfill closure plans, post-closure plans for waste piles closed as landfills will closely resemble a contingent post-closure plan, if one was required (see Exhibit 4.3-5). However, because the contingent closure plan would have been prepared much earlier (during the permit application process), it will probably require some revision. Owners or operators of waste piles that met liner requirements or were exempt, and were therefore not required to prepare a post-closure plan, must prepare such a plan if clean closure was not practicable.

4.3.3.3 Required Activities for Landfill Closure

Exhibit 4.3-6

Landfill Closure Activities

The three basic steps for landfill closure of a waste pile:

- Remove or decontaminate all waste residues, contaminated equipment, subsoils, etc., in accordance with clean closure procedures. Stabilize subsoils if necessary;
- Install a final cover over the remaining contaminated subsoils; and
- Conduct post-closure care.

Waste Removal. The requirements and procedures for removing waste from a waste pile are described in Section 4.3.2.3. All wastes must be removed from a waste pile, even if the facility is eventually closed as a landfill. If clean closure is not practicable, only contaminated subsoils can be left behind in the landfill.

Final Cover. The remaining contaminated subsoils in the waste pile must be covered with a final cover to provide long term minimization of precipitation and run-off into the closed waste pile. The standards for final covers are discussed in Section 4.1, Landfills. A list of EPA guidance documents on the design of final covers can also be found in Section 4.1 of this manual. The purpose of the final cover is to:

- Minimize the long-term prospects of migration of liquids through the landfill;
- Function with minimum maintenance;
- Promote drainage and minimize erosion and abrasion of the cover;
- Accommodate settling and subsidence; and
- Have a permeability less than or equal to the permeability of any bottom liner or subsoils present.

Further guidance on final covers is provided in *EPA/SW-867, "Evaluating Cover Systems for Solid and Hazardous Waste."*

Alternate cover designs are allowable as long as they account for settlement and subsidence of the waste which may affect the integrity of the final cover. *EPA-600/2-85/035 "Settlement and Cover Subsidence of Hazardous Waste Landfills" (1985)* provides guidance on this topic.

EPA also recommends that a Construction Quality Assurance (CQA) program be implemented for the purposes of ensuring that the final cover system meets all design criteria, plans, and specifications. Technical guidance on CQA programs has been provided by the EPA and is available in *EPA-530/SW-85-021, "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, Public Comment Document' (1985).*

4.3.3.4 Post-Closure Care Requirements for Landfill Closures

The post-closure care period is 30 years from the date of closure, unless a different period is established by the Regional Administrator. Activities to be performed during the post-closure care period include:

- Maintenance of the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;

- Permitted units are required to maintain and monitor the leak detection and leachate collection systems, in cases where such systems are present;

- Maintenance and monitoring of the ground-water monitoring system and comply with all other applicable requirements of 40 CFR Part 264 Subpart F for permitted facilities and interim status facilities that received waste after July 26, 1982. At a minimum, the detection monitoring wells must be capable of sampling specific conductance, total organic carbon, total organic halogen, and other applicable waste constituents. Note that if the waste pile was an interim status facility, it is likely that the ground-water monitoring system used will not satisfy these requirements. If this is the case, the existing system must be upgraded or a new one installed. Technical guidance on ground-water monitoring can be found in OSWER 9950.1, *"RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, September 1986."*

- Prevention of erosion and other damage to the final cover from run-on and run-off.

All other generic Subpart G closure and post-closure care requirements also apply to the closure of interim and permitted waste piles and are discussed in Chapter 3.

4.3.4 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.3

DOE 5480.11, "Radiation Protection for Occupational Workers," December 21, 1988.

DOE 5484.1, "Environmental, Safety, and Health Protection Information Reporting Requirements," February 24, 1981.

DOE 5820.2A, "Radioactive Waste Management," September 26, 1988.

EPA/530-SW-85-021, "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, Public Comment Document," 1985.

EPA/600/2-85-028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.

EPA/600/2-85-035, "Settlement and Cover Subsidence of Hazardous Waste Landfills," 1985.

EPA/625/6-85-006, "Handbook: Remedial Action at Waste Disposal Sites (Revised)," October 1985.

EPA/SW-867, "Evaluating Cover Systems for Solid and Hazardous Waste," 1982 (GPO#055-000-00228-2).

EPA/SW-873, "Closure of Hazardous Waste Surface Impoundments," 1982.

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H cost Estimating Requirements," U.S. EPA, January 1987.

OSWER Policy Directive #9476.00-18, "Guidance on Demonstrating Equivalence of Part 265 Clean Closure with Part 264 Requirements," May 12, 1989.

OSWER Policy Directive #9950.1, "RCRA Ground-water Monitoring Technical Enforcement Guidance Document (TEGD)," September 1986.

4.4 *LAND TREATMENT*

This section presents the requirements for closure and post-closure care of land treatment facilities treating hazardous and mixed wastes located at DOE facilities. A land treatment facility is defined in 40 CFR §260.10 as, a facility or part of a facility at which hazardous waste is applied onto or incorporated into the soil surface. The portion of a land treatment facility within which the hazardous constituents are degraded, transformed, or immobilized is known as the treatment zone. 40 CFR §264.271(c) states that the maximum depth of the treatment zone must be no more than five feet from the initial soil surface and no less than three feet above the seasonal high water table.

Land treatment facilities differ from other land disposal facilities in that they are not designed to minimize liquid release to ground water (e.g., through the use of liners). Instead, they are open systems that allow liquids to move out of the facility. Facilities designed primarily for the purposes of dewatering without treatment are not land treatment facilities but are considered surface impoundments (see Section 4.2).

4.4.1 What Are the Closure Requirements for Land Treatment Facilities?

Exhibit 4.4-1 provides an overview of the key closure requirements for land treatment facilities and references to where in this section more detailed information is provided.

Exhibit 4.4-1

Overview of Applicable Statutory and Regulatory Requirements

At permitted facilities, all operations conducted to ensure no migration of hazardous constituents from the treatment zone during the active life of a land treatment unit must continue throughout both the closure and post-closure periods. Interim status facility requirements are somewhat less stringent.

Section 4.4.1.2

The owner or operator of a permitted land treatment facility must apply a protective *vegetative cover* over the facility at closure, unless he can demonstrate that the level of hazardous constituents in the treatment zone soil does not exceed background values. Owners or operators of interim status facilities have the option of applying a vegetative cover, yet they are not required to do so.

Section 4.4.2.3

Post-closure care at a permitted land treatment facility continues until the level of hazardous constituents in the treatment zone soil no longer exceeds background values. Interim status facilities are subject to 30 years of post-closure care unless the Regional Administrator approves a shorter period.

Section 4.4.2.4

4.4.1.1 Statutory Requirements

RCRA section 3005(i) states that all interim status land treatment facilities that received hazardous waste after July 26, 1982, shall be subject to ground-water monitoring, corrective action, and unsaturated zone monitoring standards that apply to new facilities under Section 3004. Chapter 2 of this manual provides an overview of the RCRA ground-water monitoring and corrective action requirements found in Subpart F of 40 CFR Parts 264 and 265.

In addition to monitoring the upper aquifer in accordance with Subpart F, owners or operators of land treatment facilities must also conduct unsaturated (vadose) zone monitoring. Unsaturated zone monitoring requires the operator to sample the soil and soil-pore liquid to determine whether hazardous constituents are migrating from the treatment zone. For permitted facilities and those interim status facilities that received waste after July 26, 1982, the hazardous constituents which are to be monitored are those identified in Appendix IX of 40 CFR Part 264 that are reasonably expected to be in, or derived from, waste placed in the land treatment facility. The technical requirements for unsaturated zone monitoring can be found in 40 CFR §§264.278 and 265.278.

4.4.1.2 Regulatory Requirements

The technical requirements pertaining to the closure and post-closure of permitted and interim status land treatment facilities are found in Subpart M of Parts 264 and 265 respectively. Closure and post-closure care requirements for interim status facilities are considerably less stringent than those for permitted facilities. These requirements must be met along with the procedural requirements found in Subpart G, which are discussed in Chapter 3 of this manual.

The following is a summary of the principle regulatory requirements for closure and post-closure care of land treatment facilities:

Closure requirements for permitted land treatment facilities (40 CFR §264.280). At closure, the owner or operator must do the following:

- Cease application of wastes to the treatment zone;
- Continue all operations necessary to maximize degradation, transformation, or immobilization of hazardous constituents;
- Maintain run-on and run-off control systems;
- Control wind dispersion;
- Comply with food-chain crop restrictions;
- Continue unsaturated zone monitoring; and
- Establish and maintain a protective vegetative cover.

For a permitted facility, post-closure care terminates (or need not even begin) if the owner or operator can demonstrate that concentrations of hazardous constituents in the treatment zone soil do not exceed background levels by a statistically significant amount.

Closure requirements for interim status land treatment facilities (40 CFR §265.280). At closure, the owner or operator must attempt to control the migration of hazardous constituents or hazardous waste into ground water, surface water or air, and must also comply with food-chain crop restrictions. To achieve these objectives, the owner or operator must consider the following methods:

- Removal of contaminated soils;
- Installation of a final cover; and
- Ground-water monitoring.

In addition, owners or operators of interim status land treatment facilities must do the following:

- Continue unsaturated zone monitoring;
- Maintain run-off and run-on control systems; and
- Control wind dispersion of particulate matter.

Post-closure care at interim status facilities lasts for 30 years unless the Regional Administrator approves a shorter period.

4.4.2 Closure of Land Treatment Facilities

Closure of land treatment facilities is somewhat unique because the required activities are a continuation of those conducted during the active life of the facility, except that wastes are no longer applied to the treatment zone. And while the regulatory requirements for interim status facilities are less stringent, the closure activities conducted at both permitted and interim status facilities are similar.

The following is an overview of the required activities for owners or operators of land treatment facilities when they close their facility(s):

- Prepare closure plan (Section 4.4.2.1)
- Prepare post-closure plan (Section 4.4.2.2)
- Conduct closure (Section 4.4.2.3)
- Conduct post-closure care (Section 4.4.2.4)

4.4.2.1 Preparing Land Treatment Facility Closure Plans

A written closure plan for a land treatment facility must contain the general information required by 40 CFR Parts 264 and 265 Subpart G, in addition to the technical information found in Subpart M. An outline for a sample closure plan for a land treatment facility is presented in Exhibit 4.4-2.

4.4.2.2 Preparing Post-Closure Plans

A written post-closure plan for a land treatment facility must be prepared by the owner or operator, even in the event that post-closure care at a permitted facility is later determined to be unnecessary. The post-closure plan must contain the general information required by 40 CFR §§264.118 and 265.118 in addition to the technical information found in §§264.280 and 265.280. An outline for a sample post-closure plan for a land treatment facility is presented in Exhibit 4.4-3.

4.4.2.3 Implementing Land Treatment Facility Closure

The technical requirements for closure of permitted and interim status land treatment facilities are located in 40 CFR §§264.280 and 265.280 respectively. The purpose of these requirements is to maximize the degradation, transformation, and immobilization of hazardous constituents within the treatment zone and to ensure that no migration of hazardous constituents occurs. Closing a land treatment facility involves the following steps:

Continuation of degradation, transformation and immobilization. The owner or operator must maintain the pH level of the soil; many hazardous metals are soluble at low pH levels and hazardous constituents in solution can readily migrate out of the treatment zone. The moisture level in the treatment zone must also be controlled to avoid migration of hazardous constituents. Because many hazardous wastes disposed of in land treatment facilities are organic, and therefore subject to microbial degradation, the level of microbial activity in the zone must be maintained and enhanced if possible through such measures as fertilization and tilling.

Controlling run-off, run-on, and wind dispersion. The run-on control system must be capable of preventing flow onto the treatment zone during peak discharge from at least a 25-year storm. The run-off control system must be able to collect and control at least the water volume resulting from a 24-hour, 25-year storm. The collection and holding facilities associated with these systems must be managed expeditiously to maintain the capacity. Potential control measures for wind dispersion include: maintenance of proper soil moisture, chemical soil stabilizing agents, and the establishment of a vegetative cover (see below).

Continuation of unsaturated zone monitoring. The regulatory requirements for unsaturated zone monitoring are located in 40 CFR §§264.278 and 265.278. The purpose of unsaturated zone monitoring is to evaluate the success of the treatment. Unsaturated zone monitoring data are also used to make adjustments to the treatment system and to determine whether or not hazardous constituents are migrating from the treatment zone.

Exhibit 4.4-2

LAND TREATMENT CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Facility Conditions	• Facility description; • Topographic map; • List of other hazardous waste management facilities and wastes handled in each; • Land treatment system description; • Hydrogeological information; • References to other environmental permits; and • Anticipated waivers and exemptions.
Inventory and Decontamination	• Estimates of maximum waste volume to be placed on the land; and • Procedures for handling, disposal, and/or decontamination of other wastes and equipment.
Continuation of Land Treatment Processes	• Procedures for continued degradation of hazardous constituents; • Procedures for controlling run-on and run-off; • Procedures for controlling wind dispersal; • Procedures for complying with food-chain crop restrictions; and • Procedures for measuring the level of hazardous constituents in the treatment zone.
Ground-Water Monitoring	• Number, location, and depth of wells; • Frequency of sampling; and • Types and procedures for analyses.
Soil Monitoring	• Number and frequency of samples; • Sampling procedures; and • Types of analyses conducted.

Exhibit 4.4-2 (Continued)

LAND TREATMENT CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Demonstration that Post-Closure Care Not Required, if Applicable	• Data showing no statistical increase over background levels in treatment zone; and • Data showing no migration from treatment zone.
Security Systems	• General description.
Survey Plat	• Surveyed benchmarks.
Closure Certification	• Activities to be conducted and • Documentation.
Closure Schedule	• Expected year of closure (only for interim status facilities without approved closure plans); • Closure milestones; and • Support for deadline extensions, if applicable.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

Exhibit 4.4-3

LAND TREATMENT POST-CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Continuation of Land Treatment Processes	• Procedures for continued degradation of hazardous constituents; • Procedures for controlling run-on and run-off; • Procedures for controlling wind dispersal; • Procedures for complying with food-chain crop restrictions; and • Procedures for measuring the level of hazardous constituents in the treatment zone.
Ground-Water Monitoring	• Number, location, and depth of wells; • Frequency of sampling; and • Types and procedures for analyses.
Soil Monitoring	• Number and frequency of samples; • Sampling procedures; and • Types of analyses conducted.
Inspections	• Frequency and • Scope.
Maintenance Activities	• Vegetative cover; • Monitoring systems; and • Security systems.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

To determine if hazardous constituent migration has occurred, background levels must first be established. Owners or operators of permitted facilities and interim status facilities that received waste after July 26, 1982, must establish background levels for the hazardous constituents identified in Appendix VIII of 40 CFR Part 264 that are reasonably expected to be in, or derived from, waste placed into the treatment zone. Background values for soil may be based on a one time sampling at a plot having similar characteristics to those of the treatment zone, whereas background soil-pore liquid values must be based on at least quarterly sampling for one year at a similar background plot.

Unsaturated zone monitoring below the treatment zone is conducted to determine if there has been any statistically significant increase in the hazardous constituents in question. If an increase is detected, the operator must notify the Regional Administrator within seven days. This notification must indicate which constituents have shown a statistically significant increase.

The owner or operator of a *permitted* land treatment facility is not subject to post-closure care requirements if he can prove that there has been no statistically significant increase above the background level of hazardous constituents in the treatment zone. In addition, if the owner or operator can also prove that hazardous constituents have not migrated beyond the treatment zone during the active life of the facility, Subpart F ground-water monitoring requirements do not apply.

Additional information on unsaturated zone monitoring at land treatment facilities can be found in *"Permit Guidance Manual on Hazardous Waste Land Treatment Demonstrations," Final Draft, July 1986, EPA-530-SW-84-015.*

Establishment of a protective vegetative cover. The vegetative cover must be designed to minimize liquid migration, promote drainage while controlling erosion, minimize maintenance needs, account for potential settlement and subsidence, have a permeability equal to or less than the permeability of the bottom liners or natural subsoil, and account for freeze/thaw effects. The description in the closure plan must include the name, species, and variety of cover crop; data indicating that the crop can survive and is adapted to the region in which it is planted; and a description of the planting technique and required maintenance activities. The vegetative cover must be capable of survival and growth without extensive maintenance. In addition, any crop must comply with the food-chain restrictions contained in 40 CFR §§264.276 and 265.276 (see Section 4.4.2.5 for a discussion of these restrictions).

Additional guidance on final covers can be found in *"Permit Applicants' Guidance Manual for Hazardous Waste Land Treatment, Storage, and Disposal Facilities, Final Draft, May 1984, EPA-530-SW-84-004 or "Covers on Hazardous Waste Landfills and Surface Impoundments, Technical Guidance Document, July 1989, EPA-530-SW-89-047.*

Soils Removal. The owner or operator may decide to address the closure objectives by removing all contaminated soils. The soil should be removed in layers and sampling conducted following removal of each layer. This procedure will help minimize the amount of soil removed. Excavation should be completed as quickly as possible to reduce the probability of rain transporting contaminants through the unsaturated zone.

After closure procedures are complete, the owner or operator of the facility may have either an independent qualified soil scientist or a registered professional engineer certify that the closure occurred in accordance with the approved guidelines in the closure plan.

4.4.2.4 Conducting Post-Closure Care

During the post-closure care period, owners or operators of permitted land treatment facilities must continue all activities required during the closure period until the level of hazardous constituents in the treatment zone no longer exceeds the background value of the constituents by a statistically significant amount. 40 CFR §264.280(d)(3) states that in determining whether a statistically significant increase has occurred, the owner or operator must compare existing constituent levels with background levels using statistical techniques that provide "reasonable confidence" that the presence of such constituents will be identified.

The statistical procedure must be appropriate for the distribution of data used to establish background values and provide a balance between failing to detect an existing hazardous constituent and falsely detecting such a constituent when it is not present. The preamble to the July 26, 1982, Federal Register states that the Student's t-test protocol described in 40 CFR §264.97(h) should satisfy the reasonable confidence criteria if the number of constituents is small.

If the owner or operator of a permitted land treatment facility cannot gain an exemption from post-closure care requirements using the methods outlined above, he must continue all of the activities required during the closure period. The only exception is that soil pore liquid monitoring can be terminated 90 days after the last application of waste into the treatment zone, because the constituents detected by the soil pore monitoring system are fast-moving and should migrate out of the treatment zone soon after waste application.

In addition to the general post-closure care requirements contained in 40 CFR §265.117, the owner or operator must do the following:

- Continue unsaturated zone monitoring;
- Control wind dispersal; and
- Comply with food-chain crop restrictions (see below).

4.4.2.5 Food-Chain Crop Restrictions

Following closure, food-chain crops may not be grown in or on the treatment zone in order to prevent the migration of hazardous constituents from the treatment zone into crops and animals, thereby jeopardizing human health. The Regional Administrator may only grant an exemption from these requirements if the owner or operator of the facility can demonstrate that hazardous constituents, other than cadmium:

- Will not be transferred to the food crops by plant uptake or contact, nor will be ingested by food-chain animals; and
- Will not occur in greater concentrations than in or on the same crops in untreated soil in the same region.

If cadmium is present in the wastes applied to the treatment zone, the owner or operator of the facility must maintain the pH level so as to prevent the cadmium from going into solution. The technical requirements for food-chain prohibitions for cadmium in land treatment facilities can be found in 40 CFR §264.276.

4.4.3 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.4

EPA/530-SW-84-004, "Permit Applicants' Guidance Manual for Hazardous Waste land Treatment, Storage, and Disposal Facilities," Final Draft, May 1984.

EPA/530-SW-84-015, "Permit Guidance Manual on Hazardous Waste Land Treatment Demonstrations," Final Draft, July 1986.

EPA/530-SW-89-047, "Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," July 1989.

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," U.S. EPA, January 1987.

4.5 CONTAINER STORAGE AREAS

This section presents the requirements for closure of hazardous and radioactive mixed waste container storage areas located at DOE facilities. A container is defined in 40 CFR §260.10 as any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled. Examples of containers include 55-gallon drums or barrels. Closure of a container storage area does not refer to closure of the individual containers, but rather to closure of the entire area in which the containers are stored.

Facilities that store hazardous or mixed wastes for greater than 90 days must store these hazardous wastes in container storage areas that meet the design requirements of 40 CFR §264.175. Facilities that store hazardous wastes in containers for 90 days or less (beginning the first day waste is accumulated) are only subject to 40 CFR §§265.111 and 265.114, which address closure performance standards and decontamination activities respectively.

4.5.1 What are the Closure Requirements for Container Storage Areas?

Exhibit 4.5-1 provides an overview of the key closure requirements for container storage areas and references to where in this section more detailed information is provided.

Exhibit 4.5-1

Overview of Applicable Statutory and Regulatory Requirements

All hazardous waste and residues, and all containers, liners, bases, and soils contaminated with hazardous wastes must be removed or decontaminated.

Section 4.5.2

Because all wastes and containers must be removed at closure, there are no post-closure care requirements.

Section 4.5.2

4.5.1.1 Statutory Requirements

RCRA contains no specific requirements applicable to closure of container storage areas.

4.5.1.2 Regulatory Requirements

The regulatory requirements for container storage areas at both interim status and permitted facilities have remained unchanged since 1981. When the Subpart I regulations were promulgated on May 19, 1980, no specific closure standards were promulgated for permitted or interim status container storage facilities. In 1981 (46 FR 2831), EPA stated that the closure requirements found in Part 265, Subpart G, were applicable

to interim status container storage facilities, but for purposes of clarification and to be consistent with the existing closure requirements of tanks (Subpart J), the Agency promulgated a closure standard applicable to permitted container storage areas in Part 264. EPA has not incorporated the same specific requirements in Part 265 as of June 1990.

4.5.2 Closure of Container Storage Areas

The technical closure requirements pertaining to containers are found in 40 CFR §264.178. These requirements only allow for the clean closure of container storage areas. The Subpart G procedural requirements for closure of these units are discussed in Chapter 3 of this manual. Exhibit 4.5-2 outlines closure requirements for container storage areas.

Exhibit 4.5-2

Closure of Container Storage Areas (§264.178)

At closure, owners or operators of all facilities that store containers of hazardous waste must comply with the following requirements.

- **Remove all hazardous waste and hazardous waste residues from the containment area.**
- **Decontaminate or remove remaining containers, bases, and soil contaminated with hazardous waste or hazardous waste residues.**
- **At closure, the owner or operator becomes a generator of hazardous waste and must manage the waste accordingly, unless he can demonstrate in accordance with §261.3(d) that the waste removed from the containment area is not a hazardous waste.**

The following sections provide an overview of required closure activities applicable to owners or operators of container storage areas:

- Prepare closure plan (Section 4.5.2.1);
- Conduct closure (i.e., remove or decontaminate all wastes, equipment, etc.) (Section 4.5.2.2); and
- Demonstrate clean closure (Section 4.5.2.3).

4.5.2.1 Preparing Closure Plans for Container Storage Areas

All container storage areas must have a written closure plan as described in Chapter 3 of this manual. The closure plan must identify the steps necessary to perform closure of the container storage area at any time during its active life. Exhibit 4.5-3 presents a sample outline of a closure plan for a container storage area. For additional guidance see OSWER Policy Directive #9476.00-5, "*RCRA (Resource Conservation and Recovery Act) Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements.*"

4.5.2.2 Implementing Closure at Container Storage Areas

In order to properly clean close a container area, hazardous wastes and residues must be removed, and contaminated containment system components (e.g., bases, structures, and equipment), soils, and subsoils,[27] must be either removed or decontaminated. See Section 4.2.3 of this manual which provides an overview of the key activities required for clean closure.

With one exception (see discussion regarding "empty" containers below), all removed containers, liners, bases, and other materials must be managed as hazardous waste unless the wastes have been delisted in accordance with 40 CFR §§260.20 and 260.22, or the wastes do not exhibit any hazardous waste characteristics (see Section 2.1.2 of this manual for a discussion of hazardous waste characteristics). In addition, if these materials are mixed wastes, they must be managed in accordance with *DOE 5280.2A, Radioactive Waste Management, September 26, 1988*. Before disposing of any of the wastes in a landfill, injection well, or any other land disposal unit, the owner or operator must determine if the wastes are prohibited from land disposal under the land disposal restrictions (LDRs). If the waste is restricted from land disposal, it must be treated by a method that meets the treatment standards of 40 CFR §§268.40 to 268.44.

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[27] The EPA interprets "soils" to include both unsaturated soils and soils containing ground-water. For this reason, a clean closure must include consideration of potential ground-water contamination under both Parts 264 and 265 (53 FR 8705 and 53 FR 9944).

Exhibit 4.5-3

CONTAINER STORAGE CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Facility Description	• Facility location and size; • Topographic map; • List of other hazardous waste management units and wastes handled in each; • Hydrogeological information; • Description of container storage area capacity and design; • Secondary containment systems. • References to other environmental permits; and • Anticipated waivers or exemptions.
Inventory Removal and Decontamination	• Estimates of maximum inventory (e.g. number of drums) to be removed; • Procedures for removing inventory; • Procedures for decontamination or disposal of pads, pallets, containment systems and contaminated subsoils;
Security Systems	• General description.
Closure Certification	• Activities to be conducted and • Documentation.
Schedule of Closure	• Expected year of closure (only for interim status facilities without approved closure plans); • Time required for waste removal, facility decontamination, and final closure; and • Support for deadline extensions, if applicable.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

Exhibit 4.5-4 is an overview of the key activities for implementing closure at container storage areas. More detailed information on each of these activities immediately follows.

Exhibit 4.5-4

Implementing Closure of Container Storage Areas

To implement closure, owners or operators of all facilities that store drums of hazardous waste should perform the following activities:

- ***Removal of inventory*** (including removal of drums, stabilization of liquids, and removal of liquids and empty drums);
- ***Disposal or recycling of "empty" containers;***
- ***Decontamination;***
- ***Foundation/pad removal;*** and
- ***Removal of contaminated soil.***

Inventory Management. Closure of container storage areas generally involves sending all drums and their contents off-site. In some cases, however, the owner or operator may empty the drums, stabilize the waste and handle it separately from the drums. Usually the drums are then reused or recycled.

Leaking containers, along with their remaining contents, are usually placed and enclosed within an 85-gallon salvage drum, instead of placing the remaining contents of the leaking container into a new drum. To perform this operation, leaking containers are usually hoisted, making use of a drum lifter, and placed into the salvage drum, which in turn is then sealed and loaded into a truck for transportation to a treatment, storage, and/or disposal area. If free liquids remain in containers to be landfilled, they must first be solidified. In this pretreatment method, an absorbent material is added to the containerized wastes. Any spills generated during the container removal process must be cleaned up and managed as hazardous waste.

Disposing or Recycling of "Empty" Containers. According to 40 CFR §261.7 and §261.33(c), if a hazardous waste, except a waste that is a compressed gas or identified as an acutely hazardous waste in 40 CFR §§261.31, 261.32, or 261.33(e), is emptied from a container, the residue remaining in the container is not considered a hazardous waste and is thus not subject to Subtitle C regulations if the following conditions hold:

- All wastes have been removed using such practices as pouring, pumping, aspirating, etc.; and
- No more than 2.5 centimeters of residue remain on the bottom of the container or inner liner; or

- No more than three percent by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 110 gallons in size; or

- No more than 0.3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 110 gallons in size.

A container that held a hazardous waste in the form of a compressed gas is considered empty when the pressure in the container approaches atmospheric.

A container that held an acutely hazardous waste is considered empty if one of the following conditions hold:

- The container or inner liner has been triple rinsed; or

- The container or inner liner has been cleaned by another method shown by scientific literature or tests conducted by the generator, to achieve equivalent removal; or

- The inner liner of the container that prevented contact of the hazardous waste with the container has been removed.

Decontamination. In the case of sumps, other collecting areas within the containment system, and underlying bases (or pads), owners and operators may wish to pursue options involving steam cleaning, high-pressure washing, or sandblasting. In general, facility structures and equipment must be repeatedly cleaned, washed, or rinsed, until monitoring samples of the last rinse water satisfy the closure performance standards set for a site. Residuals resulting from this activity are assumed to be treated as hazardous wastes. The regulations also require owners or operators to decontaminate all contaminated equipment, tools, clothing, supplies, etc., involved in operating, maintaining, and closing the unit. Guidance on procedures for equipment decontamination are provided in *EPA/600/2-85/028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.*

Foundation/Pad Removal. If bases and other container system structures or equipment cannot be decontaminated, they must be removed. Demolition equipment required may include a backhoe loader with a hydraulic hammer or hand-held equipment such as a jack hammer. Other equipment required may include a truck, and either a hydraulic backhoe, front shovel, or a dozer coupled with a front-end loader. To prevent the generation of dust during waste removal, water sprays should be used. The selection of equipment is again dependent on the waste materials; however, further guidance on the selection of removal equipment is provided in Section 7.1 of *EPA/625/6-85/006, "Handbook on Remedial Actions at Waste Disposal Sites," October 1985.*

Soils Removal. Soils underlying the container storage area should be tested at this point to determine the extent of contamination. Any soils which have been determined to contain contaminants in excess of the exposure limits specified in the closure plan must be removed. The soil should be removed in layers and sampling conducted following removal of each layer. This procedure will help minimize the amount of soil removed. Excavation should be completed as quickly as possible to reduce the probability of rain transporting contaminants through the unsaturated zone.

4.5.2.3 Demonstrating Clean Closure

An independent registered professional engineer and the owner or operator must certify that closure has been conducted in accordance with the approved closure plan. Supporting documentation of the certification must be made available to the Regional Administrator upon request.

4.5.3 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.5

DOE 5820.2A, "Radioactive Waste Management," September 26, 1988.

EPA/580-SW-87-010, "RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," January 1987.

EPA/SW-873, "Closure of Hazardous Waste Surface Impoundments," 1982.

EPA/600/2-85-028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.

EPA/625/6-85-006, "Handbook: Remedial Action at Waste Disposal Sites (Revised)," October 1985.

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," U.S. EPA, January 1987.

OSWER Policy Directive #9476.00-6, "Final Report/Guidance Manual: Cost Estimates for Closure and Post-closure Plans (Subparts G and H) Volume III - Unit Costs," November 1987; and "Volume I - Treatment and Storage Facilities."

4.6 *TANKS*

This section presents the requirements for closure and post-closure care of tank systems containing hazardous and mixed wastes located at DOE facilities. A tank system includes a hazardous waste storage or treatment tank and its ancillary equipment and secondary containment system. Ancillary equipment means any device including, but not limited to, piping, fittings, flanges, valves, and pumps used to distribute, meter, or control the flow of hazardous waste from: 1) its point of generation to a storage or treatment tank(s), 2) between hazardous waste storage or treatment tanks to a point of disposal on-site, or 3) to a point of shipment for disposal off-site (40 CFR 260.10). In general, there are three types of tank systems: onground (aboveground) and underground tanks typically made of steel or fiberglass, and inground tanks usually constructed of concrete. A tank must be self-supporting when not surrounded by earthen materials; if it is not, it is a surface impoundment.

The following types of tanks are exempted from RCRA (see 40 CFR §260.10):

- ***Elementary neutralization units*** -- devices which: (1) are used for neutralizing wastes which are hazardous wastes only because they exhibit the corrosivity characteristic defined in 40 CFR §261.22, or are listed in Subpart D of Part 261 for this reason; and (2) meet the definition of tank in § 260.10.

- ***Wastewater treatment units*** -- devices which: (1) are part of a wastewater treatment facility which is subject to regulation under Section 402 or Section 307(b) of the Clean Water Act; (2) receives and treats or stores an influent wastewater which is a hazardous waste as defined in 40 CFR §261.3, or treats or stores a wastewater treatment sludge which is a hazardous waste as defined in § 261.3; and (3) meets the definition of tank in § 260.10.

4.6.1 What are the Closure Requirements for Tank Systems?

This section briefly describes the statutory authorities and regulations pertinent to the closure of tank systems. Exhibit 4.6-1 presents the key closure requirements for tank systems and references to where in this section more detailed information is provided.

4.6.1.1 Statutory Requirements

RCRA does not contain any closure requirements specific to hazardous waste tanks, but does provide for minimum design, operating, and permitting requirements. HSWA added two new provisions affecting the regulation of hazardous waste tanks:

- Leak detection requirements of all new underground hazardous waste tank systems (Section 3004(o)(4)); and

- Technical and permitting standards for underground tanks that cannot be entered for inspection (Section 3004(w)).

Exhibit 4.6-1

Overview of Applicable Statutory and Regulatory Requirements

At closure, the owner or operator must remove or decontaminate the tank, its ancillary equipment, and any existing secondary containment system.

Section 4.6.2

All contaminated soils and ground water must be removed at closure unless the owner or operator demonstrates to EPA that this is impracticable.

Sections 4.6.2 and 4.6.2.5

Owners and operators of tank systems that do not have secondary containment and are not exempt from the secondary containment requirements must prepare a contingent closure and a post-closure plan describing closure as a landfill.

Section 4.6.2.2

If all contaminated soils or ground water cannot be practicably removed or decontaminated, the soils must be covered with a final cap and monitored during the post-closure care period.

Sections 4.6.2.5 and 4.6.2.6

Prior to HSWA, RCRA did not address underground tanks that cannot be entered for inspection. In Section 3004(w), Congress mandated EPA to regulate these RCRA tanks to at least as stringent a degree as petroleum USTs regulated under HSWA §9003. As described below, when EPA revised the hazardous waste tank regulations on July 14, 1986, it extended all design and operating requirements to these underground hazardous waste tanks.

4.6.1.2 Regulatory Requirements

Regulatory requirements for interim status and permitted tank systems are found in 40 CFR Parts 264 and 265, Subpart J, respectively (revised most recently on July 14, 1986 (51 FR 25422)). These rules establish technical standards and operating procedures for the owners and operators of permitted, interim status, 90-day accumulation, and small quantity generator tank systems.[28]

Prior to the July 14, 1986, regulations, the closure requirements for tanks only required that all hazardous wastes and hazardous waste residues be removed from tanks, discharge control equipment, and discharge confinement structures (51 FR 25456). However, in the 1986 final rule, EPA substantially changed the closure and post-closure requirements of Subpart J (§§ 264.197 and 265.197) by requiring owners and operators who must leave contaminated soils in place at closure to install ground-water monitoring systems, close their tank systems as landfills, and conduct post-closure care, including ground-water monitoring. It also

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[28] "Small quantity generators" refer to generators of 100 to 1,000 kg/month of hazardous waste.

added provisions requiring certain tank systems to prepare contingent closure and post-closure care plans. Finally, it also extended the revised design and operating standards for hazardous waste tanks to underground waste tanks that cannot be entered for inspection, which were exempted from regulation under the previous standards.

Tank systems found to be leaking or unfit for use must be closed unless the owner or operator can demonstrate that the cause of the leak was a spill that has not damaged the integrity of the tank system, or that the tank system can be repaired to prevent additional leaks (§§ 264.196(e) and 265.196(e)). In the case of a tank system that requires repair, if the leak from the tank system occurred from a component that did not have secondary containment, then the owner or operator must provide that component with secondary containment, as required under §264.193, before it is returned to service. However, if the leak occurred from an aboveground portion of the tank system that can be inspected visually, the tank system can be returned to service without secondary containment if the repair is extensive. Additionally, any extensive repairs conducted on a tank system must be certified and any replacement equipment used in such repairs must satisfy the requirements for new equipment. If any of the preceding requirements cannot be met, the tank system must be closed.

4.6.2 Closure of Tank Systems

Closure requirements for tanks are found in 40 CFR §§264.197 and 265.197 and are equivalent for permitted and interim status facilities. Specifically, all waste residues, containment system components, liners, contaminated soils, and equipment and structures contaminated with waste must be decontaminated or removed. These components must then be managed as hazardous waste unless specifically exempted under 40 CFR 261.3(d) (i.e., unless it can be demonstrated that they do not exhibit hazardous waste characteristics, or have been delisted). If the owner of operator finds that removal of all contaminated soils (i.e., unsaturated and saturated soils, including ground water) is not practicable, then the unit must be closed as a landfill.

The following is an overview of the required closure activities for owners or operators of tank systems:

- Prepare closure plan (Section 4.6.2.1);
- Prepare contingent closure and post-closure plans for units without secondary containment (Section 4.6.2.2)
- Conduct closure (Section 4.6.2.3); and
- Demonstrate clean closure (Section 4.6.2.4); or
- If clean closure is demonstrated to be impracticable, submit revised closure/post-closure plans, close as a landfill. (Section 4.6.2.5); and
- Conduct post-closure care and monitoring (Section 4.6.2.6)

The following sections provide more specific guidance on how to properly perform each of these activities.

4.6.2.1 Preparing a Tank Closure Plan

All tank systems must have a written closure plan as described in Chapter 3 of this manual. The closure plan must identify the steps necessary to perform closure of the tank system at any time during its active life. Exhibit 4.6-2 presents a summary of the information requirements specific to the clean closure of tank systems that should be included in a closure plan.

4.6.2.2 Preparing Contingent Plans for Facilities without Secondary Containment

Owners and operators of permitted and interim status tank systems that do not have secondary containment and are not exempt from the secondary containment requirements (see §264.190 and §265.190, and §264.193 and §265.193) must prepare a contingent closure plan and a contingent post-closure plan, in addition to the closure plan for closing as a storage unit (§264.197(c) and §265.197(c)).[29] The contingent closure and post-closure plans are required even if the owner or operator is planning to install secondary containment in the future. In such a case, the plans would be required until appropriate secondary containment is installed. Exhibits 4.6-3 and 4.6-4 present sample outlines for contingent closure and contingent post-closure care plans for owners or operators of tank systems. The contingent closure plan would supplement the clean closure plan and would be implemented if clean closure is not possible. A key component of these plans includes the descriptions of a 40 CFR Part 264, Subpart F ground-water monitoring system as required for tank systems that close with contaminated soils in place.

4.6.2.3 Implementing Closure of Storage and Treatment Tank Systems

The owner or operator must remove or decontaminate all waste residues, contaminated system components (i.e., secondary containment liner or vaults), contaminated soil, and structures contaminated with hazardous waste. The decontamination requirement also applies explicitly to all soils at a facility, including saturated soils and ground water. If the owner or operator demonstrates that not all contaminated soils can be practicably removed or decontaminated at closure, then the owner or operator must close the tank system and perform post-closure care in accordance with the requirements applying to landfills (see Sections 4.6.2.5 and 4.6.2.6).

All removed materials must be managed as hazardous waste unless the facility has received EPA approval to delist the wastes (specified in 40 CFR 261.3(d); also discussed in Section 2.1.2.5 of this manual). In addition, if these materials are mixed radioactive wastes, they must be managed in accordance with *DOE 5280.2A, Radioactive Waste Management, September 26, 1988.* Finally, if these wastes are prohibited from land disposal under the land disposal restrictions (LDRs), they must be treated by a method that meets the treatment standards of 40 CFR 268.40 to 268.44. The LDR program is discussed in detail in Section 2.1.4.

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[29] For a description of tank technologies, operating practices, location characteristics, or combinations of environmental conditions and waste characteristics that may allow for a variance from the secondary containment requirements see: "*Technical Resource Document for Obtaining Variances from Secondary Containment Requirements for Hazardous Waste Tank System: Volume I - Technology-Based Variance*" or "*Volume 2 - Risk-Based Variance*" of the same title.

Exhibit 4.6-2

TANK CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Facility Conditions	• Facility location and size; • List of other hazardous waste management units and wastes handled in each; • Hydrogeological information; • Tank system description (volume, size, type of liner system, etc.); • Description of past releases and corrective measures taken; • References to other environmental permits; and • Anticipated waivers or exemptions.
Inventory Removal and Decontamination	• Estimates of inventory to be removed; • Procedures for removing all waste inventory from the tank systems and procedures for removing or decontaminating all tank system components (e.g., steam cleaning); • Procedures for removing or decontaminating all secondary containment structures and contaminated soils or additional equipment at the site (e.g., demolition of pad, dismantling tank); • Procedures for decontamination/disposal of equipment and disposal of residuals and contaminated washwaters; and • Major radionuclides and their concentrations.
Clean Closure Demonstration	• Listing of exposure limits for Appendix VIII constituents; • Background levels at the site; and • Description of the testing to determine if pad, piping, containment areas, etc.

Exhibit 4.6-2 (Continued)

TANK CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Security Systems	• General description.
Closure Certification	• Activities, tests to be conducted; and • Documentation.
Schedule of Closure	• Expected year of facility closure (only for interim status facilities without approved closure plans; • Time required for waste treatment, removal, decontamination, and final closure; and • Support for deadline extensions, if applicable.

Source: OSWER Policy Directive No. 9476.065, "RCRA Criteria Manual For Subpart G Closure and Post-Closure Carte Standards and Subpart H Cost Estimating Requirements (Draft)".

Exhibit 4.6-3

TANK CONTINGENT CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Final Cover Design	• Engineering drawings and area covered; • Cover characteristics (e.g., material type, permeability, depth, slope, drainage structures, and vegetation); • Installation procedures; • Erosion control procedures; and • Procedures for soil stabilization.
Ground-Water Monitoring	• Well installation, including number, depth and location of wells; • Procedures for obtaining ground-water background data • Types of sampling and analysis; and • Equipment maintenance.
Security Systems	• General description and • Description of proposed changes.
Survey Plat	• Surveyed benchmarks.
Closure Certification	• Activities to be conducted; and Documentation
Closure Schedule	• Milestone chart showing closure cover installation, vegetation planning, and total time to complete closure.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

Exhibit 4.6-4

TANK CONTINGENT POST-CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Ground-Water Monitoring	• Number, location, and depth of wells; • Frequency of sampling; and • Types and procedures for analyses.
Soil Monitoring	• Number and frequency of samples; • Sampling procedures; and • Types of analyses conducted.
Inspections	• Frequency and • Scope.
Maintenance Activities	• Final cover; • Monitoring systems; and • Security systems.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

To implement closure of storage and treatment tank systems, the owner or operator must either remove the tank system, or decontaminate it and leave it in place. Regardless of which option is chosen, the facility must either remove contaminated soils, or demonsstrate to EPA that it is impracticable to do so. The following subsections describe the general activities required for removing tank systems, leaving tank systems in place, and excavating contaminated soils and ground water.

4.6.2.3.1 Removing Tank Systems

Tanks are usually removed under the following circumstances: 1) the secondary containment system is contaminated, 2) it is necessary to remove contaminated soils or subsoils, or 3) the tank area surrounding onground or aboveground tanks is closed as a landfill. Actions involved in removing tank systems at closure generally include liquid removal, containerization of bulk waste and removal of the containers, tank cleaning, tank removal, excavation of vault systems, base or pad removal, liner removal, soils removal, and excavation of contaminated soils and containments systems. A description of each is provided below.

Waste Removal. The first step in closing tanks involves removing bulk wastes from the tank system. First, liquid wastes and sludges should be pumped from the tank into drums or trucks for transport to storage or to the site of actual treatment or disposal. Waste removal can only be undertaken after the characteristics of the waste have been fully determined. In particular, the hazards posed by radioactive mixed wastes stored in tanks may necessitate significantly more stringent worker safety precautions during closure. These precautions are not covered in this guidance document, but should be consulted before undertaking closure activities.

The type of pump chosen for the operation is dependent on the physical and chemical characteristics of the waste. For example, viscous or oily solvent wastes generally require the use of a rotary lobe pump made of cast iron; aqueous wastes require the use of a cast iron centrifugal pump; and sludges containing heavy metals and having solids content between 1 percent and 5 percent require the use of a stainless steel centrifugal pump. Pump size is primarily a function of the time allowed for closure and the quantity of material to be removed.

Waste Treatment or Disposal. After removing the bulk wastes from the tank system, they must be treated, stored further, or disposed. In particular, restricted wastes must be treated to BDAT levels as required by the LDR program. It will be critical to determine the waste characteristics and identities in order to ensure compliance with these treatment standards. Chapter 2 outlines the LDR requirements for hazardous and radioactive mixed wastes.

Decontamination. Decontamination is a critical task, especially when permanently closing a tank system. Decontamination involves removing all remaining wastes, sludges, and waste residues from the tank system. The following guidance is found in OSWER Policy Directive No. 9483.00-1, *"Technical Resource Document for the Storage and Treatment of Hazardous Waste in Tank Systems," December 1986, EPA/530-SW-86-044.* For further information on tank decontamination see: *(API) Publication 2015, "Cleaning Petroleum Storage Tanks," (September 1985); API Publication 2015A, "A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning (Supplement to API RP 2015); and NFPA No. 327, "Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers," (1982).*

- Cleaning operations should be performed under the supervision of those who understand the hazardous potential of the stored waste;

- Personnel must be sufficiently trained and equipped to perform decontamination safely;

- Testing should be done to ensure complete decontamination;

- Sludges and residues should be removed from the area near the tank using explosion-proof equipment (i.e., vacuum pumps and other respiratory and safety equipment);

- All hazardous wastes removed from the tank system must be managed in a Subtitle C hazardous waste treatment, storage, and disposal unit;

- Stubborn residues should be removed by pressure hosing with water, steam cleaning, or solvent washes; and

- Residues from cleanup chemicals such as mineral spirits and kerosene should be treated or disposed of properly.

Owners and operators should pursue options involving steam cleaning, high-pressure washing, or sandblasting to decontaminate tank interiors, the interstitial space between double-walled steel tanks, vault system interiors, sumps, troughs, or other collecting areas within the containment system, and underlying bases (concrete or asphalt slabs).

In general, facility structures and equipment must be repeatedly cleaned, washed, or rinsed, until monitoring samples of the last rinse water satisfy the closure performance standards set for a site. Residuals resulting from this activity are assumed to be treated as hazardous wastes. The regulations also require owners or operators to decontaminate all contaminated equipment, tools, clothing, supplies, etc., involved in operating, maintaining, and closing the unit. Thus, decontamination generally occurs throughout the entire cleanup process until final closure is approved by EPA. Guidance on procedures for equipment decontamination are provided in *EPA/600/2-85/028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985*. If bases, liners, and other container system structures or equipment cannot be decontaminated, they must be demolished and disposed in a Subtitle C disposal unit. Exhibit 4.6-5 summarizes decontamination methods for tanks and other facility structures.

Exhibit 4.6-5

Decontamination Methods for Tanks and Other Facility Structures

- **Steamcleaning** - An average of 50 square feet of surface area is cleaned per hour. Residual is generated at a rate of approximately four gallons per square foot.
- **High-Pressure Washing** - An average of 40 square feet of surface area is cleaned per hour. Residual is generated at a rate of approximately four gallons per square foot.
- **Sandblasting** (dry system) - An average of 50 square feet of surface area is cleaned per hour. Residual is generated at a rate of approximately two pounds per square foot.

Tank Removal. After performing the steps above, general procedures to be followed in removing tanks include the following:

- Disconnect and cap all fill, gauge, and vent lines;
- Temporarily plug all tank openings, except for a 1/8-inch hole for venting;
- Free the tank of all flammable or toxic vapors;
- In the case of underground storage tanks, remove the tank from the ground;
- Thoroughly clean the outside of the tank;
- Render the tank unfit-for-further use by puncturing holes in the walls of the tank;
- Dismantle the tank (from the outside to limit worker exposure hazards) if necessary; and
- Transport the tank from the site.

Soil excavation equipment is required in the case of underground tanks covered with soil. In removing underground tanks, a crane is used and in some cases, the tank must be detached from its supports before lifting. If the underground tank is anchored to a "deadman" or concrete slab, the anchor should be tested to see if it is contaminated with wastes. If not contaminated, it may be left in place. If the anchor slab is contaminated, demolition and excavation equipment will be necessary for removal. Removed fiberglass-reinforced plastic tanks may be reused provided that a thorough inspection is made by an approved agent of

the tank manufacturer and the manufacturer certifies that the tank is acceptable for reuse. If a removed tank will not be reused, it must be rendered unfit for further use by puncturing holes in the walls of the tank and dismantling the tank if necessary.

Since inground tanks may be constructed of concrete, a jackhammer and/or a hydraulic hammer attached to a backhoe is needed to demolish the structure. A truck will also be necessary to remove the rubble. Large field erected steel tanks are loosened from concrete pads using a jackhammer or cut from steel supports using a cutting torch, and set aside with a crane. In the case of onground/aboveground tanks greater than 700 square feet in surface area, the tank may have to be cut into pieces using a cutting torch and placed aside using a crane. Other procedures and information on the removal and disposal of tanks can be found in the following references:

- *API Publication 2015, "Cleaning Petroleum Storage Tanks," (September 1985);*
- *API Publication 2015A, "A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning (Supplement to API RP 2015);*
- *API Publication 2015B, "Cleaning Open-Top and covered Floating-Roof Tanks,"(1981);*
- *API Publication 1604, "Recommended Practice for Abandonment or Removal of Used Underground Service Station Tanks," (1981);*
- *NFPA No. 30, "Flammable and Combustible Liquids Code," (1984);*
- *NFPA No. 327, "Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers," (1982)*; and
- *National Institute of Occupational Safety and Health (NIOSH) No. 80-106, "Working in Confined Spaces," (December 1979).*

Base or Pad Removal. Demolition equipment that may be required includes a backhoe loader with a hydraulic hammer, or hand-held equipment such as a jack hammer. Other equipment that may be required includes a truck, and either a hydraulic backhoe, front shovel, or a dozer coupled with a front-end loader. A crane or backhoe should be used to remove plastic or semisolid sediments and a bulldozer can be used to break down any solidified materials prior to excavation. To prevent the generation of dust during waste removal, water sprays should be used. The selection of equipment is again dependent on the waste materials; however, further guidance on the selection of removal equipment is provided in Section 7.1 of *EPA/625/6-85/006, "Handbook on Remedial Actions at Waste Disposal Sites," October 1985.*

Vault System Removal. Vault systems used as secondary containment for underground storage tanks can be broken making use of a hydraulic hammer attached to a backhoe. Concrete which is demolished below grade can be loaded into a truck using a backhoe. A backhoe or front-end loader can be used to remove small vault system covers. A crane may be necessary for larger covers. A jackhammer or other demolition equipment may be necessary to loosen covers or break up the cast-in-place covers of concrete tanks prior to tank removal.

Removal of Secondary Containment. Secondary containment structures should be removed following waste removal and before removal of any subsoils to minimize the potential for additional contamination of the subsoil. Normal excavation methods can be used to remove liners made of clay and soil. However, concrete containment systems should first be broken up and then removed.

4.6.2.3.2 Leaving Decontaminated Tanks and Vaults in Place

The abandonment of underground, inground, onground, and aboveground tanks may be a preferred option due to safety and economic reasons. However, some state laws may prohibit the abandonment of tanks. The existence of such requirements should be determined first. The abandonment of underground storage tanks may be done by two procedures: one is a general method, while the other involves sand-pumping. Abandonment procedures for underground storage tanks include the following:[30]

Method for Abandoning Underground Tanks - General

- Drain and flush the piping into the tank and remove all hazardous waste that can be pumped out;
- Dig down to the top of the tank, remove fill drop tube, and disconnect all fill, inlet, and gauge lines (leave vent line open until the tank is filled);
- Cap all the open ends of lines that will no longer be used and fill the tank with water until almost overflowing;
- Remove excess waste floating on top and empty into a container that is appropriate for disposal;
- After water has purged the tank, make several holes into the top of the tank and pump out the water (properly dispose of water);
- Completely fill the tank and any remaining stubs with sand, gravel, or other approved, inert, solid, non-shrinking material;
- Test for complete decontamination, and disconnect and cap the vent line.

Method for Abandoning Underground Tanks - Sand Pumping

- Remove all hazardous waste from the tank and all connecting lines, and test for complete decontamination;
- Cut off vent lines approximately three feet above grade to promote an increased head on sand being pumped into the tank and thus complete

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[30] OSWER Policy Directive No. 9483.00-1, *"Technical Resource Document for the Storage and Treatment of Hazardous Waste in Tank Systems," December 1986.*

filling of the tank (**Do not use a cutting torch if ignitable wastes are involved**);

- Disconnect and cap extraction (suction) lines, and make the threaded connections between fill lines of the tank and the discharge line from the sand pump liquid-tight (on tanks equipped with fill pipes extending below the top of the tank, remove the extension piping within the tank);

- Attach a drain hose to the end of the vent line using a tight or threaded connection and direct it into a reservoir to hold any residual hazardous waste that might be left in the tank;

- Pump sand into the tank until a dense suspension of sand in water discharges from the vent lines (at this point, caps may be removed from extraction lines for observation and sand should be present here before the pumping is stopped); and

- Observe caution in the vent line area due to the possible emission of flammable or toxic vapors, if necessary conduct vapors to an area which will be more protective to human health and the environment.

A separate procedure is typically used for abandoning inground, onground, and aboveground tanks. It includes the following general steps:

- Remove as much waste as possible from the tank and piping system, disconnect and cap all fill, gauge and vent lines;

- Free the tank of all flammable or toxic vapors;

- Remove all sludge or other tank residues, and thoroughly clean the inside of the tank;

- Test for complete decontamination;

- Take security measures necessary to prevent casual or accidental entry into the tank; and

- Anchor tank to prevent flotation if located in a floodplain by filling it with sand, gravel, or other inert material.

4.6.2.3.3 Excavation of Contaminated Soils

After removing or decontaminating the tank system, the owner or operator of a tank facility must attempt to remove <u>all</u> contaminated soils (i.e., unsaturated and saturated) during closure, unless he can demonstrate that it is impracticable to do so. The most common method of excavating surface soils (as well as other tank system components such as vaults, liners, etc.) is by mechanical means. Excavation of the wastes can be accomplished using a crane (with attachments such as a clam shell bucket), backhoe, or bulldozer. A

crane or backhoe should be used to remove plastic or semisolid sediments and a bulldozer can be used to break down any solidified materials prior to excavation. To prevent the generation of dust during waste removal, water sprays should be used. The selection of equipment is again dependent on the waste materials; however, detailed guidance on the selection of equipment for sludge removal is provided in Section 7.1 of *EPA/625/6-85/006, "Handbook on Remedial Actions at Waste Disposal Sites," October 1985.*

EPA has not provided guidance on how to determine the impracticability of excavating contaminated soils. However, helpful guidance may be contained in EPA's *"Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G & H)," Volumes I through IV.* In general, EPA is unlikely to approve any request for landfill closure unless there is significant ground-water contamination which cannot be remedied in a timely fashion. In other words, if soils are contaminated and no significant ground-water contamination exists, the facility will probably be required to excavate soils to the cleanup levels described in the closure plan.

4.6.2.4 Demonstrating Clean Closure

Upon completion of closure, facilities must keep all data documenting closure on hand for three years and submit it to EPA upon request. This documentation should provide evidence that all environmental media were cleaned up to the levels established in the closure plan. The data should address soils, ground water, surface water, and air, as appropriate. Consult the discussion in Section 4.2 on demonstrating clean closure for surface impoundments, which will be largely applicable to tank demonstrations.

4.6.2.5 Submit Revised Closure/Post-Closure Plans and Close as a Landfill

If an owner or operator of a tank system demonstrates to the Regional Administrator that all contaminated soils cannot be practicably removed from the site of the tank system, or decontaminated at the time of closure, then the owner or operator must close the tank system in the same manner as a landfill (40 CFR §§ 264.310 and 265.310). In general, the facility should (1) demonstrate impracticability to EPA, (2) prepare landfill closure and post-closure plan or revise the contingent plan as applicable, and then (3) get approval from the Agency.

Facilities without secondary containment should already have a contingent plan on file with EPA and will only need to revise it to address current site conditions when applying for Agency approval to close as a landfill. If it is not necessary to revise the plan, the facility will be able to begin landfill closure immediately after Agency approval. Facilities with secondary containment are not required to submit contingent plans, and are unlikely candidates for closing as a landfill unless significant ground-water contamination has occurred due to unusual leaks, overflows, or spills.

Once the determination to close as a landfill is made, all the closure and post-closure requirements that apply to landfills will then apply to the tank system. The facility must revise the unit's closure plan to reflect closure as a landfill and prepare a post-closure plan. If closure has not yet begun, the revised closure plan must be submitted within 30 days after the determination. The post-closure plan should be drafted and submitted for approval within 90 days after the determination that the site must be closed as a landfill (40 CFR §§ 264.118 and 265.118).

If a revised closure plan is necessary, it can build on previously submitted plans (see Exhibit 4-6, Tank Contingent Closure Plan Sample Outline). During the revision of the closure plan, sections will need to be added describing cover design, stabilization, and monitoring. Since all of the wastes will have been previously

removed or decontaminated, liquid waste removal will be unnecessary and only a cap will be required to cover the remaining contaminated soils, equipment, or tank system components. Further guidance on closing as a landfill is provided in Section 4.1 of this manual.

The most critical component of closure as a landfill concerns the design, installation and operation of a ground-water monitoring system, as required in 40 CFR Part 264, Subpart F, and a final cover. The process described in these regulations is complicated, requiring characterization of the hydrogeology and ground-water flow patterns. At a minimum, the detection monitoring wells must be capable of sampling specific conductance, total organic carbon, total organic halogen, and other applicable waste constituents. The frequency of monitoring and maintenance activities will be dependent on the specific site conditions, for example, climate, waste type, soil, and vegetation. For further information on how to install and operate a RCRA ground-water monitoring system, see EPA's "*RCRA Ground-water Monitoring Enforcement Guidance, Part II: RCRA Ground-water Monitoring Technical Enforcement Document (TEGD), Draft, August 1985.*" For further information on ground-water monitoring within the context of corrective action, see OSWER Directive #9502.00-6D, "*RCRA Facility Investigation Guidance Document," May 1989*, and Section 4.2 of this manual. For further information on other RCRA requirements to consider for clean closure or landfill closure, also see Sections 4.1 and 4.2 of this manual.

Because the volume of waste remaining in place at closure will be less than in a typical landfill, it may not be necessary to design a full 3-part RCRA cap (as described in Section 4.1). The cap must be designed to minimize the release of contaminated leachate during the post-closure period and in the long-term. See Section 4.2 for a discussion of alternatives to the full RCRA cap.

4.6.2.6 Conducting Post-Closure Care and Monitoring

Owners or operators of tank systems that close as landfills must conduct post-closure care for 30 years after closure and comply with all post-closure procedural requirements contained in 40 CFR §§264.117 through 264.120, including maintenance and monitoring throughout the post-closure care period. The EPA Regional Administrator has the authority to extend or reduce the period for post-closure care on a case-by-case basis.

Provisions for the kinds of monitoring and maintenance activities that can reasonably be expected during the post-closure care period must be specified in a post-closure plan. The plan should include the following information below:

- Frequency and scope of inspections;
- Procedures for making repairs to the cover;
- Procedure for leachate collection, removal, and treatment;
- Frequency of sampling and monitoring; and
- Maintenance of monitoring systems.

4.6.3 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.6

API Publication 1604, "Recommended Practice for Abandonment or Removal of Used Underground Service Station Tanks," 1981.

API Publication 2015, "Cleaning Petroleum Storage Tanks," September 1985.

API Publication 2015A, "A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning (Supplement to API RP 2015)."

API Publication 2015B, "Cleaning Open-Top and Covered Floating-Roof Tanks," 1981.

DOE 5820.2A, "Radioactive Waste Management," September 26, 1988.

EPA/530-SW-86-044, "Technical Resource Document for the Storage and Treatment of Hazardous Waste in Tank Systems," December 1986 (OSWER Policy Directive No. 9483.00-1).

EPA/580-SW-87-010, "RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," January 1987.

EPA/600/2-85-028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.

EPA/625/6-85-006, "Handbook: Remedial Actions at Waste Disposal Sites," October 1985.

EPA/SW-873, "Closure of Hazardous Waste Surface Impoundments," 1982.

EPA's "Guidance Manual: Cost Estimates for Closure and Post-closure Plans (Subparts G and H)," Volumes I through IV.

EPA's "RCRA Ground-water Monitoring Enforcement Guidance, Part II: RCRA Ground-water Monitoring Technical Enforcement Document (TEGD) (Draft)," August 1985.

National Institute of Occupational Safety and Health (NIOSH) No. 80-106, "Working in Confined Spaces," December 1979.

NFPA No. 30, "Flammable and Combustible Liquids Code," 1984.

NFPA No. 327, "Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers," 1982.

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," U.S. EPA, January 1987.

OSWER Policy Directive #9476.00-6, "Final Report/Guidance Manual: Cost Estimates for Closure and Post-closure Plans (Subparts G and H) Volume III - Unit Costs," November 1987.

OSWER Policy Directive #9483.00-1, "Technical Resource Document for the Storage and Treatment of Hazardous Waste in Tank Systems," December 1986 (EPA/530-SW-86-044).

OSWER Policy Directive #9483.00-3, "Questions and Answers Regarding the July 14, 1986 Hazardous Waste Tank System Regulatory Amendments."

OSWER Policy Directive #9502.00-6D, "RCRA Facility Investigation Guidance Document," May 1989.

"Technical Resource Document for Obtaining Variances from Secondary Containment Requirements for Hazardous Waste Tank System: Volume I - Technology-Based Variance" or "Volume 2 - Risk-Based Variance."

4.7 *INCINERATORS*

This section presents the requirements for closure of incinerators containing hazardous and mixed wastes located at DOE facilities. Because incineration is a treatment rather than a disposal practice, closure requires that all wastes from incineration be removed from the facility, and post-closure care is not required.

An incinerator is defined in 40 CFR §260.10 as any enclosed device using controlled flame combustion that neither meets the criteria for classification as a ***boiler*** nor is listed as an ***industrial furnace.***

A ***boiler***, as defined in 40 CFR §260.10, is an enclosed device using controlled flame combustion and having the following characteristics:

(1) (i) The unit must have physical provisions for recovering and exporting thermal energy in the form of steam, heated fluids, or heated gases; and

(ii) The unit's combustion chamber and primary energy recovery section(s) must be of integral design. To be of integral design, the combustion chamber and the primary energy recovery section(s) (such as waterwalls and superheaters) must be physically formed into one manufactured or assembled unit. A unit in which the combustion chamber and the primary energy recovery section(s) are joined only by ducts or connections carrying flue gas is not integrally designed; however, secondary energy recovery equipment (such as economizers or air preheaters) need not be physically formed into the same unit as the combustion chamber and the primary energy recovery section. The following units are not precluded from being boilers solely because they are not of integral design: process heaters (units that transfer energy directly to a process stream), and fluidized bed combustion units; and

(iii) While in operation, the unit must maintain a thermal energy recovery efficiency of at least 60 percent, calculated in terms of the recovered energy compared with the thermal value of the fuel; and

(iv) The unit must export and utilize at least 75 percent of the recovered energy, calculated on an annual basis. In this calculation, no credit shall be given for recovered heat used internally in the same unit. (Examples of internal use are the preheating of fuel or combustion air, and the driving of induced or forced draft fans or feedwater pumps); or

(2) The unit is one which the Regional Administrator has determined, on a case-by-case basis, to be a boiler, after considering the standards in §260.32 (Variance to be classified as a boiler).

An ***industrial furnace***, is defined in 40 CFR §260.10 as any of the following enclosed devices that are integral components of manufacturing processes and that use controlled flame devices to accomplish recovery of materials or energy: '

(1) Cement kilns;
(2) Lime kilns;
(3) Aggregate kilns;
(4) Phosphate kilns;
(5) Coke ovens;
(6) Blast furnaces;
(7) Smelting, melting and refining furnaces (including pyrometallurgical devices such as cupolas, reverberator furnaces, sintering machine, roasters, and foundry furnaces);
(8) Titanium dioxide chloride process oxidation reactors;
(9) Methane reforming furnaces;
(10) Pulping liquor recovery furnaces;
(11) Combustion devices used in the recovery of sulfur values from spent sulfuric acid;
(12) Such other devices as the [EPA] Administrator may, after notice and comment, add to this list on the basis of one or more of the following factors:

(i) The design and use of the device primarily to accomplish recovery of material products;
(ii) The use of the device to burn or reduce raw materials to make a material product;
(iii) The use of the device to burn or reduce secondary materials as effective substitutes for raw materials, in processes using raw materials as principal feedstocks;
(iv) The use of the device to burn or reduce secondary materials as ingredients in an industrial process to make a material product;
(v) The use of the device in common industrial practice to produce a material product; and
(vi) Other factors, as appropriate.

The following types of boilers or industrial furnaces are considered to incinerate hazardous waste, as per 40 CFR §264.340:

- Boilers or industrial furnaces burning hazardous wastes in order to destroy them; or

- Boilers or industrial furnaces burning hazardous wastes for any recycling purpose that the owner or operator has elected to have regulated under Subpart O.

Examples of incinerators include liquid injection incinerators, controlled air incinerators, rotary kiln incinerators, fluid bed incinerators, and multiple hearth incinerators.

4.7.1 What are the Closure Requirements for Incinerators?

Exhibit 4.7-1 an overview of the key closure requirements for incinerators and references to where in this section more detailed information is provided.

Exhibit 4.7-1

Overview of Applicable Statutory and Regulatory Requirements

The owner or operator must remove and or decontaminate all hazardous waste and hazardous waste residues (including but not limited to ash, scrubber waters, and scrubber sludges) from the incinerator site. Post-closure care is not required.

Section 4.7.2

If the owner or operator of an incinerator fails to demonstrate, in accordance with §261.3(d), that the residue removed from the incinerator is not a hazardous waste, he is considered a generator of hazardous waste and must manage the waste accordingly.

Section 4.7.2

4.7.1.1 Statutory Requirements

There are no relevant statutory requirements that relate specifically to the closure of hazardous waste incinerators.

4.7.1.2 Regulatory Requirements

The current regulatory requirements for interim status and permitted facilities are identical. The technical requirements pertaining to closure of incinerators are found in 40 CFR Parts 264 and 265, Subpart O, for permitted (§264.351) and interim status (§265.351) facilities, respectively. These requirements are in addition to the procedural requirements found in Subpart G, which are discussed in Chapter 3 of this manual.

4.7.2 Closure of Incinerator Facilities

In order to close an incinerator, the owner or operator must remove and or decontaminate all hazardous waste and hazardous waste residues (including, but not limited to, ash, scrubber waters, and scrubber sludges) from the incinerator. These wastes and residues must then be managed as hazardous waste unless specifically exempted under 40 CFR §261.3. Incinerator ash is generally disposed of in a hazardous waste landfill. There are no post-closure care requirements for owners or operators of hazardous waste incineration facilities as long as they can demonstrate that all hazardous waste and waste residues has been successfully removed or decontaminated.

The following is an overview of the required closure activities for owners or operators of incinerators:

- Prepare closure plan (Section 4.7.2.1) and
- Conduct closure (Section 4.7.2.2).

The following sections provide guidance on how to properly perform the activities listed above.

4.7.2.1 Incinerator Closure Plan Requirements

A written closure plan for a incinerators must contain the general information required by 40 CFR Part 264 Subpart G, in addition to the technical information found in Subpart O. An outline for a sample closure plan for an incinerator is presented in Exhibit 4.7-2.

4.7.2.2 Conduct and Certify Closure

Removal of wastes and waste residues. In order to properly close an incinerator all wastes, waste residues, contaminated system components, soils, structures and equipment must be either removed or decontaminated. If the owner or operator cannot demonstrate in accordance with the requirements of 40 CFR §261.3(d) that all wastes and residues removed from the facility are not hazardous, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with 40 CFR Part 262 through Part 266. Wastes that are prohibited from land disposal under the land disposal restrictions (LDRs) must be treated by a method that meets the treatment standards of 40 CFR §§268.40 to 268.44.

Soils removal. Soils underlying the incinerable waste containment systems should be tested to determine if there has been any contamination. Any soils which have been determined to be contaminated must be removed. The soil should be removed in layers and sampling conducted following removal of each layer. This procedure will help minimize the amount of soil removed. Excavation should be completed as quickly as possible.

Equipment decontamination. The regulations require owners or operators of incinerators to decontaminate all contaminated equipment, tools, and supplies, etc., involved in operating, maintaining, and closing the unit. Guidance on procedures for equipment decontamination is provided in *EPA/600/2-85/028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.*

Closure certification. An independent registered professional engineer and the owner or operator of the incinerator must certify that closure has been conducted in accordance with the approved closure plan. Supporting documentation of the certification must be made available to the Regional Administrator upon request.

Exhibit 4.7-2

INCINERATOR CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Facility Description	• General Description • Topographic map; • List of other hazardous waste management units and wastes handled in each; • Hydrogeological information; • References to other environmental permits; and • Anticipated waivers or exemptions.
Incineration System Description	• Overall description; • Wastes managed and characteristics of feed blends; • Combustion unit design and capacity; • Waste handling system design; • Emission control system; and • Residuals handling system.
Removal of Inventory	• Estimates of maximum quantity of inventory to be removed; • Procedures for handling incinerable waste; and • Procedures for handling wastes not incinerated (e.g., ash and effluents).
Facility Decontamination	• Procedures for decontamination or disposal of equipment, cleaning agents, and contaminated soil.
Security Systems	• General description.
Closure Certification	• Activities to be conducted and • Documentation.

Exhibit 4.7-2 (Continued)

INCINERATOR CLOSURE PLAN SAMPLE OUTLINE

Section	Elements
Schedule of Closure	• Expected year of closure (only for interim status facilities without approved closure plans; • Time required to decontaminate and/or remove waste, and for final closure; and • Support for deadline extensions.

Source: OSWER Policy Directive No. 9476.00-5, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements (Draft)".

4.7.3 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.7

EPA/530-SW-88-018, "Hazardous Waste Incineration: Questions and Answers," April 1988.

EPA/600/2-85-028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites," 1985.

OSWER Policy Directive #9476.00-5, "Draft RCRA Guidance Manual for Subpart G Closure and Post-closure Care Standards and Subpart H Cost Estimating Requirements," U.S. EPA, January 1987.

OSWER Policy Directive #9502.00-6D, "RCRA Facility Investigation Guidance Document," May 1989.

4.8 *MISCELLANEOUS UNITS*

This section presents the requirements for closure and post-closure care of miscellaneous units containing hazardous and radioactive mixed wastes located at DOE facilities. The standards for miscellaneous units (found in Part 264, Subpart X) are designed to provide generic standards for hazardous waste management units not specifically addressed under the other unit-specific RCRA regulations.

A miscellaneous unit is defined in 40 CFR §260.10 as a hazardous waste management unit where hazardous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with appropriate technical standards under 40 CFR Part 146, or unit eligible for a research, development, and demonstration permit under §270.65. Exhibit 4.8-1 below provides examples of units EPA has identified that can be considered miscellaneous units and some that do not meet the definition.

Exhibit 4.8-1

Examples of Units that are Included or Excluded from the Definition of Miscellaneous Unit

Examples of Units *Included*	Examples of Units *Excluded*
• Placement of Hazardous Waste in Geological Repositories	• Treatment, Storage, and Disposal in Units Currently Regulated Under Part 264
• Placement of Hazardous Waste in Deactivated Missile Silos	• Open Burning of Nonexplosive Hazardous Waste
• Thermal Treatment Units Other Than Incinerators	• Units Excluded From Permitting Under Part 264 and 270
• Open Burning/Open Detonation of Explosive Wastes	• Mobile Treatment Units
• Certain Chemical, Physical, and Biological Treatment Units	• Placement of Hazardous Waste Underground That is Currently Regulated Under Part 146
	• Enclosed Buildings Used for Treatment, Storage, or Disposal
	• Research, Development, and Demonstration Units Covered Under §270.65

Prior to promulgation of Part 264, Subpart X, EPA developed interim status regulations for three types of units not currently addressed under Part 264: thermal treatment units (Part 265, Subpart P); chemical, physical, and biological treatment units (Part 265, Subpart Q), and underground injection wells (Part 265, Subpart R). In developing standards for permitted units in 1982, EPA decided to promulgate general standards for miscellaneous units, including those covered under Part 265, Subparts P and Q, rather than unit-specific standards for a broader number of units. Underground injection wells are not considered miscellaneous units, but are subject to *permits-by-rule* under the underground injection control (UIC) program of the Safe Drinking Water Act (SDWA) (see Section 4.9).

4.8.1 What are the Closure Requirements for Miscellaneous Units?

Exhibit 4.8-2 provides an overview of the key closure requirements for miscellaneous units and references to where in this section more detailed information is provided.

Exhibit 4.8-2

Overview of Applicable Statutory and Regulatory Requirements

Closure plans must describe the procedures and schedules for closing all miscellaneous units.

Section 4.8.2

Post-closure plans are required for miscellaneous units that leave wastes-in-place.

Section 4.8.2

Miscellaneous units must be closed in a manner that ensures protection of human health and the environment.

Section 4.8.1

4.8.1.1 Statutory Requirements

There are no relevant statutory requirements specific to the closure of miscellaneous units.

4.8.1.2 Regulatory Requirements

The regulations governing miscellaneous units are found in 40 CFR Part 264, Subpart X (§§264.600 - 264.603). 40 CFR §264.601 addresses standards for protecting the subsurface (including ground water), surface water, wetlands, soils, and air. The regulations provide a number of factors to consider to ensure that these environmental media are protected during the operation, closure, and post-closure care period of miscellaneous units. Factors in the prevention of any releases that may endanger human health or the

environment due to migration of waste constituents in or on the subsurface, surface, groundwater, or air include:

- The existing quality of the medium;
- The proximity of the unit to surface and ground-water sources; and
- The volume, and physical and chemical characteristics of the waste, including its potential for migration or for the emission of hazardous constituents into the air.

Post-closure care requirements for miscellaneous units are located in 40 CFR §264.603. These provisions require that miscellaneous units in which all wastes cannot be removed at closure, must be maintained in a manner that complies with the general performance standards of §264.601. The procedures for completing these activities must be specified in the post-closure plan.

Subpart X will not supersede or replace any requirements pertaining to specific hazardous waste management units addressed in other subparts of Part 264. For example, 40 CFR §264.175 stipulates that container storage areas must have a secondary containment system to drain and remove leakage. This requirement may not be evaded by seeking a permit under Subpart X.

Miscellaneous units permitted under Subpart X that meet the RCRA definition of "land disposal" unit may not avoid the Part 268 restrictions on land disposal of untreated or improperly treated hazardous waste. Any hazardous waste subject to land disposal restrictions that is placed into a miscellaneous "land disposal" unit must be treated prior to land disposal in compliance with a treatment standard promulgated under Part 268, unless the owner or operator submits a no migration petition that demonstrates, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the unit for as long as the waste remains hazardous.

4.8.2 Closure of Miscellaneous Units

The following is an overview of the required closure activities for miscellaneous units:

- Prepare a closure plan;
- Prepare a post-closure plan if applicable;
- Conduct closure; and
- Conduct post-closure care if applicable.

Because there are no specific requirements for these activities at miscellaneous units, the closure activities required at such a unit will depend on its design and waste management approach. The activities will mirror closely the required activities for the most similar hazardous waste management unit addressed specifically in 40 CFR Parts 264 and 265. Thus, the closure requirements for certain chemical treatment units may be similar to those for surface impoundments and/or tanks (e.g., clean closure may be preferred). The closure and post-closure care activities for wastes placed in a geologic repository may be more similar to those applicable to landfills (e.g., ground-water monitoring may be required).

In most cases, therefore, guidance on closure and post-closure requirements for miscellaneous units can be obtained from the discussions of general closure requirements in Chapter 3 and unit-specific requirements contained in Chapter 4.

4.8.3 Closure and Post-Closure Care of Interim Status Miscellaneous Units

40 CFR Part 265 contains specific standards for interim status thermal treatment and chemical, physical, and biological treatment units in Part 265 Subparts P and Q respectively. In addition, Part 265 Subpart R was reserved for regulations governing underground injection wells, which are now regulated by the Underground Injection Control (UIC) program of the Safe Drinking Water Act (SDWA).

4.8.3.1 Thermal Treatment Units

Subpart P of Part 265 regulates interim status thermal treatment units. These regulations apply to hazardous waste thermally treated in devices other than enclosed devices using controlled flame combustion, except as §265.1 specifies otherwise. At closure, the owner or operator of an interim status thermal treatment unit must remove all hazardous waste residues from the treatment process (40 CFR §265.381). Thus, the closure requirements for such thermal treatment units are "clean closure" requirements.

Open burning of hazardous waste is prohibited except for the open burning and detonation of waste explosives, which is regulated for interim status facilities under Part 265 Subpart P. These regulations do not provide additional requirements for closure of open burning and detonation units.

4.8.3.2 Chemical, Physical, and Biological Treatment

Part 265, Subpart Q contains standards for owners and operators of facilities that treat hazardous wastes by chemical, physical, or biological methods in other than tanks, surface impoundments, and land treatment facilities, except as §265.1 provides otherwise.

At closure, all hazardous waste and hazardous waste residues must be removed from the treatment processes or equipment, discharge control equipment, and discharge confinement structures. Unless the owner or operator can demonstrate in accordance with §261.3 (c) or (d) that any materials removed are not hazardous, he becomes a generator and must comply with all standards applicable to generators as specified in Parts 262, 263, and 265.

4.8.4 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- *Delisting.* If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

4.9 *UNDERGROUND INJECTION WELLS*

This section presents the requirements for closure and post-closure care of underground injection wells disposing of hazardous and mixed wastes at DOE facilities. 40 CFR §260.10 states that, underground injection is the subsurface emplacement of fluids through a bored, drilled, or driven well, or through a dug well where the depth of the well is greater than the largest surface dimension. Facilities that inject hazardous wastes are regulated under RCRA and under regulations promulgated pursuant to the Underground Injection Control (UIC) program of the Safe Drinking Water Act (SDWA), found at 40 CFR Parts 144 through 146.

Owners or operators of hazardous waste injection wells must obtain a RCRA *permit by rule*. In order to receive such a permit, the owner or operator must first obtain a UIC permit. Certain additional requirements must also be adhered to, depending upon when the UIC permit is obtained. Closure activities (e.g., preparation and submittal of closure and post-closure plans, capping and abandonment, and closure certification) are conducted through the UIC program and do not involve RCRA permit writers.

Like RCRA, the UIC program requirements are implemented by States with approved UIC programs. Section 1421 of the SDWA requires that Federal minimum guidelines be established with which the State UIC programs must comply. State programs are subject to EPA approval and may be considerably more stringent than the Federal guidelines. A State in which an approved UIC program exists is said to have *primacy*. Underground injection wells located in States without primacy are only subject to Federal UIC standards. Presently, 27 States have primacy for Class I underground injection wells. A list of these States can be found in 40 CFR Part 147.

4.9.1 What are the Closure Requirements for Underground Injection Wells?

Exhibit 4.9-1 is an overview of the key closure requirements for underground injection wells and references to where in this section more detailed information is provided.

4.9.1.1 Statutory Requirements

Section 3005(a) of the Hazardous and Solid Waste Amendments of 1984 states that each person owning or operating an underground injection well or planning to construct a new well for the disposal of hazardous waste must have a permit. However, instead of establishing its own specific requirements for the permitting of injection wells, RCRA allows UIC-permitted wells to receive a RCRA permit as long as the wells in question meet certain additional requirements.

Underground injection wells receiving UIC permits before November 8, 1984, must only comply with the general provisions for any injection well that manages hazardous waste in order to receive a RCRA permit by rule. These provisions are found in 40 CFR 144.14 and include notification, identification, manifesting, recording and reporting, and personnel training requirements.

Exhibit 4.9-1

Overview of Applicable Statutory and Regulatory Requirements

At closure, owners or operators of underground injection wells must plug and abandon the wells.

Section 4.9.2

RCRA permits can be granted to approved UIC wells on a *permit by rule* basis provided the wells have a UIC permit and meet certain RCRA requirements.

Section 4.9.1.1

Underground injection wells receiving UIC permits after November 8, 1984 must comply with the RCRA corrective action requirements of 40 CFR §264.101.

Section 4.9.1.1

Underground injection wells are subject to the Land Disposal Restrictions (LDRs) contained in 40 CFR Part 268.

Section 4.9.3.1

Injection wells receiving UIC permits after November 8, 1984 must comply with the RCRA corrective action requirements for solid waste management units of 40 CFR §264.101; and, for facilities where the UIC well is the only unit that requires a RCRA permit, they must comply with the RCRA Part B information requirements for solid waste management units located in 40 CFR §270.14(d).

In meeting the corrective action requirements, underground injection wells must meet these conditions:

- Corrective action is required regardless of when the hazardous waste was injected;
- The form and schedule of corrective action will be specified in the permit;
- Corrective action may be required beyond the boundaries of the underground injection facility, if necessary to protect human health and the environment.

RCRA Section 3004(f) stipulates that underground injection wells are subject to LDRs. More information LDRs can be found in Section 2.1.4 of this manual.

4.9.1.2 Regulatory Requirements

EPA promulgated UIC regulations in 40 CFR Parts 144 through 146 for five types of underground injection wells, including hazardous waste injection wells. 40 CFR 144.6 classifies injection wells according to the fluids that are injected and the subsurface formation into which the injection occurs as follows:

- *Class I*: Hazardous waste, industrial, or municipal wells that inject fluids beneath the lowermost formation containing an underground source of drinking water within 1/4 mile of the well bore.

- *Class II*: Wells used to inject fluids for enhanced recovery of oil and gas, including fluids brought to the surface by oil and gas production.

- *Class III*: Wells used to inject fluids for the extraction of minerals.

- *Class IV*: Hazardous or radioactive waste wells that inject fluids into or above a formation containing an underground source of drinking water within 1/4 mile of the well bore.

- *Class V*: All other injection wells.

Only Class I and Class IV wells contain hazardous and mixed wastes. However, 40 CFR 144.14 forbids the construction of any new Class IV injection wells and also required that any Class IV wells already in operation close within six months after the effective date of an approved UIC program. Because these provisions essentially eliminate the possibility of currently operating a Class IV injection well, only Class I wells are discussed in this section. *Note that wells used to inject contaminated ground water that has been treated and is being reinjected into the same formation from which it was withdrawn are not prohibited from operating if such injection is approved by EPA in accordance with CERCLA or RCRA corrective action provisions.* (See Appendix E, EPA Memorandum, "Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground-Water Treatment Reinjection Superfund Management Review," 12/27/90 and DOE Memorandum, "Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground-Water Treatment Reinjections," 3/28/90).

4.9.2 Closure of Underground Injection Wells

The technical requirements for the closure and post-closure care of Class I hazardous waste injection wells are located in 40 CFR §§144.71-73. Exhibit 4.9-2 outlines closure procedures for underground injection wells.

The following is an overview of required closure activities of underground injection wells.

- Prepare closure plan (4.9.2.1)

- Prepare post-closure plan (4.9.2.2)

- Prepare and plug wells (4.9.2.3)

- Conduct post-closure activities (4.9.2.4)

Exhibit 4.9-2

Underground Injection Well Closure Procedures (40 CFR §§146.71-73)

Closure

-- Conduct background injection zone pressure and mechanical integrity tests prior to closing wells
-- Plug wells

Post-Closure

-- Submit closure report
-- Conduct injection zone pressure and ground-water monitoring
-- Provide information and maintain records regarding well operations
-- Post-closure care continues until the pressure in the injection zone declines to the point where the well's cone of influence does not intersect with the lowermost underground source of drinking water

4.9.2.1 Closure Plan Requirements

A written closure plan is required for all closures of underground injection wells. The specific requirements for closure of an underground injection well are found in 40 CFR §146.71(a). The plan should be submitted as a part of the UIC permit application process and must be resubmitted if any significant changes are made to the method of closure. The regulations state that at a minimum, the closure plan should include the following:

- The number and types of plugs used;
- A description of the material used in plugging;
- The location and top and bottom elevation of each plug;
- The method of placement of each plug;
- The amount, size and location (by depth) of casing and any other materials left in the well;
- The method and location where casing is to be parted, if applicable; and

- Any proposed test or measure to be made on the well.

A Class I injection well that temporarily ceases operations can remain open provided that the owner or operator receives authorization from the Director of the applicable UIC program. If such a well remains open and in disuse for more than two years, the owner or operator must notify the director at least 30 days prior to continuing injection activities. Also, the owner or operator must notify the Director at least 60 days prior to closing the well. Within 60 days after closing a well, or if it is earlier, at the time of the next scheduled quarterly report to the Director, a closure report must be also submitted to the Director. The purpose of the closure report is to detail any differences between the actual methods used during closure and those contained in the closure plan.

4.9.2.2 Post-Closure Plan Requirements

A written post-closure plan must also be submitted along with the UIC permit application and must be resubmitted if any significant alterations are made to the post-closure process. The regulations (40 CFR §146.72) state that at a minimum, the post-closure plan should include the following:

- Pressure of the injection zone before the well began operations;
- The anticipated pressure in the injection zone at the time of closure;
- The predicted time until pressure in the injection zone decays to the point that the well's cone of influence does not intersect with the base of the lowermost underground source of drinking water;
- The predicted position of waste front at closure; and
- The status of any required corrective action.

4.9.2.3 Preparing and Plugging Wells

The closure procedure for underground injection wells is designed to protect underground sources of drinking water from contamination from either injected fluids or fluids displaced by injection. The closure procedure involves two steps -- ***well preparation*** and ***well plugging.***

Well preparation involves activities necessary to ensure the proper environment for setting the plug and the general integrity of the well prior to plugging.[31] Well preparation involves the following steps:

- Collecting available hydrogeological and well construction data;
- Removing tubing and packer;
- Inspecting well;

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[31] "Final Technical Manual: Injection Well Abandonment," prepared for U.S. EPA/Office of Drinking Water by Geraghty & Miller, Inc.

- Cleaning out well;
- Selecting plugging fluid;
- Establishing plugging fluid;
- Selecting cement slurry; and
- Submitting certified closure report.

Collecting available data. Knowledge of the location and characteristics of underground sources of drinking water, the injection zone and confining beds, and any intervening geologic formations is essential to plan a well plugging strategy. Information on well construction is also necessary because it influences the design and location of plugs and the long-term structural integrity of the well. Knowledge of injection zone pressure is necessary to ensure that it is properly controlled during plugging.

Removing tubing and packer. Injection well tubing must be removed first to make room for the plug. The packer is a device attached to the bottom of the tubing to prevent liquids from moving back up through the tube. The packer can be pulled out with the tubing or, if this is not possible, it may be ground-up with a drill and the debris removed via fluid circulation.

Inspecting well. The objective of well inspection is to determine the mechanical integrity of the well. The types of tests which may be used to determine mechanical integrity include:

- Liquid or gas pressure tests;
- Radioactive tracer surveys;
- Noise, temperature, pipe evaluation, or cement bond logs; and
- Any other test the Director deems appropriate.

Cleaning out well. The purpose of well cleanout is to ensure that effective plugging can take place. Surface debris, formation material, old casing and downhole equipment must be removed.

Selecting plugging fluid. The fluid in the well must provide a suitable environment for placement of plugs. Desirable qualities in a plugging fluid include:

- Ability to provide sufficient hydrostatic head (weight);
- Ability to remain in place for an extended period; and
- Physical and chemical stability.

Establishing plugging fluid system. The plugging fluid is established in the well with a drill pipe or other tubing, thus the plugging fluid will be diluted with the original fluid. Several circulations of the plugging fluid will be necessary to ensure the desired properties are maintained throughout the fluid.

Selecting cement slurry. The slurry must provide a durable and impermeable barrier to the flow of liquid through the borehole. The slurry must bond with the casing or underlying rock formation and be designed to withstand any special pressure, temperature, or compatibility problems.

Closure Report. No later than 60 days after closure of the well, the owner or operator must submit a closure report to the Director, certified by the person who performed closure (and the owner or operator if the two are not the same). The closure report must state that the well was closed in accordance with the approved closure plan.

Well plugging is the final stage of the closure procedure for underground injection facilities. The purpose of a cement plug is to prevent the migration of fluids containing hazardous constituents into or between underground sources of drinking water. The cement plugs may be placed using one of four techniques:

- *The Balance Method* involves displacing the plugging fluid with a cement slurry that is placed through drillpipe or tubing into the borehole. The amount of cement placed must match the level of cement in the drillpipe or tubing to the level of cement required in the borehole. The tubing is then slowly pulled back out of the top of the cement, leaving behind a solid plug of cement with minimal contamination by the plugging fluid.

- *The Dump Bailer Method* utilizes a bailer lowered into the well on a wireline. A measured amount of cement is then released at a desired depth. Generally, a bridge plug or cement basket is previously placed at the specified depth.

- *The Two Plug Method* involves a top plug, bottom plug, and a latch-down type of plug catcher. The procedure begins by running the placement tubing with the attached plug catcher into the hole to the depth desired for the bottom of the cement plug. The bottom plug, followed by the desired volume of cement slurry, is pumped into the pipe. The top plug is placed on top of the cement slurry and followed by a plugging fluid. When the bottom plug reaches the catcher, it passes through and out into the well. The cement slurry is then displaced into the well; when the top plug reaches the plug catcher, it is unable to pass through preventing any further displacement of fluid.

- An alternate method may be approved by the Director.

For more information on the technical aspects of underground injection well plugging and abandonment techniques, see U.S. EPA, "Final Technical Manual: Injection Well Abandonment," prepared for the Office of Drinking Water by Geraghty & Miller, Inc.

4.9.2.4 Post-Closure Activities

Post-closure care at UIC facilities generally involves monitoring of the water chemistry and the injection zone pressure. The primary goal of monitoring at UIC facilities is to ensure that plugging activities were conducted properly so as to prevent displaced fluids or hazardous constituents from the injected fluids from contaminating underground sources of drinking water. Drastic changes in water chemistry (i.e., the level of certain chemicals present) are indications of hazardous constituent migration from the injection well. Injection

zone pressure is important because the higher the pressure in the injection zone, the greater the potential for hazardous constituent migration.

The regulations do not include a standard period for post-closure care at UIC facilities; instead, monitoring must continue until the pressure in the injection zone declines to the point where the well's cone of influence does not intersect with the base of the lowermost underground source of drinking water.

The type of monitoring required is specified by the Director in the permit. In making a determination of monitoring requirements, the Director shall consider site specific factors (i.e., geohydrology, etc.) as well as the ability of particular types of monitoring wells to detect migration of hazardous constituents. Four types of monitoring may be applicable to UIC facilities:

- Shallow ground-water monitoring;
- Monitoring of the injection wellbore itself;
- Monitoring outside the well, above the injection zone; and
- Monitoring outside the well, within the injection zone.

The shallow ground-water monitoring requirements are the same as those for RCRA hazardous waste treatment and disposal facilities. These requirements are discussed in greater detail in Chapter 2 of this manual. Water chemistry is the parameter being measured by this type of monitoring.

The most effective means of measuring the injection zone pressure parameter is through the well borehole itself. Such a monitoring system can be readily achieved by replacing the wellhead assembly with a single master valve suitable for wireline access.

Monitoring wells above and within the injection zone are most appropriately suited for monitoring the water chemistry parameter. The objective of monitoring wells above the injection zone is to detect migration plumes of hazardous constituents. Monitoring wells within the injection zone are most appropriate for measuring the changes in the waste composition during the post closure period.

The owner or operator of a UIC facility must provide information (eg. survey plats and well locations) and retain for three years following closure, records reflecting the nature, position, and volume of the hazardous waste injected. In addition, the owner or operator of the well, and the owner of the property on which it is located, must record a notation on the deed that will provide any future buyer of the property with information on the nature of injection activity and the name of the appropriate UIC regulatory authority. Guidance on preparing a Notice in Deed is located in Chapter 3.

More technical information on the post-closure monitoring requirements for underground injection wells can be found in, "Monitoring Class I Hazardous Waste Injection Well Facilities During the Post-Closure Period: A Discussion of Technical Implications, Options, and Estimated Costs," prepared by Larry Browning Geological Engineering Specialties, December, 1986.

4.9.3 Additional RCRA Requirements to Consider

In addition to the unit-specific closure requirements discussed in this section, the owner or operator should also be aware of the following additional RCRA requirements.

- ***Corrective Action.*** Corrective action at facilities handling mixed waste may be required as a part of, or concurrently with, closure activities. See Section 2.1.3.2 for a discussion of corrective action requirements.

- ***Land Disposal Restrictions (LDRs).*** LDRs prohibit the land disposal of RCRA hazardous wastes beyond certain statutory dates established by Congress in HSWA. Restricted hazardous wastes and contaminated soils removed at closure are subject to LDRs. See Section 2.1.4 for a discussion of the LDR program.

- ***Delisting.*** If the owner or operator of a facility is able to delist the hazardous component of a mixed waste at closure, the waste is no longer subject to the requirements under RCRA. The delisted material becomes a radioactive waste regulated solely by the DOE. However, delisting a waste does not necessarily exempt the facility that handled the waste from RCRA closure requirements. See Section 2.1.2.5 for a discussion of delisting petitions.

REFERENCES: SECTION 4.9

DOE Memorandum, "Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground-Water Treatment Reinjections," 3/28/90.

EPA Memorandum, "Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground-Water Treatment Reinjection Superfund Management Review," 12/27/90.

Geraghty & Miller, Inc., "Final Technical Manual: Injection Well Abandonment," prepared for EPA Office of Drinking Water.

Larry Browning Geological Engineering Specialties, "Monitoring Class I Hazardous Waste Injection Well Facilities During the Post-closure Period: A Discussion of Technical Implications, Options, and Estimated Costs," December 1986.

APPENDIX A

EPA's "Contained-in" Policy

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

NOV 13 1986

OFFICE OF
SOLID WASTE AND EMERGENCY RES

MEMORANDUM

SUBJECT RCRA Regulatory Status of Contaminated Ground Water

FROM: Marcia E. Williams, Director
Office of Solid Waste

TO: Patrick Tobin, Director
Waste Management Division, Region IV

This is in response to your memorandum of September 18, 1986, regarding the regulatory status of ground water contaminated with hazardous waste leachate. To answer this question, one first has to determine the status of ground water. Under the regulations, ground water contained in the aquifer is not considered a solid waste, since it is not "discarded" in the sense of being abandoned, recycled, or inherently waste-like as those terms are defined in the regulations. See 40 CFR 261.2(a)-(d). Therefore, contaminated ground water cannot be considered a hazardous waste via the mixture rule (i.e., to have a hazardous waste mixture, a hazardous waste must be mixed with a solid waste; see 40 CFR 261.3(a)(2)(iv)). Nevertheless, ground water contaminated with hazardous waste leachate is still subject to regulation since it contains a hazardous waste. Therefore, the treatment, storage, or disposal of ground water contaminate with hazardous waste leachate must be handled as if the ground water itself were hazardous since hazardous waste 1/ leachate is subject to regulation under Subtitle C of RCRA. However, if the ground water is treated such that it no longer contains a hazardous waste, the ground water would no longer be subject to regulation under Subtitle C of RCRA.

1/ This memo more precisely explains the position on ground water contamination presented in John Skinner's memo dated December 26, 1984.

Taking this interpretation and applying it to the example in your memorandum, the ground water containing a listed hazardous waste, once collected, is subject to regulation under the hazardous waste regulations. However, if as a result of treatment, the ground water no longer contains the hazardous waste leachate, the ground water would no longer be subject to the hazardous waste rules.

Your letter also raises the question of treatment of ground water within the context of corrective action. If the corrective action is taken at an interim status facility in compliance with a §3008(h) order, treatment can take place. We are considering the possibility of amending the regulations to clarify the relationship between corrective action and the reconstruction ban (§270.72(e)). More broadly, the Agency is currently examining the issue of whether permits should be required for any corrective actions. We are also developing rules for corrective action under RCRA §3004(u). Until this analysis is completed, if the corrective action takes place at a permitted facility, it can be handled as a permit modification.

Please feel free to call Matt Straus, of my staff, if you have any further questions; his telephone number is 475-8551 (FTS).

cc: Hazardous Waste Division Directors,
Regions I-III and V-X
Gene Lucero, OWPE
Lloyd Guerci, OWPE
Mark Greenwood, OGC
Steve Silverman, OGC

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

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONS

JAN 24 1989

MEMORANDUM

SUBJECT: Status of Contaminated Groundwater and Limitations on Disposal and Reuse

FROM: Sylvia K. Lowrance, Director
Office of Solid Waste

TO: Jeff Zelikson, Director
Toxics and Waste Management Division
Region IX

In your memo of December 16, 1988 and the attached materials, you stated your understanding of the current policy on the classification of contaminated groundwater and described issues which have arisen in California regarding reuse of contaminated groundwater from a Superfund site.

You have accurately stated the effects of the "contained in" policy which governs situations such as the one you have described. Briefly, a contaminated groundwater which has been treated such that it no longer contains hazardous constituents, need not be considered to be a hazardous waste, and beneficial reuse of the water is permissible. We have not yet issued definitive guidance on levels below which the groundwater is no longer considered to contain hazardous wastes. Until such definitive guidance is issued, the Regions may determine these levels on a case-specific basis.

It is our expectation that ultimately the guidance on levels of hazardous wastes which may remain will mirror the levels in the De Minimis rule which is now under development by OSW. I know that Region IX has been participating in the Work Group discussions and reviews of this proposal and I urge you to continue this involvement.

In its present form, the De Minimis approach contemplates levels based on health-based standards (where available), assuming direct exposure. With respect to the constituents of concern at the Fairchild Superfund site -- trichloroethane

and dichloroethylene -- the levels remaining in the treated groundwater are well below the MCLs and would therefore be consistent with the De Minimis approach.

If you have additional questions, please contact David Fagan at FTS 382-4740. Questions on the De Minimis rule should be addressed to Robert Scarberry at FTS 382-4770.

cc: Tina Kaneen
Henry Longest

APPENDIX B

DOE Guidance Memorandum on RCRA Corrective Action Requirements

United States Government | Department of Energy

memorandum

DATE: January 2, 1990

COMPLETED

REPLY TO ATTN OF: EH-231

SUBJECT: Corrective Action Plan, Interim Measures Guidance, National Strategy, and Model Consent Order.

TO: Distribution

The purpose of this memorandum is to provide DOE and DOE contractor personnel with information and guidance on the Corrective Action requirements under the Resource Conservation and Recovery Act (RCRA).

The Hazardous and Solid Waste Amendments (HSWA) of 1984 greatly expanded the authority under RCRA for requiring corrective action for releases of hazardous wastes and constituents, as well as hazardous substances identified in Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at RCRA permitted and interim status facilities that manage hazardous wastes.

EPA is authorized to address corrective action through the permit process. Permits issued pursuant to Section 3005(a) of RCRA, including permits issued by states with federally delegated authority to implement HSWA provisions of RCRA programs, are required to contain corrective action requirements. Additionally, EPA, pursuant to Section 3008(h) of RCRA, may require corrective action at unpermitted facilities subject to interim status requirements.

Section 3004(u) of RCRA requires "corrective action for all releases of hazardous wastes or constituents from any solid waste management unit at a treatment, storage, and disposal facilities seeking a permit under this subtitle (Subtitle C), regardless of the time at which waste was placed in such units". Section 3004(v) requires corrective action "be taken beyond the facility property boundary where necessary to protect human health and the environment unless the owner or operator of the facility can demonstrate that, despite the owner or operator's best efforts, the owner or operator was unable to obtain permission to undertake such action".

Finally, Section 3008(h) of RCRA authorizes EPA to require that, "whenever, on the basis of any information, the Administrator determines there has been a release of hazardous waste into the environment from a facility authorized to operate under Section 3005(e) of Subtitle C, the Administrator may issue an order requiring corrective action, or other such response measure as deemed necessary to protect human health or the environment".

It should be noted that federal facilities, including those operated by DOE and DOE contractors, are subject to the same basic corrective action requirements which apply to any facility owned or operated by private parties.

The RCRA corrective action process consists of four stages (figure 1); RCRA Facility Assessment (RFA), RCRA Facility Investigation (RFI), Corrective Measures Study (CMS), and Corrective Measures Implementation (CMI).

An RFA is performed to determine areas of potential release of hazardous wastes or hazardous substances at RCRA facilities and to identify releases or suspected releases of hazardous wastes or substances needing further investigation. In most cases the RFA assessment and report will be prepared by the DOE facility; however, EPA personnel may elect to prepare a RFA report themselves using information supplied to the agency by the facility in conjunction with on-site inspections.

If further investigation is found to be warranted as a result of the RFA, the facility will conduct an RFI to evaluate the nature and extent of the release of hazardous waste and constituents, and to gather sufficient information to support a CMS. If the RFI determines that some sort of corrective measure is required, then a CMS is conducted.

The purpose of a CMS is to develop and evaluate corrective measures alternatives and to recommend a final correct measure or measures. The final step in the corrective action process is the CMI. The objective of the CMI is to design, construct, operate, maintain, and monitor the performance of the corrective measure or measures selected in the CMS.

Attached to this memorandum are four documents developed by the Office of Solid Waste and Emergency Response (OSWER) of the Environmental Protection Agency (EPA) to explain the corrective action program, and to assist EPA Regional Offices and State regulatory agencies with the development and implementation of corrective action orders under Section 3008(h), and permit corrective action requirements under Sections 3004(u) and (v) of RCRA.

The attached documents provide background information regarding the EPA policies and goals pertaining to corrective action; specify "model" requirements for corrective action plans and consent orders; and provide guidance, as well as model language, for interim measures corrective action orders.

It is important to note that the "model" language in all of the attached guidance materials is generic and is intended only as a guide for preparing required documents. In "real-world" situations, corrective action documents will be prepared on a site-specific basis, taking into account special conditions or circumstances at the location for which corrective action is required.

These guidance materials are being provided to you in order to assist you in more fully understanding the requirements of the EPA corrective action program, as well as to provide you with information which may aid you in the effective planning and implementation of the elements of corrective action plans at your respective facilities should they be required. The objective of corrective action plans, when they are required at DOE facilities, is to specify the nature and scope of investigations and corrective measures to be applied to the cleanup of releases of hazardous wastes or hazardous constituents at treatment, storage, or disposal units subject to Subpart C of RCRA following the steps outlined in the EPA corrective action program.

In the Fall or Winter of 1989, EPA is expected to propose the addition of a new Subpart S, "Corrective Action for Solid Waste Management Units", to 40 CFR Part 264. The proposed rule will further define the requirements for conducting corrective action remedial investigations, evaluating potential remedies, and selecting and implementing remedies at RCRA facilities.

Even though existing corrective action requirements will be amended by the new Subpart S when it is promulgated as a final rule, the information contained in the attached guidance materials should continue to be generally valid as guidance materials. These materials provide generalized descriptions of corrective action requirements as well as generalized "model" technical language which can be used as general guidance for the preparation of documents required as part of a corrective action plan.

Please note that once the new Subpart S requirements are promulgated, EH-231 will provide you with an update, if it is necessary of information regarding new or modified requirements of the corrective action process, especially as it relates to the information contained in the attached EPA guidance documents described below.

Attachment # 1. RCRA CORRECTIVE ACTION PLAN: INTERIM FINAL, OSWER Directive 9902.3. The purpose of a corrective action plan (CAP) is to assist regulatory authorities in the determination of the nature and extent of work that an owner or operator must perform as part of a corrective action program.

Specifically, the CAP is used by the EPA and States in the development of corrective action orders under Section 3008(h), and for defining corrective action requirements for permitted facilities, Sections 3004(u) and (v).

The CAP guidance document provides "model language" which can be used to formulate facility-specific scopes of work for the three most intensive phases (see figure 2) of corrective action under RCRA. These phases are (1); the RCRA Facility Investigation (RFI), (2) Corrective Measures Study (CMS), and (3) the Corrective Measures Implementation (CMI). Actual scopes of work for corrective action activities must be tailored to site-specific conditions.

It should be noted that different types and levels of corrective action may be required for remediation of spills and releases of hazardous wastes and constituents as well as hazardous substances. Accordingly, the information provided in the CAP, as well as provided in the other guidance materials described below, should be used for general guidance purposes only. Actual corrective action plans should be tailored to the site-specific circumstances and carefully negotiated with the EPA or state regulatory authority when it has corrective action authorization.

Attachment # 2. RCRA CORRECTIVE ACTION INTERIM MEASURES GUIDANCE, OSWER Directive 9902.4. This document provides a review of interim measures which may be implemented under Section 3008(h), as well as in and through RCRA permits, to quickly address environmental problems at a site while other detailed investigations are being conducted.

The interim measures guidance includes an interim measures implementation strategy and model language for various interim measure actions. The guidance also contains model language for interim measures investigations, designs, workplans, etc.

Attachment # 3. INTERIM FINAL RCRA SECTION 3008(h) MODEL CONSENT ORDER. The model consent order contains generalized language which may be found in 3008(h) consent orders. Section 3008(h) of RCRA, Interim Status Corrective Action Orders, authorizes the EPA to issue orders requiring corrective action, or take other appropriate response measures to protect human health and the environment, based on any information that there is or has been a release of hazardous waste from an interim status facility authorized to operate under RCRA.

In the case of federal facilities, 3008(h) Orders for corrective action are issued by the EPA upon consent of the federal facility involved.- Federal facilities are given an opportunity to review and comment on, as well as negotiate with the EPA, the requirements of the "finalized" order.

It should be noted if an agreement cannot be reached by EPA Regional office and the DOE facility regarding the terms, conditions, or schedules on an order, then a dispute resolution process will be initiated and the dispute will be escalated to EPA Headquarters. The Office of Federal Activities (EPA), and/or the lead EPA Headquarters program office, and the DOE Headquarters will attempt to negotiate an acceptable solution to the dispute within 90 days of the referral to EPA Headquarters. If at the end of the 90 days, negotiations are still unsuccessful, then the dispute is referred to the Administrator for resolution. If the dispute resolution process is evoked, the proposed order will be stayed pending escalation and resolution of the dispute.

If federal facilities fail to respond to a proposed order within a specified timeframe (usually 30 days), the Order becomes a final administrative order, effective at the time established in the proposed order.

Attachment # 4. NATIONAL RCRA CORRECTIVE ACTION STRATEGY. The Strategy document presents a general overview of the major statutory authorities for corrective action, technical aspects of the corrective action process, and state-federal roles in implementing the national corrective action program.

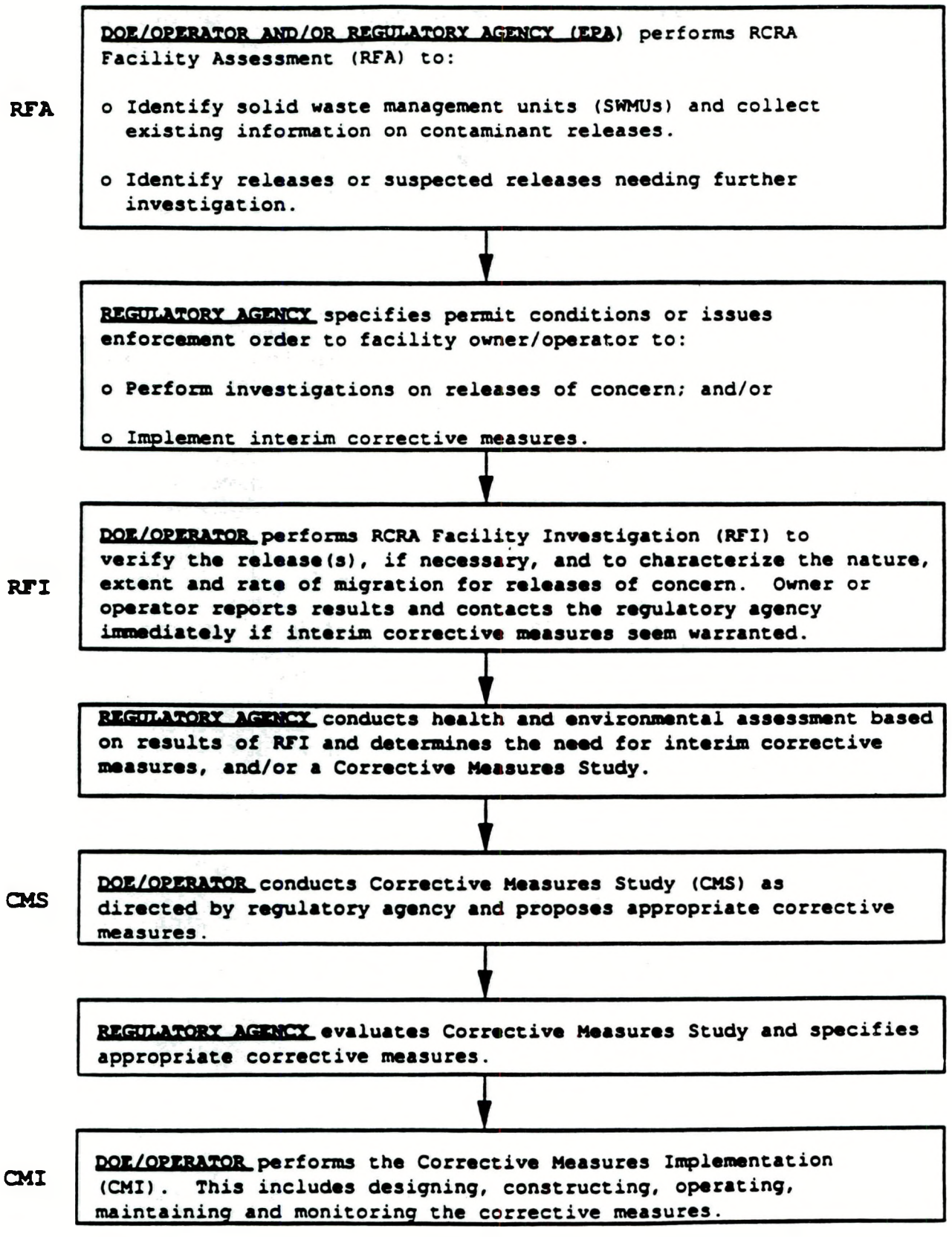
Questions pertaining to the information provided herein or to RCRA corrective action in general may be directed to Jerry Coalgate of my staff at FTS 586-6075.

Thomas T. Traceski
Chief, RCRA/CERCLA Unit
Environmental Guidance Division

Attachments (4)
Figures (2)

Figure 1

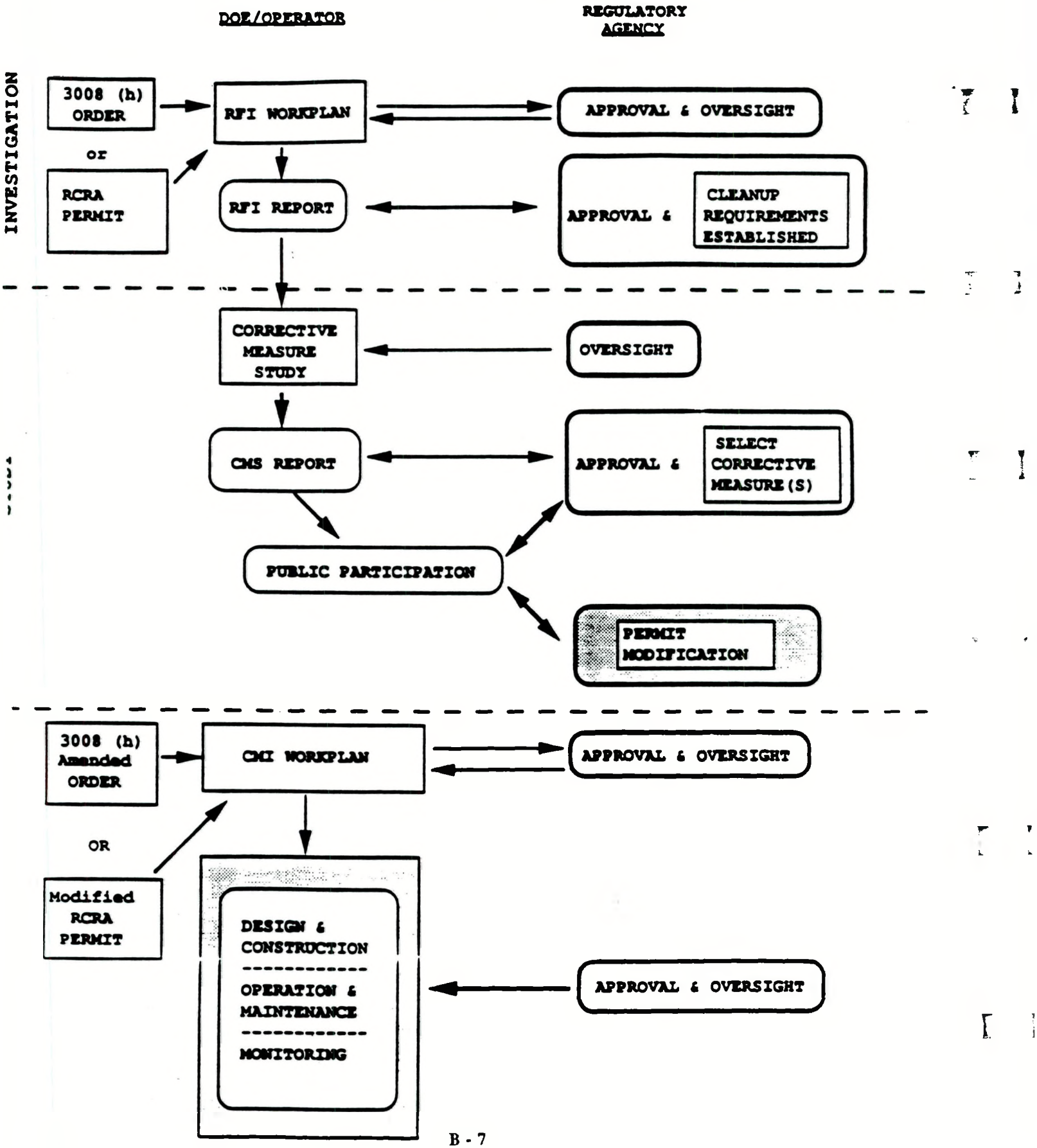
RCRA CORRECTIVE ACTION PROCESS



Note: Although certain aspects of the Corrective Action Process are the responsibility of either the regulatory agency or DOE/Operator, close coordination between the regulatory agency and DOE/Operator is essential throughout the process.

FIGURE 2

RCRA CORRECTIVE ACTION PLAN

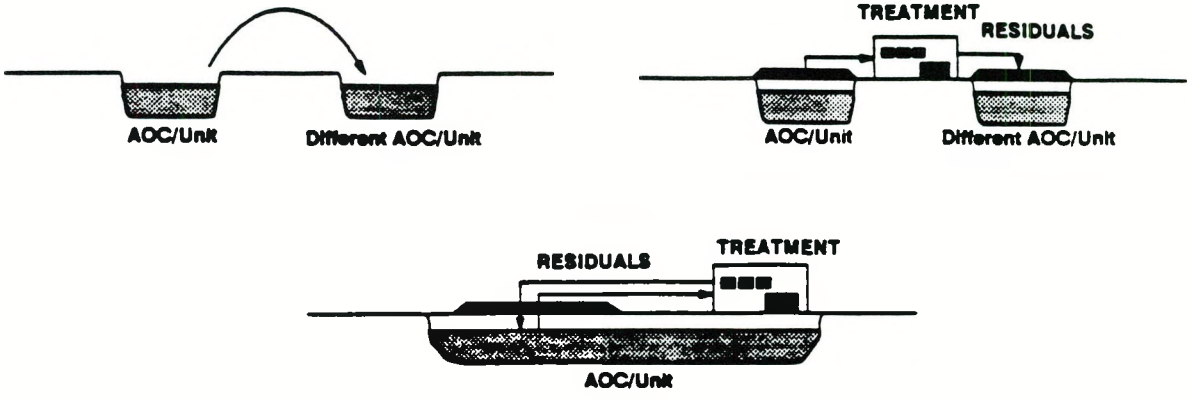


APPENDIX C

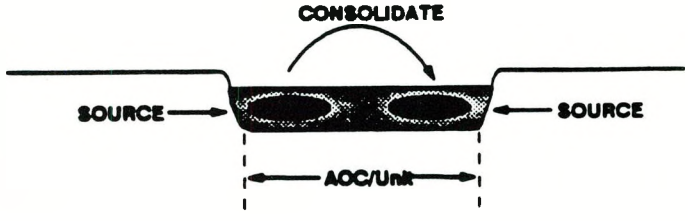
Placement and Disposal

(Source: EPA CERCLA Orientation Course)

When Placement Does Occur



When Placement Does Not Occur



APPENDIX D

Joint NRC-EPA Guidance on Conceptual Design of Radioactive Mixed Waste Management Unit Closures

Conceptual Design Exhibits

(Source: EPA Mixed Waste Training Course)

AUG 3 1987

TO THE STATES, COMPACT REGIONS, AND ALL NRC LICENSEES

SUBJECT: JOINT NRC-EPA GUIDANCE ON A CONCEPTUAL DESIGN APPROACH FOR COMMERCIAL MIXED LOW-LEVEL RADIOACTIVE AND HAZARDOUS WASTE DISPOSAL FACILITIES

Under the Resource Conservation and Recovery Act (RCRA), the U.S. Environmental Protection Agency (EPA) has jurisdiction over the management of solid wastes with the exception of source, byproduct, and special nuclear material, which are regulated by the U.S. Nuclear Regulatory Commission (NRC) under the Atomic Energy Act (AEA). Low-Level Radioactive Wastes (LLW) contain source, byproduct, or special nuclear materials, but they may also contain chemical constituents which are hazardous under EPA regulations promulgated under Subtitle C of RCRA. Such wastes are commonly referred to as Mixed Low-Level Radioactive and Hazardous Waste (Mixed LLW).

Applicable NRC regulations control the byproduct, source, and special nuclear material components of the Mixed LLW (10 CFR Parts 30, 40, 61, and 70); EPA regulations control the hazardous component of the Mixed LLW (40 CFR Parts 260-266, 268 and 270). Thus, all of the individual constituents of Mixed LLW are subject to either NRC or EPA regulations. However, when the components are combined to become Mixed LLW, neither agency has exclusive jurisdiction under current Federal law. This has resulted in dual regulation of Mixed LLW where NRC regulates the radioactive component and EPA regulates the hazardous component of the same waste.

The attached guidance document provides a conceptual design approach for Mixed LLW disposal facilities. It has been developed jointly by the NRC and EPA to assist commercial LLW disposal site operators and State and Regional Compact regulatory agencies in designing disposal facilities that satisfy both EPA and NRC regulations for Mixed LLW facilities. Although EPA is currently in the process of promulgating regulations that further define the technical parameters for the leak detection, leachate collection, and double liner systems, affected parties may proceed to develop designs for disposal units that will accept Mixed LLW in accordance with existing regulatory requirements. Owners and operators should, however, keep abreast of developing EPA regulations in this area. The attached guidance is based on NRC and EPA regulations in effect on August 1, 1987.

The attached guidance presents a conceptual design approach that meets EPA's regulations covering minimum technology requirements for liners and leachate collection systems, and NRC's requirements for minimization of contact of waste with water, while also assuring long-term stability and avoidance of long-term maintenance which are required by both agencies. The concepts proposed in this document are presented as general guidance; specific design details are expected to be complementary to particular site conditions, so that a license application will have to address site characteristics and their relationship to a proposed design as well as the details of any engineered portion of the facility. The application of this guidance will not affect the requirements for waste disposal facilities to comply with all applicable NRC and EPA regulations.

The attached guidance should permit licensees to develop safe and effective designs for disposal of Mixed LLW that fully meet the regulatory requirements of both agencies. Depending on the particular type of conceptual design selected by a licensee, EPA may permit variances to the requirements for double liners and leachate collection systems.

Sincerely,

Hugh L. Thompson, Jr., Director
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission

J. Winston Porter
Assistant Administrator
Office of Solid Waste
and Emergency Response
U.S. Environmental
Protection Agency

Enclosure:
As stated

JOINT NRC-EPA GUIDANCE ON A CONCEPTUAL DESIGN APPROACH FOR COMMERCIAL MIXED LOW-LEVEL RADIOACTIVE AND HAZARDOUS WASTE DISPOSAL FACILITIES

Introduction

The Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) requires that the three operating low-level radioactive waste (LLW) disposal facilities remain available through 1992. By that time, all states and compact regions are required to assume complete responsibility for LLW disposal. Both existing and new disposal facilities may receive commercial mixed low-level radioactive and hazardous waste (Mixed LLW), which is regulated by the U.S. Nuclear Regulatory Commission (NRC) under the Atomic Energy Act (AEA), and by the U.S. Environmental Protection Agency (EPA) under the Resource Conservation and Recovery Act (RCRA). Mixed LLW is defined as waste that satisfies the definition of LLW in the LLRWPAA and contains hazardous waste that either (1) is listed as a hazardous waste in Subpart D of 40 CFR Part 261 or (2) causes the LLW to exhibit any of the hazardous waste characteristics identified in Subpart C of 40 CFR Part 261. To assist in applying this definition, NRC and EPA issued joint guidance entitled "Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive Waste and Answers to Anticipated Questions" on January 8, 1987.

This jointly developed NRC-EPA guidance document presents a conceptual design approach that meets the regulatory requirements of both agencies for the safe disposal of Mixed LLW. Other designs, or variation of the proposed design concept may also be acceptable under the requirements of both agencies and will be reviewed on a case-by-case basis as received.

EPA regulations in 40 CFR Part 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, identify the design and operating requirements for owners and operators that dispose of hazardous waste in landfills [264.300 to 264.317]. These regulations involve requirements for the installation of two or more liners and a leachate collection and removal system (LCRS) above and between the liners to protect human health and the environment. Exceptions to the double liner and leachate collection system requirements are allowed, if alternative design and operating practices, together with location characteristics, are demonstrated to EPA's Regional Administrator to be equally effective in preventing the migration of any hazardous constituent into the ground water or surface water.

NRC regulations in 10 CFR Part 61, Licensing Requirements for Land Disposal of Radioactive Waste, indicate that long-term stability of the waste and the disposal site require minimization of access of water to the waste [61.7(b)(2)] and that the disposal site must be designed to minimize, to the extent practicable, the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal [61.51(a)(6)]. The primary objective of the above NRC regulations is to preclude the possibility of the development of a "bath-tub" effect in which the waste could become immersed in liquid

(e.g., from infiltration of surface water runoff) within a disposal unit below grade with a low-permeability bottom surface.

The guidance on a conceptual design approach that is offered in the subsequent paragraphs is intended to present basic design concepts that are acceptable in addressing the regulations of both the NRC and EPA with respect to requirements for liners, leachate collection systems and efforts to minimize the contact of liquid with the waste. It should be recognized that the guidance is being provided at the conceptual level and that the design and details that are complementary to specific site conditions need to be engineered by potential waste facility owners and operators. The application of the guidance in this document will not affect the requirements for licensees of waste disposal facilities to comply with all applicable NRC and EPA regulations.

Conceptual Design

Sketches and a brief discussion of the design considerations for an above grade disposal unit are provided. This design concept has been developed primarily to demonstrate the integration of EPA's regulatory requirements for two or more liners and a leachate collection system above and between liners and the regulations of the NRC that require the contact of water with the waste be minimized. In addition, the design concept fulfills the need under both agencies' regulations to assure long-term stability and minimize active maintenance after site closure.

In this approach, the Mixed LLW would be placed above the original ground surface in a tumulus that would be blended into the disposal site topography. Schematic details of some of the principal design features of an above grade Mixed LLW disposal unit are provided in the sketches accompanying this guidance document. Figure 1 depicts the three dimensional overall view of a conceptual Mixed LLW disposal unit; Figure 2 provides details of the perimeter berm, liners, and leachate collection system; Figure 3 presents a cross-sectional view of the covered portion of the disposal unit; and Figure 4 describes the final cover system.

In the overall view of the Mixed LLW disposal facility, the double liners and leachate collection and removal system are installed before the emplacement of the Mixed LLW; and the cover system is added at closure. The leak detection tank and leachate collection tank are encircled by a berm that controls surface water runoff from precipitation that would fall directly on the waste facility site. The drainage pipes in the upper primary collection system would collect any leachate that could possibly develop above the top flexible membrane liner and below the emplaced waste. Any leachate collected would drain through the pipes to the primary leachate collection tank where the leachate would be tested and treated, if required. Any leachate collected by the lower leachate collection and removal system would drain to the leak detection tank. The development of significant amounts of leachate from the solidified waste after closure is not anticipated. This is because the closure requirements provide that the cover must be designed and constructed 1) to provide long-term minimization of water infiltration into the closed disposal facility, 2) to function with minimum maintenance, 3) to promote drainage and minimize erosion,

and 4) to have a permeability less than or equal to the permeability of any bottom liner system. It is anticipated that the area shown on Figure 3 between the slope of the final cover and the run-on control berm, where the tanks are located, would be regraded and the tanks removed at the end of the post-closure care period (normally 30 years) when leachate development and collection is no longer a problem.

Figure 2 provides the general details required by EPA regulations for the double liner and leachate collection and removal system. The perimeter berm for leachate runoff control would assure that all leachate is collected below the waste and safely contained and transported through the drainage layers and pipes to the tanks located outside the final cover slope. NRC's regulations requiring minimizing contact of the waste with water are fulfilled by requiring the waste to be placed above the level of the highest water table fluctuation and above the drainage layers where leachate would collect. The bottom elevation of the solidified Mixed LLW would be required in all instances to be at elevations above the top of the perimeter berm.

In Figures 3 and 4, the design concepts for the final cover over the solidified waste zone and the perimeter berm are presented. The actual zone for placement of solidified Mixed LLW may consist of different options, depending on the licensee's selection. Options that would be acceptable include use of stable high integrity waste containers (HICs) that have the spaces between containers filled with a cohesionless, low compressible fill material or placement of the waste in an engineered structure, such as a reinforced concrete vault. A cover system over the waste that would be acceptable to the EPA and NRC is shown in Figure 4. The cover system would consist of (1) an outer rock or vegetative layer to minimize erosion and provide for long-term stability, (2) a filter and drainage layer that transmits infiltrating water off of the underlying low permeability layers, (3) an impervious flexible membrane liner overlying a compacted low permeability clay layer, and (4) a filter and drainage layer beneath the compacted clay layer. If the solidified waste zone does not consist of an engineered vault structure with a top roof, an additional compacted clay layer should be placed immediately above the emplaced waste to direct any water infiltration away from the waste zone. Mixed LLW that contains Class C waste as designated by NRC's regulations would need to provide sufficient thickness of cover materials or an engineered intruder barrier to ensure the required protection against inadvertent intrusion.

Variations on the above described design approach may include placement of the Mixed LLW in an engineered reinforced concrete vault, a steel fiber polymer-impregnated concrete vault, or double-lined high integrity containers that are hermetically sealed. If proposed by license applicants, these variations would be reviewed by both the EPA and NRC on a case-by-case basis to evaluate their acceptability and conformance with established Federal regulations.

For questions related to NRC regulations and design requirements, contact:

Dr. Sher Bahadur, Project Manager
Division of Low-Level Waste Management
and Decommissioning
Mail Stop 623-SS
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Facility specific questions, permitting requirements, variances and other related concerns should be addressed to either the EPA Regional office or State agency authorized to administer the mixed waste program as appropriate. For general questions related to EPA regulations and design requirements, contact:

Mr. Kenneth Skahn, Senior Engineer
Waste Management Division
Mail Stop WH-565E
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

TECHNICAL PROCESS REQUIREMENTS:

DISPOSAL

Slide No. 191

PERMITTING MIXED WASTE FACILITIES - DISPOSAL

NRC Licenses for Disposal

- Source, by-product, and special nuclear material licenses may allow for disposal:
  - On-site, if disposal process is approved by NRC, or
  - Into sanitary sewerage system, if the waste meets certain criteria
- Waste that meets certain quantity and type specifications may be disposed of without regard to its radioactivity
- Disposal of low-level radioactive waste received from other persons (i.e., commercial disposal) requires a separate disposal license

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- On-site disposal is allowed if disposal process is approved by NRC. [10 CFR 20.302]
  - Licensee or applicant must submit an application for approval of the proposed disposal. The application must include a description of the licensed material, any other radioactive material involved, the proposed manner and conditions of disposal, an analysis and evaluation of pertinent information as to the environment, usage of ground and surface waters in the general area, the nature of other potentially affected facilities, and the procedures to be observed to minimize the risk of unexpected or hazardous exposures.
- Disposal into a sanitary sewerage system is allowed, if the waste is readily soluble or dispersible in water and meets specific quantity limitations. [10 CFR 20.303]

PERMITTING MIXED WASTE FACILITIES - DISPOSAL

Typical NRC Disposal Practice

- "Near surface" disposal involves disposal into the uppermost portion of the earth (i.e., within approximately 30 meters of the surface)
- High-integrity containers can be used
- Design and operating requirements minimize migration of radiological contamination

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PERMITTING MIXED WASTE FACILITIES - DISPOSAL

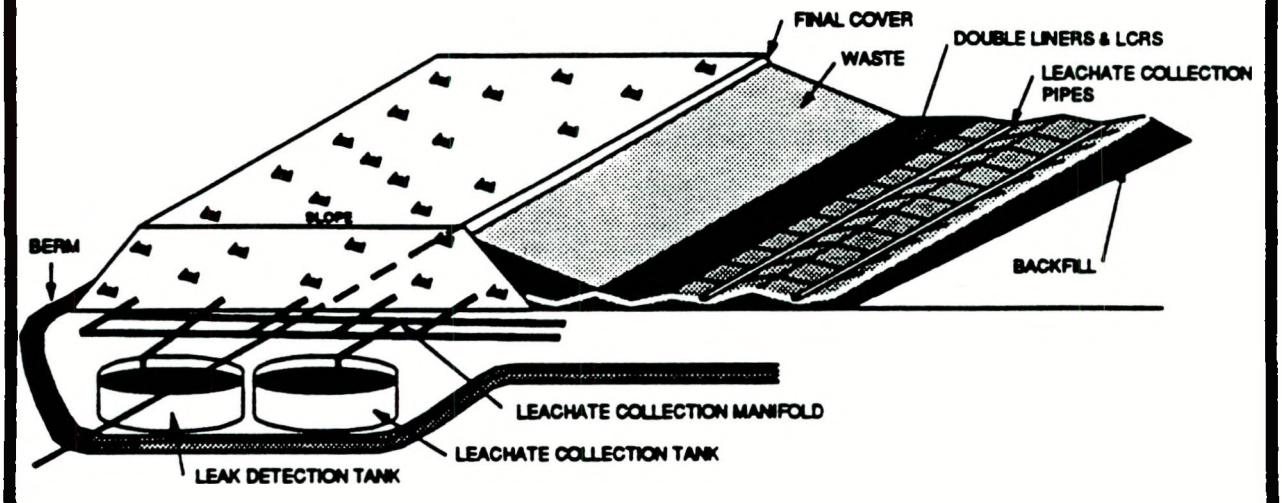
Objectives

- **NRC - Water contact with radioactive waste should be minimized**
- **EPA - Contaminants should not leach from the unit**

Slide No. 194

- NRC emphasizes the prevention of enterance of liquids into the unit.
- EPA emphasizes the prevention of release of hazardous constituents from the unit.

CONCEPTUAL DESIGN OF A MIXED WASTE DISPOSAL FACILITY



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- The conceptual design of a mixed waste disposal facility requires that mixed low-level waste be placed above the original ground surface in tumulus and blended into topography. The conceptual design integrates two liners and a leachate collection system and minimizes contact between waste and water. The design also assures long-term stability while minimizing the need for active maintenance after site closure.

PERMITTING MIXED WASTE FACILITIES - DISPOSAL

Liners

- NRC regulations do not specify liner requirements
- NRC regulations do not specify leachate collection and removal requirements
- Emphasis is on eliminating infiltration of liquids into the unit

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- Caution must be taken to prevent a "bathtub effect" from the use of RCRA liners in mixed waste units whereby the waste could become immersed in water within the disposal unit due to a low permeability bottom surface.
- RCRA systems for leachate collection and removal must be installed above and between double liners.
- NRC emphasizes eliminating the infiltration of liquids into the unit to create a passively protective system where the need for active maintenance is minimized.

PERMITTING MIXED WASTE FACILITIES - DISPOSAL

Consideration:

- **EPA and NRC design and operating requirements are based on different objectives**
- **Incorporating both sets of objectives into one facility may be difficult**

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PERMITTING MIXED WASTE FACILITIES - DISPOSAL

Options to resolve differences:

- Exceptions to EPA's double liner and leachate collection system requirements allowed if:
  - Alternate design and operating practices, and
  - Location characteristics are demonstrated to the Regional Administrator's satisfaction

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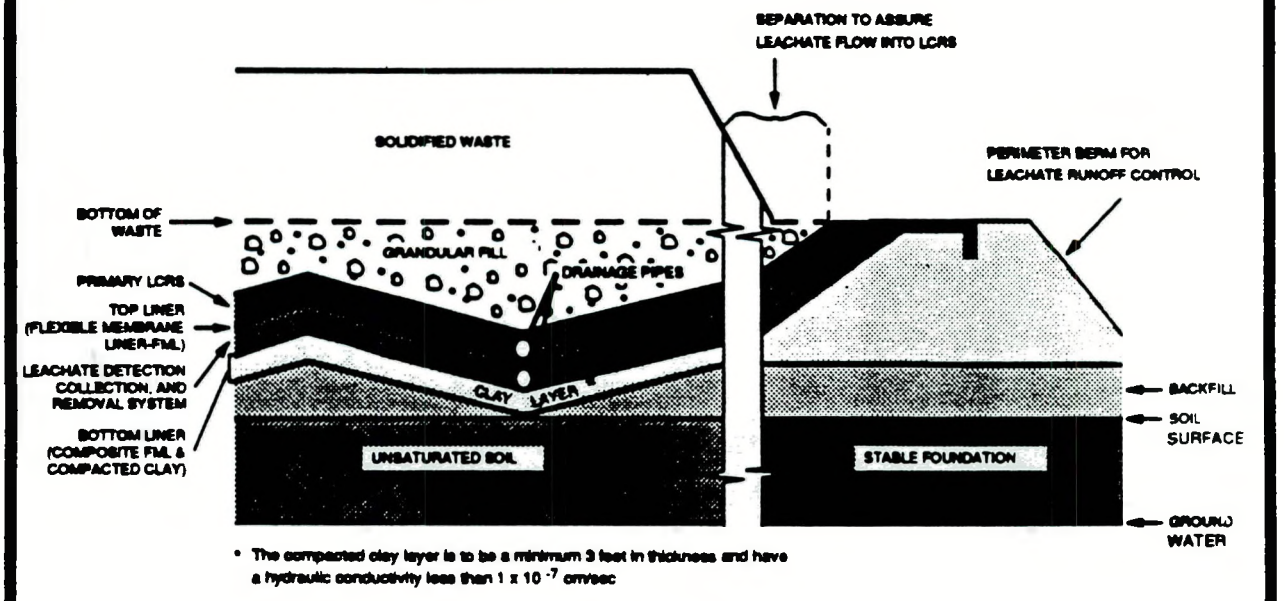
- Alternatives are to be demonstrated to the Regional Administrator to be equally effective in preventing the migration of any hazardous constituents into the ground water or surface water. (Refer to Appendix O; OSWER Directive 9487.00-8: Joint NRC-EPA Guidance on a Conceptual Design Approach for Commercial Mixed Low-Level Radioactive and Hazardous Waste Disposal Facilities, August 3, 1987.)
- Also see Appendix P; OSWER Directive 9480.00-14: Combined NRC/EPA Siting Guidelines for Disposal of Commercial Mixed Low-Level Radioactive and Hazardous Waste, June, 1987.

CONCEPTUAL DESIGN OF DOUBLE LINER AND LEACHATE COLLECTION SYSTEM AT A MIXED WASTE DISPOSAL FACILITY



Slide No. 199

- Perimeter berm for leachate runoff control assures that leachate is collected below waste. In addition, the bottom elevation of solidified waste is required to be above top of perimeter berm.
- Using this design for a double liner and leachate collection system will satisfy the NRC requirement to minimize contact of waste with water is fulfilled.

PERMITTING MIXED WASTE FACILITIES - DISPOSAL

Covers

- **NRC covers must limit the radiation dose rate at the surface of the cover**
- **Mixed waste containing Class C waste must be under cover of sufficient thickness to protect against inadvertent intrusion**

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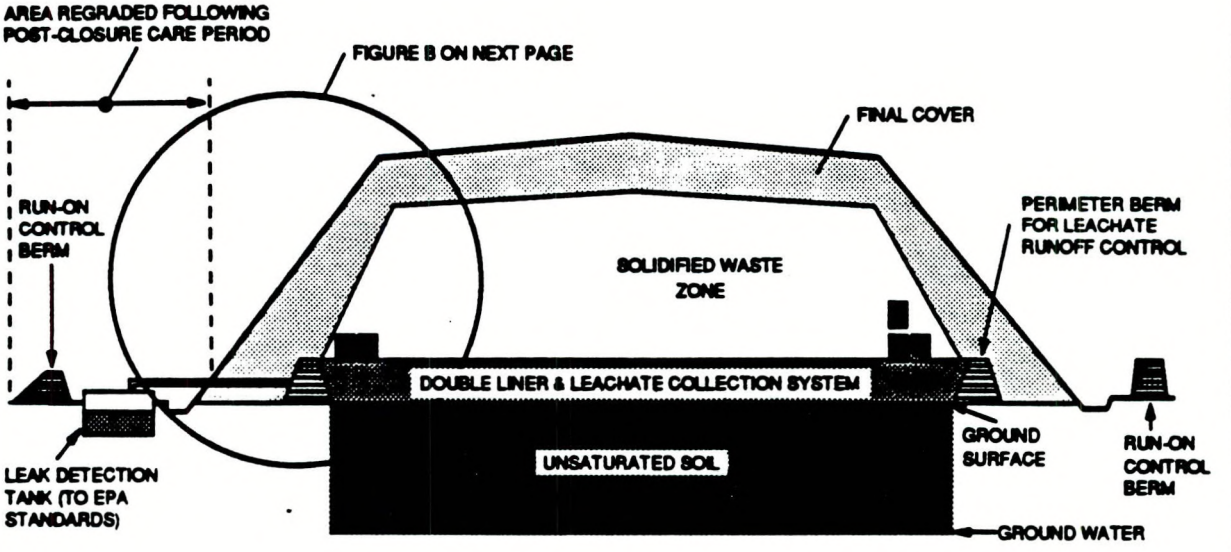
- NRC regulations (10 CFR 61.52) specify that waste must be placed and covered in a manner that limits the radiation dose rate at the surface of the cover to levels that at a minimum will permit the licensee to comply with the provisions of 10 CFR 20.105.
- 10 CFR 20.105 specifies the permissible levels of radiation in unrestricted areas.
- Both NRC and EPA covers are designed to:
  - Minimize infiltration,
  - Promote drainage,
  - Minimize erosion, and
  - Require minimum maintenance.

CONCEPTUAL DESIGN OF A COVER SYSTEM AT A MIXED WASTE DISPOSAL FACILITY -- FIGURE A



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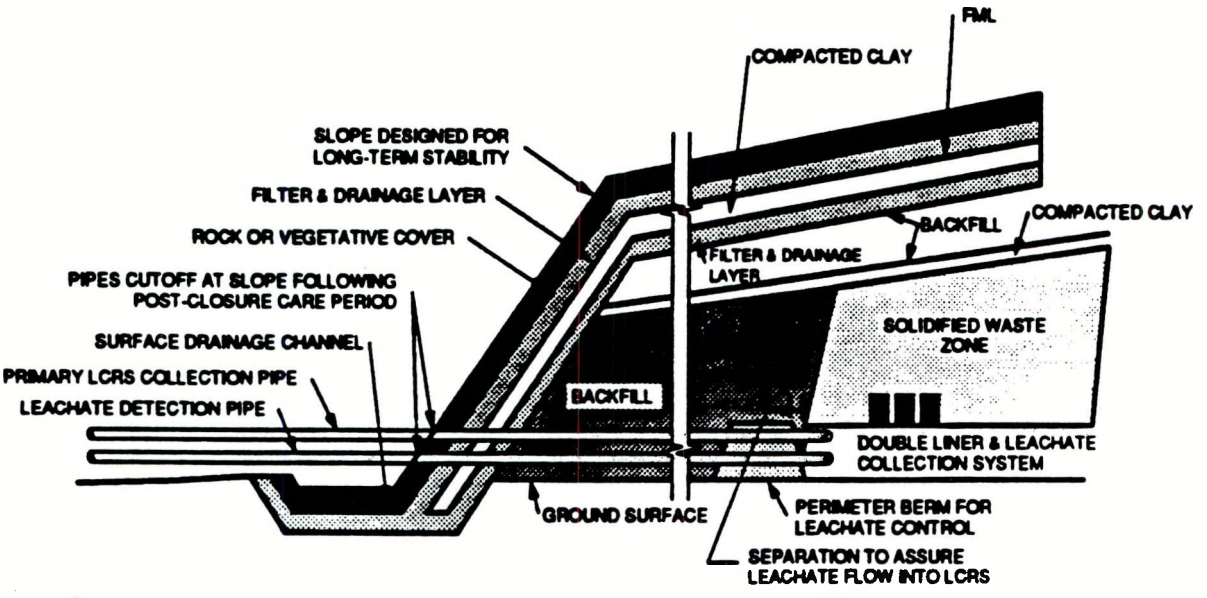
- Additional compacted clay liner should be placed immediately above emplaced waste if solidified waste zone does not consist of engineered vault structure with a top roof.

CONCEPTUAL DESIGN OF A COVER SYSTEM AT A MIXED WASTE DISPOSAL FACILITY -- FIGURE B



Slide No. 202

- Conceptual design of a cover system at a mixed waste disposal facility consists of:
  - An outer rock or vegetative layer,
  - A filter and drainage layer to transmit infiltrating water,
  - An impervious flexible membrane liner (FML) overlying a clay liner, and
  - A filter and drainage layer beneath the clay liner.

APPENDIX E

DOE and EPA Memoranda on LDRs and Ground-Water Treatment Reinjections

memorandum

DATE: MAR 2 8 1990

REPLY TO ATTN OF: EH-231

SUBJECT: Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjections

TO: Distribution

Background

The purpose of this memorandum is to provide Field Organizations with information and guidance on the applicability of Land Disposal Restrictions (LDR) to the reinjection of treated ground water into aquifers during "pump and treat" operations at Department of Energy (DOE) environmental restoration sites.

On December 15, 1989, the Environmental Guidance Division (EH-231) issued a memorandum to all Program and Operations Offices entitled "Fact Sheets: Natural Resource Trusteeship Under CERCLA and Management of Contaminated Ground Water as Hazardous Waste". The fact sheet on ground water as hazardous waste described pertinent definitions and facts about the U.S. Environmental Protection Agency's (EPA) approach to managing contaminated ground water under the Resource Conservation and Recovery Act (RCRA). It also alerted readers that EPA's Office of Solid Waste and Emergency Response (OSWER) planned to issue an interpretive memorandum which would describe whether LDR applies to ground water that is reinjected during environmental restoration "pump and treat" operations. RCRA LDR may be applicable or relevant and appropriate requirements (ARARs) for certain response actions taken under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)[1].

The LDR Interpretation for reinjected ground water has been announced by EPA and is provided for your information at attachment 1 (OSWER Directive 9234.1-06). Briefly stated, the EPA has determined that under certain circumstances, the LDR do not apply to reinjections of ground water during pump and treat operations. The driving force behind this action was a Department of Justice letter to the EPA asking for clarification of the applicability of the LDR to the injection of treated

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[1]The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires that CERCLA lead agencies comply with all applicable or relevant and appropriate requirements pertinent to the remedial action during the course of the action as well as upon its completion (55 FR 8666, March 8, 1990; to be codified at 40 CFR 300.435(b)(2).

ground water back into the aquifer from which it was withdrawn at a Federal facility. The EPA's LDR Interpretation for reinjected ground water is also consistent with a specific recommendation of a major EPA report, "A Management Review of the Superfund Program" (EH-231 distributed a synopsis for management on this report in a September 20, 1989, memorandum entitled "Fact Sheet: A Management Review of the Superfund Program: The 90-Day Report").

Need for Interpretation

In its management review of the Superfund Program, EPA identified the misapplication of RCRA LDR (which are proscriptive regulations designed to prevent contamination before it happens), as contributing to the inefficient implementation of CERCLA (a response program for responding to uncontrolled releases which have already resulted in contamination). There is recognition on the part of EPA that the problem of cleaning up large-scale contamination (under CERCLA) is quite different from the problem of how hazardous wastes should be properly managed by an ongoing operation (the focus of RCRA). EPA has recognized that in some cases, using RCRA standards as ARARs for CERCLA response actions confuses prevention for cure.

In general, RCRA LDR prohibit the land disposal of restricted wastes (after the effective date of the restriction), unless such waste meets promulgated treatment standards based on best demonstrated available technology (BDAT) identified by EPA for that particular type of waste. Requiring compliance with these fundamentally "preventative" provisions of RCRA, could place unnecessary constraints on CERCLA response actions.
The BDAT regimes can be difficult to apply at CERCLA sites because the wastes that are encountered are usually a mixture of different types of restricted wastes, non-restricted hazardous substances and debris, which may be dispersed throughout different environmental media. Each of the restricted wastes in a CERCLA mixture may require a different BDAT treatment. Since restricted wastes subject to LDR may be mixed together with other restricted wastes, it can be difficult to determine the appropriate BDAT(s) for all of the restricted wastes in a CERCLA mixture[2]. These difficulties can be expected to be magnified at DOE's environmental restoration sites, because there can be additional technical problems associated with DOE's soil and debris mixed wastes, containing restricted hazardous wastes and radioactive wastes.

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[2]In a September, 25, 1989, memorandum to Program and Operations Offices entitled "RCRA Land Disposal Restriction Guides for CERCLA Cleanup Actions", EH-231 provided a synopsis and copies of six EPA publications on the application of the RCRA LDR to CERCLA response actions.

Because injection of ground water containing restricted wastes constitutes "land disposal" under RCRA section 3004(k), the question of whether the LDR are applicable to reinjected ground water during CERCLA "pump and treat" operations has been raised. If LDR are applicable, ground water containing restricted wastes would require treatment to attain standards based on BDAT prior to each reinjection. Since "pump and treat" remedies may have to operate for many years, the clean up action could become overly burdensome, technically impractical and/or prohibitively expensive.

The Applicability of LDR To Ground Water Treatment Reinjection Interpretation at attachment 1 is one way EPA is attempting to correct the misapplication of the LDR to RCRA corrective and CERCLA response actions.

Basis for the LDR Interpretation

RCRA Section 3020(b) prohibits the injection of hazardous waste into or above an underground source of drinking water, with the following exception: the prohibition does not apply to "the injection of contaminated ground water into the aquifer from which it was withdrawn," if the injection is a CERCLA response action (or a RCRA corrective action), the ground water has been treated to "substantially reduce hazardous constituents," and the action will protect human health and the environment. The EPA Interpretation that LDR are not applicable to reinjection of treated ground water during RCRA corrective and CERCLA response actions is based on the "traditional principle" that the more specific of two overlapping statutory provisions should control. In this case, the language of the LDR, which refers generally to the land disposal of wastes, was found to be less specific than another RCRA provision [Section 3020(b)] that directly focuses on the injection of treated contaminated ground water into Class IV injection wells (40 CFR 146.5(d)).

In determining whether RCRA LDR may be "relevant and appropriate" (for CERCLA response actions), EPA indicates that the requirement must address problems or situations similar to the circumstances of the response action contemplated, and be well-suited to the (CERCLA) site. Comparing the CERCLA response objectives with the purpose and objective of the LDR requirement is the key to EPA's interpretation of the potential relevance and appropriateness of the LDR to pump and treat operations conducted under a CERCLA response action. Treating and reinjecting ground water into Class IV injection wells is ultimately performed to restore the ground water (aquifer) to drinking water quality. EPA believes that standards that have been specifically developed to establish drinking water quality levels, such as Maximum Contaminant Levels (MCLs), are well-suited to the accomplishment of the CERCLA response action (i.e., pump and treat) objective. Thus, the EPA

Interpretation provides that where drinking water standards are available (e.g., MCLs), those standards, and not the standards set by the LDR, will generally be the relevant and appropriate requirements to use in setting treatment standards for CERCLA response actions involving the clean up of drinking water aquifers.

Necessary Conditions

In order to reinject treated ground water during pump and treat operations at DOE's environmental restoration sites without triggering the RCRA LDR, three conditions must be met:

1. the reinjection must be part of a CERCLA section 104 or 106 response action, or be a RCRA corrective action,

2. the contaminated ground water must be treated to substantially reduce hazardous constituents prior to such injection, and

3. the response action or corrective action must be sufficient to protect human health and the environment upon completion.

While the language of RCRA section 3020(b) is straightforward in its application to RCRA corrective actions, it is not explicit with respect to CERCLA response actions conducted at Federal facilities. The Federal government is directed by Section 120 of the Superfund Amendments and Reauthorization Act (SARA) to comply with CERCLA to the same extent as private parties, so that a question arises as to the which statutory authority Federal facilities employ for CERCLA response actions. DOE does employ CERCLA section 104 authority consistent with the mandate of SARA section 120, consequently, DOE's CERCLA response actions satisfy the first condition.[3]

The second requirement of RCRA section 3020(b) is that the reinjection must be treated to "substantially reduce hazardous constituents prior to such injection." There is no quantitative guidance available at this time which will provide environmental restoration managers with the certain knowledge that they have met this requirement. EPA suggests that the steps necessary to

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[3]The basis for DOE's use of CERCLA section 104 is found in Executive Order 12580, "Superfund Implementation", Jan. 23, 1987, Sec. 2(d), by which the President delegated the President's removal and remedial response authority under CERCLA 104(a) and remedy selection authority under 104(c)(4) to the Secretaries of Defense and Energy with respect to releases or threats of releases from any vessel or facility under their control, provided that this authority is exercised "...consistent with the requirements of Section 120 of the Act" (i.e., SARA section 120).

"substantially reduce" hazardous constituents during a RCRA corrective action or CERCLA response action should be decided on a case-by-case basis until specific guidance is prepared on the issue. EH-231 will disseminate the EPA guidance to all Field Organizations once it becomes available.

As a final condition, the corrective action or response action must be sufficient to protect human health and the environment upon completion. EPA's guidance on meeting this requirement is to consult RCRA and CERCLA statutes, regulations and policies. Pursuant to DOE Orders, RCRA corrective actions and CERCLA response actions undertaken by the Department are required to be protective of human health and the environment. When these actions are performed in compliance with the appropriate governing statute, regulation or pertinent guidance document, they may be presumed to be protective of human health and the environment upon completion because of the stringent protectiveness requirements and the regulatory oversight imposed by these procedures. The pertinent governing regulations which, if properly implemented, will confer the appropriate degree of protectiveness for human health and the environment such that this final condition will be satisfied, include: 1) the National Oil and Hazardous Substances Pollution Contingency Plan (for CERCLA actions); 2) Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities (40 CFR 264, Subpart F); and 3) RCRA Corrective Action requirements, 40 CFR 264, Subpart S (when promulgated).

Field Organizations are encouraged to consult with their Regional EPA Office on the proper application of the LDR interpretation for the reinjection of treated ground water into or above underground sources of drinking water (i.e., into Class IV injection wells) at their facilities. If you have any questions about the attached Interpretation, please contact John Bascietto of my staff at FTS 896-7917.

Thomas T. Traceski
Chief, RCRA/CERCLA Unit
Environmental Guidance Division

Attachment

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

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

DEC 27 1990 OSWER Directive # 9234.1-06

MEMORANDUM

SUBJECT: Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjection Superfund Management Review: Recommendation No. 26

FROM: Don R. Clay, Assistant Administrator
Office of Solid Waste and Emergency Response

TO: Waste Management Division Directors
Regions I - X

Regional Counsel
Regions I - X

Purpose

There has been some question as to whether ground water contaminated with restricted RCRA hazardous wastes, which is extracted during a RCRA corrective action or CERCLA response action, must meet the best demonstrated available technology (BDAT) identified for that waste under the RCRA land disposal restrictions (LDRs) prior to each reinjection, in a pump-and-treat reinjection remediation system. (See RCRA sections 3004 (f), (g) and (m), and 40 C.F.R. Parts 148 and 268.) This memorandum explains EPA's interpretation of whether the LDRs are applicable or (under CERCLA response actions only) relevant and appropriate to such reinjections or to the remediation as a whole.

Background

RCRA LDRs prohibit land disposal of restricted RCRA hazardous wastes that do not meet treatment standards after the effective date of the restrictions. Treatment standards for RCRA hazardous wastes are based upon the best demonstrated available technology (BDAT) identified for that waste. See 40 C.F.R. 268. Because placement of hazardous waste into underground injection wells constitutes "land disposal" under LDR (see RCRA section 3004(k)), and the ground water undergoing reinjection may contain a restricted waste, the issue has been raised as to whether each reinjection of contaminated ground water should meet BDAT during response or corrective actions.

RATIONALE

Ground water restoration under RCRA corrective actions and CERCLA response actions often involves withdrawal, treatment of the contaminated water, and reinjection of the treated water into the ground. The land disposal restrictions (LDR) of the Resource Conservation and Recovery Act (RCRA) prohibit land disposal of restricted RCRA hazardous wastes that do not meet treatment standards after the effective date of the restrictions. Treatment standards for RCRA hazardous wastes are based upon the best demonstrated available technology (BDAT) identified for that waste. See 40 C.F.R. 268. Because placement of hazardous waste into underground injection wells constitutes "land disposal" under LDR (see RCRA section 3004(k)), and the ground water undergoing reinjection may contain a restricted waste, the issue has been raised as to whether each reinjection of contaminated ground water should meet BDAT during response or corrective actions.[1]

Section 3020 of RCRA [previously section 7010[2]] specifically addresses waste injection in the context of CERCLA and RCRA cleanups. RCRA section 3020(a) bans hazardous waste disposal by underground injection into or above an underground source of drinking water (within one-quarter mile of the well). However, RCRA section 3020(b) exempts from the ban all reinjections of treated contaminated ground water into such formations undertaken as part of a CERCLA section 104 or 106 response action, or a RCRA corrective action. To qualify for the exemption, the following three conditions must be met: (1) the injection is a CERCLA response action or a RCRA corrective action, (2) the contaminated ground water must be treated to substantially reduce hazardous constituents prior to such injection, and (3) the response action or corrective action must be sufficient to protect human health and the environment upon completion.

Although RCRA section 3020 and the LDR provisions at RCRA sections 3004(f), (g) and (m) arguably can address the same activity, RCRA section 3020 specifically applies to all CERCLA and

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[1] CERCLA remedial actions are required to meet Federal requirements and standards at completion of the remedial action if the Federal standards are applicable or relevant and appropriate requirements (ARARs), absent invocation of a statutory waiver. See CERCLA section 121(d). Agency policy and the proposed National Contingency Plan (NCP) require the Agency to comply with all ARARs pertinent to the action during the course of a remedial action, as well as upon its completion. See the proposed NCP (published at 53 Fed. Reg. 51,394 (Dec. 21, 1988)(to be codified at 40 C.F.R. 300.435(b)(2)), and CERCLA Compliance with Other Laws Manual: Part I, I-8 (OSWER Directive number 9234.1-01, August 8, 1988).

[2] RCRA section 3020 was section 7010 in the Hazardous and Solid Waste Amendments of 1984, but was re-numbered in 1986.

RCRA ground water treatment reinjections into Class IV injection wells.[3] Consistent with traditional principles of statutory construction, RCRA section 3020 -- which is directly focused on injections of treated contaminated ground water into Class IV wells during cleanups -- should be controlling for such injections; a contrary reading would render section 3020(b) meaningless. Where Congress has provided two potentially applicable statutory provisions, a choice between them is both necessary and appropriate, and within the discretion of the expert agency. Accordingly, EPA construes the provisions of RCRA section 3020 to be applicable instead of LDR provisions at RCRA sections 3004(f), (g), and (m), to reinjections of contaminated ground water into an underground source of drinking water (USDW), which are part of a CERCLA response action or RCRA corrective action.

As a result, the three conditions of RCRA section 3020(b) must be met during response or corrective actions involving ground water treatment reinjection into or above underground sources of drinking water. Failure to meet these conditions bans the activity under RCRA section 3020(a).[4] First, the injections must be part of a CERCLA response action or a RCRA corrective action. Second, each reinjection has to be treated to "substantially reduce hazardous constituents prior to such injection..." (RCRA section 3020(b)). Until guidance is prepared addressing the issue, steps necessary to "substantially reduce" hazardous constituents during a RCRA corrective action or a CERCLA response action should be decided on a case-by-case basis. Third, the response or corrective action upon completion must "be sufficient to protect human health and the environment" (RCRA section 3020(b)). RCRA and CERCLA statutes, regulations and policies should be reviewed to determine protectiveness.

The issue may also arise under CERCLA as to whether LDRs are relevant and appropriate requirements when treated ground water is reinjected into Class IV wells as part of a CERCLA response action. In order to be considered to be both "relevant" and "appropriate," a requirement must address problems or situations similar to the circumstances of the release or remedial action contemplated, and be well-suited to the site. A key factor in determining the potential relevance and appropriateness of a

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[3] Class IV injection wells are used to inject contaminated ground water into or above an underground source of drinking water. See 40 C.F.R. 146.5(d). In most situations, ground water treatment reinjection involves only Class IV injection wells because treated ground water is recharged back into an underground source of drinking water (USDW) during pump-and-treat activities, not beneath it. Other classes of wells are not subject to section 3020's special provisions.

[4] Note, however, that an ARARs waiver may be appropriate in certain cases for actions taken under CERCLA.

requirement is to compare the CERCLA response objective with the purpose and objective of the requirement. See "CERCLA Compliance with Other Laws Manual" at p. 1-65 (EPA, August 8, 1988); proposed NCP, 53 FR at 51436 (Dec. 21, 1988) (proposed section 300.400(g)(2)).

The ultimate purpose of treating and reinjecting ground water into Class IV wells is to restore the formation to drinking water quality. EPA believes that standards that have been specifically developed to establish drinking water quality levels (such as MCLs[5]) are particularly well-suited to the accomplishment of that purpose. Although LDRs also prescribe treatment levels, those levels were not specifically developed to achieve drinking water quality (although they may often have that result). Thus, where drinking water standards are available, the Agency believes that they will generally be the relevant and appropriate requirement to use in setting treatment standards for CERCLA cleanups of drinking water formations.

In situations where no drinking water standard has been promulgated for the contaminants to be treated, the Region should consider potentially relevant and appropriate requirements (including any available health-based standards, LDR treatment standards, etc.) and attain the standard, if any, that the Agency finds is "relevant and appropriate under the circumstances of the release" (or justify a waiver).[6] EPA guidance sets out a number of factors for deciding if a requirement is relevant and appropriate under the circumstances of the release. See CERCLA Compliance with Other Laws Manual, at p. 1-67.

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NOTICE: The policies set out in this memorandum are intended solely for the guidance of Government personnel. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.
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[5] See the discussion of MCLs and MCLGs in the proposed and final NCP.

[6] If no such standards are relevant and appropriate, TBCs may be used as cleanup levels; use of a TBC should be explained and justified for each specific case.

Separate from the restrictions found in RCRA LDRs, an independent provision of the statute, RCRA Section 3020, bans hazardous waste injection into drinking water formations (Class IV injection wells), unless the conditions in subpart (b) are met. Subpart (b) permits reinjection of contaminated ground water that has been treated if: (1) the injection is a CERCLA response action or a RCRA corrective action, (2) the contaminated ground water is treated to substantially reduce hazardous constituents prior to each injection, and (3) the response action or corrective action is sufficient to protect human health and the environment upon completion. (See RCRA section 3020(b).)

Resolution

For the reasons specified in the attachment to this memorandum, LDR is not applicable to these activities. Instead of LDR, RCRA section 3020 applies to reinjection of treated contaminated ground water into Class IV injection wells during CERCLA response actions or RCRA corrective actions. Moreover, for CERCLA response actions where the goal is to clean up ground water to drinking water levels, the Agency believes that health-based drinking water standards (e.g. MCLs) -- rather than LDRs -- will generally be the relevant and appropriate cleanup standard. See the attachment.

Until guidance addresses the issue, what is required to "substantially reduce" hazardous constituents prior to each injection in a CERCLA response action or RCRA corrective action should be determined on a case-by-case basis. RCRA and CERCLA program policies and guidance should be reviewed to determine protectiveness upon completion of the action.

Attachment

cc: CERCLA and RCRA Branch Chiefs
Office of Drinking Water

APPENDIX F

DOE Memorandum on Proposed RCRA Siting Restrictions

United States Government Department of Ener

memorandum

COMPLETED

DATE: MAR 1 3 1989

REPLY TO ATTN OF: EH-231

SUBJECT: Environmental Protection Agency Proposal to Broaden Restrictions For the Siting of RCRA Hazardous Waste Facilities

TO: Distribution

This is to inform you that the Environmental Protection Agency, Office of Solid Waste, is preparing regulations (see attached Outline of Possible Subtitle C Location Standards), which could require the closure of existing hazardous waste treatment, storage, and disposal units located in unstable terrain, near certain natural resource areas, or located above important aquifers.

Under these new regulations, the construction of new hazardous waste facilities would be prohibited near populated areas in order to reduce human exposure to hazardous wastes, and new land-based RCRA units, located above Class I aquifers, would not be allowed. The regulations would require the immediate closure of existing land-based units located above these aquifers.

It is anticipated that the regulations will be proposed in August or September of 1989, with a Final rule anticipated by February, 1991. The regulations will require EPA to establish "sensitive locations" where:

* New or expanding land-based units would be banned when the ground water cannot be accurately characterized or monitored, or where corrective action is "infeasible within the facility property." All existing units would be closed unless the owner could comply with the standards for new units. Land-based units include landfills, waste piles, surface impoundments, etc. Non land-based units would include tanks and containers and ancillary equipment.

* The construction of new, or the expansion of existing land-based units within the 100-year floodplain, or other areas prone to flooding, or within former lake beds, would be prohibited. Existing units in these areas would be required to close. Owners of other, non-land-based units in these areas would be required to demonstrate that they could prevent a washout. Units failing the demonstration would be banned or closed.

* New or expanded units would be prohibited in Karst terrains or areas with soluble carbonate rock, unless the owner is able to characterize the site's hydrogeology and prove that there will be no subsurface collapse and; demonstrate the ability to monitor ground water flow accurately at land-based units. Existing units must meet the requirements for new units or close.

* New hazardous waste units, located within 200 feet of a fault at which there has been an earthquake within the past 10,000 years, would be banned throughout the United States. The current ban on the siting of new units in active earthquake areas applies only to parts of Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, New Mexico, Utah, Washington, and Wyoming, as well as to all of California and Nevada. The ban on new units near active faults would be waived if the owner could demonstrate that the units could withstand "maximum horizontal acceleration and maximum velocity" according to the Office of Solid Waste.

* New units in or adjacent to wetlands would be banned. Units already adjacent to wetlands could not expand unless the owner obtains a permit under Section 404 of the Clean Water Act from the U. S. Army Corps of Engineers and demonstrates that the unit has sufficient "long-term integrity" to protect the nearby resource. Existing units that fail to demonstrate long-term integrity and the ability to protect the ecology of the adjacent wetland would be closed.

It should be noted that EPA is considering proposing variances from the ban on new units located above vulnerable aquifers and near human population centers. For Class I aquifers, the Office of Solid Waste would waive the ban on new land-based units and the closure of existing ones if the owner demonstrates that he will provide care beyond the normal 30-year post-closure care period; use the units only for hazardous wastes treated with best demonstrated available technology (BDAT); and ensure that there is no threat to the ground water.

EPA would also grant exemptions if the owner demonstrated that "corrective action could be implemented effectively." Additionally, owners of hazardous waste management units would be able to seek a waiver of the ban on new units near human populations if he could demonstrate, on a site-specific basis, the ability to perform corrective action entirely within the facility boundary. In addition to the exemptions noted above, the Agency is considering including a provision which would allow owners of facilities to demonstrate the "non-applicability" of the location standards by means of a certification statement by the owner.

The rule would also require permit writers to establish site-specific distances between two units and the facility boundary to allow corrective action at each unit. Owners of existing facilities that fail to make the on-site cleanup demonstration would be required to install additional protective measures to prevent releases of hazardous wastes from leaving the facility.

In addition, under this rule, owners would have to upgrade their contingency plans and emergency procedures to control catastrophic releases of hazardous substances into the air.

If it is determined that the rule does apply to a facility, the owner will have to decide whether to relocate a unit, or ensure that an existing unit, located in a sensitive environment, meets the required demonstrations. If the owner decides to close the unit, he would be required to choose among the closure options based upon technical factors specific to the sensitive area.

Two closure options are being considered by the EPA. The Agency may amend the current closure and postclosure rules in Subpart G of Part 264 to add a performance standard for closed units in sensitive areas; or it may adopt separate closure requirements for units in sensitive locations. Regardless of the option chosen, the Agency will establish specific technical closure factors which must be considered when the owner is selecting one of the two options. Among the technical factors which may be considered by EPA would be site-specific hazards, including short-term risks and possible cross-media effects; the complexity of the waste in the unit; the probability of future releases; and, the ability to respond to future releases.

The proposed regulations would apply to all new units six months after the final rule is issued in early 1991. The regulations would apply to active RCRA units at the time a Part B permit is issued or renewed (within five years for land-based units and within 10 years for all other units). The regulations would apply to interim-status units when a closure plan is approved or a postclosure permit issued.

These regulations, when promulgated, could have significant impacts on DOE operations throughout the United States. They could result in the closure of critical hazardous waste management units and/or the prevention of the construction of new, or expansion of existing units essential to DOE's mission. In order to continue the operation of some existing facilities, or to add additional hazardous waste capacity, in sensitive areas, DOE may have to provide significantly greater environmental control and monitoring features in the design of new or modified facilities and operational procedures in order to continue operation in these areas.

Because of the potential for severe disruptions in DOE operations, we are alerting you of these forthcoming draft regulations. In order to properly respond to and comment on the regulations when they are published, we need to have a good understanding of what the impacts on the various DOE facilities and operations may be.

Therefore, we are requesting that you begin to assess, based on the limited information given above, the impacts these regulations may have on your particular facilities. When the proposed regulations are published in the Federal Register, we will provide you with a complete copy for further analysis and submission of comments to Headquarters for preparation of a consolidated DOE response to EPA.

If you have any questions pertaining to the above, please contact Jerry Coalgate of my staff at FTS 896-6075 or (202) 586-6075.

Thomas T. Traceski
Acting Chief
RCRA/CERCLA Unit
Environmental Guidance Division

Attachment

OUTLINE OF SUBTITLE C LOCATION STANDARDS

LOCATION CATEGORIES AND CONDITIONS TO BE ADDRESSED	LIKELY OPTIONS FOR PROPOSED STANDARDS
(1) ADVERSE GEOLOGIC SETTINGS	
-SEISMIC IMPACT ZONES*	Fault proximity ban/ unit integrity demo for ground motion
-FLOODPLAINS	.Ban in 100-yr. floodplain/HMZ; technical demos (existing)
[VOLCANIC IMPACT ZONES]	Solicit comments in Preamble
[COASTAL AREAS*]	Solicit comments in Preamble
(2) UNSTABLE AREAS	
-POOR FOUNDATION CONDITIONS*	Demonstrate unit stability or ban/close
-LANDSLIDE SUSCEPTIBLE AREAS	Demonstrate unit stability or ban/close
-KARST TERRAINS	Demonstrate stability, ground-water monitorability or ban/close
(3) ECOLOGICAL RESOURCES	
-WETLANDS	Ban new units; allow existing unit demonstration of unit integrity, protection of ecological resources; COE permit
(4) POPULATION PROXIMITY	
-BUFFER ZONES	Site-specific distance between unit/property boundary to allow corrective action response
-CATASTROPHIC AIR RELEASES	Enhance contingency plan and preparedness reports under Subparts C and D
(5) COMPLEX HYDROGEOLOGY	
-GROUND-WATER CHARACTERIZATION*	Require ground-water flow net
-GROUND-WATER MONITORABILITY*	Demonstrate ability to perform corrective action within property boundary and compliance with Subpart F or close
(6) RESOURCE PROTECTION	
-GROUND WATER	Ban certain units over Class I/Vulnerable Hydrogeology
-SURFACE WATER	Enhance inspection and housekeeping requirements under Subpart B

*Certain existing RCRA standards may apply under Parts 264 or 270, but will be amended by the NPRM

APPENDIX G

EPA Memorandum on Equivalency Demonstrations

MAY 12 1989 OSWER Policy Directive # 9476.00-18

MEMORANDUM

SUBJECT: Guidance on Demonstrating Equivalence of Part 265 Clean Closure with Part 264 Requirements

FROM: Sylvia Lowrance, Director
Office of Solid Waste

TO: Regions I-X

I. PURPOSE

This memorandum provides guidance to Regional RCRA permits staff concerning the review of Part 264 equivalency demonstrations for interim status surface impoundments and waste piles that certified clean closure under the Part 265 standards prior to March 19, 1987. The Agency discussed the requirements for submitting equivalency demonstrations in the preamble to the December 1, 1987, Codification Rule (52 FR 45788). This memorandum expands upon that discussion by providing further guidance on the Agency's expectations for the review and approval of these demonstrations.

II. AUTHORITY

Section 3005(i) of the Hazardous and Solid Waste Amendments of 1984 (HSWA) requires all landfills, surface impoundments, waste piles, and land treatment units that received waste after July 26, 1982, to comply with the ground-water monitoring, unsaturated zone monitoring, and corrective action requirements applicable to new units. EPA implemented this provision in the December 1, 1987, Codification Rule. 40 CFR Section 270.1(c) requires that units which received waste after July 26, 1982, or which certified closure after January 26, 1983, obtain a post-closure permit unless they successfully demonstrate compliance with the Part 264 requirements for closure by removal.

III. CLEAN CLOSURE REQUIREMENTS UNDER PARTS 264 AND 265

Prior to March 19, 1987, the Part 265 regulations governing interim status clean closures differed significantly from the Part 264 requirements pertaining to permitted units. In March of 1987 (52 FR 8704), the Agency issued conforming changes to the Part 265 regulations to bring them into conformance with the Part 264 requirements.

A. Part 264 Clean Closure Requirements

The Part 264 provisions (§§ 264.228 and 264.258) require the owner/operator to "remove or decontaminate all waste residues, contaminated system components (liners, etc.), [and] contaminated

subsoils..." The Agency interprets the terms "remove" and "decontaminate" to mean "...removal of all wastes and liners, and the removal of all leachate and materials contaminated with the waste or leachate (including ground water) that pose a substantial present or potential threat to human health or the environment" (52 FR at 8706). To meet this standard, owner/operators must demonstrate that no Part 261 Appendix VIII constituents remain in the soils, vadose zone, or ground-water above Agency-recommended limits before certifying clean closure.

These Agency-approved limits or factors include water quality standards and criteria, health-based limits based on verified reference doses (RfDs) and Carcinogenic Potency Factors (CPFs), or site-specific Agency-approved health advisories (52 FR at 8706).

When assessing potential exposures to constituents released from the unit, the owner/operator must establish the points of compliance directly at or within the unit boundary for all routes of exposure (surface water contact, ground-water ingestion, inhalation, direct contact, and soil ingestion). In setting these points of compliance, consideration of contaminant attenuation between the unit and potential exposure points is not allowed.

Further discussion of these requirements is provided in the preamble to the March 19, 1987, conforming changes regulation (52 FR 8704), and in a subsequent Notice of Clarification issued on March 28, 1988 (53 FR 9944). Pending the up-coming issuance of the clean closure guidance mentioned in the March 19, 1987, preamble, these two sources provide the fullest interpretation of Agency policy concerning the requirements applicable to units undergoing clean closure.

B. Previous Part 265 Interim Status Clean Closure Requirements

The pre-1987 Part 265 interim status clean closure requirements differed from the Part 264 requirements in several significant ways. First, these standards allowed owner/operators to discontinue removal activities and certify closure if they were able to demonstrate that residuals associated with the unit were no longer hazardous. This provision allowed owner/operators of surface impoundments containing solely characteristic wastes to meet the clean closure standard by demonstrating that wastes no longer exhibit the characteristic that first brought the impoundment under regulatory control. In this situation, owner/operators could have clean closed without evaluating the presence of additional Appendix VIII constituents that could pose a threat to human health or the environment.

Secondly, the interim status ground-water monitoring requirements applicable to these units only required

owner/operators to monitor for indicator parameters and hazardous waste constituents for which a waste was listed. Owner/operators did not have to demonstrate that all Appendix VIII constituents that could pose a threat to human health or the environment had been removed in order to certify clean closure.

Finally, interim status facilities were not required to demonstrate that all releases of Appendix VIII constituents to soils, surface water, air, or ground water posing a threat to human health or the environment had been removed at closure.

IV. EQUIVALENCY DEMONSTRATION INFORMATION REQUIREMENTS

A. General Information Requirements for Equivalency Demonstrations

40 CFR Section 270.1(c) now affords owner/operators who closed under the Part 265 requirements the option of demonstrating that the units had actually been closed in accordance with the Part 264 requirements, by submitting an "equivalency demonstration". This equivalency demonstration is outside the Part B post-closure permit application and review process. The Agency expects owner/operators to submit sufficient information in their equivalency demonstrations to allow the Agency to determine whether the clean closures fully comply with the Part 264 requirements. The Agency does not intend, however, that owner/operators submit the same quantity of information required when submitting full Part B permit applications.

The demonstration submitted by the owner/operator must include, at a minimum, sufficient information for identifying the type and location of the unit, the unit boundaries, the waste that had been managed in the unit, and the extent of waste and soil removal or decontamination undertaken at closure. Relevant ground-water monitoring and soil sampling data should also be submitted to demonstrate that any Appendix VIII constituents originally in the unit and that remain at closure are below levels posing a threat to human health and the environment. These levels are those discussed in the March 28, 1987 preamble, i.e., water quality standards and criteria, health-based limits, carcinogenic potency factors, or ATSDR site-specific Agency-approved advisories (52 FR at 8706).

Owner/operators can submit information demonstrating that the closure certified under Part 265 complies with the Part 264 standards using existing data developed at the time of closure. If insufficient data are available to support this demonstration, owner/operators may collect new data to demonstrate that the Part 265 clean closure meets the Part 264 clean closure requirements that were in effect at the time of closure. If upon review, the Agency determines that the closure does not meet the Part 264 standards, the owner/operator will be required to submit a Part B

permit application containing all the applicable information required in Part 270, including ground-water monitoring information.

B. Acceptability of Specific Information Supporting Equivalency Demonstrations

Five potential issues concerning the acceptability of specific kinds of data used in an equivalency demonstration have been identified. These issues are discussed below.

1. Acceptability of Previously Collected Data

Many facility owner/operators will have generated considerable amounts of data during their original closure activities. To the extent that these data represent the conditions at closure and provide sufficient information to determine compliance with the Part 264 requirements, they may be used to support an equivalency demonstration. Regional staff should evaluate the information for the extent to which it fulfills the requirements of Part 264, and for its overall quality, reliability, and accuracy.

While previously collected data may be used, in many cases owner/operators will need to collect some additional information on hazardous constituents that may remain in the soils, vadose zone, or ground water to demonstrate equivalency.

2. Use of Existing Soil and Ground-Water Sampling Data as Proxies for Missing Data

The Agency believes that in limited cases owner/operators may use existing soil and ground-water sampling data as proxies for missing data. In the first case, soil sampling data can serve as a proxy for ground-water monitoring data when these are not available. In the second case, ground-water monitoring data can be used to demonstrate the acceptability of a soil or vadose zone cleanup. In such cases, the Agency may consider these data when reviewing equivalency demonstrations. For example, some owner/operators may wish to use previously collected soil sampling data as a surrogate for actual ground-water sampling data in order to demonstrate compliance with the Part 264 ground-water clean closure levels, or facility owner/operators may wish to demonstrate that soil contamination was remediated sufficiently by submitting ground-water monitoring data demonstrating no migration of contaminants from the soil. It is more likely that EPA will accept soil sampling data as a proxy for ground-water monitoring data than the converse. One such example of where soil sampling and vadose zone data might be used as a surrogate for ground-water sampling data is in a hydrogeologic setting where the water table is located at

significant depths from the surface or where ground-water monitoring is not feasible.

Demonstrations using soil sampling data will, however, generally require assumptions of contaminant fate and transport in the relevant subsurface media. As stated in the preamble to the March 19, 1987, conforming changes rule, the Agency does not believe it is appropriate to consider assumptions about subsurface attenuation when approving clean closures, given the uncertainty involved in such assumptions and the fact that all further regulatory control ends upon certification of the closure.

3. Requirement for Full Appendix VIII Sampling

The Part 264 clean closure standards require a demonstration that all Appendix VIII constituents originally in the unit have been removed or decontaminated. As with the 40 CFR Section 264.93 monitoring requirements, however, the Agency believes that it may be possible to exclude some hazardous constituents from consideration based on knowledge of past activities at the unit. Equivalency demonstrations that consider all the hazardous constituents that may reasonably be expected to be in or derived from the wastes managed in the unit may be acceptable in lieu of the full list of Appendix VIII constituents.

The Regions may decrease the list of constituents that must be evaluated to the extent that information submitted by the owner/operator is complete relative to the wastes disposed and demonstrates that these constituents could not reasonably be present in environmental media affected by the unit. In evaluating such demonstrations, Regions should also evaluate closely the potential that additional Appendix VIII constituents may be present in the soils or ground water beneath the unit.

4. Use of Data from Previously Existing Ground-Water Monitoring Systems

The Agency will consider equivalency demonstrations based on data from previously existing ground-water monitoring systems provided such ground-water monitoring systems were in compliance with the applicable requirements. At a minimum, such systems must have met the Part 265 Subpart F ground-water monitoring requirements. To the extent that these systems were located, screened, and operated properly to gather representative ground-water information, the Agency believes that they can be used to support an equivalency demonstration. In order to determine whether monitoring systems were in compliance with Part 265, Regions should examine available records and documents, such as old inspection reports, enforcement records, CME reports, or Ground-Water Task Force reports.

5. Practicability of Obtaining New Data

Some facilities will have certified clean closure several years ago, and subsequently may have constructed structures on top of clean closed units, making it difficult to obtain new data for the equivalency demonstration. For example, a building with a concrete floor or wastewater treatment unit constructed on top of a clean closed hazardous waste management unit could obstruct the collection of new sampling data. Collecting new soil or ground-water data at such a site might require either drilling through the concrete floor of the building or using angled drilling techniques.

The Agency recognizes the difficulties associated with data collection in these cases. In reviewing the quantity of such data submitted, the Regions may consider the technical difficulties involved in collecting such data. The standard of protection against which equivalency demonstrations will be evaluated will not, however, be different depending on the technical difficulties of data collection. Accordingly, the Agency will require owner/operators to submit representative existing data and/or to collect those data necessary to demonstrate compliance with the Part 264 requirements.

V. APPLICABILITY TO LANDFILLS

EPA interprets its regulations to allow landfills from which wastes have been removed at closure to accomplish "clean closure" and, if closed under 40 CFR Part 265 standards, to allow an equivalency demonstration to be made under 40 CFR Section 270.1(c)(5) and (6), through redefinition of the landfill as a waste pile, surface impoundment, or land treatment unit. It is most likely that the redefinition, or change in process, will be to a waste pile, pursuant to 40 CFR Section 270.72(c). Clean closures or demonstrations of equivalency with clean closure, are governed by the applicable Part 264 closure requirements (e.g., 40 CFR Section 264.258 for waste piles).

As an alternative to making an equivalency demonstration pursuant to 40 CFR Section 270.1(c)(5), the owner/operator of a landfill from which all waste has been removed and for which the owner/operator can provide evidence that the level of contamination is such that it no longer poses a threat to human health and the environment, may request that the Regional Administrator shorten the post-closure care period [40 CFR Section 264.117(a)(2)(i)]. The term of the post-closure permit should then be modified to a minimal period in accordance with 40 CFR Section 270.42.

VI. CONTENTS OF THE EQUIVALENCY DEMONSTRATION AND PROCEDURES FOR SUBMITTAL

No specific format for an equivalency demonstration is required. For ease of review, the Agency suggests that equivalency demonstrations include three basic sections: 1) a Unit Description, 2) a Description of Closure Activities Conducted, and 3) a Demonstration of Compliance with Clean Closure Levels.

The first section, Unit Description, should provide information on the size and location of the unit, the wastes managed by the unit (EPA hazardous waste numbers and quantities), any liner system and leachate collection system, containment system, and run-on and run-off control systems. In addition, owner/operators should present a description of the hydrogeology of the immediate area, including descriptions of ground-water and soil conditions, ground-water monitoring systems, detection programs, and any corrective action activities undertaken. For land treatment units, information concerning application rates should also be included.

The second section, the Description of Closure Activities Conducted, must identify, in detail, all removal and decontamination activities completed at the unit during closure. This description should include information on the quantity of waste removed (by waste type), the quantity of leachates and contaminated containment liquids removed, the quantity of bottom sludges/residues removed, the quantity of contaminated soil removed, the methods used for removal of inventory (i.e., waste, sludge, residue, liquid, and soil), and the procedures used for decontaminating and/or disposing of inventory. Specifically, the description of the decontamination and disposal activities should identify the method of decontamination of equipment/structures, the treatment or disposal of cleaning agents/rinsewater, and the demolition and removal of containment systems (e.g., liners, dikes) and other equipment/structures.

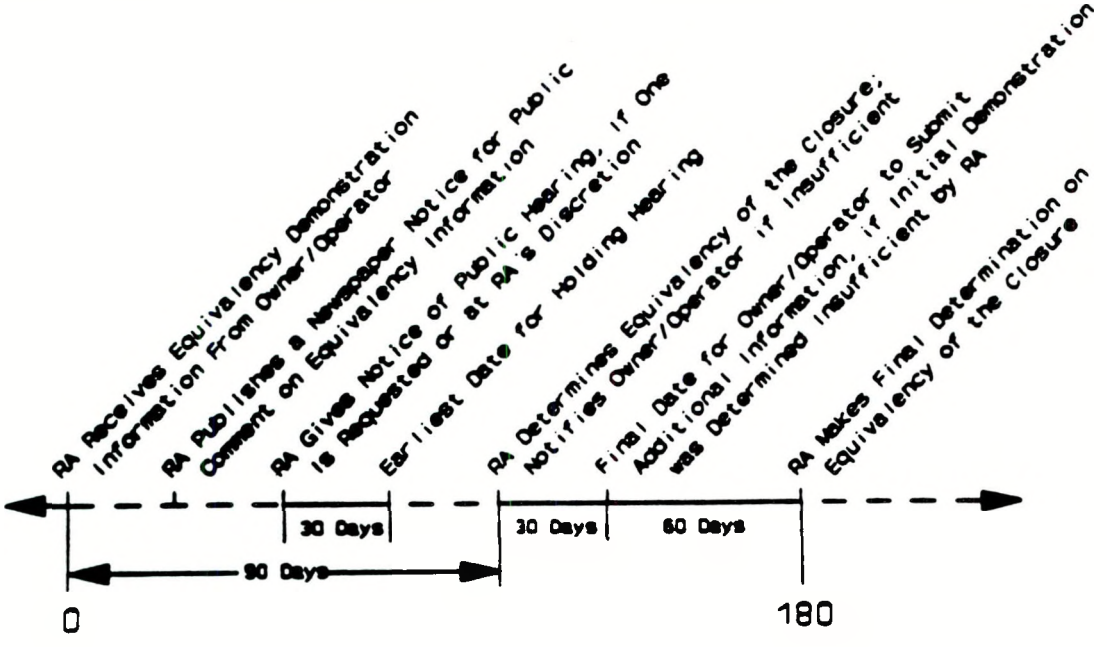
The previously approved closure plan should provide the majority of the descriptive material required for sections 1 and 2 of the demonstration. The owner/operator should not assume that the closure plan has been retained by the Agency; relevant portions of the plan should be resubmitted. A copy of the closure certification should also be provided.

The third section, Demonstration of Compliance with Clean Closure Levels, should present sampling data supporting the owner/operator's equivalency demonstration. This section should specify where samples were taken in each relevant medium, when the samples were taken, what parameters were examined, and the analytical results. The information should specify the sampling protocols and analytical methods used during the sampling

activities, along with available quality assurance/quality control information. The raw sampling data should be presented in an appendix to the report, while the results should be summarized in a clear manner in the body of the report. In cases where surrogates or proxies are proposed for use, the owner/operator should fully explain the reason for the use of such proxies and any analytic assumptions which were made. Where data from all Appendix VIII constituents are not submitted, section 2 of the submission should support the assertion that such constituents were not and are not present in the unit.

Finally, the demonstration should include a narrative discussion summarizing both the results of previously collected data and new data collected for this demonstration. In the conclusion, the section should compare the results of sampling data to the applicable clean closure levels for the relevant parameters.

The December 1, 1987, Codification Rule presented procedures and timeframes for the submittal, review, and approval of equivalency demonstrations. The timeline presented below summarizes the critical dates and activities that must be followed by owner/operators and the Agency upon receipt of an equivalency demonstration.



APPENDIX H

Joint NRC-EPA Guidance on Siting of Mixed Low-Level Radioactive and Hazardous Waste Units

(Source: EPA Mixed Waste Training Course)

MAR 13 1987

TO THE STATES AND COMPACT REGIONS:

SUBJECT: COMBINED NRC-EPA SITING GUIDELINES FOR DISPOSAL OF MIXED LOW-LEVEL RADIOACTIVE AND HAZARDOUS WASTE

As you are aware, the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) established milestones (and penalties for not meeting these milestones) to ensure adequate development of future disposal capacity for commercial low-level radioactive waste (LLW). The penalties are quite severe and the deadlines do not leave much room for slippage.

We would like to call to your attention the January 1, 1988 milestone (Section 5(e)(1)(B)) which requires that each non-sited compact or non-member state develop a siting plan for a LLW disposal facility. These siting plans must include detailed procedures and a schedule for establishing a disposal facility location and preparing a license application. Among other things, Section 5(e)(1)(B)(iii) provides that the siting plan shall:

> "... identify, to the extent practicable, the process for (1) screening for broad siting areas; (2) identifying and evaluating specific candidate sites; and (3) characterizing the preferred site(s), ..."

This letter serves four purposes:

(1) to inform states and compacts that, under current Federal law, the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Environmental Protection Agency (EPA) have dual jurisdiction over mixed low-level radioactive and hazardous waste (Mixed LLW); (2) to state that both NRC and EPA do not consider the absence of EPA's final comprehensive location standards to be justification for states and compacts to not meet their obligations under the LLRWPAA; (3) to convey that both NRC and EPA are committed to providing guidance to states and compacts who request help in their efforts to meet the January 1988 LLRWPAA milestone for siting plans; and (4) to jointly transmit the NRC-EPA combined siting guidelines for Mixed LLW (enclosed).

Dual statutory authority exists for Mixed LLW, which is regulated by the NRC under the Atomic Energy Act (AEA), as amended, and by EPA under the Resource Conservation and Recovery Act (RCRA), as amended. Mixed LLW is defined as waste that satisfies the definition of LLW in the LLRWPAA and contains hazardous waste that either is listed in 40 CFR Part 261 Subpart D or causes the LLW to exhibit any of the hazardous waste characteristics identified in 40 CFR Part 261 Subpart C. Both the NRC and EPA staffs consider that Mixed LLW

can be disposed of in accordance with the above statutes and NRC and EPA regulations.

In 1982, the NRC promulgated regulations containing minimum site suitability requirements for LLW land disposal facilities under 10 CFR Part 61. In 1981, EPA promulgated minimum location standards for hazardous waste treatment, storage, and disposal facilities in 40 CFR Part 264. Section 3004(o)(7) of RCRA, which was added by the Hazardous and Solid Waste Amendments of 1984 (HSWA), requires EPA to publish guidance identifying areas of vulnerable hydrogeology; this guidance was completed and issued in July 1986. Section 3004(o)(7) of RCRA also requires EPA to specify criteria for the acceptable location of new and existing hazardous waste treatment, storage, and disposal facilities as necessary to protect human health and the environment. EPA anticipates proposing these location standards in September 1987 and promulgating them by September 1988. This schedule provides affected states and compacts with a preview of the final standards and an opportunity to comment on the standards before promulgation.

Because of uncertainty about the precise content of EPA's future location standards, states and compacts may have questions regarding the site selection process. Both NRC and EPA are committed to providing guidance to states and compacts who request help in developing their siting plans by the January 1, 1988 deadline. Technical questions pertaining to siting a disposal facility for Mixed LLW should be submitted in writing to either the NRC or EPA contacts listed below, as appropriate.

For questions about the LLRWPAA siting deadline or NRC's site suitability requirements, contact:

Dr. Sher Bahadur
Division of Waste Management
Mail Stop 623-SS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

For questions relating to EPA's location standards contact:

Mr. Burnell Vincent
Waste Management Division
Mail Code WH-565
U.S. Environmental Protection Agency
Washington, D.C. 20460

In summary, if states and compacts observe the enclosed NRC-EPA combined siting guidelines and keep abreast of the developing EPA location standards, the absence of final RCRA location standards should not prevent states and compacts from meeting their obligations under the LLRWPAA.

Sincerely,

Hugh L. Thompson, Jr., Director
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission

J. Winston Porter
Assistant Administrator
Office of Solid Waste
and Emergency Response
U.S. Environmental Protection Agency

Enclosure:
As stated

COMBINED NRC-EPA SITING GUIDELINES FOR DISPOSAL OF COMMERCIAL MIXED LOW-LEVEL RADIOACTIVE AND HAZARDOUS WASTES

Introduction

The Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) requires states and compacts to develop siting plans for low-level radioactive waste (LLW) disposal facilities by January 1, 1988. These disposal facilities may receive commercial mixed low-level radioactive and hazardous waste (Mixed LLW), which is regulated by the U. S. Nuclear Regulatory Commission (NRC) under the Atomic Energy Act (AEA), as amended, and by the U. S. Environmental Protection Agency (EPA) under the Resource Conservation and Recovery Act (RCRA), as amended. Mixed LLW is defined as waste that satisfies the definition of LLW in the LLRWPAA and contains hazardous waste that either is listed in Subpart D of 40 CFR Part 261 or causes the LLW to exhibit any of the hazardous waste characteristics identified in Subpart C of 40 CFR Part 261. To assist in applying that definition, NRC and EPA recently developed joint guidance entitled "Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste and Answers to Anticipated Questions" (Jan. 8, 1987). NRC has promulgated LLW regulations and EPA has promulgated hazardous waste regulations that pertain to the siting requirements for disposal facilities for Mixed LLW. Because of uncertainty about the precise content of EPA's future location standards, states and compacts may have questions regarding the site selection process. This document provides combined NRC-EPA siting guidelines, to be used before EPA's new location standards are promulgated, to facilitate development of siting plans for disposal facilities that may receive Mixed LLW.

Section 5(e)(1)(B) of the LLRWPAA requires states and compacts to develop siting plans for LLW disposal facilities by January 1, 1988. In addition to other information, these siting plans must identify, to the extent practicable, the process for (1) screening for broad siting areas, (2) identifying and evaluating specific candidate sites, and (3) characterizing the preferred site(s). It is anticipated that this process will be based primarily on the site suitability requirements that apply to LLW disposal. If facilities also receive Mixed LLW, their siting requirements will reflect additional requirements that apply to disposal of hazardous waste as defined by RCRA.

In 1982, NRC promulgated regulations which contain minimum site suitability requirements for LLW land disposal facilities in 10 CFR 61.50. EPA has also promulgated minimum location standards for hazardous waste treatment, storage, and disposal facilities in 40 CFR 264.18. Considerations affecting siting are also found in 40 CFR 270.3, 270.14(b) and (c). Although both NRC and EPA have incorporated siting requirements in existing regulations for LLW and hazardous waste disposal, respectively, the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA require EPA to publish guidance identifying areas of vulnerable

hydrogeology.- In July 1986, EPA published this guidance in "Criteria for Identifying Areas of Vulnerable Hydrogeology under the Resource Conservation and Recovery Act--Statutory Interpretative Guidance, July 1986, Interim Final (PB-86-224953)." The 1984 HSWA also requires (in Section 3004(o)(7)) that EPA specify criteria for the acceptable location of new and existing hazardous waste treatment, storage, and disposal facilities. EPA anticipates proposing these location standards in September 1987 and promulgating them in final form by September 1988.

EPA's scheduled date for promulgating its final location standards is nine months after the LLRWPAA January 1, 1988, milestone for non-sited states and compacts to develop siting plans. Therefore, states and compacts may require some assistance in their efforts to develop siting plans for LLW disposal facilities that may receive Mixed LLW. The two agencies are issuing these combined guidelines to promote the development of siting plans by states and compacts. Both NRC and EPA consider that the absence of EPA's final comprehensive location standards for hazardous waste disposal facilities is not an adequate basis for states and compacts to delay development of siting plans for LLW disposal.

States and compacts should proceed at this time to develop siting plans in accordance with the existing NRC and EPA requirements. The following combined NRC-EPA guidelines are provided for use by the states and compacts, and are based on existing NRC regulations in 10 CFR Part 61 and EPA regulations in 40 CFR Parts 264 and 270. As EPA continues its development of location standards, both agencies will strive to keep states and compacts informed about the status of the developing siting requirements.

Combined NRC-EPA Siting Guidelines

Site suitability requirements for land disposal of LLW are provided in 10 CFR Section 61.50. These requirements constitute minimum technical requirements for geologic, hydrologic, and demographic characteristics of LLW disposal sites. Several of these requirements identify favorable site characteristics for near-surface disposal facilities for LLW. The majority of the site suitability requirements, however, identify potentially adverse site characteristics that must not be present at LLW disposal sites. The site suitability requirements in 10 CFR Part 61 are intended to function collectively with the requirements for facility design and operation, site closure, waste classification and segregation, waste form and packaging, and institutional controls to assure isolation of LLW for the duration of the radiological hazard. The NRC Technical Position entitled "Site Suitability, Selection, and Characterization" (NUREG-0902) provides detailed guidance on implementing the site suitability requirements in 10 CFR Part 61.

EPA has also promulgated certain minimum location standards for hazardous waste treatment, storage, and disposal facilities. These standards are provided in

40 CFR Section 264.18. As previously noted, the hazardous waste regulations also include other location considerations as well as applicable provisions of other Federal statutes. For example, Subpart F of 40 CFR Part 264 requires establishment of ground-water monitoring programs capable of detecting contamination from land disposal units. While not a siting criterion per se, this requirement can preclude siting in locations that cannot be adequately monitored or characterized. A further description of location-related standards and applicable provisions of other Federal statutes can be found in the "Permit Writers' Guidance Manual for Hazardous Waste Land Storage and Disposal Facilities: Phase I Criteria for Location Acceptability and Existing Applicable Regulations" (Final Draft - February 1985). This guidance manual describes five criteria for determining location acceptability: ability to characterize, exclusion of high hazard and unstable terrain, ability to monitor, exclusion of protected lands, and identification of areas of vulnerable hydrogeology. The first four of these criteria have a basis in the regulations and are fully described in the manual. The fifth criterion, vulnerable hydrogeology, is defined in the RCRA interpretive guidance manual mentioned above (Criteria for Identifying Areas of Vulnerable Hydrogeology under the Resource Conservation and Recovery Act--Statutory Interpretive Guidance, July 1986, Interim Final (PB-86-224953)).

However, since HSWA also added other requirements in addition to location standards to prevent or mitigate ground-water contamination, EPA recognizes that vulnerable hydrogeology must be considered in conjunction with design and operating practices. Vulnerability should not be the sole determining factor in RCRA siting decisions. Rather, this criterion provides a trigger for more detailed evaluation of sites that are identified as having potentially vulnerable hydrogeology. The extent of necessary site review and evaluation is related directly to the extent to which a location "fails" or "passes" the vulnerability criterion. Sites that are determined to be extremely vulnerable will require much closer examination than sites that are deemed non-vulnerable. The results of this more detailed review may then provide a basis for eventual permit conditions or modifications in design or operating practices.

By combining the above technical requirements, standards, and guidance of both agencies, NRC and EPA have formulated the eleven guidelines listed below. The use of terms in the guidelines is consistent with their regulatory definitions in 10 CFR Part 61 and 40 CFR Parts 260 and 264. The combined set of location guidelines is intended by the agencies to apply only as guidance to states and compacts developing siting plans for LLW disposal facilities that may receive Mixed LLW. These combined guidelines are not intended to displace existing standards and guidance. In addition, the independent guidance of both agencies should be considered in any application of the combined siting guidelines.

The combined siting guidelines for a commercial Mixed LLW disposal facility are as follows:

1. Primary emphasis in disposal site suitability should be given to isolation of wastes and to disposal site features that ensure that the long-term performance objectives of 10 CFR Part 61, Subpart C are met.

2. The disposal site shall be capable of being characterized, modeled, analyzed, and monitored. At a minimum, site characterization must be able to (a) delineate ground-water flow paths, (b) estimate ground-water flow velocities, and (c) determine geotechnical properties sufficiently to support facility design. At a minimum for site ground-water monitoring, disposal site operators must be able to (a) assess the rate and direction of ground-water flow in the uppermost aquifer, (b) determine background ground-water quality, and (c) promptly detect ground-water contamination.

3. The disposal site must be generally well-drained (with respect to surface water) and free of areas of flooding or frequent ponding.

4. The disposal site shall not be in the 100-year floodplain.

5. The site must be located so that upstream drainage areas are minimized to decrease the amount of runoff that could erode or inundate waste disposal units.

6. Disposal sites may not be located on lands specified in 10 CFR Section 61.50(a)(5), including wetlands (Clean Water Act) and coastal high hazard areas (Coastal Zone Management Act). Location of facilities on the following lands must be consistent with requirements of applicable Federal statutes: archeological and historic places (National Historic Places Act); endangered or threatened habitats (Endangered Species Act); national parks, monuments, and scenic rivers (Wild and Scenic Rivers Act); wilderness areas (Wilderness Protection Act); and wildlife refuges (National Wildlife Refuge System Administration Act).

7. The disposal site should provide a stable foundation for engineered containment structures.

8. Disposal sites must not be located in areas where:

(a) tectonic processes such as faulting, folding, seismic activity, or vulcanism may occur with such frequency and extent to affect significantly the ability of the disposal facility to satisfy the performance objectives specified in Subpart C of 10 CFR Part 61, or may preclude defensible modeling and prediction of long-term impacts; in particular, sites must be located more than 200 feet from a fault that has been active during the Holocene Epoch;

(b) surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with such frequency and extent to affect

significantly the ability of the disposal facility to meet the performance objectives in Subpart C of 10 CFR Part 61, or may preclude defensible modeling and prediction of long-term impacts;

(c) natural resources exist that, if exploited, would result in failure to meet the performance objectives in Subpart C of 10 CFR Part 61;

(d) projected population growth and future developments within the region or state where the facility is to be located are likely to affect the ability of the disposal facility to meet the performance objectives in Subpart C of 10 CFR Part 61; and

(e) nearby facilities or activities could adversely impact the disposal facility's ability to satisfy the performance objectives in Subpart C of 10 CFR Part 61 or could significantly mask an environmental monitoring program.

9. The hydrogeologic unit beneath the site shall not discharge ground water to the land surface within the disposal site boundaries.

10. The water table must be sufficiently below the disposal facility to prevent ground-water intrusion into the waste, with the exception outlined under 10 CFR Section 61.50(a)(7).

11. In general, areas with highly vulnerable hydrogeology deserve special attention in the siting process. Hydrogeology is considered vulnerable when ground-water travel time along any 100-foot flow path from the edge of the engineered containment structure is less than approximately 100 years (Criteria for Identifying Areas of Vulnerable Hydrogeology Under RCRA--Statutory Interpretive Guidance, July 1986, Interim Final (PB-86-224953)). Disposal sites located in areas of vulnerable hydrogeology may require extensive, site-specific investigations which could lead to and provide bases for restrictions or modifications to design or operating practices. However, a finding that a site is located in an area of vulnerable hydrogeology alone, based on the EPA criteria, is not considered sufficient to prohibit siting under RCRA.

Chapter VII

Examples of RCRA Information Briefs

A. Questions and Answers on the RCRA Toxicity Characteristic

Questions and Answers on the RCRA Toxicity Characteristic

BACKGROUND: The EPA issued a final toxicity characteristic (TC) rule on March 29, 1990, under the authority of §3001(g) and (h) of the Hazardous and Solid Waste Amendments (HSWA) of 1984. The final rule establishes the Toxicity Characteristic Leaching Procedure (TCLP) as a replacement to the Extraction Procedure Toxicity Test (EP Tox) (45 FR 33084) and an update to the existing TCLP, which was promulgated under the Land Disposal Restrictions (LDR) regulations (51 FR 40572). The rule also adds 25 organic chemicals to the existing list of 14 regulated toxicity characteristic waste constituents. The new TC fulfills the Congressional mandate which directed the EPA to examine and revise the EP Tox and to identify additional hazardous waste characteristics. This information brief provides questions and answers regarding the final TC.

STATUTES: Resource Conservation and Recovery Act (RCRA), Hazardous and Solid Waste Amendments Act of 1984 (HSWA).

REGULATIONS: 40 CFR 261, 264, 265, 268, 271, and 302.

REFERENCES: Final rule: 55 FR 11798, March 29, 1990.
Corrections: 55 FR 26986, June 29, 1990; 55 FR 31387, August 2, 1990; 55 FR 32733, August 10, 1990; 55 FR 39409, September 27, 1990; 55 FR 40873, October 5, 1990; 55 FR 46829, November 7, 1990.
EH-231 Memorandum, Subject: Toxicity Characteristic Rule, April 9, 1990.
EH-231 Memorandum, Subject: Toxicity Characteristics Training for Waste Management and Regulatory Compliance Personnel, December 21, 1990.

Does the TC create a de minimis concentration that provides a clear answer to whether or not a waste is hazardous?

No. The TC is only a replacement for the EP Tox for defining which wastes exhibit the toxicity characteristic. It does not affect hazardous waste determinations for wastes that are characteristic for reactivity, ignitability, or corrosivity, nor does it affect wastes that are otherwise listed as hazardous under 40 CFR 261 Subpart D. Wastes listed as hazardous continue to be considered hazardous, whether or not they exhibit the TC.

What additional materials are likely to be regulated under the TC?

The final rulemaking added 25 organic chemicals to the 8 metals and 6 pesticides already on the list of TC constituents, for a total of 39 regulated constituents. The TC potentially affects those solvent-containing wastes that are not currently regulated because the solvent is neither a spent solvent nor a discarded commercial chemical. For example, some commercial chemical products, such as paints, adhesives, and oils, that contain solvents such as methyl ethyl ketone, tetrachloroethylene, trichlorethylene, dichloroethylene, or benzene may be newly regulated under the TC. In addition, some metal-bearing wastes that passed the EP Tox may fail the TCLP, which may be somewhat more aggressive for certain waste types.

Why didn't EPA add more metals to the list of TC constituents?

EPA stated that studies must first be conducted to resolve issues regarding the subsurface fate and transport of metals. Efforts will focus on the development of the metal specification model (MINTEQ) for existing regulated metals plus nickel and thallium. Pending further study, the TC will apply only to the eight existing metals at the same regulatory levels established under the EP Tox.

RCRA allows generators to use process knowledge and/or chemical analysis as the basis for characterizing wastes. Will process knowledge and reliance on information in Material Safety Data Sheets (MSDS) be adequate for characterizing wastes under the TC?

Not necessarily. For example, preliminary data indicate that many materials containing organic constituents may fail the TCLP for benzene. For many of these materials, benzene is not a constituent that appears as an ingredient on the MSDS, nor is it a constituent that is used in the process generating the waste. This information suggests that process knowledge, even with strict controls on waste accumulation, may not be adequate to evaluate toxicity relative to the TCLP. Keep in mind that while process knowledge can be used by the generator to determine that a waste is hazardous, when process knowledge is used to determine that a waste is not hazardous, the generator should be prepared to justify this conclusion. Treatment, storage, and disposal facilities must use the TCLP as part of their waste analysis plan (40 CFR 264.13 and 265.13) to assure waste is properly managed within their facility.

The EP Tox provides for a structural integrity test. If a waste passes the test, particle size reduction is not required. Does the TCLP provide such a step and relief from the requirement to reduce particle size?

No. The TCLP does not include a structural integrity or equivalent test, but instead requires particle size reduction for all wastes. Particle size must be reduced to allow passages of the

material through a 9.5 mm sieve or the surface area per gram of material must be equal to or greater than 3.1 cm^2.

Some of the constituents regulated under the TC are found in gasoline. Does this mean that wastes produced from the remediation of leaking underground storage tanks are potentially RCRA regulated?

Not if the wastes are hazardous due to exhibiting the TC for the newly regulated constituents only. Petroleum-contaminated media and debris that fail the TCLP for any of the new constituents (DO18-DO43) and are subject to corrective action under 40 CFR 280 are excluded from regulation as a TC-hazardous waste under 40 CFR 261.4.

Dielectric fluids from electrical equipment that contain polychlorinated biphenyls also often contain chlorinated benzenes, which are now regulated under the TC. Will such wastes have to be evaluated with the TCLP and possibly regulated under both RCRA and the Toxic Substances Control Act (TSCA)?

No. Section 261.8 excludes TSCA-regulated dielectric fluid containing PCBs and associated contaminated electrical equipment from RCRA if they are hazardous only because they fail the TCLP for the newly added constituents (D018-D043), which include common solvents and chlorinated benzenes.

What is the deadline for complying with the TC?

The TC is effective on September 25, 1990, for large quantity generators (LQGs) and treatment, storage, and disposal facilities (TSDFs) and on March 29, 1991, for small quantity generators.

What actions are required of existing DOE interim status and permitted RCRA facilities that manage waste that is newly regulated under the TC or contains new TC constituents (D018-D043)?

Notification to EPA under RCRA §3010 is not required for facilities that have previously submitted such notification and received an EPA ID number. Existing interim status facilities must submit an amended Part A to EPA (copy to state, if authorized) by September 25, 1990. Existing permitted facilities must submit a Class 1 permit modification by September 25, 1990. If necessary, a Class 2 or 3 modification must also be submitted by March 24, 1991.

What actions are required of TSDFs that are newly regulated?

Facilities that come under RCRA Subtitle C regulation for the first time must submit a §3010 notification to EPA by June 27, 1990, and a Part A application by September 25, 1990. If the TC wastes will be managed in a land disposal unit, a Part B application must be submitted by September 25, 1991.

What about the management of wastes that are in storage prior to the effective date of the TC?

Wastes that are managed in an interim status or permitted hazardous storage facility prior to the effective date of the rule have already been deemed to be hazardous. The facility must determine if such wastes also fail the new TCLP, using testing or process knowledge, to ensure that the continued management of the waste is in compliance with all Subtitle C requirements, including permitting procedures. Facilities must also ensure that any solid wastes being managed are evaluated to determine if they are hazardous under the TCLP. Wastes not disposed of by the effective date of the rule must be evaluated prior to treatment or disposal to ensure that hazardous wastes are not inadvertently treated or disposed of as non-hazardous.

Can a waste be exempted from listing as a hazardous waste but still be regulated under the TC?

Yes. Exemptions from listing [such as delistings under 40 CFR 260.20/22 and the mixture rule exemption under 261.3(a)] apply only to wastes listed under 40 CFR 261 Subpart D. Generators must still determine whether their wastes exhibit a hazardous waste characteristic. For example, under the mixture rule exemption for wastewaters, if the maximum weekly usage of solvents designated under the provision does not exceed specified values, the wastewater is exempt from being a listed hazardous waste. However, the wastewater may still be regulated if it exhibits any hazardous waste characteristic, including the TC.

Are wastes newly identified as hazardous under the TC banned from land disposal immediately?

No. Under the HSWA LDRs, EPA has six months to make such determinations regarding newly identified wastes. However, if EPA fails to make timely determinations for newly identified wastes, those wastes are not automatically banned from land disposal.

When does the TC become applicable to radioactive mixed wastes?

The TC will be applicable to radioactive mixed waste (RMW) on the effective dates established in the regulations (i.e., September 25, 1990, or March 29, 1991) in those states where RMW is regulated as a RCRA hazardous waste on the relevant effective date. In states where RMW is not regulated as RCRA hazardous waste on the relevant effective date (i.e., states with base RCRA authorization, but without mixed waste authority), the TC will become applicable to RMW when the state receives mixed waste authority.

Is there a manual that describes how to do the TCLP?

Yes. The document entitled "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," otherwise known as SW-846, describes the test procedures for the TCLP as well as other waste analysis methods. The EPA is currently working a revision of SW-846 which will incorporate aspects of analyzing radioactive mixed waste. EH-231 will keep the field informed as to developments regarding SW-846.

Questions requiring policy decisions will not be dealt with in EH-231 Information Briefs unless that policy has already been established through appropriate documentation. Please refer any questions concerning the material covered in this Information Brief to Jean Schumann, RCRA/CERCLA Division, EH-231, FTS 896-7769.

B. Requirements for the Recycling of Hazardous Waste

Requirements for the Recycling of Hazardous Waste

BACKGROUND: The regulatory status of materials destined to be recycled is not always clear. There have been numerous questions from DOE Field Elements regarding the applicability of the Resource Conservation and Recovery Act (RCRA) to certain materials that can be recycled. The Office of Environmental Guidance, RCRA/CERCLA Division, has responded to questions relating to the RCRA regulations as they apply to materials that are recycled or are destined for recycling. Additional regulatory requirements for these materials may be promulgated upon the reauthorization of RCRA (e.g., regulation of used oil). Additional EH-23 Information Briefs will be issued as these regulations develop. The Office of Environment, Safety and Health has convened a workshop to establish DOE's position on a number of issues associated with mixed waste and materials management, several relative to recycling.

STATUTE: The Resource Conservation and Recovery Act (RCRA).

REGULATIONS: 40 CFR 260, 261, 262, 263, 264, 265, 266 & 268.

REFERENCE: Environmental Guidance Program Reference Book (RCRA); memorandum dated August 3, 1990 — "Mixed Waste and Materials Management Compliance Issues" (EH-22).

What is the definition of a hazardous waste?

In order for a waste to be a hazardous waste, it must first meet the definition of a solid waste. A solid waste is any material that is discarded by being abandoned (disposed of, burned or incinerated, or accumulated or treated prior to disposal or incineration), recycled (or accumulated, treated, or stored prior to recycling), or considered inherently waste-like as defined in 40 CFR 261.2(d). Furthermore, to be a hazardous waste, a solid waste must:

- ❑ exhibit one or more of the characteristics of hazardous waste identified under 40 CFR 261.20 through 261.24 (ignitability, corrosivity, reactivity, or toxicity) or
- ❑ be listed as a hazardous waste under 40 CFR 261.31 through 261.33 or
- ❑ be a mixture that contains a nonhazardous solid waste and a listed or characteristic hazardous waste [40 CFR 261.3 (a)(2)(iii) & (iv)].

What is a secondary material?

Secondary material is defined in 50 FR 616 (January 4, 1985) as "material that potentially can be a solid and hazardous waste when recycled."

When is a material considered to be "recycled"?

Under 40 CFR 261.1, a material is ***recycled*** if it is used, reused, or reclaimed. A material is "used or reused" if it is employed as an ingredient in an industrial process to make a product (e.g., distillation bottoms from one process used as feedstock in another process). However, a material will not satisfy this condition if distinct components of the material are recovered as separate end-products (as when metals are recovered from metal-containing secondary materials). A material is also "used or reused" if it is employed as an effective substitute for a commercial product (e.g., spent pickle liquor used as phosphorous precipitant and sludge conditioner in wastewater treatment).

A material is "reclaimed" if it is ***processed*** to recover a usable product, or if it's regenerated. Examples are recovery of lead from spent batteries and regeneration of spent solvents.

What is speculative accumulation?

The 40 CFR 261.1(c)(8) regulation states that materials are "accumulated speculatively" if they are accumulated before being recycled. Materials are ***not*** considered to be "accumulated speculatively" if the person accumulating the material can demonstrate that (1) it can feasibly be recycled ***and*** (2) during one calendar year, the amount recycled or transferred to another location for recycling is at least 75% of the amount accumulated at the beginning of the year. This is of particular importance to persons, including Federal facilities, storing secondary materials in anticipation of possible recycling. Unless otherwise exempt from regulation, such materials ***are*** subject to RCRA.

When is a recycled material a solid waste?

A recycled material, or a material destined for recycling, is a solid waste when it is used in a manner constituting disposal [40 CFR 261.2(c)(1)], burned for energy recovery to produce a fuel [40 CFR 261.2(c)(2)], reclaimed [40 CFR 261.2(c)(3)], or accumulated speculatively [40 CFR 261.2(c)(4)]. The following table, which is provided in 40 CFR 261.2, identifies when secondary materials are solid wastes when recycled, or destined for recycling, in one of the four manners mentioned above.

Material	Use constituting disposal	Energy recovery fuel	Reclamation	Speculative accumulation
Spent materials	Yes	Yes	Yes	Yes
Sludges (listed in 40 CFR 261.31 or 261.32)	Yes	Yes	Yes	Yes
Sludges exhibiting a hazardous characteristic	Yes	Yes	No	Yes
By-products (listed in 40 CFR 261.31 or 261.32)	Yes	Yes	Yes	Yes
By-products exhibiting a hazardous characteristic	Yes	Yes	No	Yes
Commercial chemical products listed in 40 CFR 261.33	Yes	Yes	No	No
Scrap metal	Yes	Yes	Yes	Yes

Note: spent material", "by-products", and "scrap metal" are defined in 40 CFR 261.1.

What are the requirements for handling recyclable materials that are hazardous wastes?

If a recyclable material is a hazardous waste subject to RCRA, the requirements applicable to hazardous waste handlers apply. They are summarized as follows:

- ❑ *Generators and transporters* of these materials are subject to the applicable requirements of 40 CFR 262 and 40 CFR 263, which cover the recordkeeping, reporting, pre-transport, and manifest requirements for generators and transporters, and responses to discharges for transporters. They are also subject to the notification requirements of RCRA Sect. 3010.

- ***Facilities that store*** these materials are subject to 40 CFR 264 & 265, Subparts A-L, which cover facility standards, closure/post-closure and financial requirements, emergency preparedness, recordkeeping, reporting and manifest requirements, design and maintenance of various solid waste management units, and releases from such units. They are also subject to the notification requirements under Sect. 3010 of RCRA. In addition, they are subject to the permitting requirements of 40 CFR 124 & 270, and the Land Disposal Restrictions regulations of 40 CFR 268.
- ***Recyclers*** who do not store these materials are subject to the notification requirements under Sect. 3010 of RCRA and the manifest requirements of 40 CFR 265.71 & 265.72.

The regulation in 40 CFR 261.6(a)(2) states that in lieu of the above requirements, facilities that handle certain materials must comply with 40 CFR 266, which establishes standards, prohibitions, and requirements applicable to the management of these materials. The regulations in 40 CFR 266 apply to the following:

- recyclable materials used in a manner constituting disposal, as defined in 40 CFR 261.2(c)(1);
- hazardous waste burned for energy recovery in boilers and industrial furnaces;
- used oil that exhibits one or more of the characteristics of hazardous waste and is burned for energy recovery;
- spent lead acid batteries being reclaimed; and
- recyclable materials utilized for precious metal recovery.

Handlers of the above materials are required to have a permit pursuant to 40 CFR 270 & 124.

Pursuant to 40 CFR 260.40 & 260.41, the Regional Administrator may decide on a case-by-case basis that handlers of recyclable materials from which precious metals are reclaimed should be subject to some of the more substantive requirements to which generators, transporters and storers of other hazardous wastes are subject, rather than only 40 CFR 266, Subpart F. Such a decision would be based on a determination that the materials are being stored in a manner that is not protective of human health and the environment.

What materials are not solid waste when recycled or may otherwise be exempt from regulation?

Materials identified with a "No" in the table above are not solid wastes when recycled in the manner specified. Also, 40 CFR 261.2(e) states that materials are not solid wastes when ***they can be shown*** to be recycled by being:

- "used or reused" as defined above (provided they have not been reclaimed) or
- returned to the original process from which they are generated, without first being reclaimed. (The material must be returned as a substitute for raw material feedstock, and the process must use raw materials as principal feedstocks)

Regulations in 40 CFR 261.2(e)(2) state that materials recycled by the above methods are solid wastes if "used or reused" constitutes land application, production of products that are applied to land, burning for energy recovery, producing a fuel, or contained in fuels. Furthermore, if the material is accumulated speculatively or is listed in 40 CFR 261.2(d)(1), it is a solid waste.

Regulations in 40 CFR 261.4 identify secondary materials that are not solid wastes (e.g., domestic sewage and industrial waste water discharges subject to Clean Water Act regulations) and solid wastes that are not hazardous wastes (e.g., household waste). These materials are not regulated as hazardous wastes under RCRA.

Certain recyclable materials (hazardous wastes that are recycled) are not subject to the hazardous waste regulations in 40 CFR 262-266, 268, 270, or 124. These materials are identified in 40 CFR 261.6(a)(3) and include:

- industrial ethyl alcohol being reclaimed, except in cases where it is being exported for reclamation, in which case export requirements of 40 CFR 262.53, 262.56 & 262.57 apply;
- used batteries returned to the manufacturer for regeneration;
- used oil that exhibits one or more hazardous waste characteristics, but is being recycled in some manner other than burning for energy recovery [note: the use of used oil contaminated with hazardous waste for dust suppression or road treatment is prohibited in 40 CFR 266.23 (b)];
- scrap metal; and
- other materials associated with the petroleum refining, iron, and steel industries.

Under 40 CFR 261.2(f), respondents to enforcement actions (implementing RCRA Subtitle C requirements) who claim that the wastes they handle are not a solid waste or are conditionally exempt from regulation must provide appropriate documentation to demonstrate the claim.

Specific to recyclable materials, is it possible to apply for an exclusion from the regulatory requirements for hazardous waste?

According to 40 CFR 260.30 & 260.31, the EPA Regional Administrator may determine, on a case-by-case basis, that certain recyclable materials are not solid wastes, and are not subject to regulation under RCRA. These variances are limited to materials recycled, or destined for recycling, in the following manner:

- materials accumulated speculatively without sufficient amounts being recycled [e.g., a variance from classification may be granted for materials that are accumulated speculatively, without sufficient amounts being recycled, if market factors indicate that recycling will be feasible at a later time (i.e., precious metal recovery) 40 CFR 260.31(a)(1)];
- materials that are reclaimed and then reused within the original primary production process in which they were generated; and
- materials that have been reclaimed but must be reclaimed further before the materials are completely recovered.

It is also possible, under 40 CFR 260.22, to petition the EPA Administrator to exclude from regulation a waste that is identified in Subpart D of 40 CFR 261 (listed wastes). However, a waste so excluded may still be a hazardous waste under Subpart C of 40 CFR 261 (characteristic hazardous waste).

What is the difference between a "co-product" and a "by-product"?

The distinction between "co-product" and "by-product" is important because co-products are not intended to be covered by the hazardous and solid waste regulations.

- "Co-products" are defined in the Definition of Solid Waste Final Rule (January 4, 1985; 50 FR 625), as materials produced intentionally for use by the general public, and that are suitable for such use in their existing state.
- "By-product" is defined in 40 CFR 261.1(c)(3) as a material that is not one of the primary products of a production process and is not solely or separately produced by the production process. Examples are process residues such as slags or distillation column bottoms.

Questions of policy or questions requiring policy decisions will not be dealt with in EH-231 Information Briefs unless that policy has already been established through appropriate documentation. Please refer any questions concerning the subject material covered in this Information Brief to Mark Petts, RCRA/CERCLA Division, EH-231, FTS 896-2609.

Chapter VIII

Examples of TSCA Information Briefs

A. PCB Manifesting, Tracking and Disposal Requirements

PCB Manifesting, Tracking, and Disposal Requirements

BACKGROUND:	The Environmental Protection Agency (EPA) published a *Federal Register* notice on December 21, 1989, which established requirements for all facilities generating polychlorinated biphenyl (PCB) waste to track the disposal process in a manner similar to the "cradle-to-grave" system of the Resource Conservation and Recovery Act (RCRA). The final rule became effective on February 5, 1990. As part of the EH-231 response to the final rule, a series of questions were posed to the EPA requesting clarification on the impact of the rule to Department of Energy (DOE) facilities storing PCB waste. This Information Brief will review the final rule and the EPA response to the request for clarification.
STATUTE:	Toxic Substances Control Act (TSCA).
REGULATIONS:	40 CFR 761.
REFERENCES:	Final rule: 54 FR 52716, December 21, 1989; Correction: 55 FR 26204, June 27, 1990; EH-231 Memorandum, February 5, 1990, subject: PCB Notification and Manifesting Final Rule; EH-231 Letter to the EPA, February 16, 1990, subject: Clarification on PCB Final Rule; EPA Letter to EH-231, August 2, 1990, subject: Response to Request for Clarification on PCB Final Rule.

General:

The new TSCA regulations require generators of PCB waste to notify the EPA of their activities and to implement a manifest system for tracking disposal of PCB waste. The regulations also require commercial storers of PCB waste to obtain EPA approval for such storage, develop closure plans, and demonstrate financial responsibility [Sect. 761.65(d)].

Definitions (Sect. 761.3):

"*Generator of PCB waste*" means any person whose act or process produces PCBs that are regulated for disposal under Subpart D of this Part, or whose act first causes PCBs or PCB items to become subject to the disposal requirements of Subpart D of this Part, or who has physical control over the PCBs when a decision is made that the use of the PCBs has been terminated and therefore is subject to the disposal requirements of Subpart D of this Part. Unless another provision of this part specifically requires a site-specific meaning, "generator of PCB waste" includes all of the sites of PCB waste generation owned or operated by the person who generates PCB waste.

"*Commercial storer of PCB waste*" means the owner or operator of each facility which is subject to the PCB storage facility standards of Sect. 761.65, and who engages in storage activities involving PCB waste generated by others, or PCB waste that was removed while servicing the equipment owned by others and brokered for disposal. The receipt of a fee or any other form of compensation for storage services is not necessary to qualify as a commercial storer of PCB waste. It is sufficient under this definition that the facility stores PCB waste generated by others or the facility removed the PCB waste while servicing equipment owned by others. A generator who stores only the generator's own waste is subject to the storage requirements of Sect. 761.65, but is not required to seek approval as a commercial (PCB) storer. If a facility's storage of PCB waste at no time exceeds 500 liquid gallons of PCBs, the owner or operator is not required to seek approval as a commercial storer of PCB waste.

Clarification on Definition of "Commercial Storer":

Is a DOE facility which receives only PCB waste from other DOE facilities considered a commercial storer of PCB waste?

No, for purposes of this rule, DOE facilities receiving waste from other DOE facilities will

be considered to be receiving it from a "related company" and therefore will not be considered to be commercially storing PCB waste. However, it is important to note that while the facility may not be a commercial storer of PCB waste subject to Sect. 761.65(d), it must still meet the storage facility standards in Sects. 761.65(a)-(c), where applicable.

Is a DOE facility which receives PCB waste from federal facilities other than DOE considered a commercial storer of PCB waste?

Yes, receiving waste from other federal facilities would ***not*** be considered as receiving wastes from a "related company." Therefore, DOE would be a commercial storer in this scenario if it receives more than 500 gallons of PCB wastes. As a commercial storer, DOE would be required to obtain EPA approval of such storage and to develop a closure plan. However, the Federal Government is exempt from the closure cost estimates and financial assurance requirements [Sect. 761.65(j)].

Is a DOE-owned and contractor-operated PCB waste storage facility required to have a closure plan when the quantity of PCBs on site exceeds 500 gallons regardless of whether the DOE facility is considered a commercial PCB waste facility?

In this scenario, the only time the DOE-owned and contractor-operated facility would be considered a commercial storer and need to have a closure plan would be when it stores PCB waste exceeding 500 gallons from other than another DOE facility, as discussed in the answer to the second question.

In addition, according to the EPA, while the contractor may be operating the facility, they are operating it under DOE control and oversight, essentially as employees of DOE; therefore, the answers to the questions above apply equally to the contractor. For example, if the contractor accepts PCB waste exceeding 500 gallons from other than a DOE facility, DOE is a commercial storer of PCB waste and would need to seek an approval as such from the EPA and develop a closure plan.

Relation to RCRA:

The EPA regulates the storage and disposal of PCBs under TSCA section 6(e)(1) authority, rather than under Subtitle C of RCRA, unless the PCB waste also meets the definition of RCRA hazardous waste. However, to better manage PCB waste, the EPA has promulgated requirements for a tracking system that is similar to the "cradle-to-grave" tracking system for hazardous wastes under the RCRA Subtitle C program.

Summary:

The final rule was published in the *Federal Register* on December 21, 1989, is effective on February 5, 1990, and includes the following requirements:

- ❑ The transportation of PCB waste must be properly manifested similar to the "cradle-to-grave" concept of RCRA.
- ❑ Generators must notify the EPA of their PCB waste activities.
- ❑ Generators must obtain a unique identification number from the EPA.
- ❑ DOE facilities can receive PCB waste from other DOE sources without being considered a commercial storage facility, even if the amount exceeds 500 gallons.
- ❑ For purposes of defining "commercial storer," DOE operating contractors are, in effect, considered as employees of DOE and, therefore, what applies to DOE also applies to DOE operating contractors.

Questions of policy or questions requiring policy decisions will not be dealt with in EH-231 Information Briefs unless that policy has already been established through appropriate documentation. Please refer any questions concerning the subject material covered in this Information Brief to Jean Schumann, RCRA/CERCLA Division, EH-231, FTS 896-7769.

Chapter IX

Examples of RCRA/CERCLA Newsletters

A. RCRA/CERCLA Update February 1990

RCRA/CERCLA Update

A Report from the Environmental Guidance Division of the U.S. Department of Energy

Vol. 90. Issue I *February 1990*

OTA Report Criticizes Superfund Program, Calls for Sweeping Changes

In a 223-page report, ***Coming Clean: Superfund's Problems Can Be Solved...***, released in October 1989, the Congressional Office of Technology Assessment (OTA) severely criticizes the slow pace and inconsistent management of the CERCLA cleanup program and proposes strategic initiatives and program changes that it claims will improve and strengthen the program. The report says that fundamental changes are needed in the structure and policies of the Superfund program, otherwise "significant risks to public health and environment will remain poorly managed, public expectations will remain unmet, and public confidence will worsen."

At the heart of this criticism is OTA's analysis of the current status of the Superfund Program:

❑ **Fifty to 70 percent of Superfund spending is inefficient.**

Fifty percent of cleanups address *speculative* risks; no distinction is made between real or current risks and risks based on scenarios of future use of contaminated land and groundwater, which, at best, are highly uncertain. Seventy-five percent of cleanups are unlikely to be permanent. Administrative, study, and transaction costs are unnecessarily high. OTA estimates that to date 60 percent of Superfund program costs have been litigation costs.

❑ **Priorities are poorly set.**

The size of the National Priorities List (NPL) is a *policy* choice and does not reflect real cleanup priorities. The EPA plans for 2,100 NPL sites by the year 2000; OTA estimates there should be 10,000 NPL sites. The Hazard Ranking System (HRS) is unable to rank sites by threats posed, and the 28.5 threshold score for listing sites on the NPL is arbitrary and meaningless.

❑ **The Superfund process is too slow.**

The evaluation of sites is extremely slow. A huge backlog of sites await Site Inspection and possible application of the HRS and typically three to eight years elapse from Site Inspection to proposal for the NPL. Complete cleanups can take 10 years or more.

❑ **The Superfund program is poorly managed.**

Regional EPA Administrators have extraordinary autonomy, and EPA Headquarters has done little to assure Program consistency. Also, the Superfund work force is largely inexperienced, untrained, and poorly supervised. Technical oversight of critical studies, analyses, and decisions is poor. Finally, nearly all Superfund activities are carried out by contractors, and they exert an enormous influence over policies and programs.

With these criticisms as a starting point, the OTA report proposes 38 policy options, divided into strategic initiatives and program changes, that Congress should consider to improve the program. Some of the more important of these options include:

❑ Establish a National Site Discovery Program.

❑ Limit the use of the HRS to a binary (list/not list) decision-making tool.

❑ Set high priority for sites with current risk and low priority for those with future risks.

❑ Combine the PA/SI, HRS scoring, and RI phases into a single site evaluation program.

❑ Combine the removal and remedial programs into a single site cleanup program.

❑ Set a single level of acceptable risk to reduce excessive flexibility in decision making and establish consistent cleanup levels across sites.

❑ Establish national *minimum* cleanup standards.

❑ Define the meaning and limit of "permanent" cleanup.

❑ Reduce dependency on contractors and expand the EPA work force.

❑ Reduce the use of ineffective groundwater cleanup technology.

❑ Limit responsible party action to *implementation* of the remedy.

❑ Examine alternatives to limit CERCLA liability.

❑ Strengthen EPA Headquarters oversight of Regional implementation of the Superfund program.

❑ Make the Superfund program permanent.

❑ Examine moving Superfund implementation away from the EPA to the states or transfer it to a new quasi-Federal Government Agency.

❑ Promote other cleanup programs outside of Superfund.

These and additional options are suggested to strengthen the Superfund program and reestablish public confidence. The report concludes that "Superfund's overall poor performance is not a result of inadequate funding, lack of cost-effective technology, inadequate legal authority for the government to get responsible parties to pay for cleanups, insufficient policy direction from Congress, or low public support." The root causes are "ineffective management of the Superfund program by the EPA" and "unsuccessful Congressional action."

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EPA Proposes Third Third Land Disposal Restrictions

Since the mid 1980's, DOE and the EPA have had informal discussions about the applicability of RCRA Subtitle C regulations to the DOE's large volume of radioactive mixed waste (RMW). Historically, there have been questions about the applicability of RCRA to RMW. These questions were resolved on July 3, 1986, when the EPA published a notice in the *Federal Register* (51 FR 24504), which determined that RMW was subject to RCRA and that states were required to petition the EPA for authorization to regulate RMW. While this statement was clear, there was still confusion on the definition of what constituted RMW. The notice stated that pending an interpretation of the "byproduct material" definition by DOE, RMW would be regulated by the EPA on a case-by-case basis. On May 1, 1987, DOE published in the *Federal Register* the "Byproduct Material" final rule, which stated that the hazardous portion of RMW would be regulated under RCRA (52 FR 15937).

In developing prohibitions on land disposal for hazardous waste under the initial land disposal restriction (LDR) rulemakings, consideration apparently was not given to whether there were technologies or adequate available capacity for RMW. This was a function not only of the uncertainty as to whether RMW was subject to RCRA regulation but also to the lack of data and information on RMW. In recognition of this data gap, DOE began collecting and providing large amounts of information to the EPA regarding RMW types, volumes, physical and chemical characteristics, treatment methodologies, and treatment capacity.

With this new data, the EPA began considering LDR and related prohibitions specifically applicable to RMW. For the first time [within the Third Third proposed rule of November 22, 1989 (54 FR 48372)] the EPA recognized both the hazardous nature of the waste and the radioactive component. EPA proposed separate treatability groups for RMW for several hazardous waste streams.

On January 8, 1990, DOE submitted extensive comments to the EPA on the proposed Third Third rule and additional data packages on treatment of RMW. DOE generally supported many of the proposed approaches and requirements but emphasized its concern that the proposals did not adequately consider the unique difficulties in the safe management of both the radioactive and chemical hazards of RMW. Some of these concerns and comments are highlighted below:

- ❑ **DOE requested that treatability groups or waste subcategories for RMW be promulgated separately from those for nonradioactive hazardous wastes.**

Additional efforts are needed to determine appropriate treatment standards for RMW subject to the LDR for First, Second, and Third Third wastes. Treatment standards and technologies based solely on the hazardous nature of the waste may not be appropriate for most RMW and may be unsafe. The radiological properties of RMW greatly complicate the ability to treat the chemical hazards associated with the waste. Establishing separate treatability groups for characteristic RMW becomes even more appropriate considering the diverse nature of such wastes.

- ❑ **DOE supported thermal destruction for the vast majority of ignitable liquid wastes.**

Many ignitable RMW are relatively innocuous with respect to biological toxicity but present significant radiological concerns. Treatment standards should be based on rendering the waste non-ignitable (flash point greater than 140° F), and stabilization should not be excluded as a potentially applicable treatment because of the radiological concerns. Stabilization can render ignitable wastes non-liquid, non-ignitable, and immobilize the radioactive components and, therefore, is protective of human health and the environment.

- ❑ **DOE supported stabilization as a treatment method for radioactive zirconium fines and suggested placing them in a separate subcategory.**

The EPA proposed a treatment standard of "Deactivation as a Method of Treatment" for wastes in the D001 Ignitable Reactives subcategory, including radioactive zirconium fines.

- ❑ **DOE supported stabilization by solidification as an acceptable method of treatment for corrosive RMW.**

Stabilization solidifies the waste, renders it non-corrosive, physically entraps and chemically stabilizes EP-toxic metals, and immobilizes the radioactive components.

- ❑ **DOE felt that the proposed treatment standard of neutralization to pH between 6 and 9 for corrosive hazardous wastes is inappropriate for acids and alkalines.**

In many cases insoluble salts cannot be formed via pH adjustment. Also, RMW that is managed in DOE tanks and destined for grout stabilization or vitrification are adjusted to a pH in excess of 12.5 to prevent tank corrosion. Neutralization of such wastes would be unnecessary and would interfere with the chemical fixation of the radioactive and the heavy metal constituents during stabilization. In addition, the significant exothermic reaction caused by pH adjustment would require construction of facilities to dissipate the heat and contain and control radioactive gaseous emissions. Finally, the addition of a neutralizing agent would also significantly increase waste disposal volumes.

- ❑ **DOE proposed that all EP-toxic metal RMW should be placed into separate treatability subcategories.**

DOE relies to a significant extent on mobility-reducing technologies for characteristic RMW. Treatment standards that are established on the basis of conventional technologies could be severely prohibitive. Treatment standards for metal-containing wastes should allow for the use of all applicable technologies that can achieve the EP-toxicity characteristic levels.

- ❑ **DOE supported using specified methods of treatment for EP-toxic RMW subcategories, where they are clearly applicable, or concentration-based treatment standards set at the characteristic level concentrations (where proposed concentration-based standards are below the characteristic levels).**

The EPA proposed treatment standards for characteristic metals expressed as concentration-based standards or as required methods of treatment.

- ❑ **DOE expressed concern that in some cases both the EP and TCLP tests would be required.**

For arsenic and selenium non-wastewaters, the EPA proposes use of the EP toxicity test to determine compliance with the LDR treatment standards; for other wastes the TCLP would be required. If arsenic and selenium non-wastewaters contained additional hazardous constituents, the EPA proposes that both tests would be required. DOE expressed concern over the additional cost, time, and other resources required for dual testing. Additionally, DOE pointed out that most of its data on the toxicity characteristics of mixed wastes is based on the EP toxicity test. DOE is concerned about the period of time in which facilities will be

(Continued on page 11)

Radionuclide NESHAPs is Published

The long-awaited Clean Air Act (CAA) final rule on National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for radionuclides was published in the *Federal Register* on December 15, 1989 (54 FR 51654). The immediately effective rule regulates air emissions of radionuclides from DOE and other facilities by specifying dose limits to maximally exposed individuals, flux rates for radon, and emissions limits for Po-210 *(see table, this page)*. The radionuclide NESHAPs incorporates a new method for estimating doses, and the standards are based on a "safe" or "acceptable" level of risk with "an adequate margin of safety." For DOE facilities, the result is a "committed effective dose equivalent" limit of 10 mrem/yr for all radionuclides, except radon, and a radon-222 flux rate of 20 pCi/m^2-s from uranium mill tailings piles. The EPA estimates that these standards "protect over 90 percent of the persons within 80 kilometers (km) of these sources at risk levels no higher than approximately 1 in 1 million."

Radionuclide NESHAPs for different source categories

Radionuclides	Standard	Sources	Subpart
All but radon	10 mrem/yr	DOE facilities	H
		NRC-licensed facilities	I (stayed)
Rn-222	20 pCi/m^2-s	DOE facilities	Q
		Phosphogypsum stacks	R
		Uranium mill tailings	T, W
	10 mrem/yr	Underground uranium mines	B
Iodine	3 mrem/yr	NRC-licensed facilities	I (stayed)
Po-210	2 Ci/yr	Elemental phosphorus plants	K

Subpart H — DOE Facilities

The Subpart H standards cover all DOE operations that emit radionuclides other than radon to the air, except for facilities subject to 40 CFR 191 Subpart B (disposal of spent nuclear fuel, high-level, and transuranic radioactive wastes) and 40 CFR 192 (uranium and thorium mill tailings). All DOE "facilities" — all buildings, structures, and operations on one contiguous site — are operating at safe levels of air emissions of radionuclides; nevertheless, they will be required to measure radionuclide emissions rates at stacks or vents and run AIRDOS-EPA/RADRISK (CAP-88), AIRDOS-PC, or other EPA-approved computer codes to demonstrate compliance with the 10 mrem/yr standard. If the maximally exposed individual lives within 3 km of all sources of emissions, the COMPLY model may be used to demonstrate compliance. Radionuclide emissions rates are to be determined in accordance with Section 61.93 of Subpart H, which specifies sampling points, appropriate sampling methods, flow rate determinations, frequency of sampling, analytical methods, and quality assurance procedures, or via other procedures approved by the EPA. Direct measurement of air concentrations of radionuclides at the receptor point is acceptable if the criteria in Section 61.93(b)(5) are met. These criteria include continuous monitoring of released radionuclides, satisfactory detection limits, quality assurance, and prior EPA approval.

DOE facilities are exempt from the CAA reporting requirements of 40 CFR 61.10, which include information and data on facility, emissions levels, and control technology; however, they will be required to submit an annual report to the EPA Regional offices and Headquarters on June 30 of each year. Requirements for these reports are provided in Section 61.94(a) and (b). EH is currently working with the EPA to better define reporting requirements and to minimize redundant or unnecessary reporting. If a DOE facility exceeds the 10 mrem/yr limit, monthly reporting may be required under the criteria set forth in Section 61.94(c).

The requirements are waived for a facility to apply for approval to construct or modify and to notify the EPA of start up if the potential increase in the effective dose equivalent to the maximally exposed individual is 0.1 mrem/yr or less. All new constructions or modifications that qualify for this waiver shall be reported and justified in the annual report for the year in which they are implemented. Section 61.96(c) also notes that conditions for approval granted under 40 CFR 61.08 may not contain requirements for post-approval reporting beyond those required in Section 61.94 (the annual report).

Subpart Q — Radon/DOE Facilities

The Subpart Q standard regulates the design and operation of all storage and disposal facilities for radium-containing material [i.e., byproduct material as defined by Section 11.e(2) of the Atomic Energy Act] that are owned or operated by DOE that emit Rn-222 into the air, excluding those facilities covered under 40 CFR 192. Specifically included in this Subpart are the Feed Materials Production Center, the Niagara Falls Storage Site, the Weldon Spring Site, the Middlesex Interim Storage Site, and the Monticello Mill Tailings Site. The flux standard requires that no source emit more than 20 pCi/m^2-s of Rn-222 to the air. A "source" is defined as any building, structure, pile, impoundment, or area used for interim storage or disposal of waste material containing radium of sufficient concentrations that it can emit radon in excess of the standard prior to control. All facilities covered under Subpart Q are exempt from the reporting requirements of 40 CFR 61.10. Reporting requirements are established on the basis of EPA/DOE agreements. However, independent of the rule and EPA/DOE agreements, DOE will continue to require radon emissions to be reported in the DOE annual environmental reports.

The flux standard of Subpart Q will be part of any Federal Facility Agreements (FFA) reached between the EPA and DOE. Several of the facilities specifically named in the standard have signed or are in the process of signing FFAs with the EPA. The flux standard will be included directly or by reference in these agreements, and the schedules and requirements for disposal and storage of regulated materials will be the basis for compliance with the Subpart Q standards. DOE elements should notify EH-23 to establish or verify procedures for compliance with Subpart Q of 40 CFR 61 when (1) they are responsible for facilities where remedial actions have been completed, (2) residues are currently being stored or have been disposed of, and

(Continued next page)

Radionuclide NESHAPs

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(3) EPA/DOE FFAs are not anticipated in the near-term.

Subpart T — Uranium Mill Tailings

The Subpart T standards for disposal of uranium mill tailings apply to both commercial tailings piles and those sites being remediated by DOE under Title I of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). The standard sets a limit on Rn-222 emissions from a stabilized uranium mill tailings pile or associated disposal site of 20 pCi/m^2-s. All facilities covered by this Subpart are exempt from the reporting requirements under 40 CFR 61.10. Tailings piles must be brought into compliance with the standard within 2 years (December 15, 1991). If the 2-year limit cannot be met, a compliance agreement with the EPA will be required.

Radon flux measurements must be conducted to demonstrate compliance with the standard using procedures specified in 40 CFR 61, Subpart T or using an alternate method approved by the EPA. For existing disposal sites, measurements must be made within 60 days; if such measurements are not physically possible over the 60-day period, then they must be made as soon afterward as is possible. To verify compliance, the EPA must be informed of the delay and plans for future measurement. For sources where alternate procedures are required to verify compliance, EPA approval is necessary. Upon closure of the pile and completion of the flux measurements, the data verifying compliance with the flux standard must be provided to the EPA.

EH should be notified as soon as possible when there is a need to deviate from the EPA requirements and when the need exists for compliance agreements for sites that will not be stabilized in the required 2-year period.

This article was developed from both the final rule of December 15, 1989, and memoranda to field elements from EH-231 dated November 27, 1989, and January 26, 1990. For more information on compliance with the radionuclide NESHAPs, call Andy Wallo, EH-231, at FTS 896-4996.

Waste Information Exchanges

A waste exchange is an operation that transfers information on the availability of or need for waste materials and brings together waste generators and waste users via electronic bulletin boards or by regular published listings of wastes available or sought. The exchanges do not get involved in the contractual arrangements between the waste generator and waste receiver. In dealing with hazardous wastes, DOE, as a generator, would be required to insure that the wastes are properly identified, manifested, and shipped to a permitted off-site treatment, storage, disposal, or recycling facility. If all applicable regulatory requirements are not met, DOE would be potentially liable for non-compliance with RCRA and any environmental damages resulting from improper waste management practices. The following are some waste exchanges in the United States:

CALIFORNIA WASTE EXCHANGE
Robert McCormick
Department of Health Services
Toxic Substances Control Division
714 P Street
Sacramento, CA 95814
(916) 324-1807

*GREAT LAKES REGIONAL WASTE EXCHANGE**
William Stough
470 Market St., SW
Suite 100A
Grand Rapids, MI 49503
(616) 451-8992

INDIANA WASTE EXCHANGE
Shelley Whitcomb
Environmental Quality Control
1220 Waterway Boulevard
P.O. Box 1220
Indianapolis, IN 46206
(317) 634-2142

INDUSTRIAL MATERIAL EXCHANGE SERVICE
Margo Siekerka
P.O. Box 19276
Springfield, IL 62794-9276
(217) 782-0450

INDUSTRIAL MATERIAL RECYCLING PROGRAM
Marion Mudar
New York State Environ. Facilities Corp.
50 Wolf Road
Albany, NY 12205
(518) 457-4138

INDUSTRIAL WASTE INFORMATION EXCHANGE
William E. Payne
New Jersey Chamber of Commerce
5 Commerce Street
Newark, NJ 07102
(201) 623-7070

MONTANA INDUSTRIAL WASTE EXCHANGE
Don Ingles
Montana Chamber of Commerce
P.O. Box 1730
Helena, MT 59624
(406) 442-2405

*NORTHEAST INDUSTRIAL WASTE EXCHANGE**
Lewis M. Cutler
90 Presidential Plaza
Suite 122
Syracuse, NY 13202
(315) 422-6572

SOUTHEAST WASTE EXCHANGE
Mary McDaniel
Urban Institute
UNCC Station
Charlotte, NC 28223
(704) 547-2307

SOUTHERN WASTE INFORMATION EXCHANGE
Roy Herndon
P.O. Box 6487
Florida State University
Institute of Science & Public Affairs
Tallahassee, FL 32313
(904) 644-5516

**Indicates computerized waste exchange*

EPA Revises the Proposed NCP for Consistency with SARA Requirements

The EPA has made significant language changes concerning goals for CERCLA cleanups in several sections of the proposed National Contingency Plan (NCP) which was recently submitted to OMB for review. The new language generally makes the NCP more consistent with CERCLA or reflects emerging policy directions for the EPA. Some of the more significant changes include:

- ❑ The EPA has changed the definitions of acceptable exposures limits for systemic toxicants and known or suspected carcinogens. For systemic toxicants, the new language requires that the acceptable exposure levels incorporate an "adequate margin of safety." For known or suspected carcinogens, the EPA has lowered the upper bound acceptable cancer risk limit by a factor of 10; the acceptable risk range is now 10^{-4} to 10^{-6}. The 10^{-6} risk level will be used as the "point of departure."

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NCP Revisions

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- Language changes in Section 300.430(f)(4) require that "if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after **initiation** [emphasis added] of the selected remedial action." As proposed in the December 21, 1988, NCP, the review had to occur no less often than every five years after **implementation** of the selected remedial action. This new language makes the NCP consistent with CERCLA Section 121(c).

- Another difference between the proposed NCP of December 21, 1988, and the draft final addresses use of Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs) set under the Safe Drinking Water Act (SDWA) in CERCLA water cleanups. Under the original proposal, MCLs were to be considered generally "relevant and appropriate" when determining acceptable exposure levels for groundwater and surface water that is a current or potential source of drinking water. (MCLs are legally enforceable under the SDWA, but apply at the tap, not at the source.) In the OMB submission, MCLGs that are set at levels above zero "shall be attained" by remedial actions for groundwater or surface waters that are current or potential sources of drinking water, where they are "relevant and appropriate under the circumstances of the release." If an MCLG is determined not to be relevant and appropriate, the corresponding MCL "shall be attained" where relevant and appropriate to the circumstances of the release. (MCLGs are not legally enforceable under the SDWA.)

- Section 300.430(e)(2)(C) is new and specifically addresses carcinogens, stating "Where the MCLG for a contaminant has been set at a level of zero, the MCL promulgated under the Safe Drinking Water Act shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCL is relevant and appropriate under the circumstances of the release."

- Section 300.430(e)(2)(E) is new and addresses water quality criteria set under the Clean Water Act, stating that "Water quality criteria [WQC] established under sections 303 or 304 of the Clean Water Act [CWA] shall be attained where relevant and appropriate to the circumstances of the release."

These new requirements (to meet MCLGs when they are non-zero values and CWA WQC) undoubtedly are the EPA's response to comments that the December 21, 1988, proposed NCP did not follow the clear Congressional mandate stated in CERCLA 121(d)(2)(A)(ii): MCLGs and CWA WQC ***are*** applicable or relevant and appropriate requirements (ARARs) for cleanup of groundwater or surface waters. The new draft final NCP better conforms to CERCLA's language.

The policy decision — when MCLGs are zero they are not "appropriate" — reflects the reality that zero is neither a measurable or attainable number, verification would be impossible, and to require an ARAR waiver for technical impracticality at each cleanup site where contaminants have MCLGs of zero would result in needlessly complex and prolonged CERCLA cleanups. The EPA argues that because MCLs are invariably set equal to MCLGs for non-carcinogens, the changes in the draft final rule would have little effect. This is currently the case, but the EPA is under a Congressional mandate to promulgate MCLGs and MCLs for 108 contaminants by 1991 (approximately 38 exist now). Future SDWA rulemakings will need to be monitored by DOE for instances where MCLGs and MCLs are not equal. In those instances, the preamble discussions for why (i.e., cost and feasibility) the EPA sets different values should be noted because arguments for whether MCLGs (or MCLs) are "relevant and appropriate under the circumstances of the release" will be based to a large extent on these discussions.

Overall, the changes in the draft final NCP were apparently unavoidable because of the explicit reference to MCLGs in CERCLA Section 121(d)(2)(A)(ii). The EPA has made an effort to reconcile CERCLA language with their groundwater protection policy and minimize adverse impacts to the CERCLA program. However, an issue that must be resolved at each CERCLA site occurs when MCLGs, MCLs, or WQC are "relevant and appropriate under the circumstances."

Recent EPA Reports of Interest

In the last few months, the EPA has released a number of reports, publications, and guidance documents that may be of interest to the DOE community. Four of these reports come from the Center for Environment Research Information (CERI) in Cincinnati, Ohio. These reports include the following:

- **Solvent Waste Reduction Alternatives**

- **Corrective Action: Technologies and Applications**

- **Guide to Technical Resources for the Design of Land Disposal Facilities**

- **Requirements for Hazardous Waste Landfill Design, Construction, and Closure**

The publication, "Solvent Waste Reduction Alternatives" (EPA/625/4-89/021, September 1989), is based on edited versions of presentations made at a number of EPA Technology Transfer Seminars entitled, "Solvent Waste Reduction Alternatives," which were given throughout the United States in 1988. Topics addressed in the publication include an overview of the RCRA Land Disposal Restrictions (LDR), Title III SARA reporting requirements, waste minimization liability issues, and regulations affecting the incineration of solvent wastes. Specific solvent waste issues addressed include waste minimization in process equipment and parts cleaning and solvent waste minimization by the coatings industry and chlorinated solvent users. The report also includes chapters covering on-site reuse and recycle of solvents, commercial off-site reclamation, and the treatment of solvent-containing wastewaters.

The publication, "Corrective Action: Technologies and Applications" (EPA/625/4-89/020, September 1989), contains edited versions of materials presented at five seminars describing the EPA's RCRA Corrective Action Program that were held in the spring and summer of 1988. The publication provides information on the identification, selection, and application of technologies suitable for controlling and treating releases of hazardous wastes or their constituents from RCRA treatment, storage, and disposal facilities. Applications of the technologies are presented, and factors to consider when implementing corrective measures at operating facilities are reviewed.

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EPA Reports of Interest

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Subtitle C of RCRA, as amended by HSWA, establishes minimum technological requirements for landfills and surface impoundments to ensure that land disposal of hazardous waste in these units is conducted in a manner that is protective of human health and the environment. The EPA has issued a number of documents that provide extensive detail on specific technical subjects related to the design and operation of land disposal facilities or provide broad guidance on RCRA permitting issues. The "Guide to Technical Resources for the Design of Land Disposal Facilities" (EPA/625/6-88/018) is intended to direct RCRA permit applicants and permit application reviewers to both EPA and non-EPA documents that may be helpful in answering specific technical questions (The guide itself contains limited information). Topics included in the guide address the key performance standards and minimum technology requirements specified in 40 CFR 264, including foundations (Chapter 2), dike integrity and slope stability (Chapter 3), liner systems (Chapter 4), cover systems (Chapter 5), and run-on/run-off controls (Chapter 6).

The publication, "Requirements for Hazardous Waste Landfill Design, Construction, and Closure" (EPA/625/4-89/022), outlines in detail the provisions of the minimum technology guidance and proposed regulations and offers practical and detailed information on the construction of hazardous waste facilities that comply with these requirements. However, it is not a design manual nor does it include all of the latest knowledge concerning hazardous waste landfill design and construction. Chapter 1 provides a broad overview of the minimum technology requirements of HSWA. Chapter 2 describes the use of clay liners in landfills, including the selection and testing of materials for the clay component of double liner systems. Chapter 3 discusses materials and design considerations for flexible membrane liners and the impact of proposed regulations on these considerations. Chapter 4 provides an overview of leachate collection and removal systems and secondary leak detection, collection, and removal systems. Chapter 5 discusses elements of closure of the landfill, including flexible membrane caps, surface water collection and removal systems, gas control layers, biotic barriers, and vegetative top covers. Chapters 6 and 7 cover construction, quality assurance, and control criteria for clay liners and flexible membrane liners, respectively. Chapter 8 discusses the chemical compatibility of geosynthetic and natural liner materials with waste leachates. Chapter 9 presents an overview of long-term considerations, including liner durability, failure of liquid management systems, and aesthetic concerns. Finally, Chapter 10 reviews proposed requirements for response action plans for leaks in hazardous waste landfills.

These four publications (1) Solvent Waste Reduction Alternatives; (2) Corrective Action: Technology and Applications; (3) Guide to Technical Resources for the Design of Land Disposal Facilities; and (4) Requirements for Hazardous Waste Landfill Design, Construction, and Closure Seminar Publication are all available through the Center for Environment Research Information (CERI), U.S. Environmental Protection Agency, 26 W. Martin Luther King Drive (MS G-72), Cincinnati, Ohio 45268, FTS 684-7562 or (513) 569-7562.

Recent reports and publications available from other EPA offices include the following:

❑ **Waste Minimization in Metals Parts Cleaning**

Parts cleaning is an important process for a large variety of organizations involved in the manufacture, repair, and maintenance of parts and equipment. Parts cleaning operations often result in significant air emissions, wastewater discharges, and generation of hazardous wastes. HSWA established a national policy which states that such hazardous wastes are to be reduced or eliminated as expeditiously as possible. The booklet, "Waste Minimization in Metals Parts Cleaning" (EPA/530-SW-89-049, August 1989), was prepared by the EPA to provide waste minimization options to facilities with parts cleaning operations. The booklet is organized as follows. The introduction covers basic definitions and concepts of waste minimization and outlines incentives for minimizing waste. In Section Two a general strategy and an approach to applying this strategy to parts cleaning operations is presented. Section Three offers waste minimization options in solvent cleaning, aqueous-based cleaning, and abrasive cleaning applications. A discussion of options implementation is next, followed by conclusions, waste minimization information sources, and a bibliography.

The booklet, "Waste Minimization in Metals Parts Cleaning," is available from the Office of Solid Waste and Emergency Response (OSWER), U.S. Environmental Protection Agency, Washington, D.C. 20460, (202) 382-4807.

❑ **Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference**

This report (EPA/600/3-89/013, March 1989) gives guidance on designing, implementing, and interpreting ecological assessments of hazardous waste sites. Although the methods presented are not specifically required by regulation, they provide a reasonable basis for assessing the adverse ecological effects of hazardous waste sites within a time frame of 12 to 18 months. The report's nine chapters address: (1) definition of an ecological assessment, (2) evaluation and selection of appropriate end points, (3) strategies and approaches, (4) field sampling designs, (5) quality assurance and control, (6) recommended aquatic and terrestrial toxicity tests, (7) biomarkers, (8) aquatic and terrestrial field survey methods, and (9) data analysis and interpretation.

The report, "Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference," is available from the Environmental Protection Agency, Environmental Research Laboratory, Corvallis, Oregon 97333, FTS 420-4601.

DOE "Environmental Hotline" Established

The DOE Office of the Inspector General (IG) and the Office of the Assistant Secretary for Environment, Safety and Health (ES&H) have announced the establishment of an interim Environmental Hotline that will operate 24 hours a day. The hotline provides the opportunity to report environmental, safety, or health concerns that employees might have regarding DOE operations.

Normally such concerns should be reported through regular channels of communication; however, if for any reason, it is believed that such concerns will not or cannot be addressed properly through organizational channels, employees may report the matter through the hotline. Hotline operators in the IG's office will immediately refer employee concerns to ES&H, who will review such concerns to determine appropriate disposition of the matter.

The toll-free commercial telephone number for the Environmental Hotline is 1-800-541-1625 outside of the metropolitan Washington, D.C. area or 586-4073 for DOE employees within the metropolitan Washington area.

Upcoming Meetings, Seminars & Courses

WORKER PROTECTION STANDARDS: HAZARDOUS WASTE OPERATIONS & EMERGENCY RESPONSE

March 1, 1990
Denver, CO
Radisson Hotel

March 22, 1990
Atlanta, GA
Atlanta Hilton

April 19, 1990
Philadelphia, PA
Wyndham Franklin Plaza

May 10, 1990
St. Louis, MO
Adam's Mark

June 21, 1990
Dallas, TX
Stouffer Dallas

July 24, 1990
Boston/Cambridge, MA
Royal Sonesta Hotel

Contact:
Ms. Vickie Santoro
EPA, MS-101
Woodbridge Ave., Building 18
Edison, NJ 08837

COMMUNITY RELATIONS IN SUPERFUND: CONCEPTS AND SKILLS FOR RESPONSE STAFF

March 7-8, 1990
Chicago, IL

Contact:
Toni Lessor, EPA Region V
FTS 886-6685 or
Denise Reape, EPA Region V
FTS 353-8987

March 14-15, 1990
Dallas, TX

Contact:
Ellen Greeney, EPA Region VI
FTS 255-2240

March 21-22, 1990
Philadelphia, PA

Contact:
Donna Sutsko, EPA Region III
FTS 597-1166

The course covers concepts and skills to use when working with citizens, local elected officials, media, PRPs, and other members of the public. These skills can be useful in holding public meetings, building good media relations, and conflict management.

REPORTING RELEASES OF HAZARDOUS SUBSTANCES

March 23, 1990
Atlanta, GA
Atlanta Hilton and Towers

Contact:
EPA, OSWER, (202) 475-9814

Topics include: types of releases to be reported under CERCLA, civil and criminal penalties for not reporting, and "federally permitted releases."

16TH ANNUAL HAZARDOUS WASTE RESEARCH SYMPOSIUM — REMEDIAL ACTION, TREATMENT, & DISPOSAL OF HAZARDOUS WASTE

April 3-5, 1990
Cincinnati, OH

Contact:
JACA Corporation
Kathleen Kelly
550 Pinetown Road
Fort Washington, PA 19034
(215) 643-5466

ENVIRONMENT '90

March 6-7, 1990
Milwaukee, WI

Contact:
Triese Haase, Administrator
Federation of Environmental Technologists, Inc.
Post Office Box 185
Milwaukee, WI 53201
(414) 251-8163

HAZARDOUS WASTE SITE SUPERVISOR COURSE

March 10, 1990
Hartford, CT

Contact:
Mary Firestone
Work Environment Laboratory
University of Lowell
Lowell, MA 01854
(508) 934-3257

INTERNATIONAL CONFERENCE FOR HIGH-LEVEL RADIOACTIVE WASTE MANAGEMENT

April 8-12, 1990
Las Vegas, NV

Contact:
Dean William Wells
Howard Hughes College of Engineering
UNLV, Las Vegas
(202) 739-3699

RCRA MIXED WASTE TRAINING COURSE — SESSION II

March 6-8, 1990
Chicago, IL

Contact:
Kathy Ackley, ICF Inc.
(703) 934-3293 or
Rich LaShier, OSW, EPA
FTS 382-2228

Topics covered include: overview of mixed waste regulations, introduction to basic radiation and health physics, the potential mixed waste universe, inspections and on-site activities, and permitting mixed waste facilities. The course will include presentations, a panel discussion, a case study, a site visit to a nearby mixed waste management facility, and most important, an opportunity to discuss significant issues concerning the management of mixed waste under RCRA regulations.

HAZARDOUS MATERIALS MANAGEMENT CONFERENCE & EXHIBITION

March 13-15, 1990
Resemont, IL

Contact:
Tower Conference Management Company
800 Roosevelt Road, Building E
Suite 408
Glen Ellyn, IL 60137-5835
(708) 469-3373

4TH ANNUAL CONFERENCE & EXHIBITION ON UNDERGROUND STORAGE TANK MANAGEMENT & HYDROCARBON CONTAMINATION CLEANUP

April 10-11, 1990
Sturbridge, MA

Contact:
Resource Education Institute, Inc.
60 Thoreau Street, Suite 210
Concord, MA 01742
(508) 369-3590

1990 HAZARDOUS MATERIALS SPILLS CONFERENCE

May 13-17, 1990
Houston, TX — Houston Hyatt Regency

Contact:
EPA, OSWER, (202) 475-9814

Topics include: spill prevention preparedness and response, early detection and mitigation, reporting requirements, and case histories.

(Continued on page 14)

From the federal register

October 26, 1989
54 FR 43716

The EPA reconsidered approaches to the ***burning of RCRA hazardous wastes*** in boilers and furnaces, including amending incinerator standards to make them consistent with the boiler standards proposed on 5/6/87.

54 FR 43778

The EPA proposed the ***10th update to the CERCLA National Priorities List*** (NPL). The proposal includes adding 23 non-federal and two federal (non-DOE) sites.

October 31, 1989
54 FR 46011

The EPA issued a proposed policy on ***indemnification*** of Superfund response contractors at NPL sites.

November 21, 1989
54 FR 48184

The EPA issued a CERCLA final rule, effective 12/21/89, adding two non-federal and ***27 federal sites to the NPL***. DOE sites included: Feed Materials Production Center, Bonneville Power Administration Ross Complex, Idaho National Engineering Laboratory, Oak Ridge Reservation, Savannah River Site, Brookhaven National Laboratory, Monticello Mill Tailings Site, and Mound Plant.

November 22, 1989
54 FR 48299

The EPA granted final ***authorization to Wisconsin's*** revision of its RCRA program, subject to review and comment (effective 1/22/90).

54 FR 48372

The EPA proposed ***RCRA Land Disposal Restrictions for the Third Third wastes***, including treatment standards, prohibition effective dates, and Underground Injection Control (UIC) effective dates. The EPA also proposed interpretations of the following issues: the dilution prohibition, Bevill Amendment wastes, the applicability of California list prohibitions to wastes receiving national capacity variances and newly listed wastes, and commercial chemicals that are hazardous wastes when discarded. Mixed radioactive and hazardous wastes were granted a two-year capacity variance.

November 24, 1989
54 FR 48608

The EPA approved ***final authorization for revisions to Michigan's RCRA program,*** subject to review and comment (effective 1/23/90).

November 28, 1989
54 FR 48889

The EPA granted ***final RCRA authorization to Louisiana*** for revisions to its hazardous waste program, subject to review and comment (effective 1/29/90).

December 1, 1989
54 FR 49948

The EPA issued a final CERCLA rule (proposed 4/21/89) that added nine chemicals to the list of toxic chemicals under ***Sect. 313 of Title III of SARA***. The rule was effective 12/1/89.

December 12, 1989
54 FR 51070

The EPA entered into cooperative agreements with California, Connecticut, Illinois, Minnesota, New Jersey, and Washington to participate in a ***pollution prevention research program,*** entitled "Waste Reduction Innovative Technology Evaluation."

54 FR 51033

The Nuclear Regulatory Commission announced ***availability of "Guidance on the Application of Quality Assurance for Characterizing a Low-Level Radioactive Waste Disposal Site,"*** NUREG-1383, to help meet the quality assurance requirements of 10 CFR 61.

December 15, 1989
54 FR 51472

The EPA published the second update of the CERCLA ***Federal Agency Hazardous Waste Compliance Docket.*** A number of DOE facilities are listed. These facilities must initiate a Preliminary Assessment/Site Inspection and will be scored, using the HRS model, for possible NPL listing.

54 FR 51654

The EPA issued an immediately effective Clean Air Act final rule on National Emissions Standards for Hazardous Air Pollutants ***(NESHAPs) for radionuclides.*** Source categories included DOE facilities.

December 21, 1989
54 FR 52716

The EPA issued a Toxic Substances Control Act (TSCA) final rule, effective 1/4/90, amending its ***disposal and storage regulations for PCBs.***

December 22, 1989
54 FR 52800

The EPA granted ***final and interim authorizations to Idaho for its RCRA and HSWA programs,*** respectively, subject to review and comment.

January 3, 1990
55 FR 222

The EPA issued a TSCA final rule (proposed 3/29/88) that ***prohibits the use of hexavalent chromium-based water treatment chemicals*** in comfort cooling towers. The rule is effective 5/18/90.

January 9, 1990
55 FR 835

The President issued Executive Order 12699 which addresses ***earthquake safety*** of new federal buildings and federally leased, assisted, or regulated buildings.

January 26, 1990
55 FR 2776

The Department of Labor proposed a new Occupational Safety and Health Administration (OSHA) rule that contains ***accreditation procedures for hazardous waste operation training programs.*** SARA requires that these procedures be no less comprehensive than those of the EPA under the Asbestos Hazard Emergency Response Act of 1986. The new rule would supplement the final rule of 3/6/89.

55 FR 2796

DOE proposed to amend the ***DOE acquisition regulation regarding its contracting practices*** in its M&O contracts in order to clarify responsibilities and provide additional incentives for improved accountability of contractors, especially in the areas of environment, safety, and health. The proposal only covered profit and fee contractors.

DOE's Natural Resource Trusteeship Responsibilities Under CERCLA

CERCLA establishes a dual role for DOE with regard to natural resources occurring on DOE sites. Section 107(a) establishes liabilities for residual damages to natural resources — including land, fish, wildlife, biota, air, water, groundwater, and drinking water — from releases of hazardous substances to the environment. Section 120 of CERCLA says that federal facilities (e.g., DOE facilities) have the same liability for damages to natural resources as do private parties. On the other hand, Executive Order 12580 made the Secretary of Energy a federal trustee for natural resources occurring on DOE sites. This responsibility can be shared with other federal or state co-trustees (e.g., migratory birds with U.S. Department of Interior and groundwater and state-listed endangered species with the state).

Natural resources trusteeship carries with it certain obligations. Under CERCLA Sects. 104(b), 113(k), and 120; the National Contingency Plan (NCP); and E.O. 12580, when DOE facilities potentially threaten natural resources, DOE must: (1) notify cognizant trustees; (2) coordinate plans, studies, and responses with co-trustees; and (3) place correspondence with co-trustees in the administrative record. "Tiger Teams" have discovered incomplete compliance with CERCLA natural resources notification and administrative record requirements at some DOE facilities.

Ecological assessments performed during an RI/FS can help determine whether natural resources have been damaged or injured on-site so that appropriate response actions can be performed. Co-trustees are authorized to release DOE from its natural resource liability based on the remedy taken, or they can perform a Natural Resource Damage Assessment (NRDA) (43 CFR 11). If damages occur off-site, DOE has potential liability to other trustees, who may perform an NRDA or can agree to release DOE from its liability if appropriate response actions are performed. Without a release from liability, DOE may have to set up an interest-bearing account to pay for restorative actions. In addition, trustees must recover adequate public compensation and are subject to citizen suits for failure to do so. Federal trustees cannot sue DOE; however, states and Indian tribes can, and they may also seek to recover reasonable costs of assessing damages. Natural resources trustees may develop unique methods to perform NRDAs, but adherence to procedures codified at 43 CFR 11 confers "rebuttable presumption" status (i.e., challengers have burden of proof) on damage claims in judicial or administrative proceedings.

The potential for natural resource damage liability costs to increase is a growing concern. A recent U.S. Appeals Court (in Ohio vs Department of Interior) ruled unfavorably on limiting the extent of damage claims for entities with CERCLA natural resources liability. In addition, expected changes to 43 CFR 11 include expanding the scope of states' natural resources claims for restoration costs. This expansion could result in even more costly settlements.

To reduce costs, the participation of states which are cognizant co-trustees in negotiations of DOE settlements would be beneficial. Interagency Agreements (IAGs) and/or Federal Facility Agreements (FFAs) should address (1) the trustee roles of DOE and the state, (2) the framework for assessing natural resource damages, and (3) conditions that enable state trustees to release DOE from liability. Separate liability releases should be sought from co-trustees who are not signatories to an IAG or FFA.

DOE Order 5400.4 establishes that DOE will implement NRDA procedures and that EH-1 has responsibility to develop policies, guidelines, requirements, and procedures for the NRDA process. EH-231 is currently preparing a guidance memorandum for Program and Field elements for implementing the natural resources trustee notification and coordination provisions of CERCLA and the NCP's response action requirements to remediate natural resources.

This article is based on a memorandum dated December 15, 1989, from EH-231 to Program and Field elements. Questions concerning natural resources trusteeship should be referred to John Bascietto, EH-231, FTS 896-7917.

Can't See the Forest for the Trees?

The Office of Environmental Guidance and Compliance Can Help You!

Office of Environmental Guidance and Compliance, EH-23

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Environmental Guidance Division, EH-231

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Bill Fortune	RCRA	896-7302
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Frank Russo	NMC Unit Leader**	896-7882
Jean Schumann	Albuquerque	896-7769
Mark Stahr	San Francisco	896-7879
Marilyn Stone	LLNL	896-5942
Steve Woodbury	Chicago	896-4371

* *MAC = Military Applications Compliance*
** *NMC = Nuclear Materials Compliance*

EPA Evaluates Innovative Cleanup Technologies

In a recently released EPA report, ***The Superfund Innovative Technology Evaluation Program: Technology Profiles*** (EPA/540/5-89/013), 52 demonstration and emerging hazardous waste treatment technologies are profiled. The report, which was prepared by the Risk Reduction Engineering Laboratory, Cincinnati, Ohio, is a product of the Superfund Innovative Technology Evaluation (SITE) Program, now in its fourth year. The focus of the SITE Program is to direct and evaluate research into cleanup methods for hazardous waste sites. This mission is carried out through cooperative agreements between the EPA and technology developers. Alternative or innovative technologies are refined at both the bench- and pilot-scale levels and demonstrated at actual sites. The profiles presented in the EPA report describe the technology, discuss its applicability to different types of wastes, update its development status, and make available any demonstration results. The report is intended for EPA Regional decision-makers but may be of interest to DOE and DOE contractors involved in remedial action activities.

The 119-page report begins with a description of the SITE Program and its components and lists the 12 completed site demonstrations as of November 1989. These listings include developer, technology, site location, visitor day, reports, EPA Regional contact, and Site Program component contact. These are followed by a list of SITE Demonstration Program participants, which includes developers, technology, contact, EPA project manager, waste media, and applicability to inorganic or organic wastes. Finally, the 52 technology profiles are presented as a series of two-page summaries. Each profile includes a diagram or photograph of the technology, a brief description, its waste applicability, status, demonstration results and analysis, and contact persons for further information. Technologies include various oxidation and extraction techniques, soil washing, solidification techniques (including *in situ* vitrification), biological methods, and exotic decontamination/destruction techniques.

The Superfund Innovative Technology Evaluation Program: Technology Profiles report is available from the U.S. Environmental Protection Agency, Risk Reduction Engineering Laboratory, Office of Research and Development, 26 W. Martin Luther King Drive, Cincinnati, OH 45268. For additional information on SITE call the RCRA/CERCLA Hotline 1-800-424-9346 or (202) 382-3000.

"Right-to-Know" Thresholds to Stay at 10,000 Pounds

The Environmental Manager (December 1989, page 11) reported that chemical reporting thresholds under the Emergency Planning and Community Right-To-Know Act of 1986 will remain at the present levels of 10,000 pounds for CERCLA "hazardous" substances (40 CFR 302) and 5,000 pounds for CERCLA "extremely hazardous" substances (40 CFR 355). The report indicated that the EPA Administrator Reilly has signed an interim final rule that will keep reporting thresholds at present levels. Originally, the EPA promulgated zero thresholds to become effective in the third year of reporting, but the present levels will be retained until a final rule is promulgated.

EH Guidance Memos To Be Available on WIN

Full text of guidance and compliance memoranda generated by EH offices from 1985 to the present will soon be made available on the DOE's Waste Information Network (WIN). WIN is a computer network operated by Oak Ridge National Laboratory's Hazardous Waste Remedial Action Program (HAZWRAP). The EH guidance memos contain information on environmental and regulatory matters of interest to DOE and DOE contractors. Subject categories include both RCRA and CERCLA. The memos may be retrieved by key words and downloaded to user's systems. ***Questions about the contents of the bulletin board may be directed to Thomas Traceski, EH-231, FTS 896-2481. Questions about HAZWRAP's WIN systems may be directed to Mary Phillips, HAZWRAP, (615) 435-3180.***

EPA Characterizes Hazardous Waste Generation and Management in the U.S.

In a recent report, the EPA characterized hazardous waste generation and management in the United States. The report, "1985 National Biennial Report of Hazardous Waste Generators and Treatment, Storage and Disposal Facilities Regulated Under RCRA Volume I: Summary" (EPA/530-SW-89-033A, March 1989), is the first of a two-volume set that presents data gathered by the EPA for the 1985 Biennial Report on RCRA-regulated hazardous waste generation and management activities in the United States. Volume I provides a regional- and national-level summary and analysis of the information gathered, and Volume II details the methodology used to analyze the data and provides the data by state.

The summary report states that a total of 21,740 hazardous waste generators reported production of 271.0 million tons in 1985. EPA Region IV led all others in hazardous waste generation with 95,519 million tons (35.2%), followed by Regions III (25.5%) and VI (20.0%); together these three accounted for 80.7 percent of the Nation's total. EPA Regions I, VII, VIII, and X, on the other hand, were responsible for generating only 1.6 percent of the Nation's total. The top 50 generators in 1985 accounted for roughly 80 percent of the total hazardous waste generated, and the top 100 generators accounted for 87 percent.

The total number of hazardous waste management facilities that reported was 4,944. Of these, 2,801 or 56.7 percent used container storage as a handling method; 1,089 facilities (22%) used tank storage. Fifty-nine percent of these facilities reported that they managed only on-site generated wastes. Twenty percent claimed to manage only off-site generated hazardous wastes. Roughly the same number reported managing both on-site and off-site generated hazardous wastes.

Five major RCRA hazardous waste streams accounted for 86 percent of the total wastes reported. These five waste streams and their percentages of the total generated are as follows: (1) corrosive waste (D002) at 42.1 percent; (2) mixtures, general (MOMX) at 31.9 percent; (3) mixtures, characteristic (DOMX) at 6.2 percent; (4) chromium waste (D007) at 3.3 percent; and (5) mixtures, listed industrial (KOMX) at 2.5 percent.

The EPA employed a number of statistical and modeling methods, including a mass-balance approach, to verify and assure the quality of the data reported. However, because of resource constraints, problems in collecting the data, state differences in reporting methods, and missing data for some facilities, the quality of the data is limited with respect to smaller facilities. Higher confidence is afforded data from large facilities and the aggregate results for the EPA Regions and the nation.

The reports, "1985 National Biennial Report of Hazardous Waste Generators and Treatment, Storage and Disposal Facilities Regulated Under RCRA" (Volumes I and II), are available from the Environmental Protection Agency, Office of Solid Waste, Washington, D.C. 20460, (202) 382-6972.

Third Third LDR Proposal

(Continued from page 2)

allowed to rely on EP results after the TCLP rule is finalized and recommended that the TCLP effective date provide sufficient time to allow for additional testing of DOE wastes.

❑ **DOE supported the establishment of a radioactive lead solids subcategory.**

DOE manages the disposal of large pieces of waste equipment containing elemental lead that served a biological or instrument shielding purpose. These pieces of equipment can be highly radioactive, and retrieval of the lead is not practicable because of potential worker exposures and sometimes equipment configuration. DOE requested further clarification on the definition of "radioactive lead solids".

❑ **DOE requested clarification of the term "encapsulation" and whether encapsulation of radioactive lead solids with epoxies or coatings, within packages that exceed Class C packaging requirements, and within stainless steel containers would meet the proposed standard.**

It was suggested that encapsulation standards be developed on a case-by-case basis.

❑ **DOE asserted that the applicability of the LDR to "lead shielding of radioactive waste packages" intended for disposal requires clarification.**

These materials include reactor compartments from deactivated nuclear submarines, and the lead is completely encapsulated behind or within the metal of the submarine hull and structure.

❑ **DOE suggested that in addition to amalgamation with zinc, amalgamation with gold be included as a method of treatment for "elemental mercury wastes contaminated with radioactive materials".**

This alternate method is necessary due to process requirements for tritium production and provides decreases in air emissions, mobility, and potential leachability of the liquid mercury (similar to zinc amalgamation).

❑ **For multisource leachate, DOE requested clarification on whether LDR treatment standards should be applied to soil and groundwater contaminated by leachate considering the EPA notice of October 10, 1989 (54 FR 41566).**

This issue was raised in a recent EPA supplemental notice addressing the applicability of the LDR to CERCLA response actions. In the notice, the EPA proposed to allow the temporary evacuation, treatment, and redeposition of contaminated soils without the action being considered "land disposal" and suggested that this interpretation could be expanded to RCRA corrective actions as well as closures. A separate treatability group was suggested to provide flexibility in selection of remediation techniques due to the variability of contaminated soil and groundwater.

❑ **DOE supported the two-year national capacity variance for First, Second, and Third Third RMW, including contaminated soil and debris.**

However, it is likely that many DOE facilities will need to apply for additional case-by-case extensions to the effective date. The comments indicated that because of budgeting, R&D, design, and construction requirements, it will be several years before adequate RMW treatment capacity is available throughout the DOE complex.

❑ **DOE disagreed with the establishment of treatment standards for characteristic wastes below the characteristic levels.**

Such a proposal is contrary to the intent of Congress, is beyond the EPA's statutory authority, and is incongruous with RCRA's historic foundation. Requiring treatment below characteristic levels undermines public confidence that toxicity characteristic levels are set at values protective of human health and the environment. It was pointed out that consideration also must be given to limiting potential radiation exposures during treatment and disposal of RMW. Under the Atomic Energy Act (AEA) and under EPA guidance on radiation protection, DOE cannot incur radiation doses to workers to treat wastes unless the benefits of that treatment outweigh the radiation doses incurred. DOE indicated its concerns that treatment of characteristic RMW below characteristic levels provides only minimal and speculative benefits, while imposing potentially unavoidable radiation exposures. DOE stressed that this is unacceptable and recommended establishing treatment standards for characteristic wastes at the characteristic levels.

❑ **For wastes both listed and exhibiting more than one characteristic, DOE requested the option to choose the technology or technologies that address the treatment standard for the listed waste, as long as the technology would also remove the waste's characteristic trait.**

For these wastes, the EPA proposed treatment for each waste code and to meet the standard for each characteristic. DOE felt that wastes should be treated in a manner that addresses all hazardous waste codes but is concerned that, in some cases, more than one technology may be required, and that, in isolated cases, such technologies may be conflicting.

❑ **DOE requested that the EPA evaluate the establishment of a separate waste treatability group or waste code specific to high-level RMW.**

For the high-level radioactive process waste fractions, DOE requested that the EPA establish vitrification as the treatment standard. Furthermore, DOE requested that the following specified technologies be established as the treatment standards for the low-level radioactive process waste fractions: incineration for organic wastes; solidification for supernate solution and salts; and recycling for mercury.

❑ **DOE asked for clarification of permissible vs impermissible dilution.**

Many DOE processes generate wastes with extreme pH values that require neutralization to pH levels that render them nonhazardous through mixing or dilution in plant wastewater collection systems. Requiring DOE to further adjust the pH of blended radioactive effluents would impose significant RCRA-based burdens on materials that are not RCRA hazardous wastes. In some cases, risks would be increased (due to radiation exposures) rather than reduced.

❑ **DOE urged the EPA to allow long-term storage when treatment capability and capacity are not available but are being developed. In such instances, storage is necessary during the funding, construction, and permitting of proper recovery, treatment, or disposal capacity.**

Storage of LDR hazardous wastes is prohibited "unless such storage is solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment or disposal." Suggested regulatory language changes were included in this comment. DOE has a significant amount of RMW that is or will be land disposal restricted. Until adequate treatment and disposal capacity becomes available, storage of these wastes is a necessary part of the proper management of

(Continued next page)

Third Third LDR Proposal

(Continued from previous page)

RMW. Although some treatment capability is available, treatment technology is still under development for a large quantity of these wastes. Due to state-imposed limitations or restrictions on the acceptance of out-of-state RMW, capacity will need to be developed on-site at a number of facilities. Complicating the situation further, funding for R&D, design, and construction of such facilities and for permitting these facilities may take several years or more. Therefore, long-term storage (more than two years) will, in many instances, be necessary before adequate treatment capacity is developed. When HSWA was being drafted by Congress, it was not clear as to whether RMW was subject to RCRA regulations. Hence, DOE believes that the time lines regarding storage established by Congress did not consider the long-term storage that would be required in order to develop sufficient capacity for RMW under the federal budgetary process.

The Third Third proposed rule is expected to become final by May of 1990. Questions concerning the impact of the proposed rule on DOE and DOE efforts to provide information on RMW to the EPA should be directed to Thomas Traceski, EH-231, FTS 896-2481.

PLEASE SEND US YOUR COMMENTS, ARTICLES, & PHOTOS!

If you think this report is informative; if you have any suggestions to make future reports more helpful; or if you would like to contribute articles, photographs, or other information for possible publication, we would like to hear from you. Please send your comments, suggestions, and materials to:

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The Management of Groundwater as RCRA Hazardous Waste

Remedial action managers often face the issue of how to manage groundwater contaminated with hazardous wastes. Is contaminated groundwater a hazardous waste or not? According to the EPA's Office of Solid Waste (OSW), *groundwater occurring in* an aquifer does not meet the definition of a RCRA solid waste because it is not "discarded" in the sense of being abandoned, recycled, or inherently waste-like. If it is not a RCRA solid waste, then it cannot be a Subtitle C hazardous waste. Nevertheless, groundwater contaminated with leachate from a RCRA hazardous waste *is* subject to Subtitle C regulation because it contains a hazardous waste, and the mixture rule applies ("contained-in policy"). Thus, the storage, treatment, and disposal of groundwater contaminated with RCRA hazardous waste leachate must be conducted *as if the groundwater itself were hazardous.*

This EPA policy ("contained-in" interpretation) is based on a memorandum from the Director of the Office of Solid Waste (OSW) to Region IV of the EPA entitled, "RCRA Regulatory Status of Contaminated Groundwater," November 13, 1986. Under this "contained-in" interpretation, if the water is treated such that it *no longer contains* a hazardous waste, then the groundwater is no longer subject to regulation under Subtitle C of RCRA, and a delisting petition is not required.

Although RCRA does not recognize a *de minimis* level for listed hazardous wastes, the EPA considers groundwater not to contain hazardous wastes when listed contaminants are below the health-based threshold action levels for the particular hazardous waste. OSW has not yet issued definitive guidance in this matter, and EPA Regional Offices are allowed to determine these levels on a case-by-case basis. For groundwater contaminated with characteristic hazardous wastes, the EPA considers that it no longer contains hazardous wastes when the characteristic is no longer exhibited.

While this "contained-in" policy is not a regulation, it nevertheless carries significant weight. When considering a groundwater remediation project, a determination of the status of any contaminated groundwater should be investigated through consultations with the Regional EPA office.

The effect of this EPA policy is that all untreated contaminated groundwater pumped to the surface, except for samples collected for chemical analysis and/or for use in treatability studies, will have to be managed as if it were RCRA hazardous waste. RCRA requirements pertaining to or impacting the management of contaminated groundwater include the land disposal restrictions (LDR), the monitoring and response requirements of 40 CFR 264 Subpart F, and the new corrective action regulations 40 CFR 264 Subpart S, which are expected to be proposed early this year. Once treated to levels below health-based limits or action levels, the groundwater is no longer required to be managed as hazardous waste. Treated groundwater discharged to surface water must satisfy the requirements of a National Pollutant Elimination System (NPDES) permit. Treatment residues, including spent carbon and ion exchange resins that contain listed hazardous constituents, would have to be managed as RCRA hazardous waste because of the "derived-from" rule.

In a policy statement (OSWER Directive #9234.1-06, December 27, 1989) the EPA announced that operations which pump groundwater to the surface, treat, and reinject back into the aquifer will not be subject to the RCRA LDR as long as three conditions are met: (1) the injection is a CERCLA response action or a RCRA corrective action, (2) the contaminated groundwater must be treated to substantially reduce hazardous constituents prior to such injection, and (3) the response action or corrective action must be sufficient to protect human health and the environment upon completion. The driving force for this action was a letter from the Justice Department to the EPA requesting clarification of the issue of the applicability of the LDR to reinjection of treated groundwater at the Rocky Mountain Arsenal. Wells used in pump and treat operations are defined as Class IV wells under the Safe Drinking Water Act (for injection of contaminants into or above a formation containing an underground source of drinking water); their operation is prohibited unless injections are part of either CERCLA remedial or RCRA corrective actions. OSW is currently working on guidance to define "substantially reduce" hazardous constituents prior to reinjection during CERCLA response actions or RCRA corrective actions.

This article was developed from a memorandum, dated December 15, 1989, from EH-231 to Program Offices and Field elements. EH-231 is currently developing guidance on this topic. Questions regarding the handling of contaminated groundwater, issues raised in this article, or the forthcoming guidance should be referred to Jerry Coalgate, EH-231, FTS 896-6075.

SITE Concludes Third Year

In 1986, the EPA's Office of Solid Waste and Emergency Response and Office of Research and Development established the Superfund Innovative Technology Evaluation (SITE) Program to promote the development and use of innovative technologies to meet the new CERCLA cleanup standards mandated by SARA. SITE is composed of three related programs — Demonstration, Emerging Technologies, and Monitoring and Measurement Technologies — and is now ending its third year *(see related story, page 10)*.

Since 1987, the EPA has conducted 13 demonstrations and published nine reports on six of them. Thirty-eight technology developers, including 11 accepted in 1989 for 12 technologies, are now active in the Demonstration Program. "Innovative technologies" — those fully developed but lacking complete cost and performance data — include thermal treatment, bioremediation, soil washing, solvent extraction, and *in-situ* stripping. The Each January in the ***Commerce Business Daily*** (CBD) the EPA solicits innovative technology proposals. To be accepted, the technology must be at pilot- or field-scale and offer some advantage over existing technologies. Mobile technologies are of particular interest to the EPA.

The Emerging Technologies Program has eight participants for a total of 15 bench- and pilot-scale technologies. "Emerging technologies" — technologies with limited testing but insufficient documentation for evaluation of technical viability — include constructed wetlands, electroacoustics, and laser methods for Superfund applications. The Emerging Technologies Program provides two years of funding (up to $150,000/yr) to developers. Each July the EPA advertises in the CBD and trade journals for submission of proposals.

The Monitoring and Measurement Program began with two demonstrations in 1989, and more are planned for 1990. The EPA has just concluded a symposium and soon will issue several reports on the program. ***For further information on the Monitoring and Measurement Technology Program contact Eric Koglin, U.S. EPA, EMSL-LV, P.O. Box 93478, Las Vegas, NV 89193-3478, (702) 798-7432. For additional information on the SITE Program contact the RCRA/CERCLA Hotline, 1-800-424-9346 or (202) 382-3000. To be placed on the SITE Program mailing list, send your name and address to Dorothy Williams, U.S. EPA/CERI, 26 W. Martin Luther King Drive, Cincinnati, OH 45268.***

Status of Environmental Orders

Order	Title	Status
5400.1	General Environmental Protection Program	Issued November 9, 1988
5480.1B	Environment, Safety, and Health Program for DOE Operations	Issued January 23, 1989
5400.2A	Environmental Compliance	Issued January 31, 1989
5400.3	Hazardous and Radioactive Mixed Waste Program	Issued February 22, 1989
5480.4	Environmental Protection, Safety, and Health Protection Standards	Issued May 16, 1989
5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements	Issued October 6, 1989
5400.5	Radiation Protection of the Public and the Environment	Issued February 8, 1990
5400.6	Radiological Effluent Monitoring and Environmental Surveillance	Awaiting Signature

Update on Waste Minimization

RCRA introduced the concepts of waste minimization and recycling in 1976, but its traditional focus has been on pollution control (i.e., waste identification, treatment, storage, and disposal). Although RCRA is a strong regulatory program to control hazardous wastes, enormous amounts continue to be generated *(see related report, page 10)*. Congress is unhappy with this situation and may enact legislation to force the issue. For example, in the last Congress, a bill that required recycling of 25% of all wastes within four years and 50% in ten years was considered. Mandatory waste minimization performance standards for all manufacturers were also proposed. With these pressures, it is not surprising that the EPA is beginning to develop policies and regulations that focus on the up-front minimization or elimination of the generation of hazardous wastes.

DOE is responding to this issue. In October 1989, DOE issued DOE Order 5400.1, ***General Environmental Protection Program***, which requires all DOE operating facilities to develop programs for minimizing hazardous, radioactive, and mixed wastes. Other DOE initiatives include the following:

- ❑ EH distributed for comment in October 1989, waste minimization guidance for implementing the waste minimization program and plan required in DOE Order 5400.1. The waste minimization plan is due to HQ program offices, EH, and the Office of Environmental Restoration and Waste management (EM) by May 9, 1990. Final guidance will be distributed in March.
- ❑ EH and EPA HQ staff participated in a waste reduction workshop on February 6-7, 1990, sponsored by EM. The EPA Pollution Prevention Program and DOE draft waste minimization guidance were discussed.
- ❑ EH distributed for comment in October a draft DOE-wide Waste Reduction Policy Statement for hazardous, radioactive, and mixed waste that will be consistent with the EPA's preventative approach and will present a consistent definition of waste minimization throughout the Department.
- ❑ DOE HQ is considering a proposal to implement a Department-wide pollution prevention program. This would expand the waste minimization concept to non-hazardous solid waste, air emissions, and sanitary and industrial wastewater emitted from all DOE facilities.

For additional information regarding DOE's waste minimization efforts, please contact Jane Powers, EH-231, FTS 896-7301.

Modifying RCRA Permits

In 1980, the EPA promulgated procedures for hazardous waste treatment, storage, and disposal (TSD) facilities to follow when modifying their RCRA permits. There were different procedures for "minor" and "major" modifications. For a "minor" permit modification, a very limited number of process changes were allowed subject to prior review and approval by the EPA, and there was no requirement for public notification and comment. For "major" permit modifications, the procedure was similar to issuance of the original permit, including requirements for a draft permit modification, announcements in a local newspaper and on the radio, a 45-day public comment period, and, if requested, a public hearing.

The old permitting process was unwieldy and an impediment to the ability of TSD facilities to respond quickly to improvements in technology and shifts in the types of wastes being generated. Routine changes necessary for effective waste management operations were difficult to effect. Furthermore, the public was not involved early in the process. As a result, in February 1988 (53 FR 37912) the EPA developed new permit modification procedures to provide the flexibility for TSD facilities to response to changing conditions and improve waste management operations. In addition, public involvement in the process is increased and comes at an earlier time. The new process recognizes three classes of permit modifications:

Class I modifications are routine, technical, and administrative changes that may include improving administrative and routine functions, upgrading plans and records, or replacing equipment with its functional equivalent. Most Class I changes do not require approval by the authorized agency (the state or the EPA), but within 90 days of implementing the change, the facility must notify all parties who have asked to be notified of the facilities activities. (This list is kept by the authorized agency.) Any member of the public may ask the EPA to review the Class I modification, and the EPA may deny the modification.

Class II modifications involve responses to changes in waste forms and types, improvements in technology and waste management techniques, and new regulatory requirements. Such changes typically do not alter the facility's design or management practice prescribed by the original permit and likely involve greater protection of human health and the environment. Examples include a 25% or less increase in a facility's tank treatment or storage capacity, authorization to treat new wastes with the same management practices, and modifications to improve design of regulated units. The facility must notify the authorized agency and all interested parties and publish a notice of the proposed modification in a local newspaper. The notice marks the beginning of a 60-day comment period. An informal public meeting is required no fewer than 15 days following the newspaper notice and no less than 15 days before the end of the 60-day comment period. The authorized agency must respond to the request for the modification within 90 days, or 120 days if an extension is requested. If the authorized agency fails to act on the request by 120 days, the facility is authorized for 180 days. If the agency fails to act within 250 days, the facility must notify the public that it will be permanently authorized unless the agency acts by day 300. At any time during the 300-day period, the authorized agency may reclassify the Class II permit modification request as a Class III request.

Class III modifications involve major changes to a facility and its operations, including the management of new wastes using new management practices; major changes to TSD units; increases in tank, container, or incinerator capacity by more than 25%; and major changes in a groundwater monitoring program. For a Class III permit modification request, the same procedure as for the Class II request is used. In addition, the authorized agency must prepare a draft permit modification that specifies the new operating conditions, allow a 45-day comment period on the draft, hold a public meeting if requested, and issue or deny the permit modification.

This article is based on a publication, "Modifying RCRA Permits" (EPA/530-SW-89-050, September 1989), from the EPA's Office of Solid Waste and Emergency Response. For a copy of the new permit modification regulations call the EPA's RCRA Hotline 1-800-424-9346 or (202) 382-3000.

More Upcoming Meetings

(Continued from page 7)

2ND INTERNATIONAL SYMPOSIUM ON STABILIZATION/ SOLIDIFICATION OF HAZARDOUS, RADIOACTIVE, & MIXED WASTE

May 29 - June 1, 1990
Williamsburg, VA

Contact:
T. Michael Gilliam
Oak Ridge National Laboratory
P.O. Box 2003
Oak Ridge, TN 37831-7273
(615) 574-6820

INTERNATIONAL CONFERENCE ON POLLUTION PREVENTION: CLEAN TECHNOLOGIES AND CLEAN PRODUCTS — THE ENVIRONMENTAL CHALLENGE OF THE 1990s

June 10-13, 1990
Washington, DC

Contact:
Dr. Domenic Maio, Program Coordinator
SAIC
8400 Westpart Drive
McLean, VA 22102

SOLUTIONS FOR THE 90s — 1ST U.S. CONFERENCE ON SOLID WASTE MANAGEMENT

June 13-16, 1990
Washington, DC

Contact:
Linda Cook
EPA, Office of Solid Waste
800-456-4723, FAX 301-589-7068

The conference is designed to convene a broad cross-section of individuals and organizations that will help set an agenda for the 1990s to reduce, recycle, and better manage solid waste.

COMPLYING WITH FEDERAL REQUIREMENTS FOR TRANSPORTING AND REPORTING RELEASES OF HAZARDOUS MATERIALS

June 19, 1990
San Diego — San Diego Convention Center

Contact:
EPA, OSWER, (202) 475-9814

Topics include: "Federally Permitted Releases," worker protection standards, classification of hazardous materials, DOT packaging requirements, and civil and criminal penalties.

Materials Available from EPA's Office of Underground Storage Tanks

General Information

ORDER NO.

Notification for Underground Storage Tanks: EPA Form 7530-1 (Revised 9-88) 5
Hazardous Substance List 7
LUSTLINE Bulletin 10
OUST Publications List 25
Managing Underground Storage Tanks 40
"Oh No! Leaks and Spills!" - First Response (brochure) 73
Leak Lookout (External Leak Detectors) 74
Introducing REG-IN-A-BOX (ordering flier) 84

Regulations

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B. RCRA/CERCLA Update May 1990

RCRA/CERCLA Update

A Report from the Environmental Guidance Division of the U.S. Department of Energy

Vol. 90. Issue 2 May 1990

Final NCP Published

On March, 8, 1990, one year and three months after its proposal, EPA published in the *Federal Register* (55 FR 8666) the revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which implements the oil and hazardous substance release response provisions of CERCLA and Sect. 311 of the Clean Water Act (CWA). The new Plan, effective April 9, 1990, adds new SARA requirements, conforms better to the sequence of CERCLA response actions, and more clearly reflects current EPA policies. It differs from the December 1988 proposed Plan in several important ways: the remedy selection process is modified, the target risk range for cleanups is narrowed, and the applicability of RCRA Land Disposal Restrictions (LDRs) to CERCLA cleanups is more limited.

Remedy Selection

EPA retained the proposed three-tier detailed analysis of alternatives during remedy selection, but added an initial screening phase with three new screens before the detailed analysis occurs. The first screen is "effectiveness," which focuses on the degree to which alternative remedies: (1) reduce toxicity, mobility, or volume through treatment; (2) minimize risks; (3) afford long-term protection; (4) comply with applicable or relevant and appropriate requirements (ARARs) of Federal and State laws; (5) minimize short-term impacts; and (6) quickly achieve protection. Alternatives significantly less effective than others and those not protective of human health and the environment are to be eliminated. The next screen is "implementability," which focuses on the technical feasibility and availability of cleanup technologies and the administrative feasibility of their implementation. Alternatives either not technically or administratively feasible or that require equipment, specialists, or facilities that are unavailable in a reasonable period of time may be eliminated from further consideration. The third initial screen is "cost," including costs of operation and maintenance of the remedy. Remedies whose costs are "grossly excessive" compared to overall effectiveness may be eliminated from consideration. Alternatives with the same effectiveness and implementability of less expensive methods also may be eliminated.

Remedies with "grossly excessive" costs may be eliminated from consideration.

Risk Range

The range of acceptable risk for cleanups has been changed from 10^{-4}-10^{-7} to 10^{-4}-10^{-6}. According to EPA, the new range "remains protective of human health and the environment, and provides added flexibility for site-specific remedial actions." Two reasons were stated for this change. First, current analytical methods and detection limits cannot verify for many contaminants that a risk level of 10^{-7} has been achieved. Second, changing the lower limit of the risk range is consistent with accepted *de minimis* levels used in other EPA programs. The new risk range was supported by DOE in its comments to EPA on the proposed NCP.

RCRA LDRs as ARARs

In the final NCP, "placement" of RCRA wastes in the ground during a CERCLA response action still constitutes "land disposal" under RCRA, as was proposed. However, "placement" is limited to putting hazardous wastes into a unit — not moving wastes within a unit. EPA maintains that this interpretation is consistent with Sect. 3004(k) of RCRA and with Congressional purpose behind the LDRs. Additionally, regarding any movement of wastes within a unit as "placement" or "land disposal" would be "difficult to implement," "could interfere with necessary operations at an operating RCRA facility," and is "clearly an infeasible approach." Thus, normal earthmoving and grading operations within a land disposal unit do not constitute "placement into the unit," and it is not necessary to invoke ARAR waivers for such actions.

While the definition of "placement" was not changed, the applicability of the LDRs to CERCLA responses has been narrowed. In what could be considered a major policy decision, EPA announced that RCRA LDR treatment standards generally are inappropriate for CERCLA response actions involving contaminated soil and debris. Reasoning that because LDR treatment standards are "generally inappropriate or infeasible when applied to contaminated soil and debris" and "because contaminated soil and debris is [sic] significantly different from the wastes evaluated in establishing the BDAT standards ... [and] ... cannot be treated in accordance with those standards...," persons seeking a treatability variance from LDR treatment standards for contaminated soil and debris do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable. As an alternative, the appropriate levels or percentage reductions given in Superfund LDR Guide #6A, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions" (OSWER Directive 9347.3-06FS, July 1989) may be met.

In general, RCRA LDRs are inappropriate for CERCLA actions involving contaminated soil and debris.

Other Changes

Among some of the other changes in the final NCP are the following:

- **New definitions have been added, and old definitions have been revised.**

- Definitions for "applicable requirements" and "relevant and appropriate requirements" have been broadened to include standards promulgated under both Federal and State law, including State standards that are more stringent than Federal requirements.

- The definition of "lead agency" has been revised to reflect Executive Order (E.O.) 12580, which delegates lead agency authorities to DOE and other Federal agencies under certain conditions.

- The definitions of "On-Scene Coordinator" (OSC) and "Remedial Project Manager" (RPM) have been simplified and now recognize that other Federal agencies besides EPA, the U.S. Coast Guard, DOE, and the Department of Defense can designate the OSC or RPM, as provided by E.O. 12580.

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Final NCP

(Continued from page 1)

- A definition for "on-site" has been added. On-site means "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." In its comments on the proposed rule, DOE suggested revising the definition to account for large Federal facilities that may have several discrete areas of contamination within their boundaries that are similar in nature but spatially separated. However, the only change from the proposed definition was to delete the phrase "for permitting purposes."

❑ **EPA clarified that the purpose of the remedial action process is to reduce risk "as soon as site data and information make it possible to do so" and stated program goals, program management principals, and expectations.**

Sections on program goals, program management principles, and expectations were added. The goal of the remedy selection process is to select remedies that protect human health and the environment, maintain protection over time, and minimize untreated waste. EPA's expectations in developing remedial alternatives are to use (1) treatment to address principal threats wherever practicable; (2) engineering controls, such as containment, where treatment is impracticable; (3) institutional controls, such as water use and deed restrictions, to supplement engineering controls, but not as a substitute for active response measures; and (4) innovative technology when it has potential for superior treatment performance. Lead agencies must consider the program goals, management principles, and expectations in implementing remedial actions.

❑ **The final NCP requires that cleanup of surface and groundwaters that are current or potential sources of drinking water achieve non-zero Maximum Contaminant Level Goals (MCLGs) for waters where the MCLGs are relevant and appropriate to the release.**

If an MCLG is not relevant and appropriate, the corresponding Maximum Contaminant Level (MCL) will be attained where relevant and appropriate. Where MCLGs are zero, the MCL promulgated for that contaminant must be attained where relevant and appropriate. Other remedial action directives include consideration of ARARs, no observed adverse effect levels for lifetime exposures to systemic toxicants, 10^{-4} to 10^{-6} lifetime cancer risk levels for known or suspected carcinogens, factors related to technical limitations, such as detection limits, and factors related to uncertainty.

The new NCP was effective April 9, 1990. This article is based on an analysis of the new NCP to be distributed to Program and Field Elements in the near future. Any questions concerning the new NCP and its impact on DOE should be directed to Jane Powers, RCRA/CERCLA Division, EH-23, FTS 896-7301 or (202) 586-7301.

Environmental Groups Criticize Superfund

According to a report issued in February of this year by five leading environmental groups and the Hazardous Waste Treatment Council, Superfund cleanups continue to produce remedies of variable quality, with many failing to protect human health and the environment. The report, *Tracking Superfund: Where the Program Stands*, which summarizes the 2nd annual comprehensive analysis of Superfund remedies, says that after nearly a decade many sites continue to be addressed by simple capping and containment, despite widespread criticism of this procedure. Levels of cleanup even for common chemicals are widely inconsistent, and at many sites, contaminated groundwater has been "written off," rendering it useless as a resource for decades. According to the report:

❑ **SARA's stringent national cleanup standards continue to be ignored.** At 54% of the sites, cleanup standards for groundwater, surface water, and soil have not been established. Cleanup levels for contaminants vary tremendously among sites.

❑ **Permanent remedies often are not selected.** Forty-four percent of the selected remedies utilized fencing and capping to minimize contaminant exposures, rather than treatment of the waste to permanently eliminate the hazards at the site. "Bogus treatment" technologies such as the stabilization of high organic content wastes continue to be selected despite EPA's own data showing that these technologies are ineffective. "Promising" treatment technologies such as bioremediation are inappropriately applied or are eliminated from serious consideration at appropriate sites without a technical basis.

❑ **Contamination of groundwater is often "written off" rather than cleaned up.** At several sites, contaminated groundwater currently being used, or usable in the immediate future, is not being cleaned up. Rather, alternative water supplies are provided, wells are plugged, and/or institutional controls are implemented to prevent further usage. Many remedies rely on "natural attenuation," a euphemism for "no action," to cleanse the aquifer.

The report found that the extent to which these problems prevail varies widely by region, because of the lack of an effective, consistent national program. It goes on to state that if the Superfund program is to be successful, EPA Headquarters and the Administrator himself must assume a leadership role to ensure adherence to SARA's cleanup goals.

This report concludes with a summary of the ten best and worst decisions made by EPA during FY-1988 at Superfund sites. According to the report, the ten best decisions were characterized by emphasis on permanent treatments, close adherence to SARA requirements, and the use of innovative cleanup treatment techniques. The ten worst decisions were characterized by no action taken at all, no permanent treatment, and/or poor cleanup techniques.

DOE Training in Environmental Laws & Regulations: Phase I Complete; Phase II Begun

From early November 1989 through mid-March 1990, the DOE Senior Management Training Course in Environmental Laws and Regulations was presented fifteen times, once at each of the eight Operations Office locations; three times in Washington, D. C., for DOE Headquarters personnel; and once each in Morgantown, West Virginia (Morgantown Energy Technology Center), New Orleans, Louisiana (Strategic Petroleum Reserve Office), Bakersfield, California (Elk Hills Naval Petroleum Reserve), and Denver, Colorado (for overflow from other courses at western sites). The development and presentation of this two-day course has been a collaborative effort by members of the Office of Environmental Guidance and Compliance, the Office of NEPA Project Assistance, the Office of the Inspector General, the Office of General Counsel, EPA, and the Oak Ridge National Laboratory. The course was designed to provide an intensive overview of the requirements of the seven major environmental laws that affect DOE facilities — RCRA, CERCLA, the Clean Air Act, Clean Water Act, Safe Drinking Water Act, Toxic Substance Control Act, and National Environmental Policy Act (NEPA). It also addressed the liabilities associated with lack of compliance, and presented both EPA's Federal Facilities Compliance Strategy and DOE's Environmental Compliance Strategy.

The course has generally been rated good to excellent by the attendees, who have numbered over 750. Although many of the senior managers who attended indicated that the material presented was at just the right level of detail for their needs, other participants indicated that they also needed a more in-depth course. To satisfy this additional need, a four-day course for mid-level DOE and contractor managers is now underway. The four-day course will cover the same seven environmental laws in greater detail, with one entire day devoted to NEPA alone. It will be suitable for mid-level managers in the environmental compliance field and other areas who already know the basics but require a more in-depth understanding of actual compliance processes and procedures. The presentations of this more detailed course began in May *(see box, this page, for current schedule)*.

For additional information on the training program for DOE managers, contact Larry Stirling, Environmental Training Coordinator, EH-23, at FTS 896-2417 or (202) 586-2417.

Schedule for 4-Day Training Course

Las Vegas	**May 7-10**
Albuquerque	**June 18-21**
San Francisco	**June 25-28**
Pittsburg	**July 16-19**
Idaho	**July 30 - Aug. 2**
Oak Ridge	**Aug. 13-16**
Washington, D.C.	**Sept. 10-13**
Chicago	**Oct. 1-4**
Richland	**Oct. 22-25**
Savannah River	**Nov. 5-8**

Ecological Assessment and DOE's Natural Resources Stewardship

Over the last decade, CERCLA has focused on identifying contaminated sites and responsible parties and on setting remedial priorities, with the primary goal being protection of the health of people living on or near contaminated sites. However, as the CERCLA program begins to implement remedial actions, additional concerns about impacts of hazardous substances releases on non-human organisms and ecosystems are being expressed.

Ecological Assessment

Important new regulations, policies, and program guidance underscore EPA's increasing concern about the potential ecological impacts of hazardous waste sites, and that assessing such impacts is increasingly becoming an important consideration for Federal agencies that must address risks at their hazardous waste sites. For example, EPA's proposed revisions to the Hazardous Ranking System, used to establish national remediation priorities, will place more weight on a site's proximity to "sensitive environments" and important ecological resources. This is consistent with EPA's policy that ecological factors should play a more visible role in the strategy for hazardous substance responses.

Another important element of that strategy is outlined in the revised NCP *(see story on page 1)*. The new NCP places greater emphasis on consideration of ecological impacts. It requires Remedial Project Managers (RPMs) to consider the risks to environmental receptors and directs that "environmental evaluations shall be performed to assess threats...." In addition to protecting human health, response actions "...will also be protective of environmental organisms and ecosystems...." Therefore, when the results of site investigations are formally presented (e.g., in the RI/FS), the ecological impacts should not simply be relegated to a footnote or covered in a "miscellaneous" section of the report. EPA will no longer consider it adequate to list in tabular form unsystematically collected fisheries and wildlife monitoring data or species lists or make simple assertions that a site contains no endangered or threatened species.

Indicative of the new emphasis placed on protection of environmental organisms and ecosystems, are two important EPA guidance documents that will directly impact the way the DOE Environmental Restoration Program Managers (ERPMs) evaluate their hazardous sites. These two documents are the following:

- ❑ ***Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual (EPA/540/1-89/001)*** and

- ❑ ***Ecological Assessment of Hazardous Waste Sites. A Field and Laboratory Reference (EPA/600/3-89/013).***

The first manual ("RAGS II") is EPA's science policy guidance for CERCLA RPMs who must manage the evaluation of ecological risks. The second document is a reference work for laboratory and field study methods that site investigative/assessment personnel may employ to discover pertinent facts about the potential ecological effects posed by the site or the remedial alternatives. These documents were developed by EPA as companion volumes and are available from EPA's Center for Environmental Research Information (CERI), U.S. Environmental Protection Agency, 26 Martin Luther King Drive (MS G-72), Cincinnati, Ohio 45268, FTS 684-7562 or (513) 569-7562.

EPA will no longer consider it adequate to list in tabular form unsystematically collected fisheries and wildlife monitoring data or species lists or make simple assertions that a site contains no endangered or threatened species.

Natural Resource Stewardship

CERCLA established liability for damages for injuries to natural resources, and SARA (Sect. 120) extended the liability to Federal agencies. Also, CERCLA Sect. 107 requires the appointment of certain Federal officials to act on behalf of the public as Trustees for natural resources. Their job is to provide for mitigative actions, restoration, replacement, or adequate public compensation for injured or lost natural resources under their jurisdiction. Through E. O. 12580, the President appointed the Secretary of Energy as the primary Federal Natural Resource Trustee for natural resources located on, over, and under land managed by DOE. The revised NCP codifies this DOE responsibility and defines specific duties and authorities of Natural Resource Trustees.

One of the Trustees' responsibilities is to perform, when necessary and appropriate, a Natural Resource Damage Assessment (NRDA), which establishes a dollar amount for the loss of injured natural resources so that the Trustee may pursue a damage claim against the responsible party. An NRDA is performed to assess only residual damages (i.e., those attributable to injuries that persist after remedial action is taken). Parts of the promulgated NRDA process (43 CFR 11) — proposed for revision by the U.S. Department of the Interior (DOI) — include many of the same elements of an ecological assessment (e.g., exposure assessment and hazard identification). The two processes can provide mutually beneficial information that can ultimately be used to facilitate the design of appropriate remedial measures and define the extent of "residual damages." This integrated approach also lessens or obviates the need for legal procedures associated with a natural resource damage claim.

At many DOE sites, DOE will have a "dual role" as both Natural Resource Trustee and the Federal lead agency in charge of the hazardous substance response. However, it is likely that DOE will also be subject to oversight from State Natural Resource Trustees, other Federal "co-Trustees," and EPA. Considering the increasingly important role ecological factors play in hazardous substance response and the potential for multiple ecological oversight agencies, EH-231 — with input from EPA and

DOE will have a "dual role" as both Natural Resource Trustee and the Federal lead agency in charge of the hazardous substance response.

DOI — is developing a draft guidance manual for DOE facilities that discusses DOE's requirements and responsibilities in this area and also attempts to integrate the ecological assessment and Natural Resource Trustee issues.

RCRA/CERCLA Division personnel are available to assist DOE's ERPMs and site personnel and answer questions about the requirements and responsibilities associated with ecological risk assessment and DOE's Natural Resources Trusteeship. For additional information contact John Bascietto, EH-23, RCRA/CERCLA Division, at FTS 896-7917 or (202) 586-7917.

Groundwater Data To Be Required for RCRA Delisting Petitions

Individual waste streams may vary because of the raw materials they are derived from and the processes used to generate them. Therefore, a hazardous waste that is listed at 40 CFR 261 may not be "hazardous" at every facility in which it is produced. To address this problem, EPA has a "delisting" procedure that allows a facility to demonstrate that a specific waste from a particular generating facility should not be subject to RCRA Subtitle C regulation.

To delist a waste, the generator must "petition" EPA by submitting manufacturing and treatment process information, raw materials lists, analytical data, and other information. On October 12, 1989 (54 FR 41930), under its general delisting authority, EPA proposed to additionally require submission of groundwater monitoring data for waste management units containing waste targeted for delisting because the data can provide significant additional information to fully characterize the hazards posed by disposal of a particular waste.

The proposed rule clarifies that EPA has the authority to require and evaluate groundwater data for delisting purposes. The rule will apply only if units containing the petitioned waste are already required to have a groundwater monitoring system in place. By requiring that groundwater monitoring data be included in delisting petitions EPA can better determine whether the waste in question is "hazardous," and, thus, better protect human health and the environment. Data indicating that the waste may have contaminated groundwater may be considered grounds for petition denial.

The final rule is expected in October 1990. EH-23 will distribute the rule to Field Elements and Program Offices upon its publication. For additional information or for questions concerning the impact of the proposed rule contact Tim Harms, EH-23, RCRA/CERCLA Division, at FTS 896-6073 or (202) 586-6073.

Applicability of LDRs to RCRA/CERCLA Groundwater Treatment Reinjections

EPA has announced its interpretation of the application of the RCRA Land Disposal Restrictions (LDRs) to the reinjection of treated groundwater into aquifers during "pump and treat" operations at RCRA/CERCLA cleanup sites. This action was taken, in part, because of a Department of Justice letter to EPA that asked for clarification on the applicability of the LDRs to treated groundwater that was injected back into the aquifer from which it was withdrawn *(see related story, RCRA/CERCLA Update, Vol. 90, No. 1, page 12).*

In its management review of the Superfund Program, EPA determined that misapplications of the RCRA LDRs contributed to the inefficient implementation of CERCLA. They recognized that cleaning up large-scale contamination (under CERCLA) was very different from continuous management of hazardous wastes (the focus of RCRA) and that in some cases, using RCRA standards as ARARs for CERCLA actions confused prevention for cure.

As a result of these findings, EPA has determined that under certain circumstances, the LDRs are not applicable to reinjection of treated groundwater during RCRA corrective actions and CERCLA response actions. This interpretation is based on the "traditional principle" that the more specific of two overlapping statutory provisions is used. For example, RCRA Sect. 3020(b) specifically allows injections of hazardous wastes into underground sources of drinking water under certain circumstances. Since the LDRs refer only generally to land disposal of wastes, the more specific RCRA provision takes precedence.

In order to reinject treated groundwater during pump and treat operations at DOE's environmental restoration sites without triggering the LDRs, three conditions must be met:

- ❑ **the reinjection must be part of a CERCLA Sect. 104 or 106 response action or a RCRA corrective action,**
- ❑ **the contaminated groundwater must be treated to substantially reduce hazardous constituents prior to such injection, and**
- ❑ **the response action or corrective action must protect human health and the environment upon completion.**

Field Organizations are encouraged to consult with their Regional EPA Office on the proper application of the LDR interpretation for the reinjection of treated groundwater into or above underground sources of drinking (i.e., into Class IV injection wells) at their facilities.

This article is based on a memorandum from EH-231 to Program Offices and Field Elements, dated March 28, 1990, which addressed the application of EPA's interpretation to DOE Environmental Restoration activities. For further information on this or related matters, contact John Bascietto, EH-23, RCRA/CERCLA Division, at FTS 896-7917 or (202) 586-7917.

Tiger Teams Assess DOE Facilities

On June 27, 1989, Secretary of Energy James D. Watkins announced a 10-point Initiative to strengthen safety, environmental protection, and waste management activities at DOE's production, research, and testing facilities. Among the key points was the establishment of a "Tiger Team" Assessment Program to conduct independent oversight assessments of DOE facilities' environment, safety, and health (ES&H) programs and to provide the Secretary with information on the compliance status and vulnerabilities of each DOE facility.

Tiger Team Assessments

The Tiger Teams, made up of ES&H and Management and Organization (M&O) Assessment Teams, carry out the Secretary's directives by focusing primarily on a facility's compliance with applicable Federal, State, and local environmental regulations, requirements, permits, agreements, orders, consent decrees, and DOE ES&H Orders. They also examine the adequacy of DOE and site contractor ES&H management programs. Program areas appraised include: planning, organization, resources, and training; their respective relationships with regulatory agencies; and their conformance with applicable, "best," and "accepted" industry practices. On-site activities at DOE facilities include reviewing documents, observing site operations, interviewing DOE and site contractor personnel, evaluating site procedures and protocols, and reviewing previous audits and assessments. Federal, State, and local regulatory agencies are invited to observe the assessment proceedings.

One of the most important purposes of the Tiger Team Assessments is to identify the root causes of compliance problems at each site by identifying the causal factors behind each of the assessment findings and then analyzing the findings developed by the ES&H Assessment Teams. The M&O Assessment Team reviews the findings, groups and categorizes similar findings, identifies and examines causal factors among commonly occurring and related findings, and broadly defines the root causes for the ES&H deficiencies. A draft assessment report is then completed during the on-site assessment. The report, which contains individual findings, root causes, and supporting documentation, is reviewed by site managers; several Operations, Area, and Headquarter offices; and regulatory agency representatives. The final report is provided to the Secretary who forwards it to the appropriate Program Senior Official, who then prepares and implements a final action plan to address the Tiger Team findings. The draft and final reports are made available to the public in DOE reading rooms. The final report is available through the National Technical Information Service.

Preliminary Analysis of Findings

The Assistant Secretary for Environment, Safety and Health performed a preliminary analysis of the findings from the first six Tiger Team Assessments. Despite the small data set, the following preliminary trends may be endemic to the Departments's facilities. The six areas of greatest concern are:

- ❑ **Management and oversight of ES&H Activities.**

Facilities tend to operate in a reactive mode and either have not implemented, or are slow to implement, comprehensive management systems to ensure compliance with ES&H requirements.

- ❑ **Conduct of Operations/Formality and Discipline.**

Management systems lack sufficient formality and discipline to implement effective ES&H programs.

- ❑ **Communication of ES&H Policy.**

Although evidence of improvement exists, ES&H policy is not being communicated to all levels of DOE and contractor staff.

- ❑ **Resources.**

Major difficulties exist in obtaining sufficient numbers of staff with appropriate qualifications to carry out program activities in a manner that ensures full compliance.

- ❑ **Occupational Safety and Health.**

OSHA workplace reviews have identified relatively large numbers of compliance problems.

- ❑ **Technical Issues.**

Key deficiencies were identified in the areas of radiological protection, emergency preparedness, waste management, inactive waste sites, and environmental monitoring.

Tiger Team Assessment Schedule

Tiger Team Assessments will be conducted at the major DOE operating facilities. As of April 27, 1990, a total of 13 in-depth assessments have been completed at the following sites: Rocky Flats Plant, West Valley Demonstration Project, Feed Materials Production Center, Y-12 Plant, Pantex Facility, Mound Plant, Portsmouth Uranium Enrichment Complex, Nevada Test Site, Kansas City Plant, Pinellas Plant, Savannah River Site, Lawrence Livermore National Laboratory, and Brookhaven National Laboratory. Assessments for the remainder of calendar year 1990 were approved by the Secretary on March 8, 1990 *(see box, this page for schedule).*

This article is based on a synopsis of a paper written by Larry A. Weiner and Mark Gilbertson, EH-1, Office of Special Projects, and presented at the Waste Management '90 Symposium, February 25 - March 1, 1990, in Tucson, Arizona.

Upcoming Tiger Team Assessments

Hanford Site	May 21, 1990
Paducah GDP	June 18, 1990
ANL	Sept. 24, 1990
ORNL	Oct. 29, 1990

The TCLP Replaces the EP Toxicity Test

In a final rule published in the *Federal Register* on March 29, 1990 (55 FR 11797), EPA replaced the Extraction Procedure (EP) toxicity test used to define RCRA solid wastes as hazardous by characteristic with the Toxicity Characteristic Leaching Procedure (TCLP). In an April 9, 1990, memorandum from EH-231, Field Elements and Program Offices were alerted to the new rule and provided with two EPA announcements on the TCLP.

In the new procedure, twenty-five organic chemicals were added to the 14 existing EP toxic constituents of concern *(see box, bottom of this page, for a list of constituents and their regulatory levels)*. The regulatory levels for these constituents were derived from health-based concentration limits using a dilution-attenuation factor derived from the application of a subsurface fate and transport model.

Included in the final rule are a more detailed method flow chart than in the EP and additional information on the availability of suitable testing equipment. The new modified TCLP will replace the version promulgated earlier as part of the Land Disposal Restrictions program. EPA expects the new rule to bring an additional 1.8 million metric tons of nonwastewaters, 700 million metric tons of wastewaters, and 17,000 waste generators under RCRA Subtitle C control. Approximately 200 surface impoundments currently used to dispose of wastes will also be regulated under RCRA for the first time.

The effective date for the new rule is September 25, 1990, for large quantity generators and March 29, 1991, for small quantity generators. On these dates, generators of hazardous waste are required to comply with all applicable RCRA regulations for their wastes that exhibit the new toxicity characteristic, and the TCLP must be used in place of the EP toxicity test.

Specific inquiries concerning the TCLP should be directed to Tim Harms, EH-23, RCRA/CERCLA Division, at FTS 896-6073 or (202) 586-6073.

LDR Training Via Satellite

In a recent memorandum to Program Offices and Field Elements from EH-231 dated March 8, 1990, it was announced that EPA has agreed to provide training to DOE on the RCRA Land Disposal Restrictions (LDRs).

The training session will be broadcast simultaneously via satellite to all participating DOE elements. Participants will be able to ask direct questions to the instructors by telephone hookup. The proposed topics include:

- ❑ **LDR framework and key provisions,**
- ❑ **an update on the third third rulemaking,**
- ❑ **LDR enforcement concerns,**
- ❑ **several case studies, and**
- ❑ **panel discussions.**

The tentative date for this teleconference is July 11, 1990. ***For more information, contact Larry Stirling, training coordinator for the Office of Environmental Guidance, EH-23, FTS-896-2417 or (202) 586-2417.***

PLEASE SEND US YOUR COMMENTS, ARTICLES, & PHOTOS!

If you think this report is informative; if you have any suggestions to make future reports more helpful; or if you would like to contribute articles, photographs, or other information for possible publication, we would like to hear from you. Please send your comments, suggestions, and materials to:

Mr. Jerry L. Coalgate
Editor, RCRA/CERCLA Update
Office of Environmental Guidance, EH-23
1000 Independence Ave., SW
Washington, DC 20585
FTS 896-6075/202-586-6075

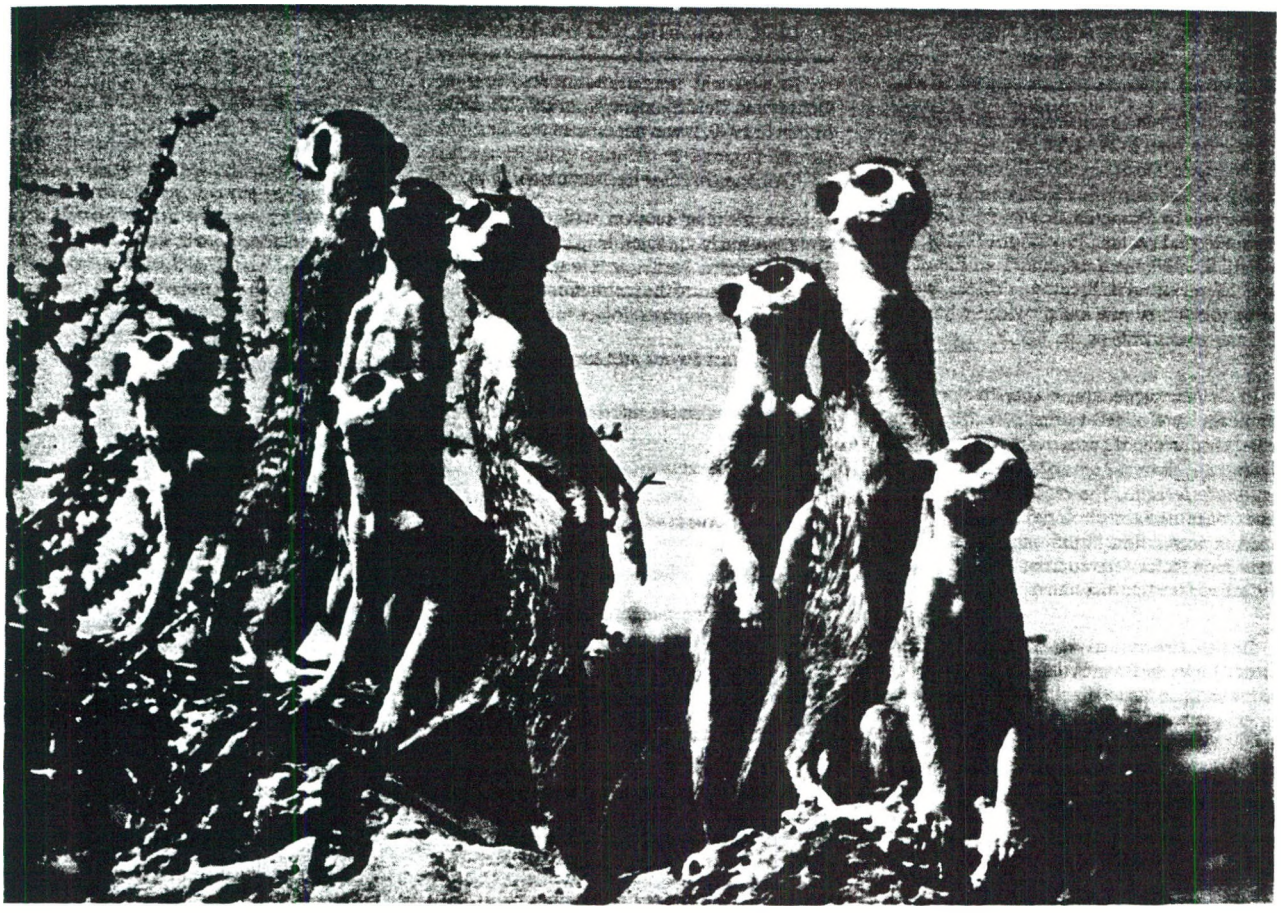
HAZWOPER: Easier Than Expected

According to the December 1989 issue of *The Environmental Manager*, OSHA's new Hazardous Waste Operations and Emergency Response (HAZWOPER) standard of March 6, 1990, may not be as significant a change for companies as it first appears. Kyle Olson, director of safety and plant operations for the Chemical Manufacturers Assoc., says that for a well-run organization that is in compliance with OSHA, training employees to meet the HAZWOPER standards would require little more than documenting the training that already has been done, such as in hazard communications or emergency response procedures. In many cases, a company may find that it has one or two deficiencies in its training program that it can remedy internally, without the expense of outside trainers, although employees still must demonstrate their competence to OSHA inspectors.

The new OSHA standards require that a routine site employee at a hazardous waste cleanup site have a minimum of 40 hrs. of basic training, 24 hrs. of field training, and 8 hrs. of refresher training, but they do not specify how those hours have to be spent. This allows companies to focus in on plant-specific problems. The new emergency response rules require a lesser degree of training (8 hrs. for operations-level staff who respond to releases of hazardous substances in a defensive manner, without trying to stop the releases), but more employees would need to be trained. Again, however, a company may be able to get credit for past training. Eventually OSHA will have a certification program for hazardous waste worker training. Until then, Olson advises that companies make sure "workers are trained in the letter and spirit of present standards."

TCLP Constituents and Their Regulatory Levels

Newly Added Constituents				*EP Constituents Retained*	
Constituent	*Regulatory level (mg/L)*	*Constituent*	*Regulatory level (mg/L)*	*Constituent*	*Regulatory level (mg/L)*
Benzene	0.5	Hexachlorobenzene	0.13	Arsenic	5.0
Carbon tetrachloride	0.5	Hexachloro-1,3-butadiene	0.5	Barium	100
Chlordane	0.03	Hexachloroethane	3.0	Cadmium	1.0
Chlorobenzene	100	Methyl ethyl ketone	200	Chromium	5.0
Chloroform	6.0	Nitrobenzene	2.0	Lead	5.0
o-Cresol	200	Pentachlorophenol	100	Mercury	0.2
m-Cresol	200	Pyridine	5.0	Selenium	1.0
p-Cresol	200	Tetrachloroethylene	0.7	Silver	5.0
1,4-Dichlorobenzene	7.5	Trichloroethylene	0.5	Endrin	0.02
1,2-Dichloroethane	0.5	2,4,5-Trichlorophenol	400	Lindane	0.4
1,1-Dichloroethylene	0.7	2,4,6-Trichlorophenol	2.0	Methoxychlor	10
2,4-Dinitrotoluene	0.13	Vinyl chloride	0.2	Toxaphene	0.5
Heptachlor	0.008			2,4-D	10
				2,4,5-TP (silvex)	1.0



Courtesy Animals Animals. Photo by David MacDonald/OSF. Reprinted by permission.

On the alert: sociable EH-22 /23 staff cope with RCRA, CERCLA, and other fiendish thingies.

Not Enough Eyes to Watch for New Regulatory Requirements? The Offices of Environmental Guidance and Environmental Compliance Can Help You!

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Melvin Leifer	Richland	896-5227
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FranK Russo	NMC Div. Dir.**	896-7882
Jean Schumann	Albuquerque	896-7769
Mark Stahr	San Francisco	896-7879
Marilyn Stone	LLNL	896-5942

* Military Applications
** Nuclear Materials

Upcoming Meetings, Seminars, & Courses

2ND INTERNATIONAL SYMPOSIUM ON STABILIZATION/ SOLIDIFICATION OF HAZARDOUS, RADIOACTIVE, & MIXED WASTE

May 29 - June 1, 1990
Williamsburg, VA

Contact:
T. Michael Gilliam
Oak Ridge National Laboratory
P.O. Box 2003
Oak Ridge, TN 37831-7273
(615) 574-6820

ENVIRONMENTAL COMPLIANCE AT FEDERAL FACILITIES

June 6-7, 1990
Washington, D.C.
Washington Hilton & Towers

Contact:
Executive Enterprises, Inc.
1-800-233-0787 or 1-800-831-8333
within New York State

EMERGING TECHNOLOGIES FOR HAZARDOUS WASTE TREATMENT

June 4-7, 1990
Atlantic City, NJ

Contact:
Dr. D. William Tedder
American Chemical Society
I&EC Symposium Chairman
School of Chemical Engineering
Georgia Institute of Technology
Atlanta, GA 30332-0100
(404) 894-2856 or (404) 973-3826

INTERNATIONAL CONFERENCE ON POLLUTION PREVENTION: CLEAN TECHNOLOGIES & CLEAN PRODUCTS — THE ENVIRONMENTAL CHALLENGE OF THE 1990s

June 10-13, 1990
Washington, DC

Contact:
Dr. Domenic Maio, Program Coordinator
SAIC
8400 Westpart Drive
McLean, VA 22102

SOLUTIONS FOR THE 90s — 1ST U.S. CONFERENCE ON SOLID WASTE MANAGEMENT

June 13-16, 1990
Washington, DC

Contact:
Linda Cook
EPA, Office of Solid Waste
800-456-4723, FAX 301-589-7068

The conference is designed to convene a broad cross-section of individuals and organizations that will help set an agenda for the 1990s to reduce, recycle, and better manage solid waste.

COMPLYING WITH FEDERAL REQUIREMENTS FOR TRANSPORTING & REPORTING RELEASES OF HAZARDOUS MATERIALS

June 19, 1990
San Diego — San Diego Convention Center

Contact:
EPA, OSWER, (202) 475-9814

Topics include: "Federally Permitted Releases," worker protection standards, classification of hazardous materials, DOT packaging requirements, and civil and criminal penalties.

WORKER PROTECTION STANDARDS: HAZARDOUS WASTE OPERATIONS & EMERGENCY RESPONSE

June 21, 1990
Dallas, TX
Stouffer Dallas

July 24, 1990
Boston/Cambridge, MA
Royal Sonesta Hotel

Contact:
Ms. Vickie Santoro
EPA, MS-101
Woodbridge Ave., Building 18
Edison, NJ 08837

Firefighters, State and local government employees, and members of State Emergency response Commissions (SERCs) and local Emergency Planning Committees (LEPCs) are invited to a free full-day workshop on any of the above dates.

THE ENVIRONMENTAL PERMITTING "HOW TO" COURSE

June 25-26, 1990
Washington, D.C.
Hyatt Regency Washington

Contact:
Executive Enterprises, Inc.
1-800-233-0787 or 1-800-831-8333
within New York State

PCB REGULATIONS UNDER TSCA

July 12, 1990
Philadelphia, PA
$350.00

Contact:
Environmental Resource Center
3679 Rosehill Road
Fayetteville, NC 28311
(800) 5-ERC-ERC or (919) 822-1172

Seminars Presented Nationwide.

AIR & WASTE MANAGEMENT ASSOCIATION SPECIALTY CONFERENCE ON POLLUTION PREVENTION THROUGH WASTE MINIMIZATION, RECYCLING & REUSE

September 10-21, 1990
Arlington, TX

Contact:
Air and Waste Management Association
Post Office Box 2861
Pittsburgh, PA 15230

HAZARDOUS WASTE AND HAZARDOUS MATERIALS MANAGEMENT CONFERENCE

September 26-28, 1990
San Francisco, CA

Contact:
Ms. R. Scheinbach
Institute for International Research
13555 Bel Red Road
Bellevue, WA 98009

from the federal register

MAJOR FINAL RULES

55 FR 8666 March 8, 1990

EPA published a CERCLA final rule (proposed December 21, 1988) revising the **National Contingency Plan** (NCP). The new Plan was effective April 9, 1990.

55 FR 11797 March 29, 1990

EPA issued a RCRA final rule, effective September 25, 1990 (proposed June 13, 1986), replacing the Extraction Procedure with the **Toxicity Characteristic Leaching Procedure** used to identify wastes as hazardous by characteristic and subject to RCRA Subtitle C regulation.

NEW INITIATIVES

55 FR 12866 April 6, 1990

EPA proposed to amend the TSCA **PCB regulations** (final rule issued July 10, 1984) by adding the phrase "on a dry weight basis" to 40 CFR 761.1(b).

55 FR 17862 April 27, 1990

EPA proposed to amend the **hazardous waste incinerator** regulations to improve toxic metals, hydrogen chloride, and residual organic emissions; to define plasma arc and infrared incinerators; to regulate carbon regeneration units as thermal treatment devices; and to make minor revisions to the permitting procedures. Comments are accepted until June 26, 1990

MISCELLANEOUS

55 FR 8948 March 9, 1990

EPA issued technical corrections to the RCRA final rule of September 29, 1989, that adopted **47 analytical testing methods** under Subtitle C. The new methods are found in the Third Edition of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846 and its Revision I.

55 FR 13208 April 16, 1990

EPA issued a SARA final rule, effective October 17, 1990, on reporting hazardous substance activity when **selling or transferring Federal property.**

STATE AUTHORIZATIONS

55 FR 5600 February 16, 1990

EPA published a compliance schedule for **Kentucky** to modify its hazardous waste program to incorporate federal program requirements promulgated between July 1, 1987 and June 30, 1988.

55 FR 7318 March 1, 1990

EPA issued a final authorization for the **Texas** RCRA program, effective March 15, 1990.

55 FR 7320 March 1, 1990

EPA issued a final authorization for the **Illinois** RCRA program, effective April 30, 1990, subject to public review and comment.

55 FR 7896 March 6, 1990

EPA granted **New York** RCRA authorization, effective May 7, 1990, subject to review and comment.

55 FR 9880 March 16, 1990

EPA granted final RCRA authorization for revisions to the **Minnesota** hazardous waste program, effective May 15, 1990, and published a compliance schedule for modifications to the **Ohio** hazardous waste program.

55 FR 10076 March 19, 1990

EPA proposed to grant final authorization to **New Mexico** for revisions to its RCRA program (including radioactive mixed wastes), subject to public review and comment.

55 FR 11015 March 26, 1990

EPA granted final authorization for the **Idaho** RCRA program and interim authorization for Idaho to administer the corrective action provisions under HSWA, effective April 9, 1990.

55 FR 11909 March 30, 1990

EPA granted final RCRA authorization to the **Oregon** hazardous waste program revision, subject to public review and comment, effective May 29, 1990.

55 FR 14280 April 17, 1990

EPA published compliance schedules for **Delaware** and **Maryland** to receive RCRA authorization.

55 FR 18112 May 1, 1990

EPA codified its approval of recent revisions to **Michigan's** RCRA program, effective July 2, 1990.

RQ ADJUSTMENTS

55 FR 4879 February 12, 1990

EPA proposed to **exempt barium sulfate** from the extremely hazardous substance reporting requirements for "barium compounds" under SARA Title III.

55 FR 5220 February 14, 1990

Effective immediately, EPA **deleted non-fibrous forms of aluminum oxide** from the list of extremely hazardous chemicals subject to reporting requirements under SARA Title III. Fibrous forms of Al_2O_3 remain listed.

55 FR 5544 February 15, 1990

EPA issued a CERCLA final rule (proposed July 21, 1989) **deleting dimethyl sulfide, isopropyl formate, methyl disulfide, phenol 2,2'-thiobis, piprotal, and sodium pentachloro-phenate** from the SARA Title III extremely hazardous substance list. The threshold planning quantity of **muscimol** was changed, and the rationale for listing **phosphorus pentoxide** was discussed.

C. RCRA/CERCLA Update August 1990

RCRA/CERCLA Update

A Report from the Office of Environmental Guidance of the U.S. Department of Energy

Vol. 90. Issue 3 ***August 1990***

RCRA THIRD THIRD FINAL RULE ISSUED

On June 1, 1990, EPA published RCRA Land Disposal Restrictions (LDRs) for the Third Third Scheduled Wastes (55 FR 22519). The rule, retroactively effective May 8, 1990, set treatment standards and effective dates applicable to radioactive mixed wastes (RMW) that contain First, Second, and Third Third components; characteristic wastes; soft hammer First and Second Third wastes; multisource leachates; and lab pack wastes. Separate treatability groups and treatment standards were specified for certain RMW. Highlights of this rulemaking are discussed below.

National Capacity Variances

EPA granted a three-month national capacity variance from the effective date for all wastes covered by the rule and a longer variance for some waste categories. A two-year national capacity variance was stipulated for RMW that contains First, Second, and Third Third wastes, or that is mixed with soil and debris. This two-year variance was allowed because of insufficient treatment capacity. Data submitted by DOE were used to make the capacity determination for RMW.

Treatability Groups for RMW

For the first time, separate LDR treatability groups are established for four types of RMW, including:

- ❑ "vitrification" for the high-level waste fraction generated during fuel rod reprocessing;
- ❑ "macroencapsulation" for radioactive lead solids excluding lead-containing treatment residuals, hydroxide sludges, other wastewater treatment residuals, or certain organo-lead materials and incinerator ashes;
- ❑ "amalgamation" for RMW containing elemental mercury; and
- ❑ "incineration" for mercury-containing hydraulic oil contaminated with radioactive materials.

For RMW not in one of the above treatability groups, the treatment standards for the corresponding nonradioactive hazardous waste will apply.

Characteristic Hazardous Waste

Treatment standards finalized for characteristic hazardous waste include: (1) in some instances treatment to concentration levels equal to or above hazardous characteristic levels; (2) in other instances (e.g., Extraction Procedure (EP) toxic pesticide nonwastewaters, reactive cyanides), treatment to concentration levels below hazardous characteristic levels; (3) "deactivation" to remove hazardous characteristics; or (4) specified treatment technologies. For all EP toxic metal wastes, treatment standards are set at the EP characteristic concentration levels, except that for selenium, which is slightly greater. For corrosive hazardous wastes and some ignitable and reactive wastes, "deactivation" is the standard.

Radioactive zirconium fines fall under the "D001 Ignitable Reactives Subcategory." Stabilization is acceptable for achieving "deactivation."

Use of the TCLP

On March 29, 1990 (55 FR 11798), EPA finalized revisions to the Toxicity Characteristic (TC) used to identify wastes as hazardous by the toxicity characteristic *(see EH-231 memorandum entitled "Toxicity Characteristic Final Rule," dated April 9, 1990)*. With the exception of lead characteristic nonwastewaters and all nonwastewaters containing arsenic, the Toxicity Characteristic Leaching Procedure (TCLP) also will be used for determining compliance with LDR standards for EP toxic metals. This is because the TCLP will replace the EP toxicity test after September 25, 1990, and under the LDRs, the TCLP will now be used to measure performance where immobilization is defined as Best Demonstrated Available Technology (BDAT). For lead characteristic nonwastewaters and all nonwastewaters containing arsenic, however, either the EP or TCLP may be used to determine compliance with LDR standards.

The Third Third final rule clarifies that wastes newly identified by the TC are not currently subject to the LDRs, unless they are also EP-toxic. This is the case even where constituents exhibiting the new TC are also constituents regulated under the EP toxicity characteristic. These TC wastes are designated as "newly identified wastes" in accordance with RCRA 3004(g)(4). Under this statutory provision, LDR determinations are to be made within 6 months of the March 29, 1990, TCLP final rule. However, these TC wastes will not be automatically prohibited from land disposal if EPA fails to make the determinations within six months.

Dilution Prohibition

Generally, LDR wastes cannot be diluted as a substitute for adequate treatment. However, the Third Third final rule identifies certain exemptions from the dilution prohibition or situations in which dilution would be permissible. Dilution is not impermissible for:

- ❑ characteristic wastes that are treated in accordance with permits or pretreatment requirements of the Clean Water Act, except in cases where a specific method of treatment has been designated in the final rule;
- ❑ characteristic wastes that are discharged into Class I injection wells subject to the Safe Drinking Water Act Underground Injection Control regulations, as long as the characteristic is removed before the wastes are disposed;
- ❑ mixing of most non-toxic characteristic hazardous wastes (i.e., purely corrosive wastes and non-toxic ignitable or reactive wastes) to eliminate the characteristic;
- ❑ prohibited wastes that are aggregated and legitimately treated in centralized treatment systems that meet BDAT;
- ❑ wastes for which dilution is a legitimate form of treatment or a necessary pretreatment step in a treatment system; and
- ❑ waste streams that are aggregated for purposes of treatment provided all of the wastes are legitimately amenable to the same type of treatment and such treatment is utilized.

Lab Packs

The Third Third rule provides two new alternate treatment standards for two categories of lab packs. For lab packs containing (1) certain organic, inorganic, or organometallic hazardous wastes identified in new Appendix IV to Part 268; (2) D002 corrosive wastes; or (3) D003 reactive wastes, the treatment standard is incineration followed by treatment to

(continued on page 2)

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Third Third Rule

(continued from page 1)

meet the standards identified in Appendix IV for the EP toxic metals. Additionally, incineration is the alternate treatment standard for lab packs containing certain organic hazardous wastes identified in new Appendix V to Part 268. Lab packs with hazardous wastes other than those listed in Appendices IV and V are not eligible for the alternate treatment standards and must comply with the applicable treatment standards for each waste that the lab pack contains.

Multi-Source Leachate

In the Third Third Final Rule, EPA establishes a separate treatability group for multi-source leachate — leachate derived from treatment, storage, or disposal of more than one listed waste — and lists it under the new waste code F039. BDAT treatment standards for multi-source leachate will be a fixed set of concentration-based nonwastewater standards and a separate set of concentration-based wastewater standards. Wastes meeting the definition of multi-source leachate must be classified as F039 and will be subject to the applicable F039 treatment standard.

To determine the adequate treatment standard for F039 multi-source leachate, an initial analysis of all F039 regulated constituents must be made. Based on this analysis and any other pertinent information available, those constituents, for which analysis must be made on a regular basis, will be identified. These constituents and the testing frequency will be determined by the permit writer. If existing permits do not address multi-source leachate, permit modifications will be required.

Separate standards were not promulgated for multi-source leachate that only exhibits hazardous characteristics. Such multi-source leachates or the resulting treatment residues must meet the treatment standard for the characteristic.

Storage Prohibition

In the Third Third proposed rulemaking, EPA acknowledged that some legitimate storage may be prohibited under the existing interpretation of the LDR storage prohibition, requested public comment on alternative interpretations, and offered one possible approach. The consolidated DOE comments (EH-231 memorandum dated February 13, 1990) provided extensive comments on this issue, indicated that DOE currently lacks sufficient treatment and disposal capacity to handle its RMW, urged EPA to allow long-term storage when treatment capacity is legitimately being developed, and suggested regulatory language for implementing an alternative that would allow for legitimate storage. In the final rule, however, EPA decided to retain its longstanding interpretation of the storage prohibition.

The issue, however, is not dead. DOE is continuing to reiterate and further clarify the difficulties imposed on RMW management for DOE as a result of the LDR storage prohibition. Actions related to this effort include the following:

- ❑ On January 12, 1990, Secretary of Energy James D. Watkins announced that DOE would prepare a programmatic environmental impact statement (PEIS) on DOE's waste management activities. The PEIS will analyze alternative configurations for DOE's waste treatment and disposal facilities and will provide a framework for comprehensive decisions about the management of DOE's RMW.
- ❑ On June 14, 1990, EH-20 met with the EPA Assistant Administrator for Solid Waste and Emergency Response to discuss RMW issues related to the LDR storage prohibitions. During this meeting the Department stressed that the final policy on the RMW storage issue should address both the DOE as well as the commercial sector.
- ❑ On July 13, 1990, in a letter from EH-20 to the EPA Assistant Administrator for Solid Waste and Emergency Response, DOE raised concerns that the proposed EPA approach to rely solely on Federal Facility Compliance Agreements (FFCAs) to address DOE's LDR storage prohibition problems "does not provide an effective framework within which DOE can make informed decisions about prioritization of currently planned near-term (limited) treatment capacity, nor does it provide for responsible decision-making regarding the best complex-wide configuration (locations, capacities, technologies) for new treatment and disposal facilities." The letter reiterated concerns that DOE's LDR problems are national in scope and that "the best solutions to its LDR problems will result from a comprehensive approach, rather than from site-specific piecemeal commitments."

This article is based on a July 9, 1990, memorandum from EH-231 (now EH-23) to Program and Field elements, entitled "Final Rule Regarding Land Disposal Restrictions for Third Third Scheduled Wastes." For further assistance in understanding this final rule or in determining LDR impacts on ongoing operations, please contact Bill Fortune, RCRA/CERCLA Division, EH-231, at FTS 896-7302 or (202) 586-7302 or contact Tim Harms, RCRA/CERCLA Division, EH-231, at FTS 896-6073 or (202) 586-6073.

SOLVING THE LDR "PUZZLE"

According to an article in the May 1990 issue of ***Environmental Manager***, the Third Third LDR final rule completes one of EPA's largest and most confusing regulatory efforts to date. The article, entitled "Solving the Land Ban Puzzle," tries to clarify the LDR "puzzle" by tracing the history behind the regulations and outlining the LDR treatment, testing, and disposal requirements. A brief synopsis of this article follows.

The LDRs were required by the Hazardous and Solid Waste Amendments (HSWA) of 1984, which directed EPA to establish treatment standards for all RCRA hazardous wastes prior to their land disposal. To prevent the delays typically associated with the EPA rulemaking process, Congress included "hammer" dates in the statute. If standards were not issued by these dates, land disposal of the wastes would be prohibited. EPA met the Congressional timetable by promulgating standards for solvent and dioxin wastes on November 7, 1986, California List wastes on July 8, 1987, "First Third" scheduled wastes on August 17, 1988, "Second Third" wastes on June 23, 1989, and "Third Third" wastes on June 1, 1990.

LDR regulations require that a waste be treated prior to its land disposal. Treatment standards are either technology-specific or performance-based (not risked based). Technology-specific standards (40 CFR 268.42) allow no choice of a treatment method except for the one indicated (e.g., toluene diisocyanate must be burned in an incinerator, boiler, or industrial furnace). Performance-based standards, on the other hand, allow the use of any available technology that achieves certain numerical treatment levels. For example, the spent solvent 1,1,1-trichloroethane must be treated to 0.41 mg/L. This can be met by incineration, biotreatment, or wet-air oxidation.

After a hazardous waste has been treated, it must be analyzed to verify that the treatment standard was met. Testing may be by Total Constituent Analysis (TCA) and/or via the TCLP. In general, TCA is used to test for organic and cyanide constituents, and the TCLP is used to test for inorganic constituents. In some cases, where wastes contain both organic and inorganic constituents, they would undergo a "treatment train." For example, a hazardous waste stream consisting of both organic constituents and toxic metals first would be incinerated and then analyzed by TCA. Next the ash residuals would be stabilized to immobilize the inorganic constituents. Finally, the TCLP would be used to measure the success of the stabilization process.

The treatment standards are met if the results from a TCA test meet the values in the Constituent Concentration in the Waste (CCW) Table (40 CFR 268.43) or if the results from a TCLP analysis meet the values of the Constituent Concentration in the Waste Extract (CCWE) Table (40 CFR 268.41). The waste codes in the CCW and CCWE tables are for performance-oriented treatment standards. For those wastes that have technology-specific treatment standards, the process specified in the standards satisfies the treatment requirements, and no analysis is required. Once the wastes have met the treatment standards, they can be placed in a RCRA Subtitle C "land disposal unit" — landfill; surface impoundment; deep injection well; land farm; salt dome or bed formation; or underground mine, cave, or waste pile.

In light of the new Third Third regulations, Program and Field Office personnel are encouraged to contact EH-23 about the changes in waste treatment procedures that will be brought about by this relatively new regulatory program.

SIERRA CLUB SUIT AT ROCKY FLATS SUCCESSFUL

In an April 12, 1990, decision in *Sierra Club v. U.S. Department of Energy* (No. 89-B-181, D. Colo.), a federal district court determined that certain plutonium-bearing materials being stored at the Rocky Flats Plant are RCRA hazardous waste. The materials in question were combustibles and ash that contained levels of plutonium above the economic discard limit and a nonradioactive waste component. During the plutonium recovery process at Rocky Flats, the material was burned in a special Nuclear Material Recovery Incinerator, reducing it to ash, and then stored (in some cases up to ten years) for later reprocessing to recover the plutonium.

The court said that the non-plutonium portion of the material was being stored for "discard" — a key determination that makes the material subject to RCRA. Citing *American Mining Congress v. EPA* (824 F.2d 1177, D.C. Cir., 1987), the court determined that "[n]either the hazardous waste nor the plutonium mixed with it was destined for immediate reuse and neither passes in a continuous stream or flows from one production process to another. Instead, the mixed waste is stored for incineration that allows ultimate recovery of plutonium."

The court dismissed DOE's argument that action on the Sierra Club motion should be deferred because of an agreement that DOE had signed with the State of Colorado on November 3, 1989, to characterize all residues at Rocky Flats and to determine their RCRA status. The court stated that by resolving the legal status of the material, it was expediting the development and implementation of a reasonable compliance schedule and plan.

As a follow-up to this decision, the Office of Environmental Restoration and Waste Management (EM) is developing a request for information from the sites where the materials in question are being held or stored for future action. The information will be used to develop a compliance strategy and to provide guidance to the sites. ***For further information, contact Dan Ruge, in the Office of the Assistant General Counsel for the Environment (GC-11), FTS 896-6947 or (202) 586-6947.***

HAZARDOUS WASTE BUSINESS BOOMING

According to the May 1990 ***Environmental Manager***, the market for hazardous-waste management services will triple from $8.6 billion in 1989 to $23.2 billion in 1993. A new report by Frost and Sullivan (New York) states that this increase is due in part to emphasis shifting away from the study of hazardous waste problems to their treatment. The different segments of the business are expected to increase in the following ways. Engineering and scientific consulting services will rise from $4.8 billion to $8.2 billion. Actual management of wastes will balloon from $2.8 billion to $12.7 billion. Finally, testing services will increase from $1 billion to $2.3 billion.

"ENVIRONMENTAL COMPLIANCE" SOFTWARE BUSINESS ALSO BOOMING

The increasing number and complexity of state and federal environmental regulations has led to an explosion in the environmental software industry. The number of companies publishing software to help deal with environmental issues has roughly doubled from 1988 to 1989, according to an article in the March/April issue of ***Environment Today***. The most common components that software publishers may offer include:

- ❑ systems that store the data required on Material Safety Data Sheets,
- ❑ right-to-know systems that keep track of employee training and potential exposures,
- ❑ SARA inventory systems that organize data about potentially hazardous substances and produce the needed regulatory and community right-to-know reports,
- ❑ tracking systems that monitor inventories of hazardous substances by recording shipments in and out of a site and documenting on-site usage, and
- ❑ monitoring systems that record emissions on a routine basis and produce the required compliance reports.

Most companies use one of two approaches to environmental compliance software with some offering both. The first approach is modular. A company buys a basic system that usually includes a data management system to record and store data. Then programs, where a few specific tasks are grouped together, are made available separately, so the company can create a system that meets its own particular needs. This approach enables a company to tailor a program to meet its needs, and when updates in regulations are made, only a small section of the system would have to be updated.

The second approach is the single-program approach, where all components are provided in a single package. The main advantage to this approach is cost. Individual programs in a modular system can run from a few hundred dollars to $3,000 each, while an all-in-one package like CHRIS+ can sell for less than $1,500.

The article predicts that the regulatory compliance software industry will go through a fundamental change within the next few years. One change will be in strategy, from a reactive to a proactive approach. The next generation of software will provide information on state and federal laws and regulations that will help companies manage their environmental efforts better and reduce liability risks. Another change will come in the form of multi-user systems, where several sites can access a single software system through remote terminals. This provides consistent, standardized data management for large companies at reduced cost.

RECYCLING — PROGRESS IN THE DOE SYSTEM

In a memorandum to all department employees dated June 18, 1990, Secretary Watkins reiterated his commitment to an increased emphasis on environmental, health, and safety issues for DOE employees. As a consequence, DOE's Forrestal Building Recycling Program was expanded to include newsprint and aluminum cans, in addition to paper. Watkins announced that, so far, DOE has more than doubled recovery of quality paper from 11,000 to 27,000 pounds per week. At this rate, DOE can recycle 1 million pounds of paper per year. For every ton of paper recycled, 3.3 cubic yards of landfill space can be saved, or about 1650 cubic yards per year.

Other recycling successes in the DOE system include the following:

Albuquerque Operations Office reports recent purchases of block products containing 25-30% fly ash and concrete containing 15% fly ash.

Idaho Operation Office reports that its largest procurement contractor purchases roughly 500 retreaded bus tires and 50 retreaded light truck tires per year. Idaho's used toner cartridges are collected and sold to a reprocessor.

Richland Operation Office reports that $39,420 worth of concrete containing fly ash, $37,680 worth of recycled rags, and $172,264 worth of retread tires have been purchased for use on the Hanford Site during 1990. In addition, a program to recycle laser printer toner cartridges was implemented, resulting in a cost savings of $32,000.

Recycling is also being emphasized in the production of DOE paper products. With the exception of classified printing produced in-house, DOE procures its printed products through the U.S. Government Printing Office (GPO). The GPO has encouraged the use of recycled, recovered, and reclaimed materials for some time, but effective July 19, 1989, the GPO has strengthened its position on requiring use of these materials in contracted production of printed materials. New requirements include the following:

- ❑ **offset and writing papers** must have a minimum of 50% recovered materials content,
- ❑ **newsprint** must be at least 40% recovered materials content, and
- ❑ **cotton/linen fiber papers** must be, at minimum, 25% recovered materials.

Contractors producing printing for DOE are required to certify in writing that the percentage of recycled, recovered, or reclaimed materials meets or exceeds the GPO standards, and they must maintain records to allow DOE to verify the accuracy of such claims. (The RCRA/CERCLA Update is printed on recycled paper.)

Ideas and suggestions for additional recycling, recovery, or reclamation efforts should be addressed to Jane Powers, RCRA/CERCLA Division, EH-231, at FTS 896-7301 or (202) 586-7301.

EPA GUIDANCE ON RCRA COVERS

In the document, *Final Covers on Hazardous Waste Landfills and Surface Impoundments* (EPA/530-SW-89-047, July 1989), EPA provides guidance on design of final covers for hazardous waste units. Recommended designs satisfy the requirements of 40 CFR 264 and 265 Subparts G (closure and post-closure), K (surface impoundments), and N (landfills), but the recommendations are for guidance only. Other final cover designs may be acceptable, depending upon site-specific conditions and a determination by EPA that the alternative design adequately fulfills all regulatory requirements. The determination must be preceded by a demonstration that the alternate design will provide a level of performance equivalent to that of the system described in the guidance document.

In the document, EPA's liquids management strategy for landfills and the role that final covers serve in that strategy are outlined. Requirements for interim status and permitted landfills and surface impoundments are also discussed. The recommended final cover system design is presented in detail, including considerations for construction quality assurance (CQA). Particular attention is given to erosion, settlement, and subsidence and their cover-damaging effects. A separate section is devoted to the design details of, and the rationale for, each layer of the cover system.

The recommended final cover design includes the following from top to bottom:

- **A top layer** consisting of two components: (1) a vegetated or armored surface component, which is selected to minimize erosion and promote drainage off the cover, and (2) a soil component with a minimum thickness of 60 cm (24 in.) of topsoil and/or fill soil as appropriate, the surface of which slopes uniformly from 3 to 5 percent.
- **A soil drainage layer** with a minimum thickness of 30 cm (12 in.), a minimum hydraulic conductivity of 1×10^{-2} cm/sec that minimizes water infiltration into the low-permeability bottom layer, and a final bottom slope of at least 3% after settlement and subsidence. Alternatively, the drainage layer may consist of geosynthetic materials with equivalent performance characteristics. The drainage layer also serves as a protective cover for the flexible membrane liner (FML) component of the underlying low-permeability layer.
- **A two-component low-permeability layer** that limits water infiltration into the underlying wastes to a rate less than or equal to the rate of leachate migration out of the bottom liner system and consists of (1) a 20-mm (8-in.) minimum thickness (or greater depending on the material and design) FML component and (2) a 60-cm (24-in.) minimum thickness compacted soil component with an in-place saturated hydraulic conductivity of 1×10^{-7} cm/sec or less.

The FML requirements apply to all permitted and interim status units with an FML in the bottom. Interim status units with clay bottom liners only may not need an FML. Optional layers include (1) a gas vent layer to remove gases produced by the wastes and/or (2) a biotic barrier layer to protect the cover from animal or plant intrusion.

EPA recommends a detailed CQA program, which documents quality and demonstrates compliance with plans and specifications, for each layer of the cover system. The design and specifications must consider many site-specific factors, such as precipitation, construction materials, freeze-thaw phenomena, waste characteristics, potential subsidence, and other environmental factors.

The guidance document, "Final Covers on Hazardous Waste Landfills and Surface Impoundments" (EPA/530-SW-89-047, July 1989), can be obtained from the RCRA Docket, U.S. Environmental Protection Agency, 401 M. Street, SW, Washington, D.C. 20460.

RCRA CORRECTIVE ACTION PROPOSAL ISSUED

After a 21-month deadlock with the Office of Management and Budget (OMB), EPA released the proposed rule for cleaning up RCRA hazardous waste treatment, storage, and disposal facilities. In the July 27, 1990, *Federal Register* "milestone" notice (55 FR 30798), EPA lays out its philosophy for how RCRA facilities will clean up releases of hazardous wastes to the environment. According to EPA, the proposed rule will affect between 3,000 and 4,000 RCRA facilities and cost between $10 billion and $60 million over the next 20 years. EPA's ten regions and the six states authorized to carry out RCRA corrective action programs are being encouraged to use the proposed rule as "de facto" guidance even though it is only a proposal at this time. Final action on the rule will be delayed for at least 18 months to allow EPA to perform a new cost estimate.

The proposed rule is flexible enough to address both large sites with complex contamination problems and small spills of hazardous wastes. One of the major features of the proposal is a provision that would allow several contaminated units within a facility to be considered a single "corrective action management unit" (CAMU) for the purpose of cleanup if they are next to each other and there is no uncontaminated soil between them. This provision allows waste to be moved from one smaller unit to another within the larger CAMU without violating RCRA's land disposal restrictions, which state that once a waste is removed from a unit it cannot be placed in the ground without first undergoing treatment. In essence, a CAMU can be considered to be a large, land-based unit. OMB insisted on including the CAMU concept in the rule, even though EPA officials expressed reservations about it.

The proposal sets cleanup standards for groundwater, surface water, soils, and air that ensure protection of human health and the environment. In the proposal, the protective risk range for carcinogens is 10^{-6} - 10^{-4} probability of cancer. At the insistence of OMB, this range was narrowed from the 10^{-7} - 10^{-4} range proposed earlier (similar action was taken in the final NCP). The proposal also sets up a number of relief mechanisms that allow an EPA Regional Administrator to decide not to clean up a site to the specified standards if (1) there is no threat of exposure from releases from the unit or (2) cleanup to the standards specified would not result in any significant reduction in risk to human health or the environment or (3) a cleanup is technically impracticable.

One controversial provision would allow "conditional remedies" — remedies that take the form of a phased-in cleanup over an extended or undetermined period of time. Conditional remedies would allow the contamination to remain within the facility boundary as long as any release outside of the boundary is cleaned up. EPA Superfund officials have objected to the idea, which was OMB-prompted, saying that "indefinite postponement of cleanup is the wrong message to give the public as well as responsible parties."

EH-231 distributed copies of the proposed rule to Program Offices and Field Elements for review and comment on July 20, 1990. Additional copies of the rule are available from the Bureau of National Affairs, FTS 452-4323, and general information can be obtained form the RCRA hotline, FTS 382-3000. Specific questions can be addressed to David M. Fagan, Office of Solid Waste (OS-341), EPA, 401 M. Street, SW, Washington, D.C. 20460 at FTS 382-4740. Questions concerning the proposed rule's impact on DOE should be addressed to Jerry Coalgate, EH-231, RCRA/CERCLA Division, at FTS 896-6075 or (202) 586-6075.

EPA REVERSES RISK ASSESSMENT POLICY

In a major policy change, EPA has decided that in the future it will perform all risk assessments associated with CERCLA cleanups, reversing the former policy that allowed potentially responsible parties (PRPs) to perform risk assessments. Environmentalists, who have often argued that allowing PRPs to assess risks at their sites "is like letting the fox guard the chicken coop," hailed the move as a "good first step" towards improving Superfund's effectiveness. Industry sources are worried that EPA may overestimate risks in order to demand more cleanup money from industrial polluters.

The decision was a result of a study comparing EPA-lead Superfund cleanups with cleanups planned and designed by PRPs. The study concluded that there was no significant difference between fund-lead (EPA) cleanups and enforcement-lead (PRP) cleanups, but that there was "substantial inconsistency in the calculation of risks." The new policy is designed to ensure that all cleanups are predicated on the same set of assumptions about significant risk factors. It not clear what impact this policy reversal will have on cleanups at federal facilities where the federal agency is both the "lead" agency and the PRP. It is expected that this issue will be addressed in the upcoming proposal on Subpart K of the NCP.

UPDATE ON DOE'S OBSERVATIONAL APPROACH

Stung by criticism that cleanups under CERCLA are fraught with delays and excessive paper studies, EPA professes a new bias for prompt action. This new emphasis on streamlining the CERCLA cleanup process has led to new language in the NCP on goals, management principals, and expectations. In addition, EPA plans to issue guidance on its streamlined approach in the future. In the meantime, DOE is developing a streamlined approach of its own — the "observational approach." The new approach will seek to address uncertainties up front in the analytical and planning phases of the remedial action process so that contingency plans can be formulated and unexpected results or new discoveries do not "bottleneck" the process and necessitate beginning it over again.

The tenets of the observational approach have been set forth in a paper by Scott Myers of PNL following a workshop held in June and July 1989. The observational approach team, consisting of representatives from EH, PNL, and CH2M Hill, gave a presentation to AL, Los Alamos Area Office, and LANL personnel on July 11, 1990. The purpose of the presentation was to determine whether the observational approach could be useful for environmental restoration efforts at Los Alamos and whether this could become the Department's "test case" in demonstrating the method complex-wide.

The presentation, which was well received, started with a formal description of the observational approach. The Los Alamos staff then gave seven sampling strategy cost estimation scenarios based on generic environmental restoration efforts at LANL (e.g., canyons, firing sites, and outfalls). The observational approach team found that many of the assumptions that were used to develop the scenarios were consistent with the tenets of the observational approach. For example, the "most likely" remedial actions had already been identified through the extrapolation of data to a set of "most probable" conditions. The team also determined that while the observational approach was not designed to be applied to sampling strategies developed as cost estimation tools, the LANL group, in developing their cost estimation tools, used many of the tenets of the observational approach.

After the cost estimation scenarios were presented, it was determined that the LANL environmental restoration efforts would not present the optimal conditions needed to serve as the Department's "test case" because most of the planned operations, such as capping in place and excavation, would not provide the range of restoration considerations and processes needed. EH and AL have since discussed the possibility of applying the observational approach to a groundwater contamination problem at Sandia National Laboratory.

For more information on the observational approach, including possible presentations, help on, or reviews of environmental restoration work plans by the observational approach team, please contact Rich Dailey, RCRA/CERCLA Division, EH-231, at FTS 896-7117 or (202) 586-7117.

RECENT EH-231 GUIDANCE DOCUMENTS

The RCRA/CERCLA Division, Office of Environmental Guidance (EH-23), has recently prepared and distributed four guidance manuals to DOE Program Offices and Field Organizations. These manuals address RCRA and CERCLA topics of interest to the Department and contractor personnel involved in hazardous waste management and site remediation activities. The four new guidance manuals are:

- ***The Federal Environmental Reporting Requirements Handbook.*** The handbook was developed to assist in the identification of various reporting requirements mandated by federal environmental laws, regulations, and Executive Orders. For further information or to request copies of this document, please contact Rich Dailey, EH-231, at FTS 896-7117 or (202) 586-7117.

- ***Obtaining Variances from the treatment Standards of the RCRA Land Disposal Restrictions.*** This guidance manual was developed to assist in the preparation of treatability variance petitions. For further information or to request copies of this document, please contact Bill Fortune, EH-231, at FTS 896-7302 or (202) 586-7302.

- ***Catalog of Applicable or Relevant and Appropriate Requirements (ARARs) Fact Sheets.*** This catalog provides all 15 EPA Fact Sheets prepared to date on applicable or relevant and appropriate requirements (ARARs) for CERCLA cleanup activities. For further information or to request copies of the ARARs catalog, please contact Jerry DiCerbo, EH-231, at FTS 896-5047 or (202) 586-5047.

- ***Closure of Hazardous and Mixed Radioactive Waste Management Units at DOE Facilities.*** This manual was developed to provide guidance for compliance with the RCRA Subtitle C closure and post-closure care requirements for hazardous waste facilities. For further information or to request copies of the manual, please contact Jerry Coalgate, EH-231, at FTS 896-6075 or (202) 586-6075.

A CHECKLIST FOR WASTE MINIMIZATION PLANS

Oak Ridge's Hazardous Waste Remedial Actions Program (HAZWRAP) has developed a comprehensive checklist for environmental managers to use when reviewing waste minimization plans. The checklist asks detailed questions on waste reduction goals; budget, implementation strategy, and schedule; costs; research and development; program evaluation; and other activities. Responses to these questions allow the assessment of the overall quality of the waste minimization plan, its major strengths and weaknesses, and whether the plan should be revised. ***For more information on the checklist, please contact Joe Coleman, EM-35, FTS 233-4728 or (202) 353-4728.***

On June 27, 1990, John Tuck (S-1), Leo Duffy (EM-1), and Peter Brush (EH-1) signed the "Waste Reduction Policy Statement," which proposes to reduce the total amount of hazardous, nonhazardous solid, radioactive, and mixed waste generated and disposed of by DOE operating facilities. Also distributed was guidance for implementing the waste minimization program and plan required in DOE Order 5400.1, *General Environmental Protection Program.*

TAGS — THE HIDDEN COSTS

Section 117(e) of CERCLA authorizes technical assistance grants (TAGs) of up to $50,000 for groups to obtain assistance in interpreting information related to cleanups at sites listed on the National Priorities List (NPL). The purpose of a TAG is to foster greater participation from the affected groups in the decision-making process at NPL sites.

TAGs also are available to groups who may be affected by DOE facilities on the NPL. Although DOE may not receive Superfund money for cleanup operations at its NPL sites, DOE may still be liable for TAGs at all NPL sites in which DOE is deemed the primary responsible party. EPA's policy is to recover the total amount of the grants in addition to any administrative costs from responsible parties at NPL sites.

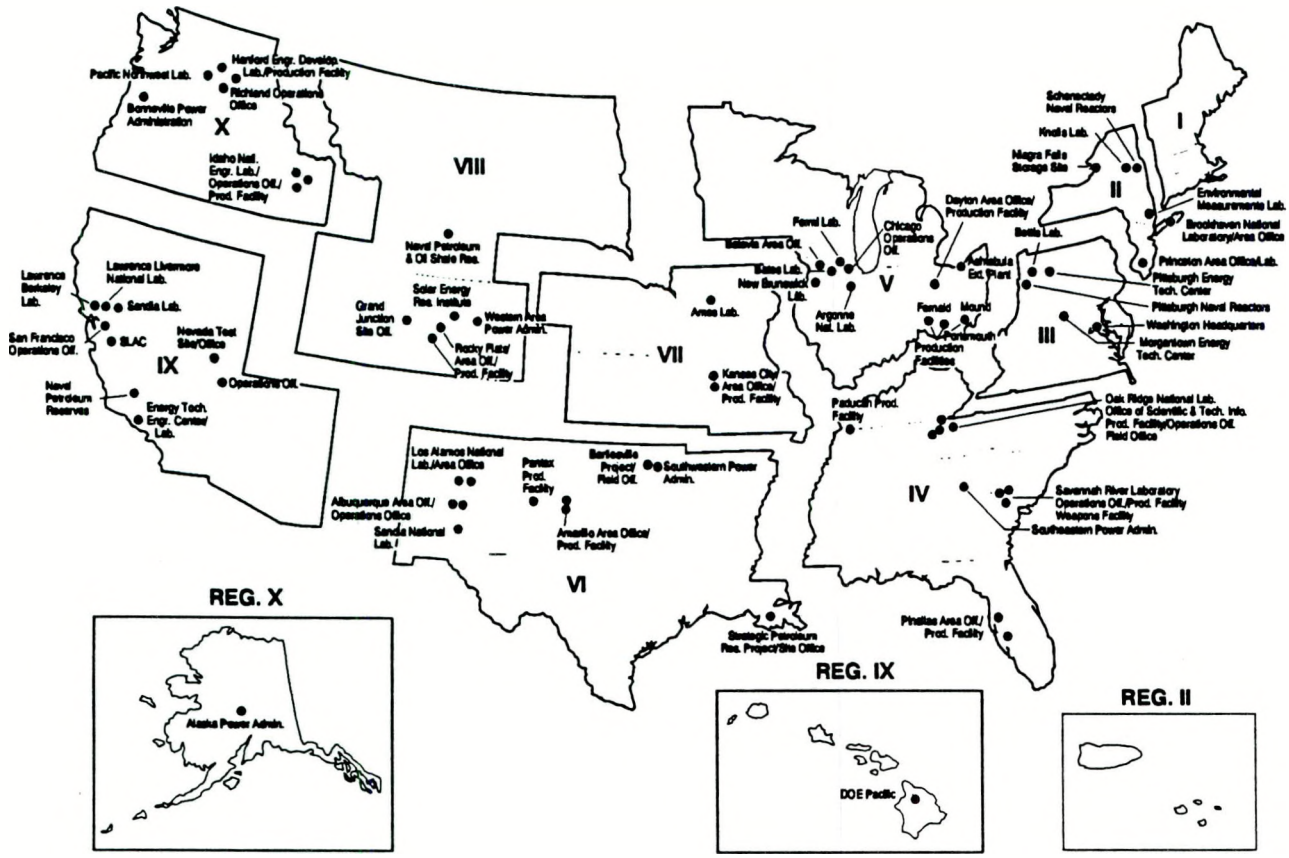
Managers planning environmental restoration activities at DOE's NPL sites should consider TAGs as potential hidden costs in CERCLA cleanups and prepare their budgets accordingly. EPA published an interim final rule on TAGs on March 23, 1988 (53 FR 9736), and amended it on December 1, 1989 (54 FR 49848). A final rule is expected in September 1991.

PLEASE SEND US YOUR COMMENTS, ARTICLES & PHOTOS!

If you think this report is (or is not) informative; if you have any suggestions to make future reports more helpful; or if you would like to contribute articles, photographs, or other information for possible publication, we would like to hear from you. Please send your comments, suggestions, and materials to:

Mr. Jerry L. Coalgate
Editor, RCRA/CERCLA Update
Office of Environmental Guidance, EH-23
1000 Independence Ave., SW
Washington, DC 20585
FTS 896-6075/(202) 586-6075

Operating DOE Facilities by EPA Region



Not Sure Where You Are?
The Offices of Environmental Guidance and Environmental Compliance Can Help You!

Office of Environmental Guidance, EH-23

Ray Pelletier	Office Director	(FTS) 896-8505
FAX		896-3915

RCRA/CERCLA Division, EH-231

Thomas Traceski	Division Director	896-2481
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Jerry Coalgate	RCRA	896-6075
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Mark Stahr	San Francisco	896-7879
Marilyn Stone	LLNL	896-5942

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Frank Russo	Division Director	896-7882
Bill Eckroade	Savannah River Site	896-7881
Al Feldt	Idaho	896-6570
Rick Green	Savannah River Site	896-4160
Glenn Hardcastle	Hanford	896-8144
Randy Kaltrieder	Idaho	896-4440
Melvin Leifer	Richland	896-5227
Steve Woodbury	Chicago	896-4371

Meetings/Seminars/Courses

AIRBORNE TOXICS MANAGEMENT

August 27-29, 1990
East Brunswick, NJ
$895.00

Contact:
Registrar
P.O. Box 964
East Brunswick, NJ 08816-0964
(201) 613-4500

ORGANIC EMISSIONS FROM TREATMENT, STORAGE & DISPOSAL FACILITIES

August 28-29, 1990
Boston, MA
September 11-12, 1990
New York, NY

Contact:
Peer Consultants, Inc.
(513) 252-1222

AIR & WASTE MANAGEMENT ASSOCIATION SPECIALTY CONFERENCE ON POLLUTION PREVENTION THROUGH WASTE MINIMIZATION, RECYCLING & REUSE

September 10-21, 1990
Arlington, TX

Contact:
Air & Waste Management Association
P.O. Box 2861
Pittsburgh, PA 15230
(412) 232-3444

NEGOTIATIONS SKILLS DEVELOPMENT TRAINING COURSE APPLICABLE TO HAZARDOUS WASTE DISPUTES

September 18-20, 1990
Washington DC
November 14-16, 1990
Albuquerque, NM
January 8-10, 1991
San Francisco, CA

Contact:
Mark Petts
FTS 896-2609 or (202) 586-2609

POLLUTION PREVENTION THROUGH WASTE MINIMIZATION, RECYCLING & REUSE

September 19-21, 1990
Arlington, TX

Contact:
Joe Fedorka
Air & Waste Management Association
P.O. Box 2861
Pittsburgh, PA 15230
(412) 232-3444

HYDROCARBON CONTAMINATED SOILS

September 24-27, 1990
Amherst, MA

Contact:
Paul T. Kostecki
Environmental Health & Sciences
Division of Public Health
University of Massachusetts
Amherst, MA 01003
(413) 545-2934

SUPERFUND AMENDMENTS & REAUTHORIZATION ACT (SARA) TITLE III WORKSHOP

September 26-27, 1990
Atlanta, GA
$225.00

Contact:
Education Extension-R
Georgia Institute of Technology
Atlanta, GA 30332-0385
(404) 894-2400 or (800) 325-5007

CERCLA/SUPERFUND: LEGAL & MANAGEMENT STRATEGIES

October 4-5, 1990
Washington, DC
$895.00

Contact:
Government Institutes, Inc.
966 Hungerford Drive, #24
Rockville, MD 20850
(301) 251-9250

INNOVATIVE CLEANUP OF CONTAMINATED SOILS & GROUNDWATER

October 8-15, 1990
Erice-Trapaini-Sicily, Italy
$900.00

Contact:
Richard C. Ragaini, Department Head
Environmental Protection Department, L-192
Lawrence Livermore National Laboratory
Livermore, CA 94550
(415) 423-8875

LEAKING UNDERGROUND STORAGE TANK WORKSHOP

October 23-26, 1990
Atlanta, GA
$550.00

Contact:
Education Extension-R
Georgia Institute of Technology
Atlanta, GA 30332-0385
(404) 894-2400 or (800) 325-5007

THE DOE MODEL CONFERENCE ON WASTE MANAGEMENT & ENVIRONMENTAL RESTORATION

October 29 - November 2, 1990
Oak Ridge, TN

Contact:
Kimberly Collins
DOE Model Conference
Analysas Corporation
300 Tulane Avenue
Oak Ridge, TN 37830
(615) 576-0650 or FTS 626-0650

PETROLEUM HYDROCARBONS & ORGANIC CHEMICALS IN GROUND WATER: PREVENTION, DETECTION & RESTORATION

October 31 - November 2, 1990

Contact:
The National Water Well Association
P.O. Box 182039/Dept. #017
Columbus, OH 43218
(614) 761-1711

HOW CLEAN IS CLEAN? CLEANUP CRITERIA FOR CONTAMINATED SOIL & GROUNDWATER

November 7-9, 1990
Boston, MA

Contact:
Joe Fedorka
Air & Waste Management Association
P.O. Box 2861
Pittsburgh, PA 15230
(412) 232-3444

SEMINAR ON POLLUTION PREVENTION STRATEGIES

November 15-16, 1990
Sheraton Crystal City Hotel
Arlington, VA
February 26-27, 1991
Red Lion Inn
Seattle, WA

Contact:
Dick Miller
Geraghty & Miller, Inc.
(212) 371-1620

SUPERFUND '90

November 26-28, 1990
Washington, DC

Contact:
Hazardous Materials Control Research Institute
9300 Columbia Boulevard
Silver Spring, MD 20910-1702
(301) 587-9390

From the federal register

FINAL RULES

55 FR 22519 June 1, 1990

EPA issued the final RCRA rule on Land Disposal Restrictions for the **Third Third hazardous wastes**. The rule, which is effective May 9, 1990, includes treatment standards for multi-source leachates and mixed wastes.

55 FR 25454 June 21, 1990

EPA issued an immediately effective RCRA final rule on **standards for organic air emissions** from process vents and equipment leaks at Subtitle C treatment, storage, and disposal facilities. A background information document and a technical guidance document are available from the EPA library in Research Triangle Park, NC.

55 FR 30166 July 24, 1990

EPA published the final CERCLA rule on **reporting requirements for continuous releases** of hazardous substances. The rule is EPA's interpretation of CERCLA Sect. 103(f)(2).

55 FR 30631 July 26, 1990

EPA promulgated a final rule on **reporting requirements for extremely hazardous substances** under Sects. 311 & 312 of SARA Title III. The rule expands reporting requirements to all facilities required to prepare or have available a Material Safety Data Sheet under OSHA regulations.

STATE AUTHORIZATIONS

55 FR 21383 May 24, 1990

EPA granted final RCRA authorization to **Texas** for revisions to its hazardous waste program, subject to review and comment.

55 FR 22916 June 5, 1990

EPA published a compliance schedule for **South Carolina** to modify its RCRA program.

55 FR 25836 June 25, 1990

EPA granted final RCRA authorization, subject to review and comment, to **North Dakota** for revisions to its hazardous waste system. Effective August 24, 1990.

55 FR 28028 July 9, 1990

EPA published a revised RCRA compliance schedule for **Kentucky** to modify its hazardous waste program to adopt federal program modifications.

55 FR 28397 July 11, 1990

EPA granted final RCRA authorization to the revised **New Mexico** hazardous waste program, effective July 25, 1990.

PROPOSED RULES — CORRECTIONS — MISCELLANEOUS

55 FR 18726 May 4, 1990

EPA issued an immediately effective technical amendment to the final and interim final rules of May 19, 1980, on criteria for **listing hazardous wastes**.

55 FR 19262 May 9, 1990

EPA corrected the RCRA final **codification rule** of July 15, 1985, in response to litigation. The correction applies to certain landfill and surface impoundment units for which the Part B permit application was received by November 8, 1984.

55 FR 20678 May 18, 1990

EPA corrected the NPRM of April 27, 1990, on **hazardous waste incinerators**.

55 FR 22176 May 31, 1990

EPA published a list of approved **asbestos training courses** and state accreditation plans.

55 FR 23737 June 12, 1990

EPA corrected the April 27, 1990, technical amendment to the RCRA **underground storage tank** regulations of September 23, 1988.

55 FR 25876 June 25, 1990

EPA published the results of its technical review of **phosphoric acid**, which was prepared in response to a petition (now withdrawn) to delist it from the SARA Title III list of "extremely hazardous chemicals."

55 FR 25976 June 26, 1990

EPA issued corrections to the May 2, 1986, RCRA final rule on **closure**.

55 FR 26986 June 29, 1990

EPA corrected the RCRA final TCLP rule of March 29, 1990, to ensure consistency of **Method 1311** with other test methods in SW-846. In addition, the section on quality assurance was clarified.

55 FR 27228 July 2, 1990

EPA corrected the RCRA interim final rule of March 24, 1989, on **management of medical waste**.

55 FR 29230 July 18, 1990

EPA proposed to amend the definition of **"wastewater treatment unit"** in 40 CFR 260.10 and 270.2 to clarify that thermal treatment units (except for sludge dryers) are not "wastewater treatment units" and not exempt from RCRA.

55 FR 30798 July 27, 1990

EPA proposed requirements for **corrective action** at RCRA treatment, storage, and disposal facilities. The proposal covered remedial investigations, remedy selection, closure, and state authorization standards.

FUTURE REGULATORY INITIATIVES*

August 1990

- A proposed CERCLA rule on **Type B Natural Resource Damage Assessments**
- A final CERCLA rule on **Federally Permitted Releases** and exemptions from CERCLA reporting requirements
- A proposed RCRA rule on **location standards** for treatment, storage, and disposal facilities
- A proposed RCRA rule on **air emissions standards for volatile organics** from treatment, storage, and disposal facility process vents and equipment leaks — Phase II
- A proposed RCRA rule on **permit modifications** to correct omitted requirements

September 1990

The TCLP final rule of March 29, 1990 (55 FR 11797), will be effective on September 25, 1990.

- A proposed **Subpart K** of the NCP, CERCLA requirements for federal facilities
- A proposed rule on the **CERCLA Cost Recovery Program**
- A proposed RCRA rule on permitting procedures for facilities conducting **experimental hazardous waste research**
- A final RCRA rule amending **groundwater monitoring** regulations

October 1990

The SARA final rule of April 16, 1990, on **reporting hazardous substance activity** before the transfer of federal property will be effective October 17, 1990.

- A final EPA policy statement on **pollution prevention** under RCRA

**Projected dates for upcoming rulemakings.*

D. RCRA/CERCLA Update November 1990

RCRA/CERCLA Update

A Report from the Office of Environmental Guidance of the U.S. Department of Energy

Vol. 90, Issue 4 *November 1990*

PAUL L. ZIEMER BECOMES NEW ES&H HEAD

On August 10, 1990, Dr. Paul L. Ziemer was sworn in as Assistant Secretary of Energy for Environment, Safety and Health by Secretary of Energy James D. Watkins *(see p. 6 for ES&H organization chart)*. President Bush announced his intention to nominate Dr. Ziemer for this position on May 25, 1990; he was confirmed by the U.S. Senate on August 4, 1990.

As the Assistant Secretary, Dr. Ziemer is responsible for overseeing all radiological and non-nuclear-safety and health activities that are conducted as part of the daily operation of DOE facilities and programs. This includes all DOE policy and oversight to ensure compliance with applicable laws related to environmental protection, radiation safety, worker safety, and Admiral Watkins' recent initiatives in the areas of occupational health and epidemiology. The conduct of safeguards and security oversight appraisals also falls under Dr. Ziemer's authority.

Since 1983, Dr. Ziemer has served as Head of the School of Health Sciences at Purdue University. Before that he served in various positions at Purdue, including the following:

- Acting Head of the School of Health Sciences, 1982-1983;
- Associate Head of the School of Health Sciences, 1979-1981;
- Associate Head for the Bionucleonics Department, 1971-1981;
- Professor of Health Physics, 1969-1990;
- Associate Professor of Health Physics, 1966-1969;
- Assistant Professor of Health Physics, 1962-1966; and
- Radiological Control Officer, 1959-1982.

Before serving at Purdue, Dr. Ziemer was a health physicist at the Oak Ridge National Laboratory (ORNL) in 1959; a Radiological Physics Fellow at Vanderbilt University and ORNL in 1957 and 1958; and a physicist at the U.S. Naval Research Laboratory in Washington, D.C., in 1957. He is a certified health physicist and has served as presidents of the Health Physics Society and the American Academy of Health Physics.

Dr. Ziemer is a native of Toledo, Ohio, and holds degrees from Wheaton College (B.S. in physics, 1957); Vanderbilt University (M.S. in radiological physics, 1959); and Purdue University (Ph.D. in bionucleonics, 1962). He is married to Marilyn Joyce Wright and is the father of four daughters.

STUDY PLOTS FUTURE COURSE OF RCRA

Where has RCRA been? Where is RCRA going? EPA's recent study, ***The Nation's Hazardous Waste Management Program at a Crossroads, The RCRA Implementation Study*** (EPA/530-SW-90-069) attempts to answer these questions by discussing EPA philosophy and providing the underlying rationale for the future management of hazardous wastes. The July 1990 study, conducted by EPA's Office of Solid Waste and Emergency Response, is based on extensive analysis of RCRA by Federal and State officials, public interest representatives, and the regulated community. Among the major findings:

- The RCRA Subtitle C program has made tremendous progress in reducing both short- and long-term risks.
- Priorities need to be clarified. RCRA has too many "high" priorities, many of which are conflicting or unrealistic.
- Human resources need invigorating. The RCRA work force is talented and committed, but needs more training, support, and incentives.
- Waste minimization needs more emphasis to promote the "conservation and recovery" aspects of RCRA.
- The roles of EPA headquarters and regional offices, States, the Office of Management and Budget, the courts, Congress, and the public are unclear.
- Better measures are needed for judging RCRA's performance and for setting realistic goals.
- Innovation in waste management and cleanup must be encouraged.
- Communication within EPA and between EPA and external groups needs improvement.

Based on these findings, the study seeks to set a course for the future direction of RCRA's implementation. Key initiatives include the following:

1. **Establish and communicate clear priorities.**

EPA intends to be more proactive in communicating priorities. When conflicts occur, EPA will consult with interested and affected parties to discuss their concerns and enlist their support.

2. **Balance prevention and cleanup efforts.**

By January 1991, EPA will (1) issue operating permits to maintain adequate waste management capacity, (2) issue post-closure permits for continued

Continued on page 2

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RCRA Implementation Study

— Continued from page 1

monitoring of closed facilities, (3) explore legislative changes to allow the "de-coupling" of corrective action from the permitting process, (4) clearly specify what is expected of facilities when they conduct corrective action, and (5) develop post-closure performance standards to allow industry to target cleanup goals.

3. Develop clear and concise regulations.

Current and future regulations will be reviewed for ease of implementation, enforceability, and environmental impact. Definitions of "solid waste" and "hazardous waste" will be clarified to help facilities determine if they are subject to RCRA and regulators to determine the size of the RCRA universe. Also, major new regulations will be evaluated within a reasonable time frame after their promulgation.

4. Support compliance and enforcement activities.

EPA will strengthen enforcement by focusing on compliance by waste generators, identifying waste handlers who have not notified EPA of their activities, and seeking higher judicial and administrative penalties for non-compliance.

5. Speed up State authorization.

EPA will better define its relationship with States, and State authorization responsibility will be transferred from EPA headquarters to the regional offices.

6. Attract, retain, and develop staff.

EPA will establish a centralized training program for Federal and State RCRA program personnel.

7. Develop more and better environmental data.

EPA will develop an information management plan for collecting information and analyzing data to determine where the greatest environmental risks occur. RCRA's success will be measured in terms of risks reduced or avoided, rather than the number of activities undertaken (e.g., permits issued, and inspections performed).

8. Accelerate scientific and technological development.

EPA will conduct the technology development component of RCRA within the office that oversees the development of innovative technologies in the Superfund program.

EPA's goal is to use the results of this study as a tool for guiding the nation's strategic decision making in the area of hazardous waste management through the upcoming Federal budget cycles, operating plans, and individual program management decisions. Although the initiatives identified cannot be implemented immediately, EPA invites all interested parties to assist in identifying the changes most critical to the present RCRA program.

EH-231 is preparing a summary report of the RCRA Implementation Study for future distribution.

FIRST CITIZEN SUIT FILED UNDER SARA TITLE III

According to the August 17, 1990, issue of *Inside EPA*, the first citizen suit has been filed against a company *for failing to report its toxic emissions under Title III of SARA*, the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). EPCRA requires companies that emit certain amounts of toxic chemicals to report their emissions to EPA and allows citizens to sue if they suspect that a company is not reporting its emissions. The case, *Atlantic States Legal Foundation (ASLF) vs. Com-Cir-Tek, Inc.*, was brought before the U.S. District Court for the Western District of New York, on July 25, 1990. The ASLF, a non-profit environmental corporation, argued that the company, Com-Cir-Tek, Inc., used more than the threshold reporting limits for a chemical or chemicals required to be reported under Sect. 313 of EPCRA and:

- ❑ failed to submit Material Safety Data Sheets for the chemicals as required under Sect. 311 and
- ❑ neglected to submit "Tier I" or "Tier II" emergency and hazardous chemical inventory forms as required by Sect. 312.

An ASLF source not identified by *Inside EPA* said that the New York environmental group has targeted 16 other facilities in the Eerie County, New York area and that complaints may be filed against them in the future. This source also predicts that SARA Title III will "likely become a more active area of citizen enforcement in the future."

UPDATE ON DOE'S OBSERVATIONAL APPROACH

As reported in the last RCRA/CERCLA Update *(Vol. 90, No. 3, p. 5)*, the Remedial Investigation/Feasibility Study (RI/FS) process can be time-consuming and costly. To expedite the process, EPA, through the National Contingency Plan (NCP) and Office of Solid Waste and Emergency Response Directives (Nos. 9355.3-06 and 9355.4-03) has promoted "streamlining" the RI/FS. DOE terms this streamlining, the "observational approach." This concept is directly applicable to RCRA Facility Investigation/Corrective Measures Studies (RFI/CMS) as well.

The RCRA/CERCLA Division (EH-231) has worked with Pacific Northwest Laboratory and CH2M Hill to develop detailed presentations on streamlining. The Office of Environmental Restoration (EM-40) believes that it is important to incorporate streamlining into RI/FS and RFI/CMS efforts; therefore, the Program Support Division (EM-43) will sponsor presentations on streamlining concepts at DOE environmental restoration sites. To date, presentations have been made to DOE-Richland Operations Office and Hanford contractors; EPA Region X and the Washington Department of Ecology; and DOE-Albuquerque Operations Office, Los Alamos Area Office, and Los Alamos National Laboratory. In addition to the presentations, the "streamlining team" may be able to help individual sites with RI/FS and RFI/CMS workplan development or review to ensure incorporation of streamlining fundamentals.

In order to get the most benefit out of the streamlining presentations, environmental restoration program managers (ERPMs) should be near the beginning of workplan preparation. Additionally, ERPMs that anticipate requesting help with workplan development should be prepared to present basic information on their specific environmental restoration sites (i.e., type/size of site, qualitative/quantitative contaminant data, and affected media) to the streamlining team.

For more information on DOE's observational approach, including possible presentations, help on, or reviews of environmental restoration work plans by the observational approach team, please contact Rich Dailey, RCRA/CERCLA Division, EH-231, at FTS 896-7117 or (202) 586-7117.

AUDIT INDICATES IMPROVED DOE ENVIRONMENTAL TRAINING

Since 1984, when a U.S. court ruled that DOE's hazardous waste was subject to RCRA, DOE's operations have been subject to increasing Federal and State regulation. For example, in 1989 alone, the number of DOE facilities on the CERCLA National Priorities List increased from 5 to 16. In response to the increasing need to comply with Federal and State environmental laws, the Secretary of Energy has modified DOE's organizational structure to emphasize that line managers are fully responsible and accountable for the compliance status of DOE facilities and has initiated substantial changes to ensure that DOE facilities comply with relevant environmental laws. One important element of this new emphasis is the establishment of DOE training in environmental laws and regulations.

The Office of Audits in DOE's Office of Inspector General conducted an audit of environmental training at DOE from August 1989 through March 1990 to determine whether (1) DOE has ensured that DOE and contractor managers are aware of their responsibilities and potential liabilities under applicable environmental regulations and (2) that individuals engaged in hazardous waste operations have received the required environmental training. The audit determined the following:

- ***DOE and contractor senior and mid-level management have an improved awareness of their responsibilities and potential liabilities under Federal and State environmental laws.*** DOE has implemented training to improve management's awareness of their responsibilities and liabilities under environmental laws. The ES&H program, with the assistance of other DOE offices, has sponsored training classes designed to educate and inform management personnel of Federal statutory and regulatory requirements, responsibilities, liabilities, and DOE compliance strategies.
- ***However, individuals involved in hazardous waste operations at DOE facilities, are not receiving the environmental training that is mandated under DOE Orders and Federal environmental laws.***
- ***DOE Operations Offices have not provided their M&O contractors with sufficient guidance and direction to ensure compliance with the training requirements.***
- ***In addition, contractors at DOE facilities do not have adequate systems to identify employees that require training, ensure that the training is received, and effectively document compliance with training requirements.***

The audit recommended that Operations Office Managers provide the guidance and direction necessary to ensure that M&O contractors institute systems that identify employees requiring environmental training, ensure the training is received, and meet documentation and record-keeping requirements.

This article was summarized from a Memorandum to DOE managers dated August 21, 1990, entitled "Official Draft Report on 'Environmental Training at the Department of Energy.'" For information on DOE's training programs, please contact Larry Stirling, Air, Water & Radiation Division, EH-232, at FTS 896-2417 or (202) 586-2417.

REPORT ON TREATABILITY STUDIES AVAILABLE

The Hazardous Waste Action Coalition (HWAC) recently published a report assessing current standards of practice for conducting treatability studies for hazardous waste cleanups. According to the July 20, 1990, issue of *Hazardous Materials Intelligence Report*, the HWAC report, entitled *Treatability Studies for Hazardous Waste Sites: State of Practice 1990*, states that "the primary objectives of treatability studies are to provide sufficient data to allow treatment alternatives to be fully developed and evaluated to reduce cost and performance uncertainties for treatment alternatives to acceptable levels." The report discusses the roles and responsibilities of response action contractors in conducting treatability studies; the challenge of ensuring compliance with all applicable regulations while conducting a treatability study; and current problems in the practice of conducting treatability studies, such as the difficulty in acquiring a representative sample of the material to be treated and the uncertainty involved in applying new technologies to hazardous waste sites.

For a copy of the report contact HWAC, c/o American Consulting Engineers Council, No. 802, 1015 15th Street, N.W., Washington, DC 20005 or call (202) 898-0068.

NEW PCB FINAL RULE CLARIFIED

On December 21, 1989, EPA published a final rule under TSCA in the *Federal Register* (54 FR 52716) on requirements for the notification and manifesting of PCB waste activities. The rule requires all facilities generating PCB waste to track the disposal process in a manner similar to the "cradle to grave" system of RCRA. PCB waste generators must notify EPA of their PCB waste activities, obtain a unique identification number, and meet the requirements of the PCB manifest system. Commercial PCB waste storage facilities must also develop closure plans for their PCB waste storage areas.

After reviewing this notice, DOE decided that it was not clear when or if a Federal facility was considered a commercial PCB waste facility. After a written inquiry, EPA responded by stating that if a DOE facility received PCB waste greater than 500 gallons from other DOE facilities, then it was not considered to be commercially storing PCB waste. However, if a DOE facility received waste greater than 500 gallons from other Federal facilities that are not DOE facilities, then it was not considered to be a "related company" and would, therefore, be considered to be commercially storing PCB waste. An Information Brief detailing this information has been finalized and will be sent to all DOE Field Organizations in November 1990.

For more information on this subject, please contact Jean Schumann, RCRA/CERCLA Division, EH-231, at FTS 896-7769 or (202) 586-7769.

PLEASE SEND US YOUR COMMENTS, ARTICLES & PHOTOS!

If you think this report is (or is not) informative; if you have any suggestions to make future reports more helpful; or if you would like to contribute articles, photographs, or other information for possible publication, we would like to hear from you. Please send your comments, suggestions, and materials to:

Mr. Jerry L. Coalgate
Editor, RCRA/CERCLA Update
Office of Environmental Guidance, EH-23
1000 Independence Ave., SW
Washington, DC 20585
FTS 896-6075/(202) 586-6075

COMPUTERIZED HAZARDOUS WASTE INFORMATION SOURCES

The following are several new sources of computerized hazardous waste information.

- The *ORD Electronic Bulletin Board System (BBS)* is designed to foster communication and technology transfer among EPA staff, State and local officials, and the private sector. It presently features five areas of special interest or "conferences," including: expert systems, biotechnology, water, regional operations, and methods of standardization. The BBS can be used to leave and read messages, upload and download files, and serves as a means for EPA's Office of Research and Development (ORD) to announce recent activities. The ORD BBS is open to all and operates 24 hours a day, 7 days a week. There is no subscription charge and no password required. To access the ORD BBS call (513) 569-7610.
- The *OSWER Electronic Bulletin Board System (BBS)* allows computer users to exchange information on solid and hazardous waste technical issues from anywhere in the country. Within the BBS are mini-bulletin boards, or "conferences," that afford specialized interest groups a dedicated forum to exchange information and programs. All registered BBS users are automatically members of the Superfund Innovative Technology Evaluation (SITE) "conference". The BBS is operated under contract to the Technology Innovation Office. A help line is available during normal business hours at (301) 589-8368.
- The *Alternative Treatment Technology Information Center (ATTIC)* is a comprehensive automated information retrieval system that integrates existing hazardous waste data sources, including the SITE program, into a searchable resource. This system provides access to a wide variety of technical information sources, including information on alternative treatment technologies. The system operator can be reached at (301) 816-9153.
- The *Pollution Prevention Information Clearinghouse (PPIC)* is a national and international network consisting of a hotline, information repository, the Pollution Prevention Information Exchange System (PIES), computer networking activities, and two newsletters, the *Pollution Prevention News* and the *PPIC User Bulletin*. The PIES is open to DOE or contractor staff working in the waste minimization area and includes an interactive message center, several databases, summaries of Federal and State pollution prevention legislation, summaries of waste minimization programs (including DOE's program), a calendar of events, and a national waste exchange to promote reuse of waste materials.

For more information on any of these information sources, contact Priscilla Flattery, Pollution Prevention Office, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460 at (202) 245-3557. For information on the PPIC, call Myles Morse, EPA Office of Environmental Engineering and Technology Demonstration, (202) 475-7161 or FTS 475-7161; PIES Technical Support, Science Applications International Corp., (703) 821-4800; or the RCRA/CERCLA Hotline at 1-800-424-9346.

DOE'S WASTE MINIMIZATION AND WASTE REDUCTION ACTIVITIES

On June 27, 1990, DOE released its *Waste Reduction Policy Statement* that calls for a reduction in the amount of waste generated and disposed of by DOE facilities. Co-signed by the Under Secretary of Energy; the Acting Assistant Secretary for Environment, Safety and Health; and the Director of the Office of Environmental Restoration and Waste Management, the policy applies to hazardous, non-hazardous, radioactive, and radioactive mixed wastes.

Waste reduction will be accomplished through practices that reduce the generation of waste and also treat existing waste to reduce its volume or toxicity prior to storage or disposal. Following a hierarchy, DOE first will minimize the generation of waste through source reduction activities (e.g., in-process recycling, feed materials substitution, and inventory control) and then recycle generated waste materials as much as possible. After exhausting these two options, DOE will treat the remaining wastes to reduce their volume, toxicity, or mobility prior to storage or disposal.

Attached to the June 27, 1990, policy statement was guidance on developing the waste minimization plan required by DOE Order 5400.1, *General Environmental Protection Program*, and a waste reduction reporting system. The guidance stressed eight elements of an effective waste minimization program. They are (1) management support; (2) waste minimization and pollution prevention awareness; (3) explicit program scope, objectives, and numerical goals; (4) periodic assessments and audits; (5) accurate cost accounting; (6) accurate waste accounting; (7) technology transfer; and (8) program evaluation.

The Office of Environmental Restoration and Waste Management (EM) has the lead in reviewing waste minimization plans from all DOE Field Operations and will be responsible for consolidating the waste reduction reports for the Department. John Tseng, acting Director of the Division of Technical Support (EM-35), is the point of contact for these activities.

The Office of Defense Programs (DP) has initiated an aggressive implementation program. DP has issued guidance to the Field on process waste assessments, and DP sites have begun training management and production line personnel. John Marchetti, DP-22.3, is the point of contact for DP waste minimization activities.

DOE's Waste Reduction Steering Committee, originally composed of members from DP, is expanding its charter and membership to include all DOE Program Offices. The committee's responsibilities include coordinating HQs and Field waste reduction activities; holding workshops; promoting training and technology transfer; developing guidance, policy, and goals; and advocating funding for waste reduction efforts. Chaired by the EM representative, the committee has distributed a draft revised charter to DOE HQ Program Offices requesting the participation of interested parties.

— CORRECTION —

In the article, "EPA Guidance on RCRA Covers," RCRA/CERCLA Update, Vol. 90, No. 3, it was incorrectly stated that the flexible membrane liner (FML) in the two-component low-permeability layer should have a "20-mm (8-in.) [sic] minimum thickness." This should have read "*20-mil (0.5 mm)* minimum thickness."

POLLUTION PREVENTION BILL SIGNED INTO LAW

Included in the *Omnibus Budget Reconciliation Act of 1990*, signed by President Bush at the end of October, were provisions of S. 585, a proposed Senate bill, the "Pollution Prevention Act of 1990." The new law declares that, whenever feasible, (1) pollution should be prevented or reduced at the source; (2) pollution that cannot be prevented should be recycled; (3) pollution that cannot be prevented or recycled should be treated; and (4) disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

The law requires EPA to establish a source reduction program to carry out the activities authorized under the Act. "Source reduction" includes practices that reduce hazardous substances, pollutants, contaminants, or health and environmental hazards prior to recycling, treatment, or disposal. Expected EPA initiatives to carry out the program include: (1) the establishment of standard measures of source reduction, (2) incorporation of source reduction in existing and proposed programs and implementing regulations, (3) coordination of source reduction activities among EPA program offices and between EPA and other Federal agencies, (4) identification of measurable goals, and (5) changes in Federal procurement practices to encourage source reduction.

The new law also contains source reduction and recycling data collection requirements. Facilities required to file annual toxic chemical release forms under Sect. 313 of SARA also must file a toxic chemical source reduction and recycling report for each chemical. The report is to contain descriptions of source reduction practices; changes in production from the previous year; and the annual amount (and change from the previous year) of chemicals (1) entering waste streams or released to the environment prior to recycling, treatment, or disposal; (2) recycled during the year; (3) released to the environment that resulted from a catastrophic event, remedial action, or other one-time event; and (4) treated during the year.

DOE is currently implementing a waste minimization program for hazardous, radioactive, and radioactive mixed waste. The Department also has released a Waste Reduction Policy that institutionalizes a hierarchical waste management policy for municipal solid, hazardous, radioactive, and radioactive mixed wastes. This policy makes source reduction its first priority. Thus, DOE's waste minimization program and waste reduction policy are consistent with the hierarchy established in the new law. However, the law differs from EPA's and other proposed bills in that it focuses solely on source reduction and categorizes recycling with treatment and disposal.

For more information on this legislation or for information on DOE's waste minimization/waste reduction activities, please contact Jane Powers, RCRA/CERCLA Division, EH-231, at FTS 896-7301 or (202) 586-7301.

NEW REPORTING REQUIREMENTS FOR CONTINUOUS RELEASES OF HAZARDOUS SUBSTANCES

On July 24, 1990, EPA published a final rule in the *Federal Register* (55 FR 30166) implementing CERCLA Sect. 103(f)(2), which addresses reporting requirements for continuous releases of hazardous substances into the environment. The new rule provides relief from CERCLA Sect. 103(a) reporting requirements for releases of hazardous substances that are continuous or stable in quantity and rate if notification has been given under CERCLA Sect. 103(a) for a period of time sufficient to establish the continuity, quantity, and regularity of the release. In such cases, notification is to be given annually, unless there is a statistically significant increase in the quantity released. Relief from reporting under CERCLA Sect. 103(a) also applies to notifications required under Sect. 302 of Title III of SARA.

The final rule requires four kinds of notification of a continuous release:

- initial telephone and written notifications,
- a written follow-up report to the EPA Regional Office 1 year after the initial written notification,
- notification of changes in the source or composition of the release or other submitted information, and
- immediate reports of any statistically significant increase in the release.

The initial telephone notification is made to the National Response Center, the State Emergency Response Commission (SERC) of any State likely to be affected by the release, and the Local Emergency Planning Committee (LEPC) for any area likely to be affected by the release. Within 30 days of the initial telephone notification, written notification must be given to the appropriate EPA Regional Office and the appropriate SERC(s) and LEPC(s). Within 30 days of the first anniversary of the initial written notification, a one-time follow-up report must be submitted to the EPA Region. Annual evaluations of the continuous releases must be made and documented, but no further reporting or notification is required unless there is a change in any of the information submitted previously or if a SSI in the release occurs.

EH-231 is preparing a guidance package on these new reporting requirements for distribution to Program and Field Offices. For further information on this subject, please contact Jerry DiCerbo, RCRA/CERCLA Division, EH-231, at FTS 896-5047 or (202) 586-5047.

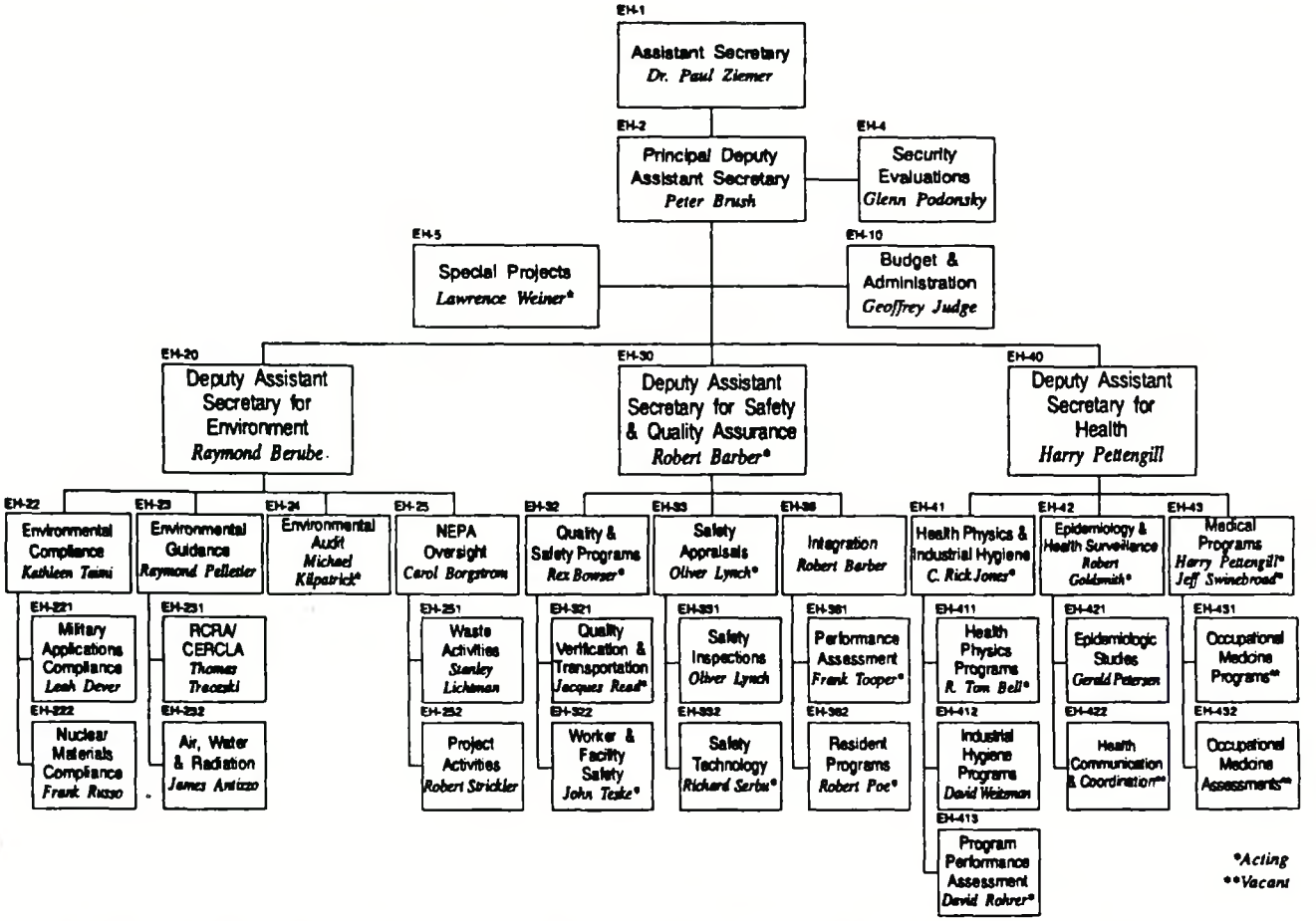
RI/FS WORKSHOPS TO BE HELD

DOE and EPA will jointly sponsor workshops on the Remedial Investigation/Feasibility Study process. The 2-day workshops will cover EPA policies and procedures, including the responsibilities of Federal facilities. The workshops will be given according to the following schedule:

Kansas City, MO.....December 13-14, 1990
Oak Ridge, TN.....January 16-17, 1991
San Francisco, CA .....February 20-21, 1991
Albuquerque, NM.....March 13-14, 1991
New York, NY .....March 17-18, 1991

For more information on these workshops please contact Lisa Easterling at FTS 626-0971 or (615) 576-0971 or Barbara Young at FTS 626-0761 or (615) 576-0761.

Assistant Secretary for Environment, Safety and Health



Not Sure Where You Fit In?
The Offices of Environmental Guidance and Environmental Compliance Can Help You!

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Ray Pelletier	Office Director	(FTS) 896-8505
FAX		896-3915

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Jerry Coalgate	RCRA	896-6075
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Mark Stahr	Albuquerque	896-7879
Marilyn Stone	San Fran./Rocky Flats	896-5942

Nuclear Materials Compliance Division, EH-222

Frank Russo	Division Director	896-7882
Al Feldt	Special Issues, WIPP	896-6570
Rick Green	Savannah River Site	896-4160
Glenn Hardcastle	Richland	896-8144
Randy Kaltrieder	Idaho	896-4440
Melvin Leifer	Richland	896-5227
Steve Woodbury	Chicago	896-4371

Meetings/Seminars/Courses

MIXED WASTE REGULATION CONFERENCE

November 27-28, 1990
Washington, DC
December 13-14, 1990
Seattle, WA
$950.00

Contact:
Executive Enterprises, Inc.
22 West 21st Street
New York, NY 10010-6904
(800) 831-8333

MANAGING HAZARDOUS SUBSTANCES AT FEDERAL FACILITIES: A HANDS ON WORKSHOP

November 27-28, 1990
San Diego, CA
$950.00

Contact:
Executive Enterprises, Inc.
22 West 21st Street
New York, NY 10010-6904
(800) 831-8333

2ND ANNUAL PRESENTATION OF THE WASTE EQUIPMENT & RECYCLING CONFERENCE & EXHIBITION

November 28-30, 1990
Rosemont, IL

Contact:
William Harrington, Show Manager
Tower Conference Management Co.
800 Roosevelt Road
Building E, Suite 408
Glen Ellyn, IL 60137-5835
(708) 469-3373

UNDERSTANDING POLLUTION PREVENTION TODAY: THE ABCs OF WHAT YOU NEED TO KNOW

November 29-30, 1990
Washington, DC
$950.00

Contact:
Executive Enterprises, Inc.
22 West 21st Street
New York, NY 10010-6904
(800) 831-8333

RESPONDING TO THE NEW LAND DISPOSAL RESTRICTIONS & TCLP REGULATIONS

December 10-11, 1990
Washington, DC
$950.00

Contact:
Executive Enterprises, Inc.
22 West 21st Street
New York, NY 10010-6904
(800) 831-8333

COST CONTROL & BUDGETING OF ENVIRONMENTAL REMEDIATION PROJECTS AT FEDERAL FACILITIES

December 10-11, 1990
Seattle, WA
January 22-23, 1991
San Diego, CA
February 4-5, 1991
San Diego, CA
$950.00

Contact:
Executive Enterprises, Inc.
22 West 21st Street
New York, NY 10010-6904
(800) 831-8333

THE 3RD ANNUAL ENVIRONMENTAL CLAIMS & LITIGATION CONFERENCE

December 11-12, 1990
Washington, DC
$950.00

Contact:
Executive Enterprises, Inc.
22 West 21st Street
New York, NY 10010-6904
(800) 831-8333

NEGOTIATIONS SKILLS DEVELOPMENT TRAINING COURSE APPLICABLE TO HAZARDOUS WASTE DISPUTES

January 8-10, 1991
San Francisco, CA

Contact:
Andy Lawrence, EH-231
FTS 896-5358 or (202) 586-5358

SOUTHWEST ENVIRONMENTAL HAZARDS CONFERENCE & EXPOSITION

February 19-21, 1991
Dallas, TX

Contact:
Tower Conference Management Co.
800 Roosevelt Road
Building E, Suite 408
Glen Ellyn, IL 60137-5835
(708) 469-3373

NATIONAL RESEARCH & DEVELOPMENT CONFERENCE ON THE CONTROL OF HAZARDOUS MATERIALS

February 20-22, 1991
Anaheim, CA

Contact:
Hazardous Materials Control Research Institute
9300 Columbia Boulevard
Silver Spring, MD 20910-1702
(301) 587-9390

WASTE MANAGEMENT '91

February 24-28, 1991
Tucson, AZ

Contact:
Dr. Morton E. Wacks
Department NEE
University of Arizona
Tucson, AZ 85721

Sponsored by the University of Arizona, the American Nuclear Society, and the Electric Power Research Institute.

SEMINAR ON POLLUTION PREVENTION STRATEGIES

February 26-27, 1991
Red Lion Inn
Seattle, WA

Contact:
Dick Miller
Geraghty & Miller, Inc.
(212) 371-1620

POLLUTION PREVENTION THROUGH WASTE MINIMIZATION, RECYCLING & REUSE

February 27 - March 1, 1991
Dallas-Fort Worth, TX

Contact:
Jon Fedorka
Air & Waste Management Association
150 East 58th Street
New York, NY 10155-0097
(412) 232-3444

4TH ANNUAL HAZARDOUS WASTE MANAGEMENT CONFERENCE & EXHIBITION

March 18-21, 1991

NOTE: Call for papers — deadline · November 15, 1990. Submit abstract to:
Jim Fish
NMHWMS Conference
P.O. Box 40353
Albuquerque, NM 87196
(505) 846-0367

DESIGN & CONSTRUCTION ISSUES AT HAZARDOUS WASTE SITES

May 1-3, 1991
Dallas, TX

Contact:
Peter Crowley
PEER Consultants
12300 Twinbrook Parkway, Suite 410
Rockville, MD 20852
(301) 616-0700, FAX (301) 816-9291

This EPA-sponsored conference will provide a forum for the exchange of technical information within and between Federal and State agencies, potentially responsible parties, and the contracting community.

From the federal register

FINAL RULES

55 FR 34212 August 22, 1990

EPA's recommendations under Title III of SARA on risk communication as a regulatory alternative were finalized and immediately effective.

55 FR 35502 August 30, 1990

EPA issued a CERCLA final rule revising the National Priorities List. Lawrence Livermore National Laboratory, Site 300, was added.

STATE AUTHORIZATIONS

55 FR 32624 August, 10, 1990

EPA granted final RCRA authorization to Mississippi for revisions to its hazardous waste management program, effective October 9, 1990, pending review and comment.

55 FR 33695 August 17, 1990

EPA granted final RCRA authorization to the State of Washington for four revisions to its hazardous waste program, effective October 16, 1990, pending review and comment.

55 FR 38057 September 17, 1990

EPA granted New Mexico final RCRA authorization for its underground storage tank program, subject to review and comment, effective November 16, 1990.

55 FR 38997 September 24, 1990

EPA granted Georgia final RCRA authorization for revisions to its hazardous waste program, subject to review and comment, effective November 24, 1990.

55 FR 39274 September 26, 1990

EPA granted Oklahoma final RCRA authorization for revisions to its hazardous waste program, subject to review and comment, effective November 27, 1990.

55 FR 39656 September 28, 1990

EPA issued a tentative determination of unsatisfactory upon reviewing Connecticut's application for final RCRA authorization for its hazardous waste program.

PROPOSED RULES — CORRECTIONS — MISCELLANEOUS

55 FR 31387 August 2, 1990

EPA issued corrections to the RCRA Toxicity Characteristic (TC) final rule of March 29, 1990.

55 FR 32733 August 10, 1990

EPA corrected the August 2, 1990, corrections to the RCRA Toxicity Characteristic (TC) final rule of March 29, 1990.

55 FR 33173 August 14, 1990

The Agency for Toxic Substances and Disease Registry issued final toxicological profiles for 25 CERCLA hazardous substances.

55 FR 33430 August 15, 1990

EPA issued a RCRA proposed rule that would extend the scope of authority of the rules on underground storage tank (UST) corrective action orders (40 CFR 24) to SARA Sect. 9003(h) UST corrective action orders.

55 FR 33693 August 17, 1990

EPA issued corrections to the RCRA Third Third final rule of June 1, 1990, and clarified that multisource leachate wastewater injected under the UIC provisions of the SDWA has been granted a two-year capacity variance.

55 FR 34492 August 22, 1990

EPA issued the third update of the CERCLA Federal Agency Hazardous Waste Compliance Docket. Several DOE facilities were added.

55 FR 35012 August 27, 1990

EPA issued an advanced notice of proposed rulemaking (ANPRM) that specifies flammability and explosivity as criteria that will be used to add chemicals to the extremely hazardous substance list under Sect. 302 of Title III of SARA.

55 FR 39409 September 27, 1990

EPA clarified the following issues in the RCRA Toxicity Characteristic final rule of March 29, 1990: (1) regulatory status of surface impoundments managing newly regulated TC wastes, (2) groundwater monitoring requirements for newly regulated land disposal facilities, (3) Sect. 3010 notification requirements, and (4) permit modifications.

55 FR 40384 October 3, 1990

EPA issued guidelines, required by RCRA, designed to encourage Federal procurement of certain products containing materials recovered from solid waste.

FUTURE REGULATORY INITIATIVES

November 1990

- Proposed CERCLA rule on Type B Natural Resource Damage Assessments
- Proposed CERCLA rule on the Cost Recovery Program

December 1990

- Proposed CERCLA rule on Subpart K of the NCP, Federal Facilities Requirements
- Proposed RCRA rule on no-migration variances for land disposal of restricted wastes
- Proposed RCRA rule on air emissions standards for volatile organics from tanks and impoundments
- Proposed RCRA rule on permit modifications to correct omitted requirements
- Final CERCLA rule on the revised Hazard Ranking System
- Final CERCLA rule on the planning and implementation of Superfund off-site remedial actions
- Final RCRA rule on amendments to groundwater monitoring regulations
- Final RCRA policy statement on pollution prevention
- Final SARA Title III rule on Citizen's Suits

January 1991

- Proposed RCRA rule on *de minimis* exemption levels
- Proposed RCRA rule on location standards for TSD facilities
- Final RCRA rule on definition of wastewater treatment unit

Chapter X

Listing of Other Guidance, Information Briefs and Memoranda

A. **Catalog of CERCLA Applicable or Relevant and Appropriate Requirements (ARARs) — Fact Sheets**

B. **Hazardous Terminology**

C. **Obtaining Variances from the Treatment Standards of the RCRA Land Disposal Restrictions**

D. **Personnel Training Requirements Applicable to Hazardous Waste Management and Environmental Restoration Operations**

E. **Strategy for Developing Environmental Guidance for DOE Facilities**

F. **Toxic Terminology**

NOTE: The documents listed above are available through the Office of Scientific and Technical Information (OSTI). To place an order with OSTI contact Ms. Leota Kane at (FTS) 626-3385 or (615) 576-3385.