

US EPA ARCHIVE DOCUMENT

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 260, 261, 262, 264, 265, 270, and 271

[SWH-FRL-3023-9]

Hazardous Waste Management System; Standards for Hazardous Waste Storage and Treatment Tank Systems

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: On June 26, 1985, the U.S. Environmental Protection Agency (EPA) proposed regulations that would revise the existing regulations for the storage and treatment of hazardous waste in tank systems under the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). The proposed rules represented the Agency's efforts to meet the mandates of HSWA and to modify certain existing tank regulations that have proved unworkable and/or ineffective. The over-all goal of this effort is to establish regulations that ensure the protection of human health and the environment from the risks posed by releases from hazardous waste tank systems.

EPA is today promulgating final regulations for new and existing interim status, accumulation, and permitted tank systems. The final rule substantially amends the sections of 40 CFR Parts 260, 261, 262, 264, 265, 270, and 271 that apply to tank systems managing hazardous wastes. These regulations address, among other things, the design and installation of the primary containment vessel, release detection and response, and closure/post-closure requirements.

EFFECTIVE DATE: The application of revised Parts 260, 261, 262, 264, 265, 270, and 271 will take effect January 12, 1987, except for § 261.4(a)(8) which will take effect on July 14, 1986. Small Quantity Generators who generate between 100 and 1000 kg/month of hazardous waste and accumulate in quantities exceeding 6000 kg or accumulate for more than 180 days (or for more than 270 days if the waste is shipped more than 200 miles) will become subject to revised Parts 264, 265, and 270 on March 24, 1987.

ADDRESSES: The docket for this Rulemaking (Docket No. 6-86-RTSF-PFFFF, Revised Tank Systems Standards) is located at U.S. Environmental Protection Agency, EPA RCRA Docket (Sub-basement), 401 M Street SW., Washington, DC 20460. The

docket is open from 9:30 a.m. to 3:30 p.m., Monday through Friday, except for Federal holidays. The public must make an appointment to review docket materials by calling Mia Zmud at (202) 475-9327 or Kate Blow at (202) 382-4675. The public may copy a maximum of 50 pages of material from any one regulatory docket at no cost. Additional copies cost \$0.20 per page.

FOR FURTHER INFORMATION CONTACT:

For general information contact the RCRA/Superfund Hotline, at (800) 424-3946 (toll free) or (202) 382-3000 in Washington, DC. For information on the specific technical aspects of this rule, contact: William J. Kline, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, Washington, DC 20460, (202) 382-7917. For specific information on the economic analysis and risk assessment for this rulemaking, contact: Betsy Tam, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, Washington, DC 20460, (202) 382-2791.

SUPPLEMENTARY INFORMATION: The contents to today's preamble are listed below:

- I. Authority
- II. Background
 - A. Existing Subtitle C Regulations for Hazardous Waste Storage and Treatment Tanks
 - B. Hazardous and Solid Waste Amendments of 1984
 - C. June 26, 1985 Notice of Proposed Rulemaking
 - D. August 1, 1985 Proposed Rules and March 24, 1986 Final Rules Applicable to Small Quantity Generators
 - E. March 17, 1986, Notice of Availability
 - F. Court-imposed Deadline for Issuance of Regulations
 - G. Summary of Today's Final Rule
 - H. Related Actions
- III. Overall Strategy for Regulation of Hazardous Waste Storage and Treatment Tank Systems
 - A. Proposed Hazardous Waste Tank System Regulations
 1. Problems Associated with Tank Systems
 2. General Approach
 - a. Existing Hazardous Waste Tank Systems
 - b. New Hazardous Waste Tank Systems
 - c. Hazardous Waste Accumulation Tank Systems
 - d. Small Quantity Generators
 3. Development of Regulatory Approach at Proposal
 - B. Development of Regulatory Strategy and Requirements for the Final Regulation
 1. Problems Associated with Hazardous Waste Tank Systems
 2. Causes of Releases from Tank Systems
 - a. Corrosion
 - b. Structural Failure
 - c. Ancillary Equipment Failure
 - d. Operator Errors

3. Risks Posed by Releases from Hazardous Waste Tank Systems
4. Technical Options for Addressing Problems Associated with Leaking Tank Systems

- a. Corrosion
- b. Structural Failure
- c. Ancillary Equipment Failure
- d. Operator Errors
- e. Multiple Causes of Releases
5. Regulatory Approach
 - a. Summary of Approach Taken in Final Rule
 - b. Secondary Containment
6. Regulatory Options Not Selected
 - a. Combination of Secondary Containment and Ground-Water Monitoring
 - b. National Risk-based Standards
 - c. Minimum National Standards with a Variance from Containment Requirements Based on Risk
 - d. Minimum Performance Standards
 - e. Ban of Underground Tanks
 - f. Forced Retirement of Underground Tank Systems

IV. Changes to Final Rule From Proposal

- A. Additions
 1. Definitions
 - a. Onground Tank Systems.
 - b. Sumps
 - c. Ancillary Equipment
 2. Exclusion of Closed-Loop Recycling Tank Systems
- B. Revisions Made Subsequent to Proposal
 1. Accumulation Tank Systems (§ 262.34)
 2. Applicability (§ 264.190 and § 265.190)
 - a. Storage of Hazardous Waste Containing No Free Liquids
 - b. Temporary Tank Systems
 3. Assessment of Existing Tank System Integrity (§ 264.191 and § 265.191)
 4. Design and Installation of New Tank Systems (§ 264.192 and § 265.192)
 5. Containment and Detection of Releases (§ 264.193 and § 265.193)
 - a. General and Specific Requirements for Tank Systems
 - b. Deletion of Ground-water Monitoring Alternative
 - c. Leak Testing and Tank System Integrity Assessment Requirements
 - d. Variances from Secondary Containment
 6. General Operating Requirements (§ 264.194 and § 265.194)
 7. Inspections (§ 264.195, and § 265.195)
 8. Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems (§ 264.196 and § 265.196)
 - a. General Responses to Leaks or Spills
 - b. Disposition of Leaking or Unfit-for-Use Tank Systems
 9. Closure and Post-Closure Care (§ 264.197 and § 265.197)
 10. Special Requirements for Ignitable and Reactive Wastes (§ 264.198 and § 265.198)
 11. Special Requirements for Incompatible Wastes (§ 264.199 and § 265.199)
 12. Waste Analysis and Trial Tests (§ 265.200)

- 13. Special Requirements for Generators of Between 100 and 1,000 kg/mo That Accumulate Hazardous Waste in Tanks (§ 265.201)
- 14. Specific Part B Information Requirements for Tank Systems (§ 270.16)
- V. Analysis of Other Significant Comments
 - A. Corrective Action for Accumulation Tank Systems
 - B. Acutely Hazardous Waste
 - C. Small Quantity Generators
 - D. Hazardous Waste Tank Risk Analysis
 - E. Contingent Post-Closure Plans
 - F. Integrity Assessments
 - G. Leak Detection Standard
 - H. Wastewater Piping and Treatment Tanks
 - I. Risks of Double-Walled Pipes
 - J. Closure and Post-Closure Requirements
 - K. Incentive to Store in Drums
 - L. SPCC Regulations
 - M. 24-Hour Detection Requirement
 - N. Future Designated Hazardous Wastes
- VI. Relationship to Current RCRA Hazardous Waste Programs
 - A. State Authority
 - 1. Applicability of Rules in Authorized States
 - 2. Effect on State Authorizations
 - a. HSWA Provisions
 - b. Non-HSWA Provisions
 - c. Program Modification Deadlines
 - B. Regulation of Underground Product Storage Tanks (the UST Program)
 - C. Relationship of Regulation to Section 3014(c) of RCRA
- VII. Economic Analysis
 - A. Cost and Economic Impact Methodology
 - B. Cost and Economic Impacts
- VIII. Supporting Documents
- IX. Executive Order 12291
- X. Paperwork Reduction Act
- XI. Regulatory Flexibility Act
- XII. List of Subjects in 40 CFR Parts 260, 261, 262, 264, 265, 270, and 271

I. Authority

These regulations are issued under the authority of sections 1006, 2002, 3001-3007, 3010, 3014, 3017, 3018, 3019, and 7004 of the Solid Waste Disposal Act of 1970, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912, 6921-6927, 6930, 6934, 6935, 6937, 6938, 6939, and 6974).

II. Background

A. Existing Subtitle C Regulations for Hazardous Waste Storage and Treatment Tanks

On October 21, 1976, Congress enacted the Resource Conservation and Recovery Act (RCRA) to protect human health and the environment and to conserve material and energy resources. In Subtitle C of the Act, EPA is directed to promulgate regulations that identify hazardous waste and to regulate generators and transporters of hazardous waste and facilities that treat, store, or dispose of hazardous

waste. Since enactment of the Act, EPA has promulgated interim status and permitting standards governing the design, operation, and maintenance of facilities used to treat, store, or dispose of hazardous wastes, including standards for tanks that are used to store or treat hazardous waste.

On May 19, 1980, EPA promulgated interim status standards for the storage or treatment of hazardous waste in tanks (Part 265, Subpart J 45 FR 33244-33245). These standards, which also were applicable to 90-day accumulation tanks, focused on operating measures designed to prevent releases of hazardous waste from tanks.

On January 12, 1981, the Agency promulgated the RCRA permitting standards for those hazardous waste storage and treatment tanks that can be entered for inspection (46 FR 2867-2868). The regulations were codified as 40 CFR Part 264, Subpart J. These standards, which emphasized the structural integrity of storage and treatment tanks to protect against leaks, ruptures, and collapse of the shell, require adequate design, maintenance of minimum shell thickness, and inspections. Concurrent with the promulgation of these permitting standards, EPA requested public comments on numerous issues of concern for future rulemaking, including secondary containment for all hazardous waste tanks and the possible banning of underground hazardous waste tanks.

EPA did not promulgate requirements for secondary containment at that time; however, the Agency explained that it would continue to consider three secondary containment options as possible future requirements for hazardous waste tanks. One of these options was complete secondary containment, which would consist of an impervious base underlying the tank(s). Its purpose would be to contain all spills and leaks completely until they could be removed.

B. Hazardous and Solid Waste Amendments of 1984

On November 8, 1984, the Hazardous and Solid Waste Amendments of 1984 were enacted. Two of these amendments directly address the storage and treatment of hazardous waste in underground tank systems.

Section 3004(w) required EPA to promulgate, by March 1, 1985, final permitting standards for hazardous waste underground storage tanks that cannot be entered for inspection. Section 3004(o)(4) directs EPA to promulgate standards requiring any new underground tank system to utilize an "approved leak detection system,"

defined as a system or technology capable of detecting leaks of hazardous constituents at the earliest practicable time.

C. June 26, 1985 Notice of Proposed Rulemaking

EPA issued a Notice of Proposed Rulemaking (NPRM), which was published in the *Federal Register* on June 26, 1985 (50 FR 26444-26504), to solicit comments on the proposed revised standards for hazardous waste storage and treatment tank systems. These revised standards were intended to satisfy the requirements of sections 3004(w) and 3004(o)(4) of the Hazardous and Solid Waste Amendments of 1984, as well as to revise certain existing tank standards. The proposed rules would have required that owner/operators of existing hazardous waste storage and treatment tank systems install secondary containment or its equivalent and that new or replacement tank systems be fitted with secondary containment before being placed into service. The proposed rules also would have imposed requirements to ensure the proper installation of tank systems, appropriate corrosion protection, that owner/operators of tank systems followed procedures for responding to leaks, and that tank systems were properly closed, where feasible, without allowing contamination to remain in soils adjacent to the tank systems.

D. August 1, 1985 Proposed Rules and March 24, 1986 Final Rules Applicable to Small Quantity Generators

Simultaneously with this rulemaking for RCRA storage and treatment tank systems, the Agency has been developing regulations applicable to hazardous waste management by 100-1000 kg/mo generators ("small quantity generators"). The Agency proposed new waste management rules for small quantity generators on August 1, 1985 (50 FR 31278). This proposal would have required that small quantity generators who store wastes in tanks for greater than 180 days (or greater than 270 days if waste must be shipped over 200 miles) or who exceed the 6000 kg accumulation limit would be subject to Parts 264 and 265, as well as the requirement to obtain a RCRA permit. The Agency also proposed that the June 1985 proposed revisions to the hazardous waste tank standards, if promulgated, would apply to such facilities.

The Agency also proposed to apply the then-existing Subpart J requirements to small quantity generators who store up to 6000 kg of hazardous waste for 180 days or less (or 270 days or less if the

waste must be shipped more than 200 miles) under § 262.34. These accumulation tanks are exempt from permitting/interim status requirements. The Agency explained that it had not determined whether the proposed amendments to Subpart J requiring secondary containment for short term accumulation tanks should be applied to generators of 100-1000 kg/mo, particularly in light of their potential impacts. The Agency stated that it would make this decision upon completion of its assessment of the risks associated with hazardous waste storage tank systems and based on comments received.

The final rule for management of hazardous wastes for small quantity generators was published in the *Federal Register* on March 24, 1986, (51 FR 10166). The final rule requires small quantity generators who accumulate hazardous waste on site for greater than 180 (or 270) days or exceed the 6000 kg limit to comply with the full Parts 264 and 265 requirements. For those generators accumulating up to 6000 kg for up to 180 (or 270) days under § 262.34, the existing provisions of Subpart J, Part 265 would apply. In the preamble to the final rule, EPA indicated that, because it had not yet completed its evaluation of the proposed tank system amendments as applied to small quantity generator accumulation tank systems (50 FR 26444-26504, June 26, 1985), application of any modified tank system standards to small quantity generators' accumulation tank systems would be determined in the final hazardous waste tank system rule (i.e., today's rule). (See 51 FR 10166; March 24, 1986.)

E. March 17, 1986, Notice of Availability

On March 17, 1986, the Agency published a *Federal Register* Notice of Availability on the hazardous waste tank risk assessment methodology and preliminary results (51 FR 9072). The risk analysis involved the following model components:

- A Monte Carlo Simulation model that predicts failure events and estimates the associated release volumes for hazardous waste tanks;
- A subsurface transport and environmental fate model that simulates contaminant transport and degradation in the unsaturated and edge a14jy0023 saturated zones; and
- An exposure and risk model that estimates human exposure to hazardous chemicals via contaminated drinking water and calculates health risks to an exposed individual.

In the March 17th Notice of Availability, the Agency solicited

comments on the appropriateness of the methodology and on how the Agency should consider using the analysis in developing or implementing the final hazardous waste tank system regulations. In addition, the Agency requested comment on the possibility of making distinctions in the regulations based on differences in the risks estimated for different tank types.

F. Court-Imposed Deadline for Issuance of Regulations

As indicated above, section 3004(w) of the HSWA of 1984 required the Agency to promulgate permitting standards for underground tanks that cannot be entered for inspection by March 1, 1985. The Agency was unable to meet this deadline and subsequently was sued by the Environmental Defense Fund. In response to the Environmental Defense Fund's suit, the United States District Court for the District of Columbia ordered the Agency to promulgate the regulations required by section 3004(w) no later than June 30, 1986.

G. Summary of Today's Final Rule

Today's rule establishes new or revised tank system standards, including standards applicable to accumulation tank systems (except small quantity generator accumulation tank systems), interim status tank systems, and permitted tank systems. These standards include requirements for proper installation of new tanks, leak testing and detection, corrosion protection, structural integrity, secondary containment, responses to leaks to the environment, closure and post-closure care (if required).

This section provides a brief discussion of the major requirements of today's final rule. One major feature is the requirement for secondary containment with interstitial monitoring for most hazardous waste tank systems.

Secondary containment with interstitial monitoring must be provided for all new hazardous waste tank systems. For the purpose of today's regulation, the term "new tank system" means not only newly-manufactured tank systems that will be put into service for the first time but also those other tank systems that, even if in existence and in use prior to the promulgation date of today's regulations, are then reinstalled and used as replacement tank systems for existing hazardous waste tank systems. Likewise, an existing tank system that is not being used for the storage or treatment of hazardous waste, but is then put into service or converted to use as a hazardous waste storage or treatment tank system subsequent to the

promulgation date of today's regulation is considered to be a new tank system.

For existing tank systems, secondary containment with interstitial monitoring will be phased in. The ground-water monitoring alternative, which was proposed as an option for most existing tank systems, will not be allowed. The reasons for this significant change from proposal are discussed in section III.B.5 of this preamble.

Tanks storing or treating listed dioxin-containing wastes must be provided with secondary containment within two years of the effective date of this regulation. Other existing tanks that are determined to be non-leaking on the basis of tank integrity assessments or other means must be provided with secondary containment by the time the tank is 15 years old. Periodic tank system integrity assessments are required for all tanks not fitted with secondary containment. In the event a leak is discovered (through the tank integrity assessment or otherwise) in any component of the tank system (i.e., tank vessel, ancillary equipment) that is underground, that component of the tank system must be provided with secondary containment before the tank system is returned to service. 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 onground tank), the entire component must be provided with secondary containment prior to the tank system being returned to service.

The rule provides two variances from the secondary containment requirement. The owner/operator of the tank system can petition the Regional Administrator for a variance from the secondary containment requirement if he can demonstrate either (a) that alternative design or operating practices will detect leaks and prevent the migration of any hazardous waste beyond a zone of engineering control (i.e., an area under the control of the owner/operator that, upon detection of a release, can and will be readily cleaned up prior to the release of hazardous constituents to ground water or surface waters); or (b) that if a release does occur, there will be no substantial present or potential hazard to human health or the environment. The second variance will not be available for new underground tanks, because section 3004(o)(4) of RCRA requires that all new underground tanks have leak detection systems.

The reasons for the requirement that all tank systems that do not qualify for a variance must be provided with

secondary containment with interstitial monitoring are explained in section III.B of this preamble. Briefly, the Agency concluded that no other method of leak detection can be considered generally reliable for hazardous waste tank systems. Thus, secondary containment is the only generally-applicable mechanism that will allow detection and response to releases from hazardous waste tank systems before they reach ground water and/or surface water.

Some commenters suggested that unsaturated zone monitoring and subsequent corrective action provided an acceptable alternative to secondary containment. EPA has not adopted unsaturated zone monitoring in this final rule as an acceptable method of release detection because the state-of-the-art of unsaturated zone monitoring is not sufficiently advanced or proven to enable the Agency to allow it as a substitute for secondary containment with interstitial monitoring for hazardous waste tank systems. It is possible, however, in case-specific situations, that an owner/operator will be able to demonstrate that an unsaturated zone monitoring system will fully protect human health and the environment from releases from hazardous waste tank systems and will qualify for a variance from the secondary containment requirement. EPA is conducting studies of the reliability of unsaturated zone monitoring and will consider modifying these final rules in the future if these studies demonstrate that unsaturated zone monitoring is reliable for the detection of releases of hazardous wastes from tank systems so that appropriate response can be taken prior to their reaching ground water or surface water.

In addition to the requirement for secondary containment, this final rule establishes design and installation standards for new tank systems. It also establishes inspection, corrosion protection, and monitoring requirements as well as various operating controls and practices designed to prevent spills and overflows, including the immediate response to leaks. Finally, financial assurance, closure, and post-closure requirements are established.

Except as noted immediately below, today's rule completely replaces the pre-

existing Subpart J of 40 CFR Parts 264 and 265.

Effective March 24, 1987, the interim status and permitting requirements, including the new Subpart J requirements of this final regulation, apply to small quantity generators who store wastes in tank systems for greater than 180 days (or 270 days if the accumulated waste is shipped over 200 miles) or who exceed the 6,000 kg limit of § 262.34(d). This regulation does not apply to new or existing accumulation tank systems owned or operated by 100-1,000 kg/mo generators who store up to 6,000 kg of wastes in tank systems for less than 180 (or 270) days. These tank systems must meet the requirements previously imposed by Subpart J in Part 265. These requirements appear in today's rule at § 265.201. However, EPA will propose, in the near future, in a separate notice, revised Subpart J requirements for all small quantity generator hazardous waste accumulation tank systems.

Today's final rule does not apply, however, to tank systems that are integrally tied to reclamation operations that are considered part of a closed-loop reclamation process and, hence, not storing solid and hazardous waste. These circumstances exist when hazardous secondary materials are returned, after being reclaimed, to the original process in which they were generated, where they are reused in the production process, provided that the hazardous materials are not accumulated over 12 months without being reclaimed and that the reclamation process does not involve controlled flame combustion. See section IV.A.2 of today's preamble for a more detailed discussion.

Today's final rule represents a recodification of the various sections that appeared in the proposed rule. This change resulted from an analysis of suggestions submitted by a number of commenters that there be more consistency in the regulation of all tank systems. Responding to this suggestion required the development of new sections and the reorganization of others. Table 1 shows the changes.

There are some differences in today's rule in the requirements for permitted, interim status, and 90-day accumulation tank systems. Table 2 summarizes the

requirements of today's final rules for the various types of tank systems.

H. Related Actions

Elsewhere in today's Federal Register, the Agency is addressing an issue related to this rulemaking. In a separate notice, the Agency is soliciting comments with respect to whether the exemption from permitting requirements for 90-day accumulation tank systems should be modified or eliminated. If it were eliminated, 90-day accumulation tank systems would be subject to corrective action, financial assurance, and other requirements.

Also, in the near future, the Agency will propose standards applicable to accumulation tank systems owned or operated by generators of 100 to 1,000 kg/mo who store up to 6,000 kg of hazardous wastes in tanks for less than 180 days (or less than 270 days if the waste must be shipped over 200 miles).

TABLE 1.—CHANGES IN CODIFICATION OF PARTS 264 AND 265 STANDARDS

Subject	Proposed section	Final section
Part 264		
Applicability.....	264.190	264.190
Design of tank systems.....	264.191	264.192
Installation.....	264.192	264.192
Secondary containment.....	264.193	264.193
General operating requirements.....	264.194	264.194
Inspections.....	264.195	264.195
Response to and disposition of leaking or unfit-for-use tank systems.....	264.196	264.196
Closure and post-closure care.....	264.197	264.197
Special requirements for ignitable or reactive wastes.....	264.198	264.198
Special requirements for incompatible wastes.....	264.199	264.199
Assessment of existing tank.....		² 264.191
Part 265		
Applicability.....	265.190	265.190
Assessment and certification.....	265.191	265.191
Response to and disposition of leaking or unfit-for-use tank system.....	265.192	265.196
Secondary containment.....	265.193	265.193
General operating requirements.....	265.194	265.194
Waste analysis and trail tests.....	265.195	265.200
Inspections.....	265.196	265.195
Closure and post-closure care.....	265.197	265.197
Special requirements for ignitable or reactive wastes.....	265.198	265.198
Special requirements for incompatible wastes.....	265.199	265.199
Design and installation of tank systems.....		³ 265.192

¹ The design and installation requirements of proposed § 264.191 have been combined as final § 264.192.

² Section 264.191 "Assessment of Existing Tank System's Integrity" in the final rule have been added to address existing tanks in a manner similar to the existing interim status tanks.

³ A new § 265.192 "Design and installation of tank systems" has been added to address the proper design and installation of new and replacement tank systems subject to the Part 265 standards (e.g.

TABLE 2.—STANDARDS FOR TANK SYSTEMS

Standard	Interim status and permitted ¹		Accumulation ²	
	New and replacement	Existing	New and replacement	Existing
Initial and periodic integrity assessments (§ 264.191, § 265.191).....	NA	x	NA	x
Design and installation standards, including need for external corrosion protection (§ 264.192, § 165.192).	x	NA	x	NA

TABLE 2.—STANDARDS FOR TANK SYSTEMS—Continued

Standard	Interim status and permitted ¹		Accumulation ²	
	New and replacement	Existing	New and replacement	Existing
Secondary containment with leak detection (§ 264.193, § 265.193).....	x (when installed)	x ^{3,4} (when tank system reaches 15 years of age, unless leaking)	x (when installed)	x ^{3,4} (when tank system reaches 15 years of age, unless leaking)
General operating requirements (§ 264.194, § 265.194).....	x	x	x	x
Inspections (§ 264.195, § 265.195).....	x	x	x	x
Responses to releases (§ 264.196, § 265.196).....	x	x	x	x
Closure and Post-closure care (§ 264.197, § 265.197).....	x	x	x	x ⁵
Special requirements for ignitable and reactive wastes (§ 264.198, § 265.198).....	x	x	x	x
Special requirements for incompatible wastes (§ 264.199, § 265.199).....	x	x	x	x
Waste analysis and trial tests (§ 265.200).....	x ⁶	x ⁶	NA	NA

¹ A generator who generates greater than 100 kg but less than 1,000 kg of hazardous waste in a calendar month and who accumulates hazardous waste in quantities exceeding 6,000 kg or accumulates hazardous waste for more than 180 days (or for more than 270 days if he must transport his waste, or offer his waste for transportation, over a distance of 200 miles or more) is subject to the interim status and permitting requirements.

² Except as provided in 1, generators of 100 to 1,000 kg of hazardous waste in a calendar month are not covered by the interim status and permitting requirements of this rulemaking. Rather, these generators will need to continue to comply with the requirements as promulgated on 51 FR 10174-10178 on March 24, 1986. These requirements appear in § 265.201 of today's rulemaking.

³ Tank systems used to store or treat EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, F027 must provide secondary containment within two years of the date of promulgation. ⁴ For those existing tank systems for which the age cannot be determined and documented, secondary containment must be provided within eight years of date of promulgation unless the facility age is known to be greater than 7 years, in which case, secondary containment must be provided by the time the facility reaches fifteen years of age or within two years of the date of promulgation, whichever comes later.

⁵ Existing accumulation tank systems are not subject to the § 265.197(c), (d), (e)—requirements for preparation of closure, post-closure, and contingency plans for such or financial responsibility for complying with such plans.

⁶ The § 265.200 standards are applicable to interim hazardous waste tank systems. Permitted tank systems must comply with the General Waste Analysis requirements in § 264.13.

III. Overall Strategy for Regulation of Hazardous Waste Storage and Treatment Tank Systems

This portion of the preamble first reviews the significant conclusions upon which the proposed regulation was based. Then it explains how comments and further analysis by the Agency performed in response to comments have led to changes in the regulation. In brief, the Agency has confirmed that a substantial number of hazardous waste tank systems are likely to be leaking and may lead to substantial risks to human health and the environment. The Agency has confirmed its earlier conclusion that the best regulatory strategy for hazardous waste tank systems is one that focuses on sound primary containment and effective and rapid detection and response to leaks from the primary containment structure. The best means of ensuring these objectives for most tank systems is secondary containment with interstitial monitoring.

A. Proposed Hazardous Waste Tank System Regulations

1. Problems Associated With Tank Systems

In the June 26, 1985, hazardous waste tank system proposal, the Agency explained that many hazardous waste storage and treatment tank systems were continuing to release hazardous wastes to the environment through such factors as tank system failure and operator error and that these releases could present significant risks to human health and the environment.

The preamble to the June 26, 1985, proposed rule referenced three sources of information as the basis for the

determination that many hazardous waste tank systems were releasing their contents to the environment and that these releases presented significant risks:

- Several EPA-sponsored studies completed in 1984;
- Information from the public, industry, and State and local governments, including survey results and studies; and
- Internal Agency information pertaining to damages, or threats of damage, caused by releases of hazardous wastes from tank systems.

These studies also allowed the Agency to identify what appeared to be the major causes of tank system releases. These were external corrosion, tank structural failure, piping and ancillary equipment failures, improper tank system installation, and operator errors.

EPA's 1980 and 1981 hazardous waste tank regulations did not address many of these problems. While external corrosion is a major cause of failure in underground storage tanks, corrosion was not adequately addressed in the pre-existing standards. Other significant deficiencies in the 1980/1981 rules were cited in the preamble to the proposed rule. Among other things, there were no permitting standards for underground hazardous waste storage and treatment tanks that cannot be entered for inspection. For a complete discussion of the limitations of the 1980/1981 RCRA tank standards, see the preamble to the proposed revised tank system regulations (50 FR 26447, June 26, 1985).

2. General Approach

The June 26, 1985, proposed regulation addressed hazardous waste tank

systems (i.e., tanks and ancillary equipment) in contrast to the 1980/1981 regulations that simply addressed hazardous waste tanks. The proposed rules were based on the premise that the proper management of hazardous waste storage or treatment tank systems should rest on a combination of proper tank system design, secondary containment or an equivalent mechanism, and operational practices. A variety of technical approaches were examined and evaluated for their ability to prevent releases from entering the environment. Design and operating measures such as design and installation standards, leak detection, certification requirements, and the use of corrosion protection were incorporated into the proposed regulatory strategy to ensure the continued integrity of the primary tank system during its useful life.

The major components of the proposed regulations are summarized below:

a. Existing Hazardous Waste Tank Systems. Existing tank systems were identified as tank systems already in operation or for which installation commenced prior to the effective date of this final rule. Retrofit of existing tank systems with secondary containment was a key element of EPA's proposed strategy. Full secondary containment would have been required within one year after the effective date of this final rule. This requirement would apply to all tank types including aboveground, inground, and underground tanks.

An alternative to secondary containment was also proposed for interim status and permitted tank systems. In the case of aboveground and

inground tank systems, this alternative would require secondary containment for the aboveground portions of the tank system provided that a ground-water monitoring program was implemented. In the case of underground tank systems, other than those storing or treating dioxin-containing wastes (listed Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027), owner/operators could substitute a ground-water monitoring program combined with leak testing every six months in lieu of full secondary containment. The proposed regulation would have allowed interim status and permitted tanks to obtain waivers from the requirement to provide secondary containment or its equivalent if the owner/operator could demonstrate that no hazardous waste or hazardous waste constituents would migrate to ground water or surface water "at any future time."

The proposal also required that the structural integrity of existing interim status and permitted tank systems be assessed and certified by a qualified and registered professional engineer. The assessment would consider the potential for corrosion of underground metal tank systems and would require a leak test for underground tanks or an internal inspection for above or inground tanks. The integrity assessment would also consider whether the design was adequate to handle vehicular traffic, floods, and seismic phenomena.

Under the proposed regulations, an existing tank system found to be unfit-for-use or leaking would have to be taken out of service and closed, repaired, or replaced. A replaced tank system would have to be equipped with secondary containment before being brought into service. These requirements were applicable to interim status, permitted, and 90-day accumulation tank systems.

b. New Hazardous Waste Tank Systems. The proposed regulation would have required that all new permitted, interim status, and 90-day accumulation tank systems of any type (e.g., aboveground, inground, or underground) be equipped with secondary containment. New tank system requirements would have been applicable to all hazardous waste tank systems that were newly installed (e.g., new tank systems and tank systems that had been used previously).

The proposed standards for new tank systems generally incorporated the same design, installation, operation, and response requirements for leaks or releases as proposed for existing tank systems. Since a new installation involves installing a total tank system

(primary tank and secondary containment) rather than just the secondary containment system, EPA proposed additional design and installation standards for new tank systems. These include structural integrity design standards for the primary tank vessel and installation standards and certification for both the primary and secondary containment systems.

c. Hazardous Waste Accumulation Tank Systems. The Agency proposed that 90-day accumulation tank systems be subject to many of the same standards as other new and existing tank systems. One major exception was that the ground-water monitoring alternative would not be allowed for owners and operators of 90-day accumulation tank systems that were not permitted. Other Part 265 standards were not proposed for accumulation tank systems, including: (a) an assessment and certification of tank system integrity, (b) provision for corrosion protection, (c) allowance of a request for a variance from the secondary containment requirements, and (d) preparation of closure plans, contingent closure, and post-closure plans, and financial responsibility. The basis for not proposing these standards was the lack of a mechanism, such as a permit, to act as a framework for the interaction between the owner/operator and EPA that the Agency believed would be needed to establish and implement the ground-water monitoring and other requirements.

d. Small Quantity Generators. The June 26, 1985, proposed hazardous waste tank system rules did not address the extent to which the new Subpart J standards should apply to small quantity generators (SQGs). A major element that was unresolved at proposal was the application of a secondary containment requirement for tank systems owned or operated by small quantity generators. In the proposed rule to establish a hazardous waste management system for generators of 100 to 1,000 kg of hazardous waste per month, EPA proposed that those generators who store wastes in tanks for greater than 180 days (270 days if the accumulated waste is shipped over 200 miles), or who store over 6,000 kg, would be subject to Parts 264 and 265, as well as the requirement to obtain a RCRA permit (see 50 FR 31287; August 1, 1985). In the preamble to the August 1985 proposed rule, EPA explained that it saw no basis for distinguishing between facilities owned or operated by these generators from other hazardous waste facilities and that the proposed secondary containment requirements for

tank systems, if finalized, would apply to such facilities.

Neither the June 1985 proposed hazardous waste tank system regulations nor the August 1985 SQG regulation proposed a specific set of revised hazardous waste tank system standards applicable to generators of 100 to 1,000 kg of hazardous waste per month who store up to 6,000 kg of wastes in tank systems for less than 180 (or 270) days. For this reason, final standards for these tank systems are not included in this final rule. However, EPA will propose in the near future, in a separate notice, revised hazardous waste tank system standards applicable to these small quantity generators.

3. Development of Regulatory Approach at Proposal

Central to the June 1985 proposed revised hazardous waste tank system standards was the requirement that these tank systems be provided with secondary containment or its equivalent. Under the proposal, owners or operators of existing interim status or permitted tank systems would be required to equip those tank systems with complete secondary containment or specific combinations of partial secondary containment, tank system integrity testing or semi-annual leak testing, and ground-water monitoring. The purpose of these requirements was to protect against human health and environmental damage that would occur if the tank systems developed leaks because of corrosion or other circumstances.

The principal basis for the requirement of secondary containment or its equivalent was the conclusion, drawn from several sources, that many tank systems have leaked and that others were likely to leak in the future. The preamble to the proposed regulation cited EPA studies, information from other governmental sources, and materials in the rulemaking docket to support the conclusion that the other requirements of the proposed standards (such as proper design, installation, and operating practices) would not be sufficient to protect human health and the environment from the effects of hazardous waste that would leak from tank systems (50 FR 26448; June 26, 1985).

The preamble to the proposed regulation explained that protection of human health and the environment "may not require the containment of all releases by means of an impervious secondary containment structure An approach may be to rely upon early release detection systems and a rapid

response program . . . " *Id.* The preamble discussed, and solicited comment upon, two methods of detecting releases—inventory monitoring and tank testing. The preamble explained that both of these methods of release detection appeared to have shortcomings. Inventory monitoring appeared unlikely to detect smaller leaks, and tank testing, which was developed for underground gasoline storage tanks, was not clearly reliable in detecting leaks of 0.05 gallons per hour. The uncertainties associated with release detection methods led the Agency to believe that an alternative to full secondary containment could not be based solely on release detection; it would have to combine periodic release detection methods with ground-water monitoring.

The regulatory strategy for the proposed regulations was an outgrowth, in part, of the philosophy expressed in the preamble to the January 12, 1981, interim final regulations for hazardous waste tanks. That preamble explained that requirements for storage facilities, as distinguished from disposal facilities, should have as their goal the containment of materials during the storage period. See 46 FR 2807; January 12, 1981.

The preamble to the June 1985 proposed regulation solicited comments on other regulatory strategies; the Agency said that it would reconsider these strategies before promulgating revised hazardous waste tank system standards. The alternative regulatory strategies discussed in the preamble to the proposed regulation were: (1) the combination of secondary containment and ground-water monitoring; (2) national risk-based standards; (3) minimum national standards with a variance from the containment requirement based upon risk; (4) minimum performance standards; (5) forced retirement of underground tanks; and (6) a ban on underground tanks. (See 50 FR 26451–26453; June 26, 1985.)

B. Development of Regulatory Strategy and Requirements for the Final Regulation

The Agency received numerous comments on the proposed regulation. In addition, the Agency's Office of Solid Waste and Emergency Response and Office of Toxic Substances have generated additional data and technical information that relate to the regulation of hazardous waste tank systems. Since the June 1985 proposal, the Agency has re-examined the need for regulations, the strategy underlying the proposed regulations, and the technical options available to address the problems

associated with hazardous waste tank systems. In the discussion that follows, the Agency explains these issues and the policy and technical conclusions upon which these final regulations are based.

1. Problems Associated With Hazardous Waste Tank Systems

The studies that the Agency relied upon at proposal and additional studies conducted subsequent to proposal demonstrate that there is a significant problem that these regulations will address. At this time, it is not possible to quantify the extent of the problem. These studies show, however, that a significant number of existing tank systems are likely to be leaking, now or in the future. Leaks are likely to contaminate ground water and pose human health risks. Approximately 16,000 existing hazardous waste tank systems are subject to the requirements of these regulations. Uncontrolled releases from these tank systems could pose substantial human health risks.

At proposal, the Agency concluded that a substantial number of tank systems were likely to be leaking. This conclusion was based principally on information derived from several studies which showed that a substantial number of tank systems were leaking or were likely to leak and that releases were suspected of impacting or threatening to impact community ground-water well systems and/or surface waters (50 FR 26448, 26459, and 26460; June 26, 1985). However, because of limitations in the type of information collected in studies of tank systems, it was impossible to estimate the actual number of leaking hazardous waste tank systems or to estimate the extent of the problem with any precision.

Some commenters questioned the conclusion that releases from hazardous waste tank systems pose serious health and environmental problems. However, no commenters submitted any data to assist the Agency in estimating how many hazardous waste tank systems may be leaking, and no systematic studies of hazardous waste tank systems have been performed. Thus, it is still not possible to quantify the number of leaking hazardous waste tank systems. The studies the Agency has conducted since proposal, however, have demonstrated that the number may be substantial. The Agency's Office of Solid Waste and Emergency Response (OSWER) performed a nationwide study of over 12,000 reports of releases from underground tank systems storing petroleum and chemical products. The Agency's Office of Toxic Substances tested over 400 motor fuel storage tank

systems. The OSWER study shows that a substantial number of underground tank systems may be leaking. The OTS study appears to confirm that conclusion, in that: approximately 35 percent of the tank systems tested did not pass a tank system tightness test. These studies support the conclusion that a substantial number of hazardous waste tanks also may be leaking.

A number of commenters asserted that petroleum and gasoline tank system data could not be used to indicate potential problems with respect to releases from hazardous waste tank systems. They presented no data, however, to substantiate their claims that hazardous waste tank systems would leak at a different rate than product storage tank systems. As is explained below, the major causes of releases from tank systems are unrelated to the characteristics of the material stored in the tanks, assuming that the stored material is compatible with the material of construction of the tank system. The principal causes of reported tank failures are external corrosion, installation problems, structural failure, spills, and overfills due to operator errors, and ancillary equipment failure. There are no data from which to conclude, or reason to believe, that these problems would not occur in hazardous waste tank systems with approximately the same frequency as for the petroleum or chemical storage tank systems.

The OSWER study conducted since proposal included chemical and petroleum storage tank systems. Significantly, the results were similar for these two types of tank systems, confirming that the propensity for tank systems to leak does not vary significantly with the characteristics of the material stored.

2. Causes of Releases From Tank Systems

a. Corrosion. At proposal, the Agency identified external corrosion as a major cause of underground tank system failure. The basis for this conclusion was a study conducted by the American Petroleum Institute (API), which analyzed nearly 2,000 leaks from underground gasoline storage tank systems. The API study concluded that external corrosion of underground tank systems was the predominant cause of tank and piping failure; 75 to 80 percent of the tank and/or piping failures reported resulted from subsurface corrosion of steel tanks and/or piping.

Commenters criticized the use of this study, asserting that differences in the chemical and physical properties

between petroleum products and hazardous wastes made the study inapplicable. As is noted above, these criticisms contradict the results of the API study itself, since 75 to 80 percent of the tank system failures were reported to be caused by corrosion due to contact with soils, not the material in the tank.

The majority of tank systems in the API survey were of bare steel construction and had no corrosion protection. On the basis of the available data, EPA has concluded that this is also the case for hazardous waste storage and treatment tank systems. In 1982-1983, the Agency sponsored a national survey of hazardous waste facilities. A report prepared for EPA, "National Survey of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated Under RCRA in 1981," presents the survey's methodology and conclusions. EPA found that steel is the most common material of construction for underground (73 percent) and aboveground (84 percent) hazardous waste tank systems. Overall, about 75 percent of all hazardous waste tank systems are constructed of carbon steel. Few of these tank systems are believed to have corrosion protection.

Other studies the Agency relied upon at proposal showed that external corrosion is one of the principal causes of underground tank system failure. For example, a study of 800 underground tanks in Ohio conducted by a company specializing in cathodic protection indicated that at least one underground metal tank failure can be expected in 55 percent of the gasoline stations over a 15 year period and that failures can be expected at 70 percent of the stations over a period of 20 years.

The OSWER study conducted after proposal of the hazardous waste tank system regulation has confirmed that external corrosion is a principal cause of underground tank failure. It shows that, excluding those releases for which a cause was not specified and those releases caused by operator errors, about 22 percent of the reported release incidences were due to some type of corrosion (28 percent for underground chemical tanks and 21 percent for underground petroleum tanks). In addition, it is likely that many of the nonspecific causes reported, such as age and holes, were also due to corrosion. Of the corrosion incidences, only about 5 percent were attributed to internal corrosion (10 percent for underground chemical tanks and 5 percent for underground petroleum tanks).

The Spill Prevention Control and Countermeasure (SPCC) database and the Pollution Incident Reporting System

(PIRS) database provided valuable information on the causes of failure and releases from aboveground storage tanks. Since aboveground tanks are not in contact with corrosion-inducing soils, external corrosion was not a major failure mode for these tanks. It does cause failure in aboveground tanks, however. Exclusive of failures caused by operator error and natural phenomena, failure by all forms of corrosion was 2.2 percent in the PIRS database and 6.2 percent in the SPCC database. Based on a review of available data on underground and aboveground tank systems, EPA expects that the aboveground portions of onground and inground tanks would experience external corrosion failures similar to that of aboveground tanks. On the other hand, the bottoms of onground tanks and below ground portions of inground tanks constructed of steel and other metals would likely have external corrosion failure rates similar to underground tanks.

b. Structural Failure. At proposal, the Agency identified structural failure as one of the causes of underground tank system failure. For example, the API study discussed above indicated that the primary cause of fiberglass tank failures was breakage or physical separation of the tank wall. The OSWER study confirms this conclusion, although, based on the study results, it is not possible to identify the specific causes of structural failure. Qualitatively, failures were reported as fabrication defects, design defects, mechanical failures, or structural failures. The study shows that, excluding those releases for which a cause was not specified and those releases caused by operator errors, structural failure accounted for about 45 percent of the release incidents reported (38 percent for underground chemical tanks and 45 percent for underground petroleum tanks). As is true of external corrosion, there is no reason to believe that structural failure would not also be a significant problem with hazardous waste underground tank systems. Because of the similarities in fabrication, handling, and installation between hazardous waste tank systems and petroleum and chemical storage tank systems, the Agency believes that structural failure is likely to occur regardless of whether hazardous waste, petroleum products, or chemicals are stored.

Based on the SPCC and PIRS databases, in the case of aboveground tanks, structural failure accounted for between 6 and 7 percent of the reported failures.

c. Ancillary Equipment Failure. At proposal, EPA identified failures of

ancillary equipment, including piping systems, as a significant cause of releases from above ground tank systems, citing the analysis of over 2,000 incidents of spills of oil or hazardous substances reported under EPA's Spill Prevention Countermeasures (SPCC) plans and the Coast Guard's Pollution Incident Reporting System (PIRS). This analysis showed that, if failures due to operator error and natural phenomena are excluded, between 85 and 90 percent of these release incidences resulted from failures of piping systems (including failures of pumps, flanges, couplings, interconnecting hoses, and valves). EPA also cited studies on the occurrence of leaks in underground piping due to corrosion. One study showed that the accumulated number of leaks in underground piping increases exponentially with time, starting at about 5 years from the date of installation and increases by a factor of 10 every 6 years. The API survey discussed previously also indicates that corrosion of underground piping and ancillary equipment is a major cause of releases from underground tank systems.

The OSWER study confirms the conclusion that failures of ancillary equipment are major causes of releases from tank systems. The study shows that, excluding those releases for which a cause was not specified and those releases caused by operator errors, ancillary equipment failures accounted in 38 percent of the reported release incidents (35 percent for underground chemical tank systems and 38 percent for underground petroleum storage).

Several commenters expressed the opinion that data derived from petroleum storage tanks should not be used to predict the failure rates for piping and other ancillary equipment in hazardous waste tank systems because they believed that petroleum tank systems are more often pressurized than hazardous waste tanks (presumably a pressurized pipe, pump, valve, etc. would be more likely to leak than a non-pressurized component). They also asserted that there were differences in the length of piping. No data were provided to substantiate their claims, however.

There is no basis for concluding that hazardous waste tank systems are less likely to have pressurized piping or other ancillary equipment, especially in the underground situation where pumps must usually be used to remove fluids from the tank. In addition, the Agency is unaware of any information showing that piping length is substantially different for hazardous waste versus

petroleum tank systems. Some commenters asserted that piping lengths of about 200 feet are typical of gasoline service station tank systems compared to the 50 feet of piping assumed by EPA for a typical hazardous waste tank system. Other commenters stated that piping lengths for many hazardous waste tank systems are often greater than 50 feet, with one commenter citing a piping length of 8,000 feet. While EPA does not consider the latter figure to be typical of many hazardous waste tank systems, it is likely that piping systems used at gasoline service stations are well within the range of piping lengths characteristic of hazardous waste tank systems.

The corrosive properties and presence of suspended solids in many hazardous wastes might actually cause higher failure rates of valve stem seals, shaft seals in pumps, flanged and threaded connections, and other tank seals in hazardous waste tank systems than in petroleum storage tank systems. Suspended solids, sludges, and debris are found in many hazardous wastes, and their presence in hazardous waste tank systems might cause clogging and blockages, which can cause pressure buildup in pumps and pressurized segments of the piping system. The higher pressure combined with the abrasive properties of some hazardous wastes might lead to accelerated wear on rotating shaft and valve stem seals.

EPA concludes that the external corrosion rate and the incidence of leakage from piping and ancillary equipment for underground hazardous waste tank systems are likely to be at least as great as those of petroleum storage tank systems. Thus, re-examination of the potential for ancillary equipment to cause tank system failure confirms that the regulation of hazardous waste tank systems must include ancillary equipment.

d. Operator Errors. At proposal, EPA identified overfills, overflows, and other operational errors as a significant cause of releases of hazardous waste to the environment. For example, in the SPCC and PIRS data bases, operator error and overfills/overflows accounted for 32 and 47 percent of the release incidents reported. Recent studies confirm this conclusion. The OSWER study identified this as the leading cause of releases for both petroleum and chemical storage tank systems. Typical operator errors were: (1) overfill of tanks; (2) incomplete closure of valves; (3) opening of wrong valves; (4) improper mating of hose connections; (5) improper repair or maintenance; and (6) accidents

(e.g., forklift damage to a tank or breaking of a valve stem through the use of a wrench to open a stubborn valve). There is no reason to believe that operators of hazardous waste tank systems will commit fewer errors than operators of other tank systems.

Aside from the immediate threat of migration to ground and surface waters, overfills can contribute to accelerated corrosion failure in underground, inground, and onground tank systems storing hazardous wastes. Many of the hazardous wastes contain acids, bases, and salts which if spilled into the soil surrounding the tank system can cause the soil to become corrosion-inducing. Also, microbial action on organics, halogenated organics, and sulfur-containing hazardous wastes that have leaked into the soil adjacent to the exterior tank wall can produce biodegradation products that are highly corrosive (i.e., organic acids, HCl, and sulfuric acid).

3. Risks Posed by Releases From Hazardous Waste Tank Systems

The report, "The National Survey of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated Under RCRA in 1981," indicates that about 16,000 hazardous waste storage and treatment tanks were used at about 3,800 facilities (exclusive of small quantity generators) in the United States in 1981. As is explained above, many of these tank systems probably are leaking or can be expected to leak in the future. Leaks of hazardous waste can be expected to pose a significant risk to human health and the environment in part because leaked materials may contaminate ground water and cause individuals to be exposed to the hazardous constituents in the wastes. In addition, risks to human health and the environment may be introduced by exposure to contaminated surface water and air.

The recent OSWER survey of documented release incidents from underground storage tank systems showed that over 75 percent of the incidents resulted in contamination of the soil and that the ground water was contaminated in more than 50 percent of these incidents. In addition, the same survey showed that, of the underground chemical release incidents, 74 percent resulted in contamination of the ground water. Leaks from hazardous waste tank systems may also cause ground water contamination.

Other available data confirm that leaking tanks present serious threats because they allow hazardous chemicals to contaminate soils and

ground water. In a study entitled "Assessment of the Technical, Environmental and Safety Aspects of Storage of Hazardous Waste in Underground Tanks," dated February 1984, the Agency compiled studies conducted by the American Petroleum Institute and by various State and municipal agencies. The studies analyzed leaks from petroleum product and other tank systems. One of the studies was conducted by the California Water Quality Board—San Francisco Bay Region.

In 1982, the Regional Board initiated a survey of 1,950 facilities. Of the facilities surveyed, 480 reported current or prior use of underground tanks or sumps. Of these, the Board selected 87 judged as having a high potential for leaking hazardous substances. These tank systems were non-vaulted, solvent waste tanks and sumps, without corrosion protection, and at least seven years of age. These high priority facilities were required to conduct a contamination assessment. Of the first 80 facilities reporting, 64 had subsurface contamination although at least 5 of these were from sources other than the tank system. At many of these facilities, highly toxic materials, such as benzene and other solvents, contaminated soils and/or ground water. At 10 facilities, soil contamination levels exceeded 1,000 ppb for at least one chemical; 11 facilities reported ground water concentrations of over 1,000 ppb.

This study also included case histories of two facilities with leak problems reported prior to the initiation of the larger study of 1,950 facilities. These case studies of release incidents at these additional facilities reported the following: In one case, a solvent storage tank leaked for one and one-half years before it was detected. This leak resulted in the contamination of three aquifers with a cleanup cost of over \$12 million. In the second case, two public and several private water supply wells were contaminated and cleanup costs by the end of the first year had reached approximately \$10 million.

The conclusion that leaks from tank systems may present substantial risks is supported by EPA's "Hazardous Waste Tank Risk Analysis." This analysis modeled what EPA believes are current hazardous waste tank system management practices. The results of this analysis indicate that current practices lead to a substantial probability of release to the environment from tank failures due to corrosion, rupture, improper installation, gasket failures, and operator errors.

Current practices tend to allow releases to continue undetected until the release becomes obvious. In many cases, undetected releases can be expected to contaminate valuable resources and threaten human health and the environment.

The estimated release volumes vary depending upon the type of tank system and the quantity of waste handled. Underground and large volume tank systems tended to have the highest estimated releases. However, all tank systems, including aboveground and small volume tank systems, were associated with significant release volumes and, therefore, risk to human health and the environment. In general, all tank systems modeled under current management practices were associated with release volumes that were approximately 10 percent or less of the tank system throughput over the 20 year time horizon. Although small volume tank systems were estimated to have relatively small release volumes, even such small release volumes may pose a significant risk to human health and the environment as a result of the toxic effects associated with hazardous waste constituents. Chronic exposure to hazardous waste constituents may lead to such adverse health effects as cancer or damage to various organ systems (e.g., kidneys, liver, and reproductive systems).

The Hazardous and Solid Waste Amendments of 1984 placed additional bans and limitations on disposing of hazardous waste in landfills. EPA must make ban determinations on all RCRA waste by November 1990. The first such determination, regarding solvents and dioxins, was made in a proposed rule dated January 14, 1986. Others are currently under development and still others will follow at regular intervals. When effective, these regulations may substantially increase the amount of wastes in storage and treatment tank systems, thus increasing the aggregate risks posed by these systems if they are not managed properly.

4. Technical Options for Addressing Problems Associated With Leaking Tanks

The incidence of releases resulting from the major causes discussed in the preceding section tends to vary slightly from study to study depending on the particular population surveyed. In all cases, however, high among the most frequent causes are:

- Corrosion;
- Structural failure;
- Piping and ancillary equipment failure; and

- Operator error leading to spills or overfills.

Before determining how best to address the problems associated with leaking tank systems, the Agency evaluated the technical options available for addressing the principal causes of releases. As is explained immediately below, there were significant drawbacks to reliance upon any method other than secondary containment with interstitial monitoring for the effective identification of and response to releases from hazardous waste tank systems to the environment.

a. Corrosion. Corrosion of tank systems is usually caused by improper selection of construction materials and/or inadequate protection against external corrosion. The Agency explored the possibility of addressing this problem by ensuring that the design of the tank system was appropriate (i.e., that the materials of construction were compatible with the waste being stored) to prevent internal corrosion from occurring and that effective corrosion protection be applied to steel tank systems and metal components of non-steel systems to address external corrosion problems. Corrosion protection might consist of specifications of corrosion-resistant coatings or liners, or cathodic protection systems.

The corrosion process is very complex and is influenced by factors such as: oxidizing agents, electrolytic activity, acidity, moisture levels, soil resistivity, temperature, bacterial action, and other factors. Corrosion protection approaches include cathodic protection; paints, coatings, and linings; soluble corrosion inhibitors; electrical isolation; and the use of corrosion resistant materials.

EPA was concerned whether most owner/operators have the knowledge and technical specialization to evaluate and select the most appropriate corrosion protection measure. In order to assure the application of a proper level of expertise in this phase of waste management, EPA evaluated the benefits of requiring owner/operators to obtain certification of proper corrosion device selection and system design by qualified corrosion experts. Independent, qualified corrosion experts would be required. As a minimum, they would need to specify the appropriate design and installation requirements. In the case of a field-fabricated corrosion protection system, a corrosion expert would supervise the installation of the system.

Even if owner/operators had the necessary expertise or obtained the services of qualified experts, corrosion

problems would remain. The Agency is aware of no data establishing the complete effectiveness of corrosion protection measures applied to single-walled steel tanks. The reliability of many protection methods depends upon effective maintenance and inspection practices which are subject to human error or negligence. Corrosion protection measures, such as cathodic protection systems, coatings, and moisture barriers, may be effective in significantly reducing rates of corrosion, but they do not necessarily stop corrosion completely. Therefore, corrosion protection measures will reduce, but not eliminate, failures resulting from corrosion. In addition, corrosion protection does not address causes of releases other than corrosion. Thus, in addition to corrosion protection, some form of release detection is required to enable an appropriate response in the event of a release from a tank system protected against corrosion.

b. Structural Failure. Structural failure problems can be attributed to a large degree to improper design and installation. However, inadequate quality assurance and quality control during the manufacture of tank systems would also be a major concern. The solution, again, would involve applying proper levels of expertise at the design and installation stages and adequate quality assurance during manufacture. Certification by a qualified professional engineer that the design and installation is in accordance with sound engineering practices and applicable standards can be of considerable benefit. The major limitations of design and installation standards is that once a tank system is designed, built, and installed, improvements in the standards or even errors in applying the standards cannot be retrofitted in most instances. For example, it is usually impossible to retrofit existing tank systems with better materials of construction or with thicker walls.

In addition, improved tank design standards cannot assure the proper installation and maintenance of the tanks. That a substantial number of releases from tank systems have resulted from structural failure demonstrates that improved design standards have not obviated the need for regulations ensuring that tank systems are installed and operated appropriately. In addition, some form of release detection is required to enable an appropriate response in the event of a release from even a well-designed and installed tank system.

c. Ancillary Equipment Failure. Data cited in the preamble to the proposed

regulation and the recent OSWER survey attributed a significant number of leaks to ancillary equipment failure. Most of these releases appear to have resulted from mechanical and thermal stresses common to daily operation. These stresses, however, are most evident on the components of the systems that are most susceptible to wear, such as pipes with flanges or threaded connections, valves, and pumps. Pumps and valves, for example, are designed with moving parts and seals that periodically deteriorate with use. In addition to these stress-induced factors, underground piping is susceptible to the same corrosion influences discussed previously for tanks.

The principal leak prevention measure suggested for ancillary equipment is its proper design and installation. The design should match its intended function taking into consideration first the proper material of construction. The material of choice must be compatible with the array of substances that will pass through it. Specifically, the material of construction must match the thermal coefficients of expansion and corrosive properties of the substances transported through it. A quality audit of tank system installation, especially to prevent loose fittings, poor welding, and malaligned gaskets, will prevent many leaks.

The difficulties of addressing the problems of structural failure and corrosion of ancillary equipment are similar to those of the tanks themselves. Thus, in addition to proper design and installation of ancillary equipment, some form of release detection is required to enable an appropriate response in the event of a release from even a well-designed and installed piping system.

A basic type of construction that helps prevent releases is piping with welded connections. Devices are also available that enclose specific components of the ancillary equipment system such as jacketed (double-walled) piping and sealless (canned) pumps. These devices—forms of secondary containment—are capable of containing a release in the event of a failure of the primary containment system.

d. Operator Errors. Operator errors are among the most prevalent causes of tank system leaks and releases. Proper training and the establishment of standard operating procedures and safety practices can reduce the occurrence of human errors. Spill control and contingency plans, training plans, and operating procedures are important and are required to obtain permits for

tank systems and other treatment, storage, and disposal facilities (TSDFs).

Some operator errors can be averted by installing engineered safeguards. Overflow protection devices can be installed on tank systems to provide warning to the operator and/or to shutdown transfer pumps when the tank reaches full capacity. Protective guards can be installed to prevent vehicular or forklift damage to tanks. Proper tagging or labeling of valves and piping can help alleviate human error in operating valves. Tank design standards, such as specification of a minimum freeboard requirement and a minimum volume requirement for secondary containment, can also help to reduce the consequences of human error. However, even the best training programs and operations practices will not completely eliminate human error.

e. Multiple Causes of Releases. In addition to the direct methods described above for controlling or reducing the likelihood of releases from tank systems, there are a number of monitoring methods and backup devices that are capable of addressing, to varying degrees, the problems associated with releases due to corrosion, poor design, fabrication, and/or installation, piping and other ancillary equipment, and operator error. These include tank system inspection, leak detection, and secondary containment.

i. Inspections. Physical inspections can be conducted in order to detect existing leaks and/or to identify problem areas that can lead to releases if not repaired. If the release is detected early and response measures are taken, inspections can reduce risks to human health and the environment. Inspections can commence at the time a tank system is installed and can be conducted on a periodic basis thereafter. Tests conducted at the time the tank system is installed include various non-destructive methods such as tank tightness tests, soap tests, ultrasonic tests, spark tests, acoustic emissions tests and radiography tests.

Periodic inspections can include visual inspections of tanks (foundations, connections, coatings, and tank walls), internal inspections for enterable tanks (roof, structural members, shell, and bottom), and visual inspection of pipes and ancillary equipment. Inspection equipment includes penetrant dyes, vacuum boxes (for seam testing), ultrasonic instruments, and radiographic equipment.

While regular visual inspections can reduce risks, they cannot be relied upon completely. There are many problems that visual inspections would not reveal

(e.g., loose fittings, external corrosion if only the inside of the vessel can be inspected) and, because visual inspection is an episodic rather than a continuous process, detection of releases may occur after significant quantities of waste have migrated to the environment. This problem can be alleviated if a mechanism is available to contain the release until the release is discovered.

ii. Leak Detection. If a leak is detected early and response measures are taken, this approach can reduce risks to human health and the environment. The concept of early detection and subsequent corrective action as an appropriate method of addressing the risks presented by releases from hazardous waste tank systems was the basis for the ground-water monitoring alternative for existing tanks that was a major component of the proposed regulation. For underground tank systems, this alternative consisted of semi-annual tank tightness testing combined with ground-water monitoring. The Agency received many comments on this approach; most of them identified asserted problems and advantages that commenters believed were associated with various methods of leak detection. In response to these comments, the Agency has re-examined each of these methods and has concluded that they are not reliable enough to provide long-term control of leaks from hazardous waste tank systems.

There are a number of leak detection methods that can be applied to tank systems. There are various methods of tank testing, including pneumatic, valve manometer, liquid level bubble, fabricated float, laser beam, overflow/standpipe, buoyancy sensor, and capacitance probe tests. Other methods of leak detection are inventory monitoring, unsaturated zone monitoring, and ground-water monitoring.

(a) Ground-water monitoring: A number of commenters identified problems with ground-water monitoring. Commenters pointed out that ground-water monitoring alone only detects a leak after the hazardous waste has reached the ground water and that the leak would potentially be undetected until long after the leak occurred. Other general problems cited by commenters included issues of accuracy, especially for certain materials, hydrogeologic settings, and background contamination.

Commenters pointed out several problems with ground-water monitoring as it might be applied specifically to tank systems. They noted that the

design of the ground-water monitoring system could be complicated if there are many tanks located in close proximity to one another. The proper location, depth, and number of wells required were all mentioned as items of concern if the system was to be effective. In facilities where pipes are interconnected between multiple tanks, commenters stated that it is often impossible to pinpoint the source of ground-water contamination (e.g., determine which tank is leaking). Some commenters stated that monitoring wells could provide a pathway for hazardous waste to migrate and contaminate ground water. Commenters also stated that soil characteristics and the presence of installed foundations and underground piping or equipment in the vicinity of the tank can sometimes lead to channeling of underground contamination, effectively bypassing the ground-water monitoring points, making it improbable that meaningful ground-water monitoring can be implemented for hazardous waste tank systems with a single sampling point. They stated that multiple sample wells, properly placed, are required to detect contamination effectively. They also stated that the determination of the direction of flow in ground-water aquifers is difficult and makes the placement of sampling wells even more difficult.

The Agency agrees with some commenters that ground-water monitoring, while it can be useful for other types of treatment, storage, and disposal facilities, will not by itself allow detection and identification of the releases from hazardous waste tank systems within a timeframe that will permit rapid responses to the releases. Ground-water monitoring is not as effective as secondary containment with interstitial monitoring in protecting human health and environment from leaking hazardous waste tank systems because it detects leaks substantially later than monitoring the interstitial volume between the tank and the secondary containment system. Reducing the length of time required to detect a release is important in reducing risks of environmental damage. The Agency is also concerned that ground-water monitoring might have reduced effectiveness in detecting releases from long lengths of piping or individual tanks when multiple tanks are in close proximity to each other.

EPA, however, does not agree with the commenters who claimed that ground-water monitoring systems are unreliable in detecting leaks or inherently dangerous as conduits of contamination. While the design of an

effective ground-water monitoring system requires careful consideration of facility structure and site hydrogeology. EPA believes that the design of a system which will reliably detect leaks is quite feasible. EPA agrees with the commenters who stated that multiple wells may be required to detect contamination effectively and that care should be taken to ensure that the direction of ground-water flow is properly determined. Also, while improperly-installed or improperly-maintained wells may provide a pathway for contamination, such improper installation or maintenance is not an appropriate reason to reject ground-water monitoring.

(b) *Tank testing:* Tank testing, or tank tightness testing, can be useful in detecting many leaks from tanks or ancillary equipment. It, too, however, is not sufficiently reliable to serve as a long-term method of controlling leaks from hazardous waste tank systems.

Many commenters addressed tank testing with various points of view. Some claimed that the method was unreliable; others claimed that leaks of 0.05 gallons per hour could reliably be detected—especially in smaller tanks. The Agency commenced its own study of leak testing, but the results of that study were not available for this rule.

The recent OTS survey of motor fuel storage tank systems concluded that commercial tank testing methods were not reliably detecting releases in the range of 0.05 gallons per hour. In many cases, fairly substantial leaks remained undetected. OTS concluded that commercial methods and field procedures could be modified to improve their reliability, however. OTS analysts adapted a commercial method to correct deficiencies in the methods and generated a tank testing methodology that they determined can detect releases under testing conditions of 0.1 gallons per hour with 95 percent confidence. OTS also concluded that it is imperative that information be made available on both the accuracy and precision of tank testing methodologies.

The Agency concludes that tank tightness testing can play a role in regulating hazardous waste tank systems. Properly performed tank system tightness tests appear to be able to detect leaks of approximately 0.1 gallons per hour. During the phase-in period, these tests may be used to conduct assessments of tank system integrity. This will enable the identification of most leaking tank systems. However, undetected leaks of below 0.1 gallons per hour could still be considerable over the period of a year.

The Agency has concluded that permitting hazardous waste leaks of that size to be undetected and, therefore, uncorrected, would be unacceptable over the long term.

The re-examination of ground-water monitoring and leak testing led the Agency to reject the ground-water monitoring alternative contained in the proposed rule. Because both ground-water monitoring and hazardous waste tank system integrity assessments, including tank system tightness tests, are not completely reliable in detecting releases so that response actions can be taken before the releases reach ground water or surface water, EPA found that this alternative does not provide equal protection to human health and the environment as secondary containment with interstitial monitoring. This conclusion is further supported by the results of the Agency's risk analysis conducted as a part of this rulemaking.

(c) *Inventory monitoring:* In the preamble to the proposed regulation, the Agency expressed serious doubts about inventory monitoring as a method of detecting leaks from hazardous waste tanks. Re-examination of the issues has confirmed that the regulation should not rely on this method. Among other things, the OTS survey of underground motor fuel storage tank systems found that owner/operators were not able to perform inventory monitoring effectively. Only 41 percent of the attempted cases resulted in the development of usable data. The Agency believes that the use of inventory monitoring may be even more difficult and problematic for owners and operators of hazardous waste tank systems.

(d) *Unsaturated zone monitoring:* Unsaturated zone monitoring is a technique for monitoring conditions in the zone of aeration lying between the earth's surface and the water table. This is a zone where vapors can migrate relatively easily. A number of devices can be used to monitor conditions in this zone. They rely on the principles of thermal conductivity, electrical resistivity, solubility, and vapor pressure. Soil-gas detectors are a widely used form of vadose or unsaturated zone monitoring. They function best in pourous soils where vapors can migrate easily to a sensing device. These detectors are most effective when monitoring highly volatile gases in relatively dry soil.

Some commenters stated that unsaturated or vadose zone monitoring should be considered as a replacement for ground-water monitoring, because it would be capable of detecting leaks

prior to the release of hazardous constituents to ground water. EPA agrees that releases from hazardous waste tank systems should be detected before they reach ground water. However, in analyzing these comments and other available information on the capability and reliability of unsaturated zone monitoring, EPA has concluded that unsaturated zone monitoring is an unproven technology for reliably detecting releases from hazardous waste tank systems at this time.

EPA evaluated the use of unsaturated zone monitoring as a possible substitute for ground-water monitoring. The Agency used mathematical models to simulate the effectiveness of soil-gas monitoring in analyzing these comments and other available information on the capabilities and reliability of unsaturated zone monitoring using the best available information on the transportation of vapors through soil. In evaluating the reliability of unsaturated zone monitoring, EPA assumed that (1) monitoring would occur in the excavation zone; (2) the system monitored is a carbon steel underground tank containing the highly volatile waste dichloromethane; (3) the tank is located in a homogeneous backfill of known permeability; (4) the ground-water table is deep enough to allow detection of the leak prior to ground-water contamination; (5) the composition of the waste stored in the tank does not vary over the time that excavation zone monitoring is used; (6) the monitoring well is located two feet from the tank; and (7) the tank owner/operator can afford and would perform periodic cleanup and repair or replacement of the tank. Overall, these assumptions result in an evaluation of excavation zone monitoring under ideal installation and operating conditions.

The results of the simulation (see "Hazardous Waste Tanks Risk Analysis," June 1986) show that for volatile hazardous waste, vapor monitoring in a sand-backfilled excavation zone under ideal conditions and combined with immediate response action, might reduce the volume of releases to the environment nearly as well as secondary containment: vapor monitoring in the excavation zone, combined with immediate response action, reduced baseline releases by 96 percent, while secondary containment reduced them by 98 percent. These simulated results have not been validated with field studies, however, even under the ideal conditions described above.

EPA agrees that there are arguments that can be made regarding the

theoretical superiority of unsaturated zone monitoring when compared to ground-water monitoring or other leak detection methods for identifying releases of volatile materials from hazardous waste tank systems. The Agency does not agree, however, that its current state of development is adequate for full reliance in lieu of secondary containment. Rather, EPA believes that unsaturated zone monitoring is an emerging technology with considerable promise. Once it has been sufficiently developed and its reliability is understood, it could provide a means of assuring that leaked wastes can be confined to an area in which remedial action is practical.

EPA has a number of specific reservations about adopting this approach for use as the principal regulatory strategy. Because unsaturated zone monitoring procedures, including soil-gas monitoring, are still relatively new, there has been little field validation of their effectiveness, especially for the wide range of hazardous wastes that will be covered by this rule. Many wastes are not volatile, and soil-gas monitoring in the unsaturated zone would not detect their release. In addition, sample representativeness, quality control, the effect of sampling methods on detection limits, and other issues must be resolved. The Agency recognizes that there is a special need to focus on these issues from the standpoint of the unique characteristics of hazardous waste storage in tank systems. The approach needs verification over the expected range of waste types, hydrogeologic settings, and waste mobility and persistence levels. Methods must be developed to distinguish tank system failure from background contamination from previous overfills, spills, and/or releases. Also, in the cases where relatively lower concentrations of constituents are present in hazardous wastes when compared to the levels characteristic of stored products or raw materials, leaks might lead to contaminant levels that are below the detection limits of current unsaturated zone monitoring techniques.

EPA's Office of Research and Development will be committing significant resources over the next 18 months in an effort to investigate system reliability, investigate the proper geometry for placing monitoring devices around tank systems, and to identify acceptable unsaturated zone monitoring systems. EPA will continue to evaluate unsaturated zone monitoring for its applicability in detecting hazardous waste releases. Although the techniques

are not specifically included in this rule, they could potentially, with improvement, be employed on a case-by-case basis as part of a technology-based variance application presented to the Regional Administrator when seeking an exemption to the secondary containment regulations contained in this rule.

iii. *Secondary Containment with Interstitial Monitoring.* Secondary containment is a method of containing releases to enable detection of hazardous wastes leaking from hazardous waste tank systems. Secondary containment technologies include liners, vaults, and double-walled tanks. When combined with interstitial monitoring, the overwhelming advantage of secondary containment is that it allows for the detection of releases from the primary containment vessel while providing a secondary barrier that contains the released material before it escapes into the environment. The space between the primary and secondary vessels is easily and reliably monitored.

There are other benefits to secondary containment. Secondary containment can isolate the primary tank from high ground water and saturated soils, thereby protecting the tank from potential corrosion by the combination of water and corrosion-inducing soils. In some cases, the materials of construction offering the best corrosion protection against external and internal corrosion may not be one and the same or the choice of material for corrosion protection may not have adequate structural strength. In these cases, the secondary containment system and the tank system can be constructed of materials that provide the desired combination of properties (e.g., steel or fiberglass tanks in concrete vaults).

Another important benefit is that the secondary containment system can also be designed to provide for containment and detection of accidental spills and overfills. For example, in secondary containment system designs incorporating vaults and berms, spills and overfills can be easily detected by visual examination and also decontaminated readily. This compensates for human errors and reduces the reliance upon flawless operator performance. Secondary containment prevents spills and overfills whose volume does not exceed the capacity of the secondary containment system from being released to the environment.

Additionally, in the event that a tank system is used to store or treat a hazardous waste which was not

considered at the time the system was designed, secondary containment can provide protection against design deficiencies that might otherwise result in releases of hazardous waste constituents.

Secondary containment can afford security for other causes of tank failure. As a secondary barrier, it can eliminate releases to the environment caused by point anode corrosion (e.g., caused by a piece of cinder contacting the tank surface), collect leakage from loose fittings and worn seals on valves and pumps, and prevent releases due to structural failure of the tank system.

Table 3 summarizes the Agency's evaluation of the technical options now available for addressing releases from hazardous waste tank systems.

5. Regulatory Approach

a. Summary of Approach Taken in Final Rule. As explained previously, the Agency's overall strategy for accomplishing the statutory goal of protecting human health and the environment from the risks posed by hazardous waste storage and treatment facilities is to prevent the migration of hazardous waste constituents to ground and surface waters where such releases may present a risk to human health or the environment. A key element of the overall strategy is the need to detect releases in a timely manner so that an appropriate response can be made.

The Agency's overall risk management strategy has evolved from the following considerations. First, as is explained in this preamble, there is a need to address further regulation of

hazardous waste tank systems because the current situation most likely presents significant risks. A number of studies have shown that tank systems are likely to be leaking or are likely to leak in the future. Releases from tank systems are likely to contaminate ground water and surface water, posing risks to human health and the environment.

Second, based on EPA's review of the technical options, as well as the rationale expressed in the preamble to the 1981 hazardous waste tank system regulations, the Agency has concluded that a regulatory approach that emphasizes secondary containment with interstitial monitoring both satisfies the statutory objective and is consistent with the function of tank systems as storage, rather than disposal units.

TABLE 3.—EVALUATION OF VARIOUS CONTROL TECHNOLOGIES

Problem	Technology	Function	Ability to contain release to ground and surface waters
External corrosion.....	Cathodic protection	Slow corrosion rate	No.
	Coatings	Slow corrosion rate	No.
	Secondary containment	Barrier against waste and corrosive soils	Yes.
Internal corrosion.....	Materials standards	Slow corrosion	No.
	Coatings	Slow corrosion	No.
	Linings	Protective barrier	Maybe.
Leaks (Tanks and ancillary equipment).....	Leak detection	Early warning	No.
	Visual inspection	Early warning	No.
	Ground-water monitoring	Early warning	No.
	Vadose zone monitoring	Early warning	No. ¹
	Secondary containment	Early warning and containment	Yes.
Loss of structural integrity.....	Design standards	Proper design	No.
	Quality audit	Eliminate flaws	No.
	Installation standards	Proper installation	No.
	Secondary containment	Early warning and containment	Yes.
Overfill	Protective controls	Prevent overfill	No.
	Secondary containment	Early warning and containment	Yes.
Operator error	Operator procedures and training	Reduce errors	No.
	Secondary containment	Early warning and containment	Yes.

¹ Promising, emerging technology that may result in detection prior to release to ground waters. Currently the subject of intensive EPA research to define the capabilities of existing state-of-the-art technology. Research is focusing primarily on volatile materials.

Secondary containment is not expected to impose economic burdens as explained later in this preamble in section VII. When the potential costs of corrective action are considered, secondary containment may result in substantial savings over the long term. For example, the annualized present value cost of replacing a 4,000 gallon underground steel tank system with a new tank system with full secondary containment and interstitial monitoring would be about \$3,900. On the other hand, the typical annualized present value corrective action costs associated with cleanup of a release from a leaking 4,000 gallon single-walled tank system would range from about \$2,500 (removal and replacement of tank, removal of contaminated soil, no ground-water contamination) to \$6,300 (removal and replacement of tank, removal of

contaminated soil, two years of ground-water treatment correcting one year of plume growth) or up to \$68,000 (removal and replacement of tank, removal of contaminated soil, 33 years of ground-water treatment correcting 20 years of plume growth).

While the focus of today's regulation is on secondary containment, the Agency recognizes that secondary containment is not always necessary to achieve the statutory objectives. From an overall risk management perspective, secondary containment with interstitial monitoring was selected as a general rule, subject to the availability of variances. This selection was made because of the probability of risk in most cases and the uncertainties associated with leak detection and other technologies. While there are some tank systems that may not require secondary

containment, the Agency has been unable to identify generically which tank systems fit into this category. Accordingly, the Agency has included in the regulations the opportunity for owner/operators to obtain variances from the secondary containment requirements of today's regulation.

As is explained further below, the principal reliance on secondary containment does not mean that all existing tank systems must be equipped with secondary containment immediately. The regulations provide for an orderly phase-in of secondary containment for existing tank systems, beginning with tank systems believed to pose the greatest risk (i.e., leaking tank systems).

The major features of the Agency's risk management strategy for new and existing permitted, interim status, and

90-day accumulation hazardous waste tank systems, as expressed in today's rule, are summarized below. For the purpose of today's regulation, the term "new tank system" means not only newly-manufactured tank systems that will be put into service for the first time but also those other tank systems that even if in existence and in use prior to the promulgation date of today's regulations are then reinstalled and used as replacement tank systems for existing hazardous waste tank systems. Likewise, an existing tank system that is not being used for the storage or treatment of hazardous waste, but is then put into service or converted to use as a hazardous waste storage or treatment tank system subsequent to the promulgation date of today's regulation is considered to be a new tank system.

The first feature of the regulation consists of requirements intended to maintain the integrity of the primary containment structure. For both new and existing tank systems, the final rule requires that the primary tank system be designed properly and that it be compatible with the wastes that are stored or treated. For existing tank systems not fitted with a secondary containment system, a tank integrity assessment (e.g., internal inspection, visual inspection, tank system tightness testing) must be conducted by the owner/operator within 18 months of the promulgation date (12 months of the effective date) of today's rule to identify leaks from the primary tank system. Where tank system tightness testing is used, the tests must be able to account for temperature fluctuations, tank end deflection vapor pockets, and effects of high water table. These factors were commonly cited by commenters to be of greatest concern in attaining testing accuracy and precision and were likewise found in the OTS survey to be crucial in order to conduct a tank tightness test reliably.

To ensure the integrity of metal tank systems, all new metal tank systems in which all or part of the system is or will be in contact with the soil or with water are required to be evaluated for corrosion potential by a corrosion expert. The Agency's review of available data indicates that external corrosion of metal tank systems is a major cause of tank failure and release to the environment. External corrosion protection can substantially reduce, but not eliminate, the potential for releases from metal tank systems. The assessment of the corrosion potential of local conditions by a corrosion expert will provide an evaluation of the degree of corrosion protection required in each

situation. As a protective measure for cathodic corrosion protection devices, the rule requires regular inspection/testing of sacrificial anode potential and impressed current sources. Existing tank systems need not be retrofitted with corrosion protection because this would be redundant: the basis of the phase-in of secondary containment accounted for the fact that most hazardous waste tank systems currently in use do not have corrosion protection.

The second feature of the Agency's overall regulatory approach is proper installation of the tank systems. Today's rule requires an independent, qualified installation inspector or professional engineer to certify that the tank system is structurally sound before installation and that proper handling procedures are adhered to during installation. Tank systems must be tested for tightness prior to use. Tanks and piping must be supported properly, and corrosion protection must be installed if needed. The design and installation requirements are intended to prevent tank failure and releases due to improper design and installation practices, known to be major causes of tank system failures. These requirements can also lead to long-term prevention of releases due to structural failure and/or corrosion.

The third feature of the Agency's regulatory approach is secondary containment with interstitial monitoring to detect leaks from the primary containment vessel. Despite the provisions requiring proper design, installation, and operation of the primary containment system, available data show that leaks are still likely to occur. The function of the secondary containment and leak detection system is to ensure that leaks are detected before they migrate beyond the zone of engineering control (i.e., an area under the control of the owner/operator that, upon detection of a hazardous waste release, can be readily cleaned up prior to the release of hazardous constituents to ground water or surface waters). The secondary containment system collects and contains releases from the primary containment vessel so that releases can be detected before they migrate into the environment. The leak detection system allows prompt detection of any release from the primary system to the secondary containment system. The rule provides design standards for vaults, exterior liners, and double-walled tank secondary containment systems. The Agency's implementation of the secondary containment requirements are discussed in further detail later in this section.

The fourth feature of EPA's approach incorporates provisions for adequate responses to releases of hazardous wastes. This rule requires that all releases to the environment be reported to the Regional Administrator. One exception is if a reportable quantity of a hazardous waste constituent is released; in this case, the owner/operator must report the release to the National Response Center under CERCLA regulations (in which case, the Regional Administrator is informed of the release. If appropriate, the EPA Regional Administrator will issue an order or permit condition requiring corrective action. In addition, immediate action must be taken to identify and stop the release, including, if necessary, emptying that part of the tank system found to be leaking until the leak has been stopped. The final rule requires that a qualified, registered professional engineer certify that major repairs have been properly made before a leaking tank is returned to service. Today's rule also requires that secondary containment with leak detection be provided for replacement tank systems and for any component of a repaired tank system that is underground. Additionally if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection, the entire component, i.e., either the tank or the entire piping system, must be provided with secondary containment prior to being returned to service.

As the final feature of these regulations, EPA is requiring owners or operators of hazardous waste tank systems to provide adequate closure, and, if necessary, post-closure, care. All wastes and all contaminated components, soils, structures, and equipment must be decontaminated or removed from the site at closure. If all contaminated compounds, soils, structures, and equipment cannot be decontaminated or removed at closure, or if the ground water is found to be contaminated, the site must be provided with post-closure care similar to that required for landfills.

EPA believes that this regulation, by requiring design and installation standards for primary containment structures, corrosion protection for metal tanks, secondary containment and leak detection, and quick response in the case of a release from the primary containment structure or other spill, and proper closure and post-closure care, will protect tank systems against failure and minimize, by containment and detection, any releases of hazardous waste to the environment.

b. Secondary Containment.—i.

Secondary Containment Approach. As explained previously, EPA has concluded that the only demonstrated method for ensuring against releases to ground water or surface water is secondary containment with interstitial monitoring. This method greatly reduces the risks associated with managing hazardous wastes in tank systems (see "Hazardous Waste Tank Risk Analysis," June 1986).

The Agency considered two secondary containment options that would define the framework of the final regulation. The first would require immediate secondary containment for both new and existing tank systems. The second would require secondary containment within two years for new tank systems, leaking tank systems, and tank systems containing dioxin wastes, but, for other existing tank systems, would require secondary containment on a mandatory phase-in schedule.

EPA selected the second option as the basis for the regulation because it will ultimately lead to the implementation of full secondary containment for all tank systems, while phasing-in secondary containment in a manner that ensures that existing tank systems appearing to present the greatest risks receive immediate attention. In addition, it will allow for technological advances in leak detection or tank system design that might increase the opportunity for tank systems to obtain variances from secondary containment or might lead to the Agency's amending this regulation in the future. The phase-in schedule applies to permitted, interim status, and 90-day accumulation tank systems.

The phase-in of secondary containment will occur as follows:

(a) Leaking underground components of tank systems (i.e., tank vessel or ancillary equipment), would require secondary containment with leak detection before being placed back into service after the leak is discovered. Additionally, if a leak is discovered in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an inground tank), the entire component must be provided with secondary containment with leak detection prior to being returned to service. These components of tank systems pose the most significant risk to human health and the environment because they are currently leaking hazardous wastes to the environment and because subsequent leaks may be imminent and would go undiscovered until the next tank integrity assessment was performed. If a leak is discovered in a tank system component or a portion of a tank system component that is readily accessible for visual inspection, the component may be repaired and brought back into service without being provided with secondary containment as long as an independent,

qualified registered professional engineer certifies that the tank system is capable of handling hazardous waste without permitting its release into the environment for the projected useful life of the tank system. Such a repair is inherently less risky because (a) the system has been certified to be capable of handling hazardous waste for its remaining useful life and (b) the component will be inspected on a daily basis to ensure its integrity.

(b) Tank systems storing or treating dioxin-containing wastes (EPA Hazardous Waste Nos F020, F021, F022, F023, F026, and F027) that are not shown to be leaking by tank integrity assessments must be retrofitted with secondary containment within two years. These wastes are highly potent and extremely toxic and pose significant risks to human health and the environment if released. Additionally, in the event of a release, cleanup costs can be substantial; for example, the proposed land disposal restrictions would require that dioxins in contaminated soils would have to be reduced below detection levels prior to land disposal (see 51 FR 1062; January 14, 1986).

(c) The integrity of remaining existing tank systems must be tested periodically. If a leak is detected through the integrity assessment or in any other manner, for the reasons explained above, the following is required by today's regulation. Any component, i.e., tank or ancillary equipment, of a leaking tank system that is underground must be provided with secondary containment with leak detection before being brought back into service. Additionally, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection, the entire component must be provided with secondary containment with leak detection prior to being returned to service. In all cases, secondary containment must be provided when the tank reaches 15 years of age except that, for non-leaking tanks, in no instance is secondary containment required sooner than two years from the date of promulgation of today's regulation. This schedule provides that aboveground tank systems and components of tank systems that are readily accessible for visual inspection are given the maximum period of time prior to phase-in the secondary containment requirements of today's final regulation.

To ensure that today's regulation is applied uniformly in those situations where an owner/operator is unable to document the age of his tank system, EPA will assume, based on its study of the age distribution of hazardous waste tank systems, that the tank system is seven years old, the median age of all hazardous waste tank systems, except that, if the age of the tank system is unknown, but the facility at which the tank system is located is known to be older than seven years of age, secondary containment would be required within two years, or by the time the facility reaches 15 years of age, whichever comes later.

The Agency considered several approaches to phasing-in secondary containment for existing tank systems that do not leak. The studies considering

the incidents of releases from tank systems and the causes of these releases do not identify a single factor that correlates precisely with leaking. Neither the age of the tank system nor any other factor allows one to conclude that a particular tank system will leak at any particular time because there are so many variables in the placement of tank systems, their construction, their installation, and other factors. Assuming that all other influences were identical, however, there is little doubt that an older tank system will leak before a newer one. Accordingly, the Agency selected tank age as the best criterion for phasing-in secondary containment.

The Agency examined the available data to decide what age to select as the basis for the phase-in. The Agency selected fifteen years—approximate median time to failure for those underground steel tank systems that were the subject of studies discussed previously in this preamble.

Underground steel tank systems are the only systems for which reliable data are available. Other available information, developed by EPA's Office of Toxic Substances, suggests that fiberglass tanks may be as susceptible to failure as steel tanks, although the database for fiberglass tanks is not nearly as extensive as for steel tanks.

On the basis that EPA has no data to the contrary, the phase-in for other tank systems will be the same as for underground steel tanks. The Agency has conducted extensive literature reviews and sought data on failure incidences for various types of tank systems (e.g., concrete, fiberglass) from trade associations and tank manufacturers and through an information request (51 FR 9072, March 17, 1986). Unfortunately, no definitive studies or data have been discovered or made available to the Agency. EPA will continue to seek information on tank system failure incidences and, if appropriate, will consider modifying the basis of the phase-in in the future.

ii. Variances from Secondary Containment. Today's rule provides for two types of variances: one may be obtained if the owner/operator can show that alternative design and operating practices, together with location characteristics, will prevent the migration of released materials to ground or surface water at least as effectively as secondary containment with interstitial monitoring; the second may be obtained if there would be no substantial present or potential hazard to human health or the environment associated with a release. The variances are available for permitted, interim

status, and 90-day accumulation tank systems, and are explained more fully below. Both new and existing tank systems may qualify for variances. These variances are consistent with the overall strategy of today's regulation. Secondary containment with interstitial monitoring is the only generally-reliable means to achieve control over releases before they pose risks to human health and the environment. Secondary containment is not necessarily an end in itself. If other methods can be shown on a case-by-case basis to achieve the regulation's goals, there is no reason to require secondary containment.

The variances included in today's regulation differ from the ones in the proposed regulation. Sections 264.193(i) and 265.193(f) in the proposed rule provided a variance from all or part of the secondary containment requirements if the owner or operator could demonstrate to the Regional Administrator that the location of the tank system and alternative design and operating practices would prevent hazardous waste from reaching ground or surface waters at any future time. Owners and operators storing or treating dioxin-containing hazardous wastes with EPA codes F020, F021, F022, F023, F026, and F027 could not obtain this variance and would be required to provide full secondary containment within one year of the effective date of the final regulation.

Many commenters to the proposed rule objected to the stringency of the variance as proposed, especially the language "at any future time." Some commenters stated that this language exceeded the requirement of § 3004(a) of RCRA, to promulgate regulations "as may be necessary to protect human health and the environment." Many commenters suggested the substitute language "during the active life of the unit and post-closure care period," as a possible alternative to "at any future time."

Several commenters suggested that a risk-based variance should be allowed and that the protocols for establishing this variance should be consistent with EPA's ground-water protection strategy. Commenters also suggested other factors that they believed would be important when considering the granting of a risk-based variance. Others proposed that the entire regulation be established on the basis of risk. Among the suggested risk factors were waste toxicity, site location, site hydrogeology, soil characteristics, ground-water quality, climate, tank size, waste storage time, and the migration potential and environmental persistence of the waste

evaluated in a manner similar to that provided in EPA's proposed implementation of the land disposal restrictions (50 FR 23250; May 31, 1985).

The Agency has attempted to base today's regulation on risk to the extent that it is possible to do so. Accordingly, immediate secondary containment is required for leaking components of tank systems that cannot be visually inspected, and tank systems containing dioxin-containing wastes; and older tank systems that, based on tank integrity assessments, are considered non-leaking will be phased-in first. The lack of substantive data on numbers, sizes, locations of tank systems, the types of hazardous wastes stored in individual tank systems, and site-specific hydrogeologic conditions make it impossible to go beyond this level of risk-based rulemaking at this time. However, the Agency concludes, as did many commenters, that a risk-based variance from the secondary containment requirements should be available to owner/operators to take into account site-specific situations.

For this reason, the final rule, unlike the proposed rule, allows both a risk-based variance from secondary containment and a technology-based variance. The risk-based variance can be obtained if the owner/operator, including the owner/operator of a tank system managing dioxin-containing listed hazardous wastes, demonstrates that there will be no substantial present or potential hazard to human health or the environment in the event hazardous waste is released from the storage or treatment tank system. This variance does not exempt the tank system owner or operator from the requirements of this regulation other than secondary containment. Even where it is demonstrated that secondary containment is not needed, the Agency believes that it is important to maintain good day-to-day operating practices, as required in today's revised Subpart J standards. Relaxation of the requirement for secondary containment must not be construed to mean that the facility is licensed to be a hazardous waste disposal facility. Adherence to good operating practices will not pose an undue burden on the hazardous waste tank system owner/operators.

The risk-based variance is not available for new underground tank systems. Section 3004(o)(4) of RCRA requires that new underground tank systems be provided with leak detection methods that detect leaks at the "earliest practicable time." EPA has concluded that new underground tank systems may qualify for the technology-

based variance if they demonstrate that a leak detection method detects leaks to the environment before they reach ground water or surface waters. However, the risk-based variance—through which the tank system would not need to be equipped with leak detection—would not satisfy the requirements of section 3004(o)(4).

The technology-based variance, similar in nature to the proposed variance, allows owner/operators a second variance mechanism if the owner/operator can demonstrate to the Regional Administrator that alternative design and operating practices, together with location characteristics will prevent the migration of any hazardous waste or hazardous waste constituents into the ground water or surface water at least as effectively as secondary containment with interstitial monitoring. This variance would be granted if the owner/operator demonstrates, for example, that a leak detection method not believed generally reliable will be reliable for his tank system because of its characteristics, location, and other factors such as the wastes stored or treated. Reliable detection of leaks or spills would be followed by response action to prevent contamination of ground water or surface water. Some owner/operators may be able to demonstrate that unsaturated zone monitoring will be effective for their tank systems. Variances will not be allowed for tanks for which ground-water monitoring is claimed to be effective, however. The overall strategy for regulating hazardous waste tank systems is based on the prevention of contamination of ground water by releases from tank systems.

There are two changes from proposal with respect to this variance. The variance is now technology-based and requires that an alternative system provide equivalent protection as secondary containment rather than a showing of no migration of hazardous waste or hazardous waste constituents at any future time. As explained above, this change is consistent with the Agency's overall strategy for regulating hazardous waste tank systems as expressed in this preamble.

The second change in this variance allows owners and operators storing or treating EPA Hazardous Wastes F020, F021, F022, F023, F026, and F027 to apply for this technology-based variance. EPA is allowing owner/operators storing or treating dioxin-containing listed wastes the opportunity to apply for the technology-based variance because it is possible that such owner/operators may develop a technology alternative to

secondary containment that ensures protection of human health and the environment.

The two variances are available to interim status and 90-day accumulation tank systems as well as to permitted tank systems. Procedures are established in Part 265 of today's regulation through which owner/operators of interim status and 90-day accumulation tank systems may apply for the variances.

EPA intends to issue guidance on these variance provisions prior to the effective date of this regulation. EPA will continue to investigate the combinations of factors (e.g., waste types, hydrogeologies, potential release volumes) that may enable the Agency to describe generically the situations in which tank systems would be eligible for variances from the secondary containment requirements. To the extent that the Agency is successful in this effort, it will be reflected in the guidance. Additionally, guidance relating to the risk-based variance will reflect the concept of differential protection based on the use, value, and vulnerability of the ground water as embodied in EPA's Ground Water Protection Strategy.

iii. *Small Quantity Generators.* Under today's final rule, the Part 264 and 265 requirements, including the secondary containment requirements, apply to those generators of 100 to 1000 kg of hazardous waste per month who are subject to interim status or permitting requirements because they store these wastes on-site for more than 180 (or 270) days or store more than 6,000 kg of waste. Under the conditions of long-term storage or treatment, the potential for release of hazardous waste to the environment becomes significant or the quantity of waste present, over time, becomes significant. The Agency sees no basis for distinguishing these generators from other hazardous waste facilities. (See 50 FR 31287; August 1, 1985.)

6. Regulatory Options Not Selected

The preamble to the proposed rule described several regulatory options considered by EPA. The Agency chose to propose secondary containment with a ground-water monitoring alternative, but invited comments on six alternate regulatory options:

- Combination of secondary containment and ground-water monitoring;
- National risk-based standards;
- Minimum national standards with a variance from containment requirements based on risk;
- Minimum performance standards;

- Ban of underground tanks; and
- Forced retirement of underground tanks.

a. Combination of Secondary Containment and Ground-Water Monitoring

This strategy would require both secondary containment and ground-water monitoring for all tank systems rather than permitting the use of only one of these approaches. This approach would be similar to the approach required for surface impoundments and landfills where, under section 3004(o) of RCRA, each new, replacement, or lateral expansion of existing landfills and surface impoundments is required to install two or more liners and a leachate collection system and a ground-water monitoring system.

The overwhelming majority of commenters on this issue stated that ground-water monitoring was an unnecessary additional requirement for tank systems equipped with secondary containment on the basis that the additional protection resulting from ground-water monitoring is negligible, particularly when compared to cost. Some commenters suggested that periodic ground-water monitoring be used to confirm the effectiveness of secondary containment systems.

Upon analysis of the issue, EPA concludes that secondary containment, combined with a requirement for an interstitial leak detection system, obviates the need for ground-water monitoring. An interstitial leak detection system (one located in the interstitial space between the primary tank system and the secondary containment system) will detect leaks before the wastes are released to surface or ground waters, thus fully protecting human health and the environment. Since this leak detection method detects releases before they enter the environment, it satisfies section 3004(o)(4)'s requirement that new underground tank systems be equipped with means for detecting releases to the environment at the earliest practicable time. While section 3004(o) of RCRA requires that certain new land disposal facilities be equipped with ground-water monitoring as well as double liners, the statute does not impose similar requirements for new underground tanks. Because interstitial monitoring in tanks with secondary containment is extremely reliable, the Agency is not imposing additional ground-water monitoring requirements as a matter of policy.

b. *National Risk-based Standards.* An alternative to generally-applicable design and operating standards is the concept of risk-based standards. Risk-based standards would vary based on

the degree of risk presented by a combination of factors, such as site location, type of hazardous waste managed, proximity to ground water, and proximity to populated areas. Hypothetically, such factors could be arrayed in the form of a matrix, with different levels of control prescribed according to the relative risk posed by a particular combination of factors.

Most commenters were in favor of some type of risk-based standard, although no workable suggestions on how to implement national risk-based standards were included in the comments. The Agency has analyzed possible risk-based approaches for storage and treatment tank systems, accumulation tank systems, and small quantity generator tank systems. A hazardous waste tank failure model to examine risks associated with certain wastes, in a variety of settings, was developed. The estimated release volumes from specific release events were used to estimate human health risks through the use of a transport and exposure model.

The Agency concluded that national risk-based standards cannot be developed at this time because of insufficient information regarding: (1) Waste stream constituent concentrations; (2) hydrogeological data for the hazardous waste tank population; (3) distances between drinking water wells and hazardous waste tank systems, and (4) populations relying on drinking water wells. In the absence of such information, the Agency has decided that a risk-based variance would be more appropriate than national risk-based standards.

As explained previously, today's regulation does, however, take broad concepts of risk into consideration to the extent possible with existing data. The phase-in of secondary containment for existing hazardous waste tank systems requires that tank systems generally likely to pose the greatest risks (leaking tanks and tanks containing dioxin wastes) be provided with secondary containment before other tank systems.

c. *Minimum National Standards with a Variance From Containment Requirements Based on Risk.* As an alternative to risk-based standards, the proposed regulation requested comment on the concept of risk-based variances to minimum national standards. Numerous comments were submitted that encouraged the Agency to adopt this strategy. One commenter did express reservations about the cost and time that would be necessary to perform the demonstration.

In today's final rule, EPA has provided two separate mechanisms for obtaining a variance from secondary containment requirements. These mechanisms are discussed in section III.B.5.b.ii of this preamble.

EPA acknowledges that the cost of making the demonstration of no substantial present or potential hazard to human health and the environment will, in many cases, exceed the cost of providing secondary containment. However, the Agency believes it is appropriate to allow a variance for those facilities that can make the necessary demonstration, and for whom the cost of demonstration would not be excessive.

d. Minimum Performance Standards. Under this approach, EPA would establish minimum Federal performance standards for hazardous waste tank systems. The example used at proposal was—"all new tank systems must be located, designed, operated, maintained, and closed in a manner that will assure protection of human health and the environment." Under this option, states would have the option of expanding on the Federal performance standards by issuing more specific standards. In states choosing not to elaborate on the Federal performance standards, owner/operators of hazardous waste tank systems would have the responsibility of demonstrating that their tank systems do not endanger human health and the environment. This would require a case-by-case assessment of the protective measures needed to achieve the performance standard.

In the worst case situation that states did not expand upon the minimum performance standards, individual risk assessments would have to be performed for every tank system used to store or treat hazardous waste. This would be incredibly resource intensive for owner/operators because of the probable need to gather additional information on local hydrogeologies, distances to drinking water wells; and populations relying on these wells. It would also require considerable state and Agency resources to review and analyze the information developed by the owner/operators to show that their systems would be protective. The three commenters who supported this approach did not offer a means of overcoming the resource implications of this alternative approach. For the above reasons, the Agency has rejected broad performance standards as the basis for today's final rule. Today's rule does, of course, develop minimum standards that must be applied. States may impose

more rigorous standards if they choose to.

e. Ban of Underground Tanks. In the preamble of the proposed rule, EPA discussed the banning of hazardous waste from underground tanks as yet another alternative regulatory strategy. This option had previously been raised for public comment in the preamble to the January 12, 1981, permitting standards and was opposed by most commenters at that time.

Numerous comments were again received. Nearly all of the commenters stated that a ban of underground tank systems that stored or treated hazardous waste was not necessary, because proper management of such tank systems can prevent releases from impacting the environment. One commenter suggested, however, that hazardous waste be banned from underground storage unless no other means of aboveground storage were feasible.

EPA believes that, with implementation of the regulatory approach being promulgated today, the use of hazardous waste underground storage tank systems will not endanger human health or the environment. The Agency is also aware that National Fire Codes and space limitations frequently give tank system owner/operators no alternative to underground storage. All underground tank systems that do not qualify for a variance will, over time, be equipped with secondary containment with interstitial monitoring. This will ensure that leaks are discovered prior to their release to ground water or surface waters, thus protecting human health and the environment.

f. Forced Retirement of Underground Tank Systems. In the preamble to the June 26, 1985, proposal, EPA also discussed the regulatory option of forced retirement of tank systems, i.e., mandating replacement of tank systems upon reaching a predetermined age.

Numerous comments were submitted that stated that forced retirement is not a fair and reliable means of regulating underground tank systems. However, one commenter advocated a forced retirement of underground tank systems at the time the system reaches the age previously determined as being the end of the useful life of the system.

Today's final regulation mandates that secondary containment with interstitial monitoring be phased-in so that all existing hazardous waste tank systems would be provided with secondary containment by the time they reach 15 years of age, including those systems that do not appear to be leaking. This approach could be

considered equivalent to the forced retirement of tank systems.

As explained previously in this preamble, EPA has determined that secondary containment with interstitial monitoring is the only reliable means of consistently detecting releases from hazardous waste tank systems. The Agency has selected a phase-in procedure that will ultimately lead to the implementation of full secondary containment with interstitial monitoring for all tank systems, while phasing-in secondary containment in a manner that ensures that existing tank systems appearing to present the greatest risks will receive immediate attention. EPA rejected basing the phase-in solely on the results of tank integrity assessments because the Agency is concerned that the reliability of such assessments is such that relatively small releases are likely to go undetected. Thus, in this final rule, EPA has selected an overall regulatory approach that could be construed as forced retirement in some instances.

IV. Changes to Final Rule From Proposal

A. Additions

Additions to the rule since proposal that were not discussed previously in this preamble are: (a) new definitions (onground tank systems and sumps); (b) exemption of closed-loop recycling tank systems; and (c) a clarification of the definition of ancillary equipment.

1. Definitions

a. Onground Tank System. Today's final rule adds to part 260 the definition of an onground tank. An "onground tank" is a device that meets the definition of "tank" in § 260.10 and is situated in such a way that the bottom of the tank is on the same level as the adjacent surface. In the proposed regulation, this type of tank was considered an aboveground tank. This new definition is added to clarify the revised requirements in § 264.196 and § 265.196, which now make clear that if a leak occurs on the bottom of an onground tank, secondary containment must be provided for the entire tank prior to the tanks being returned to service.

b. Sumps. A tank is defined in 40 CFR 260.10 as a stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support. If a sump meets this definition of a tank and if it is used to manage hazardous waste, it would have been subject to all of the hazardous

waste tank system standards proposed on June 26, 1985.

Two commenters urged EPA to distinguish between a tank and a sump. One commenter explained that sumps are generally made of reinforced concrete, open on top, and used to contain liquids for very short periods of time. Also, the commenter pointed out that liquids enter a tank through attached piping, while liquids often enter a sump by flowing directly across a floor draining into the sump. Similarly, the second commenter described sumps as typically composed of impermeable material, possessing little or no attached piping, and presenting little hazard of release of hazardous waste into the environment. Because of these perceived differences, one commenter suggested that sumps should not be subject to the hazardous waste tank requirements. The other, while recognizing that sumps "may also represent a potential source of contamination," stated his belief that it was inappropriate to apply all of the requirements for tanks to sumps. A third commenter was concerned that the broad definition of a tank would result in process drains being defined as hazardous waste tanks.

Sumps meeting the definition of tank that manage hazardous wastes are covered by today's regulation, as explained below. In response to comments and to clarify the requirements of today's final regulation, EPA has added a definition of sump in today's rule. A "sump" is "any pit or reservoir that meets the definition of tank, and those troughs/trenches connected to it, that serves to collect hazardous waste for transport to hazardous waste storage, treatment, or disposal." Sumps can serve a variety of applications including collection of rain runoff from a treatment, storage, and disposal facility, collection of spills or releases as part of a secondary containment system, and collection of hazardous waste discharged from a manufacturing process.

In general, EPA believes that sumps may present the same potential for leaks and releases as hazardous waste storage and treatment tanks. For example, the San Francisco Regional Water Quality Board studied the releases of hazardous wastes into ground water and found leaking sumps to be a contributing factor along with leaking hazardous waste tanks. Thus, EPA concludes that sumps generally should be subject to the same standards as tanks. However, where a sump is a part of a secondary containment system used to collect or contain spills and releases of hazardous wastes, it would

be redundant to require secondary containment as the sump is part of a system that is already serving as a secondary means of containment. Thus, EPA will not require secondary containment for sumps that serve as part of secondary containment systems, but the other standards for hazardous waste tank systems will apply.

A situation where a sump is used to collect potential spills or leaks of hazardous waste from process equipment, e.g., accidental releases from a distillation column, would be a situation where the sump serves as part of a secondary containment system. Therefore, secondary containment for the sump would not be required. However, it is EPA's intention that hazardous waste tank systems, including sumps used to transport hazardous wastes, are managed in a manner that would ensure protection of human health and the environment. Thus, if a sump is used to collect intentional discharges of hazardous wastes, e.g., the discharge of hazardous waste from a centrifuge directly on the floor and into a sump, the sump would have to meet the secondary containment and other requirements of today's regulation.

c. Ancillary Equipment. In the proposed rules, EPA defined ancillary equipment as any device used to distribute, meter, or control the flow of hazardous waste to or from the storage or treatment tank(s), including but not limited to such devices as piping, fittings, flanges, valves, and pumps. Several comments were received that requested EPA to clarify to what extent (i.e., how much of) the ancillary equipment was intended to be covered by the regulations.

EPA's intention was and still is to include *all* ancillary equipment that is used in the handling of the waste from its point of generation (i.e., that point at which the material is initially considered to be a hazardous waste) to the hazardous waste storage/treatment tank(s) and, if applicable, from the hazardous waste storage/treatment tank(s) to a point of disposal on-site or to a point of shipment for disposal off-site. It is the Agency's belief that, in most cases, the point at which the material will initially be considered to be a hazardous waste is the point at which the material leaves a process tank or area. Thus, the definition of ancillary equipment has been revised in today's final regulation to include this clarification.

2. Exclusion of Closed-Loop Recycling Tank Systems

EPA received a number of comments which argued that the Agency had substantially underestimated the number of tanks potentially affected by the proposed rule because it did not consider tanks that are part of the production process and thus integrally tied to reclamation operations. The commenters further argued that such tank systems were not handling solid or hazardous wastes; rather, they were accumulating materials to be used in the actual production process. In response to these comments, EPA published a notice in the **Federal Register** that requested information on the number of tanks potentially affected and comment on the question of when tank systems would be a part of a closed-loop reclamation process and thus not managing solid or hazardous wastes. The notice also outlined the Agency's tentative view of the conditions under which a tank system would be considered part of a closed-loop system. (See 50 FR 51264; December 16, 1985.)

EPA received approximately 40 comments on this notice; virtually all of them supported an exclusion along the lines indicated in the notice. These commenters endorsed the Agency's reasoning, stated that the numbers of tanks potentially involved were quite large (in the tens of thousands of tanks), and indicated that a number of commenters already were submitting variance applications for these tanks pursuant to 40 CFR 260.31(b). [40 CFR 260.31(b) allows any person to petition the Agency for a variance from classifying as a solid waste those materials that are reclaimed and then reused as feedstocks within the original primary production process in which the materials were generated if the reclamation operation is an essential part of the production process.] In a few cases, variances have already been granted. Some of these commenters also urged the Agency to expand the scope of an exclusion beyond that outlined in the December notice to include tank systems where there is no hard connection between tanks, where drums or containers are used instead of tanks, or where reclaimed products are not returned to the original process that generated them.

A few commenters, however, urged the Agency to retain its present rules and to rely exclusively on the closed-loop variance provision in § 260.31(b) to exclude tank systems involved in closed-loop reclamation processes. In these commenters' opinion, utilizing the

existing variance is preferable because the Agency could evaluate on an individual basis how safely a facility is storing secondary materials before deciding whether an exclusion is warranted. A particular concern raised by these commenters was air emissions of volatile materials from uncovered tanks.

EPA has decided to adopt an exclusion substantially along the lines indicated in the notice and has placed this exclusion in § 261.4 of the regulations. EPA is taking this step because these types of operations are best viewed as part of the production process, not as a distinct waste management operation. The Agency, in essence, is determining generically that tank systems that meet the requirements specified below satisfy the criteria specified in § 260.31(b)(1) through (8) for granting a closed-loop variance. As commenters stressed, these types of closed-loop tank systems are very prevalent in a wide variety of industries (see § 260.31(b)(2)), for example, chemical manufacturing, pharmaceutical, dry cleaning. Commenters indicated that the total number of tanks that would be affected are in the tens of thousands. Substantial volumes of secondary material are involved (estimated in the billions of pounds annually), and significant economic savings are associated with the reclamation activity (§ 260.31(b)(1)). Several commenters also indicated that their production processes would not be economically viable without the recovery step and subsequent reuse of the recovered product.

The activities discussed here likewise satisfy the remaining variance factors. The time period to complete a closed-loop process (§ 260.31(b)(4)) would be relatively short, never to exceed one year (to accommodate certain types of normal batch manufacturing operations). (See 50 FR 51265; December 16, 1985.) Reclaimed materials usually would be returned to the original process in their original form for their original purpose (§ 260.31(b)(6)), and would then be reused by the generator (§ 260.31(b)(7)).

Tank systems would be considered as part of a closed-loop reclamation process and not, therefore, as storing solid and hazardous wastes under the following circumstances:

- Secondary materials are returned, after being reclaimed, to the original process in which they were generated where they are reused in the production process.

- Only tank storage is involved, and the entire process through completion of reclamation is closed by being entirely connected with pipes or other

comparable enclosed means of conveyance.

- Reclamation does not involve controlled flame combustion (such as occurs in boilers, industrial furnaces, or incinerators).

- The hazardous secondary materials are never accumulated in such tanks for over twelve months without being reclaimed.

- The reclaimed material is not used to produce a fuel or to produce a material that is used in a manner constituting disposal.

With respect to the first condition, an issue exists regarding the types of reuse to which reclaimed materials can be put in order for the process to be considered a closed-loop. As EPA noted previously (50 FR at 51265 and n.1), the material that is returned after having been reclaimed can be reused as a feedstock, as a purifying agent to remove contaminants from feedstock, and can also be reused for other purposes, including as a reaction medium to dissolve or suspend chemicals, or as a reactant to facilitate chemical reactions. To be considered as being "returned to the original process," the reclaimed material need not be returned to the same unit operation from which it was generated, but only to the same *part* of the process. (See 50 FR 640; January 4, 1985.) In addition, if the same material is reused in a number of production operations at an integrated plant, and the secondary material is reclaimed in a common reclamation operation, the reclaimed material can be returned to any process which originally used the material. (The regulatory language has been modified to clarify this last point.)

A requirement of the exclusion is that the reclaimed materials be returned for reuse in the production process. By production process, the Agency intends to include those activities that tie directly into the manufacturing operation or those activities that are the primary operation at an establishment; it does not include ancillary or secondary activities that are carried out as part of the total activities at the facility.

Commenters argued that, based on the above definition, solvents used as cleaning agents in dry cleaning operations would not qualify, nor would materials that are used to clean equipment (i. e., in degreasing operations). In response to these comments, EPA believes that solvents returned for use as cleaning agents in dry cleaning operations will be considered to be reused in the production process (as described earlier) since they are used as the basic raw material in the process (in this case,

cleaning). On the other hand, materials used to clean equipment (for example, solvents returned and reused as degreasers) are not normally considered to be reused in a production process. The solvents do not contribute directly to the production process, but rather perform an ancillary function of cleaning. The essence of the closed-loop reclamation process (as described here) is that the act of reclamation must be directly related to the act of production. In the Agency's view, this is most evidently the case when the material reclaimed is put back to use in the production process. Nevertheless, the Agency is considering modifying the closed-loop exclusion and may, in the future, expand the provision to apply to any situation, including where the activity is part of an ancillary function of the production process, where the tank and reclamation process are part of a closed system.

Note.—Excluded closed-loop reclamation processes, as described in this regulation, are not "flow-through process tanks" for purposes of RCRA Subtitle I, since these tanks are not utilized in the act of manufacturing (see memorandum from J. Winston Porter, Assistant Administrator, Office of Solid Waste and Emergency Response, to the EPA Regional Administrators, dated April 7, 1986, concerning the Definition of "Underground Storage Tank.")

With respect to the second condition, several commenters questioned whether pipes were the sole eligible means of conveyance. The exclusion specifically contemplates "other comparable enclosed means of conveyance." Any system used to transfer the material from the process to the tank and to the reclamation process, however, must be "closed." Unless there are no gaps in the process, the Agency does not believe it possible to determine generically (i.e., *a priori*) that these operations constitute one single production process. Situations where a reclamation operation is not literally closed can still be evaluated on a case-by-case basis under § 260.31(b).

With respect to the third condition, most commenters agreed that this exclusion should not involve controlled flame combustion. The Agency reiterates that such processes involve either incineration or burning for energy recovery, operations explicitly within the Agency's authority (RCRA section 3004(c)).

With respect to the condition regarding duration, the 12 month time limit is adopted from the definition of speculative accumulation at 40 CFR 261.1(c)(8). Under this condition, persons

would not need physically to empty the tank once a year, but rather would need to show that 100 percent of the tank's content was turned over within the 12 month period. Examples of tank systems that may meet this condition are flow-through tank systems that are involved in continuous manufacturing operations (see 50 FR 640; January 4, 1985). In addition, tanks involved in batch production could show that secondary materials are stored for less than one year through recordkeeping similar to that which documents that secondary materials are not being accumulated speculatively. See 50 FR 636; January 4, 1985.

Finally, we have added a clarifying paragraph indicating that the exclusion does not apply when reclaimed materials are used to produce fuels or used to produce products that are applied to the land. This principle was established finally in the definition of solid waste rulemaking (see §§ 261.2(c)(1) and (2) and 261.3(c)(2) and 50 FR 628, 630, and 634; January 4, 1985), and is restated here to avoid confusion.

Those commenters who opposed promulgation of a generic exclusion felt that the individual variance proceedings provided a preferable means of evaluation, particularly with respect to evaluating how carefully secondary materials are stored before reclamation. (See § 260.31(b)(3), listing this as one of the factors to consider in evaluating variance petitions.) This factor is relevant in determining if a secondary material is a waste, because it is assumed that materials of value utilized in production processes will be handled in a manner designed to conserve them (50 FR 654; January 4, 1985). Many commenters from industry, in fact, indicated that they take extra handling precautions for these types of tanks. Secondary containment is provided for many of the tanks (since many of these tanks are located indoors), and closed top tanks are used to store volatiles. Commenters indicated that few of these tanks were located underground.

More particularly, the extent to which materials are handled to minimize loss is just one of the factors EPA may consider in determining if these processes are deemed to be managing solid wastes. (See 50 FR 617; January 4, 1985.) The decisive factors here, in the Agency's view, are the closed nature of the process (hard connections from point of generation to point of return to the original process), integral relationship of these reclamation steps to production processes, and widespread use and economic value of the activity.

EPA is concerned, however, with the issue of air emissions of volatile hazardous secondary materials. For practical purposes, if such materials were stored in open top tanks, they would be uncontained EPA does not believe that product-like secondary materials would be stored in a completely uncontained manner. (Cf. 50 FR 652, n.44 (surface impoundments, another type of uncontained management, are not considered an integral part of a hazardous waste recycling process).) Thus, the Agency considered requiring that volatiles be stored in closed top tanks to be within the scope of the exclusion. EPA has decided not to include this requirement in the final rules, however. The Agency believes that there are other factors and circumstances that would prevent most materials from being stored in open top tanks, especially volatile materials. In particular, to prevent undue contamination from rain or dust or to prevent explosive conditions from occurring, most, if not all, of these tank systems would be closed. Commenters, in fact, indicated that these secondary materials are stored in closed top tanks. Nevertheless, the Agency is still considering whether this exclusion should be modified to state that volatiles must be stored in closed top tanks. If such a provision is to be added, the Agency would propose and request comment before modifying this exclusion. It should be noted that if the Agency finds a situation where highly volatile materials are being stored in open top tanks and large volumes of material are being lost prior to the reclamation step, the Agency may consider today's exclusion to be inapplicable because secondary materials are not being reclaimed and returned to the process. They are being allowed to evaporate. Thus, such open tanks could be deemed to remain subject to the Subtitle C regulations.

It should be noted that, under today's rule, although secondary materials stored in closed-loop reclamation processes that fit within the exclusion of § 261.4(a)(8) are not solid wastes, wastes from their management are solid wastes. Thus, still bottoms from solvent reclamation in a closed-loop reclamation process remain solid wastes assuming no exclusion applies for another reason, and can be hazardous wastes if they are identified or listed. In this regard, the Agency notes that many still bottoms from solvent reclamation are listed wastes, as are the residual spent solvents themselves (Hazardous Wastes F001-005).

Finally, EPA has decided that the exclusion provisions of § 261.4(a)(8) should become effective immediately pursuant to section 3010(b)(1) of RCRA: the rule reduces, rather than increases, the existing requirements for persons generating hazardous wastes (i.e., since persons do not need six months to comply and in light of the unnecessary hardship and expense which would be imposed on the regulated community, we believe these rules should be effective immediately).

More detailed responses to comments on the proposal to establish this exclusion are contained in a separate background document entitled "Response to Comment to Closed-Loop Exclusion."

B. Revisions Made Subsequent to Proposal

In this section, the requirements of the proposed and final rules are reviewed and any revisions to the final rules since proposal (other than those discussed elsewhere in this preamble) are discussed.

Subpart J of Parts 264 and 265 provide the tank system standards for permitted and interim status facilities, respectively. Many comments were received urging the Agency to eliminate any discrepancies between Parts 264 and 265 and to make the two parts as consistent as possible and appropriate. In examining this issue, the Agency concludes that consistency between the two parts is appropriate from the standpoint of protecting human health and the environment and would simplify the permitting process of interim status facilities for both EPA and the affected parties. Consequently, the Agency has made several changes and additions to Part 265 so that it is consistent with Part 264. Proposed Part 265 has also been recodified to make the numbering systems of both Part 264 and 265 comparable. Therefore, the numbering system for Part 265 of the final rule differs from that of Part 265 of the proposed rule. Table 1 in section II.G may be used to cross reference Part 265 in the final and proposed rules.

In developing the proposed rule, EPA assumed that the interim status standards would apply to existing tank systems almost exclusively. Thus, the proposed standards in Part 264 which applied to new tank systems were not included in Part 265. However, as was pointed out in the public comments, owners/operators of new accumulation tank systems as well as replacement tank systems installed at interim status facilities will require standards for new tank systems. Since EPA is promulgating

a phase-in schedule for existing tank systems and is eliminating the ground-water monitoring alternative of the proposal rule, EPA expects a significant number of existing tank systems to be replaced with new tank systems. Therefore, standards applicable to these new tank system installations are required and EPA is including new tank system standards in Part 265 that are consistent with those found in Part 264.

These revisions as well as other specific changes that have been made to the proposed standards are discussed below.

1. Accumulation Tank Systems (§ 262.34)

The proposed rule would have required that owners/operators of 90-day accumulation tank systems comply with many of the provisions of Part 265, Subpart J, including the installation of full secondary containment. Other requirements of the proposal for 90-day accumulation tank systems were:

- Response requirements for leaking tank systems, which would include: removal of the tank system from service, removal of waste from the tank system, containment of the leaked waste, and notification of the Regional Administrator;

- General operating requirements which would include: assurance of compatibility of the tank contents with the tank or its inner liner, provision of 2 feet of freeboard for uncovered tanks, and provision of a waste feed cutoff or bypass system where waste is continuously fed to the tank;

- Closure and post-closure requirements which would include: removal of all contamination at closure or performance of post-closure care as specified for permitted and interim-status tank systems; and

- Inspection requirements and special requirements for ignitable, reactive, or incompatible wastes as would be required for interim-status tank systems.

A number of commenters asked for a special exemption for 90-day accumulation tank systems from the requirements of Subpart J, especially the secondary containment requirements. Another commenter was concerned that since no tank system assessment was proposed, the result would be no requirement to address tank systems that are leaking at the time of promulgation of the rule. Yet another commenter suggested that corrosion protection was just as important for accumulation tank systems as for any other hazardous waste storage tank systems.

As previously stated, EPA continues to believe that there is no significant difference with respect to the risks

posed by 90-day accumulation tanks and the general hazardous waste tank population. The Agency did not propose to apply the entire Part 265 standards to accumulation tanks because of its concerns that significant interaction between the owner/operator and EPA would be needed to implement the standards properly. However, numerous commenters stated that the issue of interaction was not indeed a problem in properly implementing many of the technical standards. EPA, in reconsidering its proposed standards for accumulation tank systems, agrees with the commenters that several of the standards not proposed for accumulation tank systems (e.g., integrity tests, installation requirements, corrosion protection) can be implemented without the need for substantial interaction with the permitting authority. Furthermore, EPA believes that 90-day accumulation tank systems should be able to qualify for variances from secondary containment. Thus, the final rule requires that owners/operators of 90-day accumulation tank systems comply with many requirements of the final Part 265, Subpart J, including:

- A one-time assessment of the tank system, as discussed above, including the results of an integrity test;
- Installation standards;
- Design standards including an assessment of corrosion potential;
- Secondary containment phase-in provisions;

- Periodic leak testing if the tank system does not have secondary containment; and

- Additional response requirements to a leak, including a report to the Regional Administrator of the extent of the release and requirements for repair or replacement of leaking tanks.

Variance provisions that had been provided in the proposal only for permitted and interim status tank systems are available to 90-day tank systems

The final rule does not require that owner/operators of 90-day accumulation tank systems comply with the final Part 265, Subpart J requirements for preparation of closure and post-closure plans, contingent closure and post-closure plans, financial responsibility requirements, and waste analysis and trial tests. Unlike off-site commercial hazardous waste storage and treatment facilities where a wide variety of hazardous wastes are managed, generators generally produce and would thus store or treat wastes that are relatively consistent in terms of their physical/chemical properties. Thus, EPA does not believe that waste

analysis and trial tests must be conducted by generators of hazardous waste because of their familiarity with the wastes that they generate. As explained previously in section II.H of this preamble, EPA is conducting a review of the requirements that are imposed on owner/operators of accumulation tank systems and will address the issues of closure and post-closure, contingent closure and post-closure, and financial assurance requirements for accumulation tank systems as part of this review.

This final regulation imposes no additional requirements for 180 (270) day accumulation tanks owned or operated by generators of between 100 and 1000 kg of hazardous waste per month. Concurrently, in today's **Federal Register**, EPA is proposing revised tank system standards that would apply to these generators.

2. Applicability (§§ 264.190 and 265.190)

Under the proposed rule, the requirements of Subpart J of Parts 264 and 265 would have applied to owners and operators of tank systems that store and/or treat hazardous waste, with the exception of those tank systems qualifying for the exemptions provided in § 264.1. Commenters to the proposed rule suggested that EPA reconsider applying the Subpart J standards to many different categories of tank systems. Among these were tank systems storing solid hazardous wastes and temporary tank systems.

a. Storage of Hazardous Waste Containing No Free Liquids. Many commenters recommended that tank systems containing solid hazardous wastes, residues, dried sludges, and other nonliquid wastes be exempt from the Part 264 standards, especially the requirement for secondary containment, because solid hazardous wastes are relatively immobile compared to liquids and generally do not present a threat to ground water.

There is no question that the mobility of nonliquid solid wastes is lower than the mobility of liquids and gases. For example, liquids and gases can be moved through conduits with relative ease while solids can be moved only with difficulty, requiring the use of either mechanical or pneumatic conveyor systems.

Mobility, however, is only one consideration with respect to the applicability of the hazardous waste tank system standards to these wastes. Physical and chemical properties of the solid are also critical considerations. The solubility and hydrophilic (affinity for absorbing water) properties will

determine whether the waste can readily change physical state from a solid to a liquid. Thus, rainwater or high water tables could leach and dissolve some solid wastes from poorly-constructed tank systems rendering the wastes as mobile as liquid wastes. Chemical properties are also important. Some solids, after absorbing small quantities of moisture, can become highly corrosive to tank system materials (e.g., inorganic salts). Additionally, a change in oxidation state of some solid wastes can significantly affect solubility (e.g., a change in the valence state of chromium in chromates and chrome oxides from trivalent to hexavalent can transform the substance from insoluble to soluble).

Although EPA concludes that there is merit to exempting some solid wastes (i.e., those that contain no free liquids) from the secondary containment requirements of today's regulation, this exemption would have to be made on a case-by-case basis. Given the expected small number of tank systems in this category, EPA concludes that the appropriate relief can be given the owner or operator by the variance provisions built into this rule.

Tank systems storing hazardous waste that contains no free liquids are afforded a large degree of protection when located within buildings with impermeable floors: the contents cannot flow out of the tank system, and the tank system is protected from precipitation or other water flowing into it. Furthermore, if no free liquids are present in the waste, the potential for migration of hazardous constituents is substantially reduced. Based on the above factors, EPA concludes that an exemption from the secondary containment requirements of § 264.193 and § 265.193 are appropriate for this limited class of tank systems. To determine the absence or presence of free liquids, as suggested by commenters, EPA method 9095 (Paint Filter Liquids Test), as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Publication No. SW-846), must be used.

In light of the comments regarding tank systems containing solid and other nonliquid hazardous wastes, EPA reviewed its approach to regulation of hazardous waste tank systems managing gaseous wastes. EPA has no reason to believe, nor were data submitted that would lead the Agency to conclude, that releases from tank systems managing gaseous hazardous wastes will not present risks to human

health and the environment. Thus, EPA has not revised the proposed regulation regarding this subset of hazardous wastes, and tank systems storing or treating gaseous hazardous wastes are subject to today's final regulation. The variance provisions discussed previously are available to owner/operators of tank systems managing gaseous hazardous wastes.

b. Temporary Tank Systems.

Standards for temporary tanks were not proposed. Many commenters requested exemption from the requirements of Subpart J for temporary tanks used for storage of waste in response to a leak or spill, and other temporary, unplanned occurrences where the facility owner or operator would need tank storage but would not have sufficient previous warning to provide such measures as integrity assessments, corrosion protection, or obtain a RCRA permit for the tank system.

EPA has reviewed the comments and has determined that no modifications are required to the proposed rule. Section 264.1(g)(8) provides that the requirements of Part 264 do not apply during immediate response to discharges or threats of discharges of hazardous waste. Section 265.1(c)(11) provides a similar exemption for interim status facilities. Additionally, the Regional Administrator has the authority under § 270.61 to issue an emergency permit in the event he "finds an imminent and substantial endangerment to human health or the environment." The emergency permit can be issued to a non-permitted facility for any hazardous waste or to a permitted facility to allow treatment, storage, or disposal of hazardous waste not covered by an effective permit. The emergency permit issued pursuant to § 270.61 must include, to the extent possible, all applicable requirements of Parts 264, 266, and 270. The emergency permit will be valid for 90 days which should allow sufficient time for the owner/operator to arrange for adequate storage, treatment, or disposal of the hazardous waste.

3. Assessment of Existing Tank System Integrity (§ 264.191 and § 265.191)

As illustrated in Table 1, § 264.191 of the proposed rule addressed the design of hazardous waste tank systems, and also required that the results of tank systems' integrity assessments be submitted to the Regional Administrator. Section 265.191 of the proposed rule addressed the assessment and certification of existing hazardous waste tank systems integrity at interim status facilities for tank systems that would not meet the secondary

containment requirements of proposed § 265.193(b)-(d).

Section 264.191 of the proposed rule would require owners and operators of existing and newly-installed hazardous waste storage and treatment tank systems to submit a written assessment to the Regional Administrator of their tank systems' structural integrity and acceptability for the storage and treatment of hazardous waste. These assessments would be used by the Regional Administrator to make a judgment on the acceptability of the tank system design. Under proposed § 264.191, information that would be addressed for all tank systems in the assessments would include (1) standards for the design and construction of the tank and ancillary equipment and (2) hazard characteristics of the waste(s) to be handled in the system. In addition, for existing, used, and reused tank systems, the following information would also be required: (1) description of the tank (for example, size, age, and material of construction); (2) estimated remaining life of the tank; (3) results of a tank integrity test; (4) factors affecting potential corrosion and type and degree of corrosion protection provided; and (5) design measures to protect the tank from vehicular traffic, floods, and seismic phenomena.

In a reorganization of the final regulation, §§ 264.191 and 265.191 now address assessment of the integrity of existing hazardous waste tank systems. Design of new hazardous waste tank systems is now addressed in §§ 264.192 and 265.192 along with installation requirements. Additionally, in response to comments that the Agency should reassess the consistency of the proposed regulations for permitted, interim status, and accumulation tank systems, §§ 264.191 and 265.191 have been modified to require similar information to be included in tank system integrity assessments for interim status, accumulation, and permitted hazardous waste tank systems. Also, a performance standard has been added to § 265.191 to ensure that the purpose of the integrity assessment is carried out. This objective is satisfied in the Part 264 requirements by the Regional Administrator's independent review of the integrity assessment conducted on behalf of the owner/operator.

Comments were received on a variety of the proposed design and assessment requirements. Those related to the hazardous waste tank integrity assessment requirements are addressed in this section of today's preamble.

Several commenters questioned the need for certifications and presented different views with respect to whether experts conducting the assessments should be independent of the owner/operator. EPA analyzed the issue of whether the assessment required in § 264.191 should be conducted by a qualified registered professional engineer and whether the registered professional engineer could be employed by the owner or operator. The Agency believes that the one-time assessment should be made by a person who does not have a conflict or the appearance of a conflict of interest. Accordingly, the word independent has been added to the final rule to clarify that employees of the owner/operator cannot make the assessment. The Agency's position in this regard is consistent with other types of certification programs which require assessments and certifications to be made by independent parties. For example, the Subpart G—Closure and Post-Closure regulations in § 264.115 require that both the owner/operator and an independent registered professional engineer certify that the facility has been closed in accordance with the specifications in the approved closure plan. Additionally, the Securities and Exchange Commission requires that all publicly-traded companies provide independent audits of financial information. Similarly, grants issued under the Clean Water Act must be accompanied by independent audits.

Several commenters also objected to the 0.05 gallon per hour leak test standard as being unmeasurable or arbitrary. Others supported this proposed leak testing standard. As discussed previously, the state-of-the-art of leak testing procedures is such that it is not possible to measure reliably for leaks to this degree of accuracy. Therefore, the final rule for both §§ 264.191 and 265.191 removes the leak test standard of 0.05 gallons per hour. EPA will continue to study the entire issue of leak detection and plans to publish guidance in the future regarding leak detection methods and procedures. In the meantime, EPA has included general performance standards in the final regulation that require that a leak test be capable of accounting for temperature fluctuations, tank end deflection, vapor pocket effects, and water table effects. The factors were added based on comments on the June 26, 1985 proposed hazardous waste tank system regulations. EPA's prior knowledge of potential problems associated with tank tightness testing, and on the OTS survey, which found

that failure to take account of these effects rendered many commercial tank tests extremely unreliable. In addition, § 264.193 and § 265.193 require that a qualified registered professional engineer review and certify that the selected annual leak testing method(s) is in accordance with sound and acceptable engineering practices for the tank system being evaluated. For additional discussion of this issue, refer to section IV.B.5.c of this preamble.

EPA proposed that tank integrity assessments be conducted within 6 months of the effective date of the rules. Several concerns were voiced by commenters regarding the number of qualified leak testers, the availability of funds to perform the assessment, the interruption of facility schedules (yearly shutdowns for maintenance are often necessary), and the amount of time necessary for compliance for large facilities. Some commenters were concerned with the inadequacy of tank integrity testing methods, and asked for an extension or elimination of the first-time inspection requirement for interim status tank systems based on this factor alone.

EPA has further evaluated the six-month deadline imposed for the one-time assessment. The Agency concludes that there are potential problems associated with this requirement. Based on the results of the OTS study of available tank system tightness testing methods, it is likely that available commercial methods will need to be modified to meet the general performance standards contained in the final regulation. Additionally, it will be necessary to test the accuracy of the new methods and to train personnel in the use of the new methods. For these reasons, the final rule establishes a deadline of twelve months for the one-time assessment. EPA believes that this extension will afford sufficient time to ensure that qualified methods and personnel are available to conduct integrity assessments of hazardous waste tank systems.

The proposed rule in § 264.191 would have required that, as part of the assessment of the adequacy of the design of an existing system, an estimate of the remaining useful life of the tank system be made. Commenters expressed the concern that an estimation of this kind would be subjective and thus of questionable value. While disagreeing with the commenters that estimates of this nature are of little value, the Agency is now adopting a phase-in approach for secondary containment and that periodic tank system integrity

assessments be made prior to the phase-in. Thus, EPA concludes that the requirement to estimate the tank system's remaining useful life is no longer necessary. Instead, §§ 264.191 and 265.191 require that the age of the tank system be documented for use in determining when secondary containment will be required because of the phase-in requirements of this final regulation.

4. Design and Installation of New Tank Systems (§ 264.192 and § 265.192)

As illustrated in Table 1, § 264.191 of the proposed rule would have addressed design and § 264.192 would have addressed installation of new hazardous waste tank systems at permitted facilities. The proposed Part 264 standards were formulated to ensure that a tank system is acceptable for storing or treating hazardous wastes and also addressed the handling and installation of new tank systems, including backfill requirements, tightness testing requirements before placement into service, corrosion protection requirements, and installation supervision requirements.

In today's regulation, both design and installation of new permitted hazardous waste tank systems are addressed in § 264.192. As pointed out by commenters, the proposed rule was deficient in that it did not specify requirements for the design and installation of new tank systems at interim status facilities. As previously discussed, new hazardous waste tank systems may be installed by owner/operators of interim status facilities and by generators. Thus, this final rule now addresses design and installation of new hazardous waste interim status and accumulation tank systems in § 265.192. As suggested by commenters, § 265.192 is consistent with § 264.192 in its treatment of new hazardous waste tank systems.

For the purpose of today's regulation, the term "new tank system" means not only newly-manufactured tank systems that will be put into service for the first time but also those other tank systems that even if in existence and in use prior to the promulgation date of today's regulations are then reinstalled and used as replacement tank systems for existing hazardous waste tank systems. Likewise, an existing tank system that is not being used for the storage or treatment of hazardous waste, but is then put into service or converted to use as a hazardous waste storage or treatment tank system subsequent to the promulgation date of today's regulation is considered to be a new tank system.

One commenter noted the potential effect of frost heave on tank systems in northern States and suggested a change in the design requirements to cover this contingency. EPA agrees that frost heave, where applicable, is an important factor that needs to be taken into account in the design of a tank system and is thus adding the consideration of such to the items that need to be addressed in the design standards in § 264.191 and § 265.191.

Sections 264.191 and 264.192 of the proposed rule would have required that the type and degree of corrosion protection needed to ensure the integrity of new hazardous waste tank systems be determined by a corrosion expert and that the installation of any cathodic protection system be supervised by a corrosion expert. Additionally, § 264.192 of the proposed rule would have required an assessment of the need for corrosion protection measures for existing tank systems.

Regarding the corrosion protection issue, one commenter suggested that more flexibility was needed in responding to corrosion threats. Other comments expressed reservations about the feasibility and necessity of retrofitting existing tanks with corrosion protection devices. Another commenter suggested that double-walled tanks be exempted from the corrosion protection requirements.

As discussed previously, EPA is requiring that all existing tank systems be provided with secondary containment if they are found to be leaking or by the time the tank system reaches 15 years of age. The 15 year timeframe represents the approximate median time to failure for those underground steel tank systems that were the subject of studies discussed previously in this preamble. EPA has selected this approach on the basis that underground steel tank systems are the only tank systems for which reliable data are available. For this reason, the Agency believes that a requirement to provide existing tanks with corrosion protection before phase-in of the secondary containment requirements of today's final rule is redundant because the basis of the phase-in of secondary containment accounts for the fact that most hazardous waste tank systems currently in use do not have corrosion protection. Therefore, EPA has modified the final rule and no longer requires that existing primary tank systems be retrofitted with corrosion protection prior to the mandatory phase-in of secondary containment.

EPA also believes that the corrosion protection measures proposed represent the spectrum of the technology that is

currently available, and are consistent with NACE recommended practices. Therefore, EPA believes that the corrosion protection requirements as proposed are sufficiently flexible and capable of meeting the corrosion protection needs of hazardous waste tanks. The Agency also believes that double-walled tanks that are constructed of metal, or that have metal components, should not be exempt from the requirements to provide adequate corrosion protection measures. EPA believes that it is important to ensure the integrity of the secondary containment structure so that it will be able to provide the function that it is intended to perform (i.e., containment so that the interstitial monitoring device is capable of detecting releases).

A primary function of the secondary containment system is to provide a means for accumulating leaks from the storage or treatment tank system so that a leak can be detected by leak detection methods before its release to ground water or surface water. Therefore, it is important that the integrity of the secondary containment system be maintained because a breach in the secondary containment system can lead to unreliable leak detection and result in subsurface releases from underground, inground, or onground tank systems. Also, failure of the secondary containment system can lead to intrusion of ground water into the interstitial space between the tank and secondary containment systems with consequent potential for corrosion of the entire system. For these reasons, EPA believes that corrosion protection systems should be installed for secondary containment systems constructed of steel or other materials subject to corrosion.

For the same reasons discussed previously, EPA has revised Parts 264 and 265 so that all interim status and permitted, as well as existing and new tank systems, are more consistently managed. EPA believes that interim status and permitted tank systems should be subject to the same requirements since there is no information that would suggest that the threats to human health and the environment differ for these two types of tank systems. On the contrary, the risks posed by interim status and permitted tank systems would be similar under similar conditions (e.g., tank size, material stored or treated, hydrogeology, proximity to a drinking water source). Performance standards have been added to § 265.192 to ensure that the purposes of the design and installation requirements are achieved. This objective is satisfied in the Part 264

requirements by the Regional Administrator's independent evaluation of the design of new hazardous waste tank systems.

5. Containment and Detection of Releases (§§ 264.193 and 265.193)

Secondary containment is the key element in EPA's strategy to ensure the proper management of hazardous wastes stored and treated in tank systems. Based on EPA's studies, it is likely that over time tank systems will experience failure. As discussed previously, secondary containment with interstitial monitoring ensures that a failure of the tank system will be detected before there is a release to the environment.

Several commenters urged that more time be allowed for installing secondary containment systems than the one year that would have been allowed in the proposed regulations, especially for facilities with multiple tanks or those located in areas where the availability of construction equipment or qualified personnel is limited. As discussed previously, in a substantive change from the proposed rule, EPA has decided, in the final rule, to allow a phase-in schedule for installing secondary containment systems that is based, in part, on the age of the tank systems. Therefore, except for those tank systems that would require secondary containment in the relatively near term due to advanced age (i.e., tank systems that are approaching 15 years of age), considerable time is available for owner/operators to provide secondary containment for their existing tank systems. For those tank systems that must be provided with secondary containment in the near term, for the reasons discussed below, in no instance will secondary containment be required to be installed for tank systems shown to be non-leaking by tank system integrity assessments or by other means sooner than two years from the promulgation date of this regulation. However, leaking tank systems must be taken out of service promptly upon detection of the leak and equipped with secondary containment prior to being returned to service. EPA expects that owner/operators will use back-up tank systems or some form of temporary storage while servicing a leaking tank system.

In evaluating comments on this subject, EPA relied, in part, on a study prepared for the proposed Land Disposal Restrictions Rules for Solvents and Dioxins (51 FR 1602; January 14, 1986). The purpose of this study ("Time Requirements for the Siting, Permitting

and Construction of New Hazardous Waste Treatment Facilities", December 1985) was to determine the time required to plan, design, permit, construct, and start up twenty-three different waste treatment technologies.

This study identified five major critical path activities (planning, design, bid solicitation/evaluation, construction, and start up) in addition to the EPA permit approval activity. Several of these twenty-three treatment technologies, such as neutralization or precipitation, involve equipment that is identical to or similar to the equipment used in the tank systems covered by today's regulation. The study reveals that the minimum time required to plan, design, solicit and evaluate bids, construct, and start up a small chemical treatment system would be from 12 to 17 months, excluding the time for permit application approval. For a large chemical treatment system, about 25 to 29 months would be required.

These schedules included estimates of the time required for site selection, environmental assessment, and Part B permit application preparation. EPA believes, therefore, that the amount of time required to provide secondary containment for existing hazardous waste tank systems will be less than the 29 month period identified for large systems, but is likely to take more than the one year period specified in the proposed rule. Thus, the final rule allows owner/operators a minimum of two years to provide secondary containment for existing hazardous waste tank systems shown to be non-leaking by tank integrity assessments. This will allow ample time to install secondary containment systems.

a. General and Specific Requirements for Tank Systems. Sections 264.193 (b) and (c) and 265.193 (b) and (c) of the proposed rule would define the general performance standards that must be achieved by secondary containment systems. They were as follows: (1) the design of the tank system must take into account normal climatic, hydrological, and operating conditions; (2) materials of construction of the secondary containment system must be compatible with the wastes being handled in the tank system; (3) the secondary containment system must be supported on a properly designed and installed foundation or base; (4) the system must be provided with a leak detection system designed to detect the presence of hazardous wastes in the secondary containment system within 24 hours of entry of liquid into the system; (5) the design must provide for drainage, collection, and removal of the wastes;

(6) the system must be designed and operated to contain 110 percent of the design capacity of the largest tank within its boundary; and (7) the system must be designed and operated to prevent run-on or infiltration of outside water sources or precipitation unless the liquids removal system is designed to handle and dispose of such sources properly.

Numerous technical comments were directed at these standards, especially to point out cases and situations where the standards were believed to conflict with specific designs or current practices. The corresponding standards of the final rule, found in §§ 264.193 (c) through (e) and 265.193 (c) through (e), remain substantially as proposed, with the exceptions discussed below.

The proposed rule would require that, in conjunction with secondary containment, a leak detection system be designed and operated to detect the presence of any release of hazardous waste or accumulated liquid within 24 hours of entry into the secondary containment system. Many commenters expressed concern over the requirement that the detection system be able to detect a leak within 24 hours. Based on further evaluation, EPA agrees that, depending on type of detector, waste characteristics, and migration time through backfill materials, the 24-hour detection criterion may not be achievable in some situations. On this basis, the final rule has been amended to allow a leak detection system that will detect a release "within 24 hours or at the earliest practicable time" if it can be demonstrated that existing technologies or site conditions will not allow detection of the release within 24 hours. In no instance would the Agency consider a leak detection system to be adequate if it would allow the release to escape from the secondary containment system before being detected.

EPA had originally proposed a 110-percent capacity requirement for the secondary containment system, intending that this requirement would apply to vault and liner systems. Commenters pointed out that the interstitial volume of a double-walled tank, an acceptable form of secondary containment, would not be capable of meeting the 110-percent capacity requirement. It was not the Agency's intent at proposal to apply this capacity standard to double-walled tanks. Thus, the organization of § 264.193 (b) through (d) (and the corresponding sections of Part 265) has been changed so that capacity of the secondary containment system is specified only for vault and liner systems.

Many commenters stated that the proposed standards that would require 110-percent design capacity were excessive. Many existing industry standards and regulations, such as those published by the National Fire Protection Association, specify that aboveground secondary containment systems be capable of containing 100 percent of the storage tank volumes. Several commenters also explained that they have installed secondary containment in accordance with State regulations that specify 100 percent of the tank design capacity. The Agency agrees that 100 percent secondary containment capacity is sufficient to contain even catastrophic releases from tank systems. Therefore, the final rule is amended to require that vault and liner systems contain 100 percent of the actual volume of the largest tank within their boundaries.

Section 264.193(c) of the proposed rule specified that secondary containment must include one or more of the three most common types of secondary containment available: external liners, vaults, and double-walled systems. Equivalent devices would be allowable if approved by the Regional Administrator. This requirement was not intended to endorse any particular type of containment system over another. If properly designed, installed, and operated, each of the methods is expected to provide adequate protection of human health and the environment. The requirements of this section of the final rule, therefore, remain the same as in the proposed rule.

EPA solicited comments on the feasibility of allowing the use of a synthetic membrane liner with interstitial monitoring installed inside the primary containment device as an alternative means of achieving secondary containment. The comments that were submitted on this subject presented opposing opinions on the acceptability of this alternative as an equivalent form of secondary containment. The Agency has very little data regarding the current use of and reliability of internally fitted membrane liners. Additionally, EPA has concerns about the ability to maintain an interstitial space between the membrane liner and the tank and the consequent impact on the ability to reliably detect releases from the membrane liner. Since no additional data were offered by public commenters, at this time, EPA is unable to evaluate this alternative approach to secondary containment. Therefore, the final regulation does not specifically allow the use of a membrane liner as an acceptable

method of secondary containment. It is possible, however, that an owner/operator's specific design will be approved by a Regional Administrator as a system equivalent to secondary containment with interstitial monitoring.

Section 264.193(d)(1) of the proposed rule would provide design standards for external liners used for secondary containment. It specified that liners are to be free of cracks or gaps and installed to cover all surrounding earth likely to come into contact with the waste if a release occurred. It explained that external liners may be used to contain releases from aboveground, inground, and underground tanks and that owners and operators who use an external liner to provide secondary containment must ensure that the liner provides a complete envelope that will prevent both lateral and vertical migration of wastes from the containment system. It required that a leak-proof connection between the tank and piping containment systems must be provided and that compatibility between the liner and the wastes to be handled must be ensured so that the integrity of the liner would be maintained.

Some commenters suggested that certain specific liner performance criteria be incorporated into the standards. In order to provide sufficient flexibility in selecting an appropriate liner material and given the ever-improving technology for liner materials, the Agency has chosen not to establish specific liner performance criteria at this time. EPA believes that such criteria are best discussed in a guidance document. Due to the important role of liners for use in landfill, surface impoundment, and waste pile design and operation, substantial information has been gathered by EPA on the subject of liner performance. The Agency will publish available information on specific liner performance in a guidance document to be issued prior to the effective date of this regulation.

No other substantive comments were received on these proposed requirements and they remain in the final rule under § 264.193(d)(1). Identical requirements have been added to the final rule under § 265.193(d)(1) in order to help maintain a consistent approach between interim status and permitted standards.

The standards in § 264.193(d)(2) of the proposed rule would have required that a vault system be constructed so that it is liquid-tight; that is, it must provide a continuous structure with leak-proof joints. Water stops or seals on all joints must be chemically compatible with the waste being stored or treated. The proposed rule would require that

concrete vaults, one of the most common types of vault systems now in use, be lined with a nonporous, impermeable interior coating that is compatible with the waste being stored, on the basis that concrete is porous and susceptible to cracking. The proposed rule would also require that the external surface of vault containment structures be provided with a moisture barrier to prevent water from being absorbed by the concrete and entering the interior of the secondary containment area.

Several commenters recommended that the requirement for interior coating be amended to require interior coating only where it is necessary to prevent the migration of waste through the concrete; others recommended that it be eliminated entirely. Further review of this issue by EPA concludes that concrete, as a generic term, can vary widely in specific composition and characteristics, making it extremely difficult to establish a specification for concrete that would ensure resistance to the wide range of hazardous materials that may come in contact with a vault system. Thus, some type of protective internal coating or liner is needed to maintain the integrity of concrete vaults. The Agency has, however, expressed this requirement in terms of a broad performance standard so as not to preclude operating flexibility, and thus is not recommending any specific type of liner coating or liner as at proposal.

Comments concerning the requirement for an exterior moisture barrier for vaults stated that the moisture barrier should not be required, except where vaults that are in contact with the soil or in locations where potential for ground-water infiltration exists. Other commenters raised the concern that retrofitting an exterior moisture barrier could be costly relative to the benefits achieved. EPA reevaluated the proposed requirements and concludes that the use of moisture barriers to prevent infiltration of ground water into an underground or inground vault should be required only when the vault is subject to hydraulic pressure. This is a condition that is most likely to exist when a vault is completely or partially submerged below the water table at some time. EPA has also determined that other methods are currently available that could reduce or eliminate water infiltration (such as well-point installation, subsurface drain tiles, or slurry walls). Thus, EPA has modified the final rule to require that all vault systems, both new and existing, be provided with an external moisture barrier or be otherwise designed or operated to prevent migration of

moisture into the vault if the system is subject to hydraulic pressure.

A significant concern addressed in the proposed rule was the risk of fire or explosion in vaults. Section 264.193(d)(2)(iii) of the proposed rule would require vaults containing tanks storing or treating ignitable wastes to be backfilled to minimize the possibility of fires or explosions. Several commenters objected to the backfilling requirement because: (1) fire protection codes and practices may not allow backfilling in the case of ignitable substances; (2) backfilling prevents visual inspection of the vault interior and tank exterior surfaces; and (3) the cost of remedial action is increased in the event of a release. Upon further consideration of this issue, EPA concludes that the explosion hazard associated with vaults is small and that there are relatively inexpensive and reliable equipment and instrumentation systems to reduce the risks of explosion. These systems include preventative measures such as equipment grounding and the use of electrical equipment meeting explosion-proof service. In addition, suppression systems can also be installed which use an explosive vapor detector, and provide an inert flooding agent such as a fluorochlorohydrocarbon to flood the vault automatically if explosive conditions exist. The final rule thus eliminates the backfilling requirement for vault systems as the only means to protect against fire hazards and substitutes the requirement that secondary containment vaults for tanks storing or treating ignitable wastes must be provided with a means to protect against the formation and ignition of explosive vapors within the vault system. Backfilling would be an acceptable method. Also, because some reactive wastes can lead to the formation of ignitable or explosive vapors, today's regulation requires that secondary containment vaults for storing or treating reactive wastes that may lead to the formation of ignitable or explosive vapors must also be provided with a means to protect against the formation and ignition of explosive vapors within the vault system.

The standards in § 264.193(d)(3) of the proposed rule would require that double-walled tank systems be designed as integral structures that are completely self contained, with interstitial leak detection monitoring. It would allow the use of liquid, vacuum, or pressure-type detection systems. It would require that corrosion protection be provided for metal double-walled tanks if it is determined to be necessary. As previously discussed in section

IV.B.4 of this preamble, EPA believes that corrosion protection of double-walled tanks is necessary, contrary to the opinion of one of the commenters. The final rule does not change the standards for double-walled tanks, except, as discussed previously, to modify the proposed provision requiring 110 percent secondary containment volume.

In § 264.193(e) and § 265.193(d) of the proposed rule, EPA would require secondary containment for all new ancillary equipment as well as for the ancillary equipment of all existing hazardous waste storage and treatment tank systems that did not choose to implement a ground-water monitoring program. This requirement would have applied to both aboveground and underground piping systems.

Many commenters supported the application of secondary containment to the ancillary equipment or most ancillary components. Commenters noted, however, that the overwhelming majority of leaks from the ancillary equipment occur in certain components of piping systems, and not in the more extensive sections of straight-run piping with welded connections. EPA's reevaluation of the available data on releases from tank systems shows that leaks and ruptures from aboveground piping systems are primarily associated with certain components such as flanges, valves, and piping connections, not straight runs of piping with welded connections, probably because they often employ pipe thread or gasket-type seals and are more susceptible to stresses than straight-run welded piping. Technologies that are both cost-effective and reliable are available to provide containment for many ancillary equipment components. For example, local jacketing provides effective secondary containment for components such as flanges, valves, and fittings, and can be provided with leak detection equipment.

The Agency concludes that the potential for leakage from straight runs of aboveground welded piping, sealless pumps, and pressurized aboveground piping equipped with automatic shut-off devices is substantially lower than for other components of the ancillary equipment systems. Thus, the requirements of proposed § 264.193(e) and proposed § 265.193(d) have been modified in today's final rule to exclude the requirement of secondary containment for aboveground piping (exclusive of flanges, joints, and valves unless they are sealless and welded to the piping), sealless or magnetic pumps, and pressurized aboveground piping

systems with automatic shut-off devices that can be visually inspected for leaks on a daily basis. The final regulation (in § 264.195 and § 265.195) requires that these ancillary equipment systems be visually inspected on a daily basis to ensure that leaks are not occurring.

The final rule requires secondary containment for underground piping systems, including straight runs of underground pipe, because of the potential for failure caused by corrosion and/or the inability to detect releases from the underground piping systems.

b. Deletion of Ground-Water Monitoring Alternative. As discussed in section III.B.6.a of this preamble, the Agency has removed the provisions of proposed § 264.193(f) and § 265.193(e) that gave owners/operators the option of instituting a ground-water monitoring program in lieu of secondary containment. Instead, owner/operators of all hazardous waste tank systems must either provide full secondary containment or obtain a variance to the secondary containment requirements. However, as explained previously, the technology-based variance is not available on the basis of ground-water monitoring technology because the overall strategy for regulating hazardous waste tank systems is based on the prevention of contamination of ground water by releases from tank systems.

c. Leak Testing and Tank System Integrity Assessment Requirements. In § 264.193(h) and § 265.194(d) of the proposed rule, EPA would require all underground tank systems that do not have secondary containment to be leak tested semiannually. The leak testing or tank system tightness testing method selected was required to detect leaks equal to or greater than 0.05 gallons per hour. Many commenters expressed a concern that the accuracy requirement may not be achievable by commercially-available tank system tightness testing techniques. Some commenters felt that the accuracy standard should be based on tank size, while others stated that there is not enough good field data to establish a standard at all. In response to comments, EPA has reconsidered the reliability of tank system tightness test methods. While some techniques may be capable of achieving the 0.05 gallon per hour accuracy threshold in specific instances, EPA concludes that variations in tank system characteristics, operating procedures, calibration and maintenance of leak detection devices, and the level of experience and proficiency of test personnel may not allow achievement of this accuracy on a consistent basis.

Many factors can affect tank system tightness testing accuracy, including temperature, barometric and hydrostatic pressure variations, tank size and design, physical characteristics of the waste (e.g., viscosity, volumetric coefficient of expansion, and uniformity of the liquid waste), variations in structural support provided by soil or fill characteristics, and leak detector characteristics. An example illustrates the volumetric sensitivity of tank system tightness tests to temperature for a tank storing a waste hydrocarbon solvent. A temperature rise of only 0.02°F in one hour would mask a leak of 0.084 gallons per hour in a 6,000-gallon tank storing the waste solvent. On the other hand, a leak of 0.05 gallons per hour in a 4-inch diameter pipe experiencing the same temperature change can be detected in a pipe up to 9,000 ft long. Because smaller volumes are associated with piping, integrity tests are much more accurate for piping.

EPA believes that the level of accuracy attainable by leak testing methods must be reviewed periodically as the technology improves. In this final rulemaking, EPA has decided not to specify a minimum acceptable accuracy requirement for hazardous waste tank system tightness testing. Rather, EPA has chosen to include in Parts 264 and 265 general performance standards to ensure that the leak testing method is capable of properly compensating for water table effects and temperature effects and to address the problems posed by tank end deflections and vapor pockets. EPA is currently conducting research on the effectiveness of tank system tightness testing technologies at the EPA Research Facility in Edison, New Jersey. The Agency hopes to be able to use the information gained from this research to recommend the use of specific methods of tank system integrity testing. However, it is unlikely that these methods will ever be as reliable as leak detection methods employing secondary containment and interstitial monitoring, in part because it is unlikely that tank tightness testing can be conducted on a routine basis (e.g., daily) because of the high costs of so doing.

In a modification to the proposed rule, EPA will allow owner/operators of underground tanks that can be entered for inspection to conduct internal inspections or other tank integrity assessments, including tank tightness testing, rather than to specify that tank tightness test methods must be employed. The Agency is making this change, which was strongly supported by commenters, to ensure that owner/

operators are able to use the most reliable methods available to assess the integrity of their hazardous waste tank systems. In certain instances, it is probable that internal inspection or some other form of integrity assessment may be shown to be preferable to tank tightness testing.

Commenters also addressed the issue of leak testing frequency. Most felt that the semi-annual leak testing requirement was excessive. Specific points raised were that (1) a sufficient number of qualified leak-testing personnel do not exist, (2) tank testing should be scheduled to coincide with annual shutdowns for maintenance and repair, and (3) leak testing every six months represents a significant increase in operating costs.

In this final rule, leak testing will be used during the period of phase-in of secondary containment to identify leaking tank systems. As discussed previously, those systems found to be leaking will be taken out of service immediately. Underground components of tank systems, or components for which a leak occurred in an area that cannot be visually inspected will be provided with secondary containment prior to being placed back into service. The final rule requires that such tests be conducted on an annual basis. Leak testing methods that meet the performance standards included in today's final rule will be able to detect releases in the range of 0.1 gallons per hour that develop during the period of the phase-in of secondary containment. Once secondary containment is phased-in, risks associated with leaks that are undetectable by present leak testing methods will be eliminated.

Proposed §§ 264.193(g)(9)(ii) and 265.193(e) addressed tank integrity testing requirements for owner/operators of inground and aboveground (including onground) hazardous waste tank systems not equipped with secondary containment with interstitial monitoring (i.e., those owner/operators electing to comply with the requirements of the proposed ground-water monitoring alternative). These proposed standards would have required owner/operators to assess the integrity of the tank system in the event that there was, at any monitoring well, a statistically-significant increase in the parameters or constituents measured as part of the ground-water monitoring alternative. Additionally, as explained previously, proposed §§ 264.191 and 265.191 would have required an initial assessment of tank system integrity, including inground and aboveground tank systems.

As the secondary containment requirements of today's regulation are being phased-in over a period of time, EPA believes that it is important to assess the integrity of hazardous waste tank systems during the phase-in period. Therefore, today's regulation requires in §§ 264.193 and 265.193 that periodic integrity assessments be conducted for completely aboveground, onground, and inground hazardous waste tank systems, as well as for the underground tank systems discussed above. Integrity assessments of ancillary equipment must be conducted annually. Available methods include the various pipe system tightness tests and, to a limited extent, visual inspections.

For permitted tanks other than non-enterable underground tanks, a schedule and procedure must be developed during the permitting process for assessing the overall condition of the tanks. In the absence of a permitting process applicable to interim status and accumulation tank systems, EPA has determined that an internal inspection or other tank integrity examination that addresses cracks, leaks, corrosion, and erosion must be performed at least annually for tanks other than non-enterable underground tanks. As explained previously, for non-enterable underground hazardous waste tank systems, leak testing procedures are required that meet the general performance standards established in today's regulation.

d. Variances from Secondary Containment. Sections 264.193(i) and 265.193(f) in the proposed rule provided a variance from all or part of the secondary containment requirements if the owner or operator could demonstrate to the Regional Administrator that the location of the tank system and alternative design and operating practices would prevent hazardous waste from reaching ground or surface waters at any future time. As explained previously in section III.B.5.b.ii, the final rule, in § 264.193(g) and § 265.193(g), allows hazardous waste tank system owner/operators to seek both technology-based and risk-based variances from secondary containment requirements based on either (1) a demonstration of no migration of hazardous waste constituents beyond the zone of engineering control or (2) a demonstration of no substantial present or potential hazard to human health and the environment.

As with all variances, the burden of demonstrating that a variance is appropriate remains with the applicant. If the Agency is not persuaded that the

information provided makes the necessary demonstration with great certainty, the variance will be denied.

(i) *Technology-based variance.* The criteria that the applicant must use when preparing requests for a technology-based variance from the secondary containment requirements of this regulation are specified in § 264.193(g)(1) and § 265.193(g)(1). Essentially, the applicant must be able to demonstrate that his alternative design and operating practices together with location characteristics will prevent the migration of hazardous waste or hazardous waste constituents into the ground water or surface water at least as effectively as secondary containment with leak detection. The key element of this variance mechanism is the ability of the owner/operator to contain releases from his tank system within an area under his control that, upon detection of a release, can be readily cleaned up prior to the release of hazardous waste constituents to ground water or surface water.

The Agency will require that the application for variance include a complete and thorough demonstration that the alternative system will provide equal prevention of migration as that provided by secondary containment with interstitial monitoring. The application will undergo rigorous review by the Regional Administrator to ensure that the applicant makes the demonstration with great certainty. Owner/operators are cautioned that EPA has evaluated available release detection systems as a part of this rulemaking and has determined that inventory monitoring, tank tightness testing, and unsaturated zone monitoring are not as reliable at present as secondary containment with interstitial monitoring. However, EPA is aware that technology could improve or that site-specific conditions may exist at some locations that might enable performance equivalent to secondary containment with interstitial monitoring. Therefore, the Agency has provided a mechanism that allows owner/operators of hazardous waste tank systems to seek a technology-based variance from the secondary containment requirements of this regulation.

This variance mechanism is designed to allow an owner/operator the opportunity to demonstrate that an innovative tank system design or leak detection method will be capable of preventing contamination of ground water or surface water or that a leak detection method not believed to be generally reliable (e.g., unsaturated zone monitoring) will be reliable for his

hazardous waste tank system. The applicant must take into consideration the nature and quantity of the hazardous waste, the proposed alternative design and operating conditions, the hydrogeologic setting, and all other factors (e.g., depth of soil underlying the tank system, soil properties including porosity and likely degree of saturation during operation of the tank system, and fluid or constituent viscosity) that influence the mobility of the hazardous waste constituents and the potential for their migration. The applicant must also demonstrate the reliability and capability of his alternative system design (and release detection method) and operating practices in detecting releases and in preventing the migration of hazardous waste constituents to ground water and surface water.

If a technology-based variance is granted, the Regional Administrator will substitute a set of requirements in place of secondary containment that will ensure that the system for which the variance has been granted is maintained and operated in a manner that will prevent the migration of hazardous waste to ground water or surface water. If hazardous waste does reach ground water or surface water, the variance will be revoked.

The Agency discourages the submission of technology-based variance applications in those situations where secondary containment is obviously provided. For example, for tank systems located inside buildings, the building floor, if appropriate berms are constructed, would serve as part of the secondary containment system. The Agency also may deny the variance if the application is incomplete. Additionally, the Agency discourages the submission of unpersuasive applications. For example, earthen berms are generally not capable of preventing the migration of hazardous waste or hazardous waste constituents and would not qualify for a variance.

If a release of hazardous waste occurs at a tank system operating under the technology-based variance, the owner or operator must comply with response measures required by §§ 264.193 and 265.193. The response measures that will be applicable to releases from hazardous waste tank systems granted a technology-based variance will vary depending on whether migration has occurred outside the zone of engineering control established in the variance process.

If the release is contained within the zone of engineering control, the responses that are required in §§ 264.196 and 265.196 for releases to a secondary containment system would be

applicable. The owner or operator must stop the flow of hazardous waste into the tank system and promptly, within 24 hours if possible, empty that portion of the leaking tank system at which the leak or spill has or is occurring in order to prevent any additional release of hazardous waste and to allow inspection and repair to be performed. The owner/operator must also prevent the migration of hazardous waste or hazardous waste constituents beyond the zone of engineering control to ground water or surface water.

In addition, the owner or operator must decontaminate or remove the contaminated soil so that releases from the hazardous waste tank system can be detected and responded to in a manner consistent with the detection and response conditions of the technology-based variance. If this can be done, the tank system must be repaired prior to its being returned to service. If such repair is major, a certification by an independent, registered professional engineer must be obtained and submitted to the Regional Administrator within seven days of returning the tank system back into service. If contaminated soil cannot be removed or decontaminated so that the tank system, upon return to service, will be equipped with release detection capability at least as effective as was in place prior to the release and upon which the technology-based variance was granted, the owner/operator must close the system and provide post-closure care in accordance with §§ 264.197 and 265.197, as appropriate. In this situation, if the owner/operator elects to replace or reinstall the existing hazardous waste tank system, he must provide secondary containment consistent with the requirements of §§ 264.193 or 265.193 and comply with the requirements of §§ 264.192 or 265.192, or reapply for a variance from the secondary containment requirement of today's regulation.

If the release migrates beyond the zone of engineering control, the Agency will consider the technology for which the technology-based variance was granted to have failed. In this case, the owner/operator must follow all procedures in §§ 264.196 and 265.196 applicable to a release from a secondary containment system or a single-walled tank system to the environment. Furthermore, the owner or operator must prevent the migration of hazardous waste or hazardous waste constituents to ground water or surface water, if possible. In addition, the owner or operator must decontaminate or remove the contaminated soil. If he cannot decontaminate or remove the

contaminated soil or if ground water has been contaminated, he must close the system and provide post-closure care in accordance with §§ 264.197 and 265.197, as appropriate. In all cases, including those where contaminated soil can be removed or decontaminated and ground water has not been contaminated, if the owner/operator elects to repair, replace, or reinstall the existing hazardous waste tank system, he must provide secondary containment consistent with the requirements of §§ 264.193 or 265.193 and comply with the requirements of §§ 264.192 or 265.192, or reapply for a variance from the secondary containment requirements of today's regulation.

(ii) *Risk-based variance.* The criteria that the applicant must use when preparing requests for a risk-based variance from the secondary containment requirements of this regulation are specified in §§ 264.193(g)(2) and 265.193(g)(2). Essentially, the applicant must be able to demonstrate that as long as the concentration(s) of the hazardous constituent(s) present in the hazardous waste stored, treated, or accumulated in the hazardous waste tank system remain(s) below the requested concentration limit(s), no substantial current or potential hazard to human health or the environment will result. As explained previously, this variance provision is not available to owner/operators of new underground hazardous waste tank systems.

This demonstration is essentially a risk assessment and risk management process in which a determination is made that, in the event of a release from a hazardous waste tank system, the level of contamination of ground water that results will not pose a substantial present or potential hazard to human health or the environment. In making this demonstration, the owner/operator must make a reasonable estimate of the likely release incident that might occur for his hazardous waste tank system. For example, a strong case could be made that the likely release event from a completely aboveground hazardous waste tank system would be a catastrophic release incident (i.e., the entire contents of the tank system would be released). For underground, onground, and inground tank systems, the most likely event might be a continuous release between the time interval of tank integrity assessments. Thus, the owner/operator would, based on the precision and reliability of the method used to conduct the periodic tank system integrity assessments required by today's regulation, assume a

constant release rate that would occur over the time interval between periodic assessments (generally one year). In the event that a release rate cannot be reasonably estimated, the owner/operator would assume that the release incident would be a catastrophic release incident.

Site specific information, such as local hydrogeological characteristics, the facility's waste constituents, and local environmental factors, is needed to assess the potential impact of each hazardous waste constituent on human health or the environment if it were to be released to ground water or surface water. There are two approaches that an applicant can take in this demonstration:

1. There will be no pathway to exposure to the hazardous waste constituents, or

2. The exposure to the ground-water or surface water contaminants will be at concentration levels that do not pose a substantial current or potential hazard to human health and the environment.

In the second approach, the demonstration depends upon determining concentration levels of the ground-water contaminants that do not pose a substantial current or potential hazard to human health and the environment at a potential point of exposure. The allowable hazardous waste constituent concentration limits are derived from these acceptable concentrations.

Agency published acceptable exposure levels for the protection of human health and the environment can be used as allowable hazardous waste constituent concentration limits without going through elaborate exposure pathway analyses or fate and transport modeling. For example, a health-based acceptable ground-water exposure concentration for a constituent that might migrate to the ground water can be used as the allowable hazardous waste constituent concentration limit. However, the allowable concentration limit may need to be modified to include an assessment of any cumulative effects associated with exposure to the hazardous waste constituent. In addition, exposure levels that the Agency established pursuant to a statutory authority that requires risk-benefit balancing or technology-based standards may not always be acceptable for purposes of this variance. It is anticipated that the Agency will periodically publish and update a list of acceptable dose levels that can be used by permit applicants in preparing risk based variance demonstrations. In this regard, EPA intends to issue guidance on the variance provisions prior to the

effective date of today's regulation and will update this guidance as necessary.

The type and amount of information needed for a risk-based variance demonstration depends on site-specific characteristics and which approach (either no exposure or no substantial risk) is chosen. Both approaches require information on the physical and chemical characteristics of the waste, flow direction and quantity of the ground water, and hydrogeological characteristics of the site. A demonstration based on the second approach requires additional information. Depending on the basis for the demonstration, one or more of the following must be addressed in greater detail:

1. Current and future uses of ground water and surface water (if applicable),

2. The proximity of the user of the water resources,

3. The existing ground-water and surface water quality,

4. The potential human health risks and environmental damage from exposure to the contaminants, and

5. The permanence of the potential adverse effects resulting from exposure to the contaminants.

For any of the above factors that are not submitted as part of the variance demonstration, justification is required to explain why they do not need to be addressed. Depending on the site characteristics, either approach may require information on the engineered characteristics of the hazardous waste management facility, the rainfall patterns in the area, the existing quality of ground-water and surface water (if applicable), soil type and characteristics (adsorptivity and permeability) determined by soil boring tests, and any current or future institutional ground-water use restrictions. The demonstration for each hazardous waste constituent must be independent.

Sections 264.193(h) and 265.193(h) have been added to the final rule and specify the schedules to be used in requesting variances.

6. General Operating Requirements (§ 264.194 and § 265.194)

In the proposed rule, the general operating requirements of § 265.194 included provisions for periodic leak testing and a corrosion assessment. In the final rule, these requirements have been relocated to other sections in Part 265 as part of EPA's reorganization of the rule. The only revision that has not been discussed is the modification to the proposed rule that requires 2 feet of freeboard for uncovered tanks. The comments pointed out that the 2 foot freeboard requirement did not take into

account tank volume, thus creating a disparity relative to tank capacity. In order to eliminate this result, EPA has adopted the same language found in § 264.194 which requires that uncovered tanks have sufficient freeboard to prevent overtopping by wave or wind action or by precipitation.

7. Inspection (§ 264.195 and § 265.195)

The requirements of proposed § 264.195 would have included development and implementation of a schedule and procedure for inspection of overfill controls, daily inspection of the aboveground portion of tank systems and data gathered from monitoring equipment, weekly inspection of the construction materials of, and the area immediately surrounding, the externally accessible portion of the tank system, and inspection of cathodic protection systems. The requirements for inspections in § 265.196 would have been identical except that daily inspection of overfill controls would have been required.

Several commenters stated that the proposed schedule of inspections of cathodic protection systems was more stringent than other inspection frequencies specified for cathodic protection systems by other Federal standards and engineering societies (e.g., National Association of Corrosion Engineers (NACE)). After further study of this issue, the final rule has been modified to include the NACE-recommended inspection standards. NACE RP-02-85 (Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems), which EPA has adopted for establishing minimum inspection requirements, was prepared by a task force composed of corrosion consultants, corrosion specialists for oil and gas transmission companies, gas distribution firms, power companies, and communications companies; representatives of tank manufacturers and coating manufacturers/applicators; the National Bureau of Standards; the American Water Works Association; the Department of Transportation; and other corrosion experts.

The NACE document represents the consensus of a wide range of corrosion experts representing manufacturers, government, trade associations, consultants, and firms with experience in corrosion protection of submerged or buried equipment constructed of metal. Since EPA has not undertaken independent research, this consensus offers the most reasoned approach to setting the inspection standards contained in today's final rule. Thus,

consistent with the NACE findings, § 264.195 and § 265.195, now require inspection of a cathodic protection system within six months of installation and annually thereafter to ensure that it is properly functioning. In addition, the rule requires that all sources of impressed current be inspected bimonthly (i.e., every other month).

A few commenters stated that the recordkeeping requirements in the proposed rule would create an unnecessary burden. The Agency strongly disagrees with these commenters; EPA believes that it is important for owner/operators of facilities subject to this regulation to keep a permanent record of their inspections to document their compliance with the rule. Thus, in an addition to the proposed rule, the final regulation at § 265.195 requires that owner/operators of interim status facilities and accumulation tank systems maintain records of required inspections as was proposed for permitted hazardous waste tank systems in § 264.195.

The other requirements of proposed § 264.195 and § 265.195 remain the same as proposed, except that inspection of the construction materials of and the area surrounding the externally accessible portions of the tank and secondary containment systems must be inspected daily. EPA has added this requirement because it will enable the detection of releases or potential releases at the earliest possible time. Additionally, this inspection requirement can easily be incorporated into the daily inspection schedule required for the aboveground portions of tank systems (including all piping and other ancillary equipment). Pursuant to 40 CFR 264.15 and 265.15, any discrepancies found during inspections must be remedied.

8. Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems (§§ 264.196 and 265.196)

This section of the preamble describes procedures the owner/operator must follow if his tank system has developed a leak or if he determines that a tank system is unfit for use. Paragraph (a) describes what actions must be taken in response to a leak or spill from a tank system which has not been granted a variance from secondary containment. Paragraph (b) describes procedures for disposing of tanks that have leaked or are unfit for use. Procedures for responses to leaks or spills from tank systems with variances are included in §§ 264.193 and 265.193 of the regulations and are in section IV.B.5.d.i of this preamble

a. General Responses to Leaks or Spills. Sections 264.196 and 265.196 specify procedures the owner/operator generally must follow if there is a release (leak or spill) from a hazardous waste tank system. For permitted tank systems, the framework for responding to releases is established, in part, through a contingency plan prepared under Subpart D of Part 264. Section 264.196 of today's regulation expands the requirements beyond those currently required by this plan and imposes other requirements. For interim status and 90-day accumulation tank systems, procedures for responding to leaks and spills are specified at § 265.196 of today's regulation.

The response procedures must be followed if a release is detected through tank testing, visual inspection, interstitial monitoring, or in any other manner.

There are three types of releases that are addressed in §§ 264.196 and 265.196:

(1) Releases from a single-walled tank system to the environment;

(2) Releases from secondary containment systems to the environment (if any); and

(3) Releases from primary containment devices (tank, piping, other ancillary equipment) into secondary containment systems.

Generally, regardless of the type of release, several response measures must be followed. For example, in all cases, the owner or operator must stop the inflow of hazardous waste to that portion of the tank system that is releasing the hazardous waste and must remove hazardous waste from the tank system so that no further release will occur. Other requirements of §§ 264.196 and 265.196 vary with the type of release as described below. A more detailed discussion of each of the response procedures follows.

i. Stopping of Flow or Addition of Wastes. The final rule requires that if a leak or spill has occurred, the owner or operator must immediately stop the flow or addition of hazardous waste into the tank system. This requirement applies to all types of releases: leaks or spills to the environment or from the primary containment device to the secondary containment system. The purpose of this requirement is to limit, to the extent possible the quantity of hazardous waste that might potentially be released from the tank system. This requirement is identical to that contained in the proposal. No comments were received relative to this provision.

ii. Removal of Waste from Leaking Tank Systems. Today's rule requires that the owner or operator promptly

remove hazardous waste from that portion of the primary tank system at which a leak or spill has or is occurring. It also requires that, in the event of a release to a secondary containment system, hazardous waste must be entirely removed from the secondary containment system. The proposed rule would have required the immediate removal of all waste from the tank and containment system when it was found to be leaking. Many commenters objected to that requirement. They suggested: (1) that immediate removal of the waste was only necessary above the leaking portion of the tank; (2) that, for leaks in the ancillary equipment or piping, it is only necessary to isolate the leaking equipment or pipe section for repair or replacement, and (3) that many repairs can be made without complete removal of hazardous waste from the tank system.

EPA agrees with the commenters that removal of all waste from a single-walled leaking tank system may not be necessary under all circumstances. A major concern during a repair operation is the risk of potential exposure or direct contact of maintenance personnel with the hazardous waste. Therefore, the final rule is revised to require measures for isolation of that portion of a single-walled tank system where a release has occurred or is occurring and prompt removal of remaining wastes from the leaking portion of the tank and containment system. The decision to remove all remaining waste should be based upon consideration of health risks to repair personnel and the potential risk for further release to the environment.

For a tank system with secondary containment, all the leaked waste must be removed from the entire secondary containment system. If this were not done, the interstitial monitoring system would not function effectively.

The proposed rule would have required removal of the hazardous waste no later than 24 hours after a leak is detected. Several commenters argued that the 24-hour response time for removal of waste was unreasonable and even impossible for tanks with extensive interconnecting systems, large tanks, and facilities without adequate storage capacity. The requirement in the proposed rule for removal of tank contents within 24 hours has been modified in the final rule to require removal of the remaining waste to commence within 24 hours of detection of the leak and to be completed as quickly as possible so that no further releases occur. In today's final regulation, EPA has modified this

requirement based on its consideration of the range of likely conditions that might be encountered in such situations. Several major problem areas were identified in this analysis. The principal concern was that any such transfer operation be accomplished in such a manner that human health not be threatened. In the event of a leak, time is required to plan the transfer operation so that further spills or accidents are prevented. This cannot always be accomplished within a 24-hour period.

Other logistics problems could prevent removal within 24 hours. If there were not sufficient tank capacity available that was compatible with the wastes being transferred, time would be required to obtain such capacity. This would be a special problem with large, interconnected tank systems. Finally, for extremely large tanks, more time may be required to obtain alternative capacity and to transfer the waste physically.

Removal of wastes from a secondary containment system might encounter similar difficulties. Accordingly, the 24-hour time limit has been modified for these situations as well.

iii. *Containment of Visible Releases to the Environment.* The final rule requires the owner or operator to contain any visible contamination resulting from a release from the tank system to the environment. Only releases from an aboveground portion of a tank system are likely to result in visible contamination. This requirement is unchanged from the proposal. The purpose of this provision is to require that measures be taken to minimize the impact of a release by promptly containing it. An example of this type of response would be the placement of barricades or other barriers to prevent further lateral overland migration of the leak or spill.

In addition, the owner/operators must conduct a visual inspection and promptly remove, and dispose of, any soil that appears to be contaminated. Likewise, if a release has reached surface water and is visible (e.g., an oil-sheen), the owner/operator must take immediate action to contain and remove the released material. These actions will result in minimizing the amount of soil or surface water that becomes contaminated and may also avoid more costly future corrective actions.

iv. *Notification of Release to the Environment.* The final rule requires that the owner or operator notify the Regional Administrator within 24 hours after a release to the environment has been detected. If the leak or spill is confined by the secondary containment system, notification is not required. The purpose of this notification is to provide

EPA the opportunity, in appropriate cases, to order that correction action be taken. Corrective action may be required pursuant to sections 3008(h), 3004(w), or 7003 of RCRA.

Many of the commenters stated that the proposed notification provisions overlapped with current CERCLA requirements. Under the Reportable Quantity rule (40 CFR, Part 302), a release of a hazardous substance in quantities equal to or greater than its assigned Reportable Quantity (RQ) must be reported immediately to the National Response Center. To avoid duplicative notification, the final rule clarifies that an owner's or operator's report complying with 40 CFR Part 302 will satisfy the notification requirements of this regulation. Commenters on the proposed regulation stated that small leaks and spills should not be reported to the Regional Administrator because of their insignificance. EPA agrees that to report small, insignificant spills should not be required. Accordingly, the final regulation has been modified to require that spills of less than or equal to one pound need not be reported if they can be immediately contained and cleaned up. This is equal to the lowest "reportable quantity" established in the CERCLA reporting regulations. EPA is confident that owner/operators can perform the necessary cleanup of releases of this size without Regional Administrator involvement.

v. *Assessment of Risk Posed by Leaks or Spills to the Environment.* The owner or operator of a permitted, interim status, or 90-day accumulation tank system must, within 30 days of detection of a release, submit a report to the Regional Administrator that estimates the extent of the release. The purpose of this requirement is to provide the Regional Administrator with sufficient data (e.g., size of release, receptors, estimated corrective action, etc.) to make a decision with respect to what type and degree of corrective action, if any, may be appropriate.

For permitted tank systems, the final rule expands the requirements relating to contingency plans prepared pursuant to Subpart D of Part 264. These plans must now include procedures for assessing the risk to human health and the environment caused by a release from a tank system and the remedial actions necessary to mitigate the release. Section 264.196 requires that these procedures be followed if there has been a release to the environment. For interim status and 90-day accumulation tank systems, the final rule expands upon the reporting requirements of 40 CFR 265.56(j).

Pursuant to 40 CFR 265.56(j), owner/operators of interim status or 90-day accumulation tank systems must provide, in a report to the Regional Administrator by 15 days after the incident, certain details of any incident that requires implementing the contingency plan. This report must include:

- (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 (e.g., fire, explosion);
- (d) Name and quantity of material(s) involved;
- (e) The extent of injuries, if any;
- (f) An assessment of actual or potential hazard to human health or the environment, where this is applicable; and
- (g) Estimated quantity and disposition of recovered material that resulted from the incident.

Today's rulemaking requires that additional items be included in a report to the Regional Administrator within 30 days of detection of a release. These additional items to be addressed are:

- (a) Likely route of migration by the release;
- (b) Characteristics of the surrounding environment (soil composition, geology, hydrogeology, climate);
- (c) Results of monitoring/sampling (if available);
- (d) Proximity to downgradient drinking water, surface water, and population areas; and
- (e) Remedial actions taken or to be taken.

In response to comments, the Agency has made these requirements more specific than they were in the proposal.

b. *Disposition of Leaking or Unfit-for-Use Tank Systems—i. Tank Systems Without Secondary Containment.* When a tank system without secondary containment is found to be leaking or unfit for use, the owner/operator can close the tank system in accordance with §§ 264.197 or 265.197, or resume use of it if he complies with the following:

- (a) *Provide secondary containment:* Sections 264.196(b) and 265.196(b) require that if a leak has occurred in any component of the tank system (i.e., tank, piping), that is underground, that component of the tank system must be provided with secondary containment prior to being returned to service. 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 onground tank), the entire component must be provided with secondary

containment before the tank system is returned to service (e.g., in the event that a leak is found on the bottom of an inground tank, the entire tank must be provided with secondary containment prior to the tank system being returned to service). If a leak is detected in an underground piping system, the entire underground piping system must be equipped with secondary containment. This requirement is consistent with EPA's strategy to require secondary containment for those hazardous waste tank systems presenting a substantial risk of release of hazardous waste to surface or ground water. EPA concludes that it would not be prudent to allow that portion of a tank system that has experienced a leak or failure in an inaccessible area to continue to operate without the added protection of secondary containment. This is because leaks in other inaccessible areas of the tank system may be imminent, and it is not possible to anticipate and prevent their occurrence. Any replacement tank system component is considered a new tank system component and must, in addition to complying with the secondary containment requirements of today's regulation, comply with the requirements for new tank systems (certification of design, proper installation practices, etc.). If the tank system is replaced during interim status, a certification by an independent, qualified registered professional engineer must be submitted to the Regional Administrator at least seven days prior to bringing the replacement tank system into use, that attests that the tank system will be capable of storing or treating hazardous waste for the intended life of the system under the anticipated operating condition without permitting a release of hazardous waste to the environment.

(b) *Repair*: In some circumstances, a leaking or unfit-for-use component of a single-walled tank system may be repaired and returned to use without being equipped with secondary containment. If the portion of the leaking or unfit-for-use component is aboveground and can be inspected visually, repair without secondary containment is allowed. This includes such items as flanges, pipe fittings, pumps, and valves that are part of aboveground piping systems.

If major repairs have been performed, the owner/operator must submit a certification to the Regional Administrator seven days after returning the tank system to use. The EPA proposed to require owners or operators to submit a certification by a qualified registered professional

engineer that the system, when repaired, was capable of handling hazardous wastes without release for the intended life of the tank system. EPA proposed that this certification be submitted to the Regional Administrator, whenever any repair was performed, at least seven days prior to the return of the tank system to service. The purpose of this requirement was to give the Regional Administrator ample prior notice so that, if desired, an inspection of the repaired tank system could be performed, prior to its being put back into service. Commenters asserted that this requirement was unreasonable. A point they raised was that tank systems are often components of a continuously-operating system, and the requirement for seven day notification would unnecessarily restrict or shut down operations. Another reservation was that the requirement was unreasonable for minor leaks, which are usually quickly repaired.

The Agency has reevaluated this proposed requirement and has determined that it is overly burdensome in some situations. EPA has modified the final rule in §§ 264.196(b) and 265.196(b) to require that the certification of major repairs be submitted within seven days of the tank system being returned to service. This certification would be necessary, for example: for repaired aboveground portions of tanks; for extensive repairs that have been performed subsequent to a rupture or other major loss of structural integrity (e.g., when there is loss of structural integrity as a result of an accident such as puncture by a forklift, a catastrophic event such as fire, explosion, flood, or seismic event, a process malfunction such as overheating or overpressurization, or other event that results from improper design or installation, such as seam-weld breaks, foundation failure, or extensive localized corrosion). Certification is not required for such day-to-day routine maintenance or service practices as replacement or repair of worn portions of tank system components (e.g., valves, bearings, seals), adjustment or repairs to instruments, etc.

ii. *Tank Systems With Secondary Containment*. When a hazardous waste tank system with secondary containment is found to be leaking or unfit-for-use, the owner/operator can close the tank system in accordance with §§ 264.197 or 265.197, or resume its use if he complies with the following:

(a) *Repair*: In the case of repairs to the primary containment system, the same procedures described above for repair of single-walled hazardous waste tank

systems would apply. For all repairs to the secondary containment system, the owner/operator must submit a certification to the Regional Administrator seven days after returning the tank system to use. This certification would be necessary, for example: for repairs of tears in liners, cracks in concrete vaults, or rupture of the outer wall of a double-walled tank. Additionally, the owner/operator must comply with the certification requirements of §§ 264.196(f) and 265.196(f).

(b) *Replace*: In the event that the owner/operator decides to replace, rather than repair, the primary containment system of a hazardous waste tank system equipped with secondary containment or to replace the secondary containment system, the owner/operator must comply with §§ 264.192 and 264.193 or §§ 265.192 and 265.193, as appropriate.

9. Closure and Post-Closure Care (§§ 264.197 and 265.197)

Under the previous Subpart J regulations, the closure requirements for tanks (§§ 264.197 and 265.197) were brief:

At closure, all hazardous waste and hazardous waste residues must be removed from tanks, discharge control equipment, and discharge confinement structures.

The proposed rules made several changes to these existing closure requirements. Identical changes were proposed for both permitted and interim status facilities under Parts 264 and 265. The changes generally parallel the current closure regulations in § 264.258 for permitted waste pile facilities. The proposal extended the closure requirement provisions to include soils and the entire tank system, not just the tank. The proposal also required that tank systems meet the closure and post-closure requirements for landfills if not all contaminated soils could be removed. Tank systems without secondary containment (and thus most likely to have extensive soil contamination and most likely to need post-closure care) were required to prepare contingent closure and post-closure plans, to plan for the possibility of closing as a landfill. Finally, the proposal made conforming changes to the applicability sections of Subparts G and H so that post-closure care requirements would apply to certain tank systems.

The final rules are being promulgated substantially as proposed; however, clarifications were added explicitly listing the closure post-closure, and

financial responsibility requirements which apply to tank systems which intend to close as landfills or to tank systems that must prepare contingent closure and post-closure plans.

The final rule makes five major changes to the previous Subpart J regulations. Each of these changes will be discussed in more detail, along with the rationale for each change and a discussion of any comments received.

First, the closure requirements in § 264.197(a) and § 265.197(a) have been expanded to include the entire tank system, not just the tank. This is consistent with the new definition of "tank system" in § 260.10, and consistent with the Agency's intent that all contaminated hazardous waste management apparatus be removed or decontaminated at closure. Thus, at closure, the owner or operator of a tank system is now required to remove or decontaminate the tank, its ancillary equipment, and its secondary containment system, if used.

Second, the closure requirements in § 264.197(a) and § 265.197(a) have been expanded to include contaminated soils. These new requirements are consistent with previous Agency intent, and with the general closure performance standard in Subpart G to "protect human health and the environment." It is also consistent with the recently promulgated revisions to Subpart G, (51 FR 16422; May 2, 1986), which require explicitly in § 264.114 and § 265.114 the decontamination of soils. It should be noted that decontamination of saturated soils (i.e., ground water) would be necessary for a closure that would not require post-closure care.

Commenters expressed concern over the requirement to decontaminate soil, and the extent and degree to which the soil must be decontaminated EPA has noted these comments but still concludes that the closure and post-closure requirements are both proper and reasonable. The final rule requires the removal or decontamination of all contamination at closure of the tank system. If this is not practicable, the regulation provides for post-closure care of the unit. This regulation does not define the level of decontamination. EPA is currently developing policy on the broad issue of defining acceptable levels of contamination (i.e., how clean is clean) outside the scope of this rulemaking. The new tank regulations are intended to prevent releases from tank systems and to eliminate contamination to the surrounding soil so that neither human health nor the environment is endangered subsequent to closure of the system. Furthermore, the final rule includes a significant

change from the proposed rule by establishing a secondary containment requirement for all new and existing tank systems. This should considerably reduce the amount of contaminated soil generated during the lifetime of a tank system, thus substantially reducing the amount of soil requiring decontamination and post-closure care.

The third major change was the requirement in § 264.197(b) and § 265.197(b) that a tank system owner or operator must meet the post-closure landfill requirements of final capping and ground-water monitoring set forth in § 264.310 or § 265.310 in the event that it is not practicable to remove or decontaminate all contaminated soils at closure. This post-closure care requirement was included because there is the potential that a release from any tank system, especially one without secondary containment, could be left unmanaged after closure. The Agency believes that an impermeable cap over the contaminated area will reduce the possibility of the waste in the soil migrating into the ground water. In addition, implementation of a ground-water monitoring program would ensure that human health and the environment are not adversely impacted during the post-closure care period if the contamination moves offsite.

The Agency does not expect nor intend that many tank systems will be closed as landfills. However, this option is being provided to address the possible cases where extensive soil contamination has occurred. Also, the owner or operator cannot decide unilaterally to close his tank system as a landfill. New closure and post-closure plans would have to be prepared and submitted to the Regional Administrator, and these modified plans must still comply with the general closure performance standard to protect human health and the environment.

The fourth major change in the rules (§ 264.197(c) and § 265.197(c)) requires the owner or operator of tank systems without secondary containment to prepare contingent closure and post-closure plans to ensure that they have adequately planned for the possibility of closing the tank system as a landfill. These plans would be used only if all contaminated residues and soils could not be practicably removed at closure. EPA believes that contingent closure and post-closure plans should be required for facilities with tank systems without secondary containment because, if such a tank system has had undetected leaks or spills in the past, it is possible that the material cannot be practicably removed from the soil and that the tank system might have to be

closed as a landfill. Implementation of the contingent closure and post-closure plans would ensure that future threats to public health and the environment from these past releases at closed facilities are minimized, monitored, and controlled as necessary.

In this final rule, an owner or operator of a tank system that receives a variance under § 264.193(g) or § 265.193(g) from the secondary containment requirements need not prepare contingent closure and post-closure plans for the possibility of closing as a landfill. Although no public comments were received regarding this point, EPA believes that such plans would not be necessary for such a tank system because the Agency would have previously examined the tank system's design, operation, and location characteristics in determining the likelihood of hazardous waste constituents migrating into ground water or surface water during the post-closure period. Tank systems with secondary containment systems are not required to prepare contingent closure and post-closure plans, because these systems are expected to prevent releases into the environment. However, under § 264.197(b) or § 265.197(b), if it is determined that *any* tank system has released hazardous waste which cannot be removed or be decontaminated at closure, then that tank system must also meet the post-closure requirements of § 264.197(b) or § 265.197(b). Similarly, if there is evidence of leakage from a tank system before the installation of secondary containment, the leak would have been addressed pursuant to § 264.196 or § 265.196. (See section V.E of this preamble.)

In the final rule, additional language was added to clarify the Agency's intent that the cost estimates and corresponding financial responsibility must reflect the costs of complying with the contingent closure and post-closure plans, if those costs are greater than the costs of complying with the expected closure plan.

The fifth change from the previous Subpart J requirements makes conforming changes to the applicability sections of Subparts G and H, (§§ 264.110, 264.140, 265.110, and 265.140) to implement fully the changes to the closure requirements for tank systems in § 264.197 and § 265.197. These conforming changes make it explicit that a tank system which closes as a landfill and performs post-closure care as a landfill is subject to the general post-closure care and corresponding post-closure financial responsibility requirements for disposal units in

§§ 264.116 through 264.120, and §§ 264.144 through 264.146 (and the parallel sections in Part 265). Previously, a tank system was subject only to the general closure requirements and the corresponding closure financial responsibility requirements. Additional minor changes were made in the applicability sections in the final regulations to make the regulation clearer and consistent with the recently promulgated revisions to Subparts G and H, (51 FR 16422; May 2, 1986).

10. Special Requirements for Ignitable or Reactive Wastes (§ 264.198 and § 265.198)

The proposed requirements in § 264.198 and § 265.198 were the same as the existing special requirements for ignitable or reactive wastes except that the applicability of these requirements was expanded to the entire tank system rather than just the tank. The Agency made this proposed change because the risks posed by ignitable and reactive wastes would seemingly be the same for piping as for the tank itself. One commenter stated that it is inappropriate to require a buffer zone between tanks storing ignitable wastes and public properties since loading facilities are not often located near public ways. The proposed buffer zone requirement was intended to be in accordance with the National Fire Protection Association's (NFPA's) "Flammable and Combustible Liquids Code." EPA has evaluated the comment and agrees that the NFPA 30 Code really only does address buffer zone requirements for tanks storing flammable and combustible liquids. No reference is made in the code regarding applying a buffer zone to piping or other ancillary equipment. No buffer zone is established for piping and other ancillary equipment because the greatest fire/explosion hazard is posed at the tank, where a large volume of ignitable material is present, rather than at piping/ancillary equipment where relatively little ignitable material is present. Furthermore, it would be extremely difficult to define a specific distance (buffer zone) from public ways for this equipment that commonly consists of a complicated and extensive network of piping. Thus, today's final rule modifies the proposal by deleting the term "tank system" from § 264.198(b). The other requirements in § 264.198 of today's final rules remain as proposed.

11. Special Requirements for Incompatible Wastes (§§ 264.199 and 265.199)

The proposed standards in § 264.199 and § 265.199 were the same as the pre-existing standards with only one minor change: the owner or operator would be required to ensure that the required precautions for tanks are taken throughout the entire tank system (i.e., tank and ancillary equipment). No comments were received on this proposed change to the existing standards applicable to incompatible wastes, and the final standards are identical to those proposed.

12. Waste Analysis and Trial Tests (§ 265.200)

This section of today's final rulemaking remains unchanged from that of the existing rule. As explained in the proposed rule (see 50 FR 26487; June 26, 1985), EPA did not repropose this section and as such stated that it was not requesting or accepting public comment on this section.

The one comment that was submitted regarding the requirements of this section suggested that the waste analysis and storage trial test are not necessary if the tank was first properly flushed to remove the residue of the waste from previous storage. The Agency cannot accept this suggestion, because merely flushing the tank does not assure the tank design and materials of construction can accommodate the waste under question.

As explained previously, the final rule does not require the owner/operators of 90-day accumulation tank systems to conduct waste analyses and trial tests. Unlike off-site commercial hazardous waste storage and treatment facilities where a wide variety of hazardous wastes are managed, generators generally produce and would thus store or treat wastes that are relatively consistent in terms of their physical/chemical properties. Thus, EPA does not believe that waste analysis and trial tests must be conducted by generators of hazardous waste because of their familiarity with the wastes they generate.

13. Special Requirements for Generators of Between 100 and 1,000 kg/mo that Accumulate Hazardous Waste in Tanks (§ 265.201)

Today's final regulation does not apply to new or existing accumulation tank systems owned or operated by 100-1000 kg/mo generators who store up to 6000 kg of wastes in a tank system for less than 180 (or 270) days. As explained previously, these tank systems must

meet the requirements previously imposed by Subpart J in Part 265. These requirements appear in today's rule at § 265.201.

14. Specific Part B Information Requirements for Tanks (§ 270.16)

In order to receive a RCRA permit for hazardous waste treatment, storage, or disposal facilities, an owner or operator must submit sufficient information in Parts A and B of a two-part permit application to demonstrate that a facility's methods of compliance are technically appropriate in relation to the Part 264 standards. The proposed rule would not change the requirements for the contents of the Part A application, which are in § 270.13. The contents of Part B of the application are specified in §§ 270.14 through 270.21. The proposed rule would revise the specific Part B information for tanks in § 270.16, but would not change the general information requirements in § 270.14.

A commenter suggested that EPA clarify the information required of an applicant for the ground-water monitoring alternative that was proposed. Today's final rule does not allow the substitution of ground water monitoring for secondary containment. Thus, no change has been made. Thus, this portion of the final rule is essentially unchanged from the proposal. The specific Part B information requirements that apply to tanks are revised under § 270.16 by tailoring the requirements to the technical standards for tanks in Part 264, Subpart J, of the final rule.

V. Analysis of Other Significant Comments

Following publication of the EPA proposal on June 26, 1985, (50 FR 26444-26504) to revise the existing hazardous waste storage and treatment tank standards, a total of 89 public comments, including 9 comments made at three public hearings conducted in August, 1985, were received. In addition to these comments, EPA also received and considered the 15 comment submittals filed on the Notice of Availability of Data and Information that was published on March 17, 1986 (51 FR 90720) regarding the hazard waste tank risk analysis. The comments were received from individuals, corporations, Federal and State agencies, industry, trade associations, consultants, and public interest groups. EPA has evaluated all the comments received and has modified the rule where appropriate.

This section of the preamble addresses significant comments received by the Agency that relate to

this final rulemaking that are not addressed elsewhere in this preamble. EPA has carefully reviewed all comments relating to the final hazardous waste tank standards and has responded to these comments in a document entitled "Response to Comments on the Revised RCRA Hazardous Waste Storage and Treatment Tank Standards," USEPA, June 1986. This document is available by contacting the RCRA Hotline and can also be found in the docket for today's rulemaking.

A. Corrective Action for Accumulation Tank Systems

Comment: One commenter cited a variety of perceived shortcomings in the proposed regulation regarding corrective action for 90-day accumulation tank systems. The commenter noted that although EPA proposed to subject 90-day accumulation tank systems to the proposed interim status tank closure performance standards, there is no mechanism for a regulatory authority to review or approve the closure. In addition, the commenter pointed out that the proposed rule would require owner/operators of 90-day accumulation tank systems to install secondary containment, but did not address the issue of corrective action for prior releases.

Response: The commenter has raised some important issues with respect to corrective action measures for accumulation tanks. This is part of a bigger issue relating to the exclusion of certain accumulation tank systems from the necessity to seek a RCRA permit. An Advanced Notice of Proposed Rulemaking (ANPR) published in today's Federal Register explains that EPA is considering modifying the exemption from permitting for accumulation tank systems, which would make some or all of these tank systems subject to the same corrective action and other requirements as interim status or permitted tank systems. At present the Agency can require corrective action for accumulation tank systems in certain instances. Section 265.196 of today's final regulation requires accumulation tank owner/operators to notify the Regional Administrator within 24 hours of any release to the environment (or the National Response Center immediately if the quantity of waste released exceeds the CERCLA reportable quantity). Thus, a regulatory authority will be notified when a release to the environment occurs. The regulatory authority will then have the opportunity to monitor the progress of the corrective action measures taken, including any

cleanup of prior releases. Additionally, under the provisions of section 7003 of the HSWA of 1984, EPA has the authority to bring suit against an owner/operator on behalf of the United States upon receipt of evidence that the past or present handling, storage, treatment, transportation, or disposal of any solid waste or hazardous waste may present an imminent and substantial endangerment to human health or the environment.

B. Acutely Hazardous Waste

1. Variance Provision

Comment: A commenter objected to the provisions in the proposed rule which would prohibit the owner/operator of tanks that store dioxin-contaminated F-listed wastes from applying for a variance from the secondary containment requirements, and installing a ground-water monitoring system in lieu of secondary containment. The commenter stated that these wastes may pose no greater environmental hazard than other hazardous wastes and that the proposed prohibitions seem arbitrary and capricious.

Response: On January 14, 1985 (50 FR 2003), final amendments to Part 264 were promulgated, specifying management standards for the storage and treatment of F020, F021, F022, F023, F026, and F027 dioxin-containing listed wastes in aboveground, inground, and underground tanks that were enterable for inspection. The January 1985 rule required secondary containment and leak detection devices for permitted tanks containing these wastes. The rule also required the development of procedures for responding to a leak or spill. The placement of these wastes in landfills, surface impoundments, waste piles, or land treatment units was restricted and destruction and removal efficiency standards for incinerating these wastes were specified.

Today's final rule extends the secondary containment requirement to all tank systems treating or storing the listed dioxin-containing wastes because EPA can find no basis for differentiating between permitted, interim status, or accumulation tank systems storing or treating these highly toxic wastes.

As explained in the preamble to the proposed hazardous tank regulations (50 FR 26489; June 26, 1985), the proposed hazardous waste tank rules would not allow owner/operators of new or existing tank systems storing or treating dioxin-containing wastes the option of using the ground-water monitoring alternative or of seeking a no-migration waiver because (a) it is well

documented that these extremely toxic wastes present a substantial hazard to human health and the environment and (b) it is EPA's experience that these wastes are particularly difficult and expensive to clean up.

After reconsidering this issue, EPA concludes that it is acceptable to allow owner/operators of hazardous waste tank systems the opportunity to petition for variances to the secondary containment requirements specified in today's final rule.

As explained previously in today's preamble, EPA has rejected the ground-water monitoring alternative as a basis for the final regulations applicable to all hazardous waste tank systems, including tank systems storing or treating dioxin-containing wastes.

In the process of reviewing this issue, EPA reevaluated the possibility of mandating immediate secondary containment for a wider universe of highly toxic wastes than those relatively few represented by listed Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.

The Agency believes that it may be appropriate to apply the requirement to other materials that have been defined as acutely hazardous wastes. Two separate lists of acutely hazardous materials are currently being reviewed by EPA. These are (1) those materials listed as acutely hazardous wastes in § 261.33(e) and (2) those materials being defined as acutely hazardous under TSCA (see Notice of Availability of Chemical Emergency Preparedness Program Interim Guidance (50 FR 51451; December 17, 1985)). In the future, EPA may propose to require immediate secondary containment for acutely hazardous wastes other than the listed dioxin-containing wastes. One implementation problem that EPA has identified is the fact that both the TSCA and RCRA lists noted above are individual chemical lists. Thus, one issue that may need to be addressed prior to proposing an additional requirement for acutely hazardous wastes is the concentration or amount of these materials that must be present in a hazardous waste such that immediate secondary containment should be required.

2. Requirements for Dioxin-Containing Listed Hazardous Wastes

Comment: One commenter objected to more stringent requirements for tank systems containing dioxin-containing listed wastes. The commenter does not believe EPA has supported that any greater risk exists for these wastes,

especially if concentrations of TCDD are less than 10 ppm.

Response: In a prior rulemaking (50 FR 2003; January 14, 1985), EPA justified the need for more stringent requirements for management of the dioxin-containing listed wastes based on three considerations: (1) the demonstrated toxicity of the waste; (2) the tendency toward long storage before treatment or disposal; and (3) the difficulty and expense of spill cleanup. The justification is more fully discussed in the proposed rule dated April 4, 1983 (48 FR 14514). See also 51 FR 1730 to 1733 (January 14, 1986) noting the extreme toxicity of TCDD and other types of dioxins as well as their migratory potential and resistance. The proposed screening level for TCDDs was in fact 8 to 10 orders of magnitude lower than the 10 ppm level cited by the commenter. The preamble to the proposed rule discussed the proven and suspected carcinogenic, teratogenic, fetotoxic, and embryotoxic characteristics of the dioxin-containing listed wastes, even at low concentrations. For these same reasons, the Agency believes that immediate secondary containment is required to ensure protection of human health and the environment, unless a case-by-case variance is justified on the basis of site-specific factors.

C. Small Quantity Generators

Comment: In response to the August 1, 1985 proposed regulations (50 FR 31278), several State agencies supported applying to hazardous waste tank systems owned or operated by generators of between 100 and 1,000 kg of hazardous waste per month that are used to store hazardous wastes in excess of 180 days (270 days) or 6,000 kg the full provisions of the proposed hazardous waste tank standards including secondary containment.

Response: As explained previously in this preamble, today's rule applies in its entirety to generators of between 100 and 1,000 kg of hazardous waste per month who accumulate hazardous wastes in tanks for more than 180 (270) days or in excess of 6,000 kg. However, today's final rule does not apply to accumulation tank systems used by generators of between 100 and 1,000 kg of hazardous waste per month who store hazardous wastes for less than 180 (270) days and less than 6,000 kg. In the near future, the Agency will propose hazardous waste tank system standards that would apply to this class of accumulation tank system.

D. Hazardous Waste Tank Risk Analysis

Commenters generally did not support the use of the hazardous waste tank risk analysis in developing or implementing the final hazardous waste tank system regulations. They provided two principal reasons for their lack of support: (1) the risk analysis is not currently able to reflect site-specific conditions, and (2) the models are based more on assumptions than on data.

1. Site-Specific Conditions

Comment: The Hazardous Waste Tank Risk Analysis Model is not capable of assessing site-specific situations. Some hazardous waste tank facility conditions may be amenable to alternatives to secondary containment; therefore, the results of the hazardous waste tank risk analysis should not be used to justify requiring secondary containment for all hazardous waste tanks.

Response: The Agency developed the hazardous waste tank risk analysis methodology in order to estimate the relative risk reduction that would be achieved under different regulatory options, in order to represent national variation in tank types, waste types, and hydrogeologic conditions. EPA developed numerous model tank systems, model waste streams, and model hydrogeologic settings. These model conditions represented the most common conditions associated with hazardous waste tank systems.

The Agency realizes that actual existing tank systems, waste streams, and hydrogeologic conditions may vary from those represented in the analysis. However, to try to model all possible combinations of tank technologies, waste streams, and hydrogeologies that may occur across the nation is unreasonable and unrealistic, given the diversity of conditions that exist.

In order to develop national site-specific hazardous waste tank regulations, the Agency would need to undertake an extensive data collection exercise that would involve identifying the location of hazardous waste tank systems in specific hydrogeologies, waste stream characteristics, and distances to potential exposure points. Such information is not currently available for the existing universe of hazardous waste tank systems.

Because of this lack of data, the Agency focused the risk analysis on identifying the range of potential conditions that would most likely be encountered at tank systems and the range of risk estimates associated with the national population of hazardous

waste tank systems. The results of the risk analysis (i.e., the frequency distributions of risk estimates) are based on currently available information and reflect the range of estimates that would be obtained from detailed site-specific analyses. Consequently, although the Agency did not conduct a detailed analysis of actual tank systems, the Agency believes that the risk analysis reflects the range of estimates that would likely be obtained from such a detailed site-specific analysis.

Therefore, despite the lack of site specific-data, the Agency believes that the analysis was consistent in its assumptions and provides a reasonable method for comparing regulatory alternatives for reducing the risks presented by hazardous waste tank systems. The analysis, along with evidence gathered from case studies, indicates that contamination of ground water from leaking hazardous waste tank systems poses risk to human health, and suggests that secondary containment is currently the most effective method for reducing the risk associated with different tank system technology options, hazardous wastes, and hydrogeologic conditions.

Although the Agency is requiring the eventual implementation of secondary containment for most hazardous waste tank systems, the Agency does recognize that certain site conditions may be amenable to alternative protective measures. Accordingly, two variances from secondary containment are provided in the regulations. (See section 111.B.5.b.ii of this preamble.) These variance provisions allow for the consideration of site-specific factors, such as particular tank characteristics, waste streams managed, and hydrogeologic setting, but will also encourage technological advances in the area of release detection methods.

In summary, the Agency agrees that the model, as currently structured, is not suitable for developing site-specific national standards, nor, at this time, for implementing risk based variances. However, the Agency does believe that the risk analysis results support the final regulatory strategy for hazardous waste tank systems.

2. Modeling Assumptions

Comment: A number of commenters questioned many of the basic modeling assumptions that were used in the risk assessment. They explained that, in many cases, due to data limitations, the assumptions did not have a strong foundation. Among the assumptions criticized were the following:

- The effectiveness of leak testing and ground-water monitoring is questioned by many experts; thus, any conclusions drawn from the risk analysis on these methods are invalid;

- The model does not include corrective action;

- The PACE data is not an acceptable sample on which to base tank failures;

- The assumption that fiberglass tanks have twice the probability of rupture as steel tanks is incorrect;

Response: The purpose of providing the methodology and results for public comment was to supplement the data that the Agency used to develop the risk analysis model and to improve modeling assumptions where possible. For the most part, commenters did not provide data from which the risk analysis model could be modified or that would allow EPA to verify or refute the model results. As a result, given the assumptions that the Agency has made, the results of the analysis and the conclusions drawn from them as presented in the March 17th Notice of Availability have not changed and appear to be reasonable.

Some of the most significant comments on the notice are addressed below. All comments received by the Agency on the March 17th, 1986 Notice of Availability are addressed in the docket report, "Hazardous Waste Tanks Risk Analysis Public Comments and Responses."

(a) Leak Detection and Monitoring Methods. In order to conduct the Hazardous Waste Tanks Risk Analysis, EPA modified the previously-developed Underground Storage Tank (UST) failure model to represent hazardous waste tank systems. The Agency assumed that the same leak testing and monitoring technologies that are employed for petroleum tank systems can be used for hazardous waste tank systems. The Agency received comments concerning the reliability of various leak testing and monitoring technologies and the lack of historical performance data. The Agency agrees that it had a limited data base from which to model such tank testing and monitoring technologies. However, enough data for petroleum tank system leak testing and monitoring was available to model such technologies for a relative comparison of the effectiveness of regulatory alternatives.

As a result of recent research by the Office of Underground Storage Tanks (OUST), EPA has since modified the UST failure model such that assumptions about the reliability of various leak testing and monitoring methods have been modified. The UST failure model now assumes that leak testing is effective in detecting 95 percent of the releases that are greater

than 0.1 gallons per hour, whereas the Hazardous Waste Tank (HWT) failure model assumes that leak testing is effective in detecting 100 percent of the releases that are greater than 0.1 gallons per hour. The UST model also assumes that vapor wells are effective in detecting 80 percent of the releases that reach the concentration limit, while, for the supplementary analysis, the HWT failure model assumed that vapor wells are 90 percent effective in detecting releases that reach the concentration limit.

In addition, EPA's Motor Fuel Storage Tank survey results indicate that leak testing technologies do not currently work as well as the vendors claim, even for petroleum tanks. (See "Underground Motor Fuel Storage Tanks: A National Survey," EPA 560/5-86-013, June 1986.) The Agency has no reason to expect such methods to perform better for hazardous waste tank systems, even if we were to assume the tank must be cleaned and the test performed using water. Therefore, from the more current modeling effort and an EPA field study of leak detection methods, it is clear that EPA overestimated the performance of the various leak testing and monitoring alternatives in the Hazardous Waste Tanks Risk Analysis.

(b) Corrective Action. In the Hazardous Waste Tanks Risk Analysis, EPA did not include extensive corrective action for hazardous waste tank systems that were discovered to be leaking. EPA assumed only that tank systems that were determined to be leaking would be removed and replaced. EPA did not account for corrective action, such as contaminated soil excavation and ground water pumping and treatment. Many commenters were concerned that the assumption of no corrective action biased the analysis toward strategies that prevented leaks (e.g., secondary containment) rather than strategies that allowed for detection and clean-up (e.g., leak testing, ground water or unsaturated zone monitoring, etc.)

The Agency did not model corrective action because there were too many variables and too little data from which estimates could be made, given the schedule for promulgating this rule. EPA conducted the Hazardous Waste Tanks Risk Analysis by adapting existing failure and risk models to represent hazardous waste tank systems. The Agency is currently developing a model to estimate the effectiveness of corrective action for land disposal units; however, this component was not available for the Hazardous Waste Tanks Risk Analysis. The timeframe available for the Hazardous Waste

Tanks Risk Analysis was insufficient for developing a corrective action component given the complexity of the many necessary assumptions.

EPA does not agree that excluding corrective action from the risk analysis biased the results to the extent that they are inaccurate. Consideration of corrective action in the model—if it had been possible—would have shown that other technical options would have increased in cost and still would have been inferior in protection of human health and the environment in comparison to secondary containment because, as previously discussed, the Agency does not know of any leak testing or monitoring methods which, when used with single-walled tanks, are reliable enough to assure early detection and expeditious corrective action. For the reasons discussed elsewhere in this preamble, EPA has determined that secondary containment with interstitial monitoring is the most effective and reliable method for preventing releases from contaminating ground water or surface water and, therefore, reducing risks posed by hazardous waste tank system releases. The results of the risk analysis were only one of many reasons for the Agency's selection of secondary containment as the Agency's general approach to regulating hazardous waste tank systems.

(c) PACE Data. EPA used the Petroleum Association for Conservation of the Canadian Environment (PACE) data in the model to estimate the timing and frequency of steel tank corrosion. The PACE data contain information on 300 underground petroleum tanks and were collected by PACE to develop a methodology for siting future installations of underground storage tanks. Consequently, the survey focused on identifying the effect of soil properties on tank corrosion failures. Soil samples were then taken at sites with leaking tanks. In addition, all tanks at a site were tested for leaks. The survey identified the soil properties associated with 108 leaking tanks and 192 non-leaking tanks.

The Agency received comments expressing concern that the use of these data will overestimate the frequency of tank corrosion failures because the data may be biased towards leaking tanks. EPA agrees that, because the PACE data do not represent a statistical sample of the overall tank population, the PACE data should not be used to determine the percentage of tanks expected to be leaking at any given point in time. However, EPA used these data to provide a rough estimate of the probability of a steel tank corroding

given the soil type and length of time the tank was in that soil. The PACE data are the only available data that examine the effect of soil variations on tank corrosion and include information on non-leaking tanks located in the same soil environments as leaking tanks. Thus, its use in the model was appropriate.

(d) *Fiberglass Tanks.* The only area where the commenters supplied the Agency with new information was with respect to the fiberglass reinforced plastic (FRP) tank rupture rate. The Agency assumed that FRP tanks have twice the probability of rupture as steel tanks. This assumption was based on a comparison of the annual failure probabilities that were derived for steel and FRP tank ruptures. The Agency received conflicting comments on this assumption. Some commenters considered the 2:1 ratio as severely overestimating FRP tank ruptures, while others considered the ratio a severe underestimate of the FRP tank rupture probability. All commenters on this issue indicated that FRP tank ruptures are more likely to occur in the first five years after installation.

However, even with this new information, EPA cannot revise the Hazardous Waste Tank failure model with respect to the FRP tank rupture probability. The information provided by commenters on this issue is complicated by additional areas of uncertainty. For example, EPA received data indicating that the ratio of the reported number of failed FRP tanks to the number of FRP tanks sold in a given year is 0.25:1. This information does not provide EPA with appropriate data to estimate the probability of a FRP tank rupturing or the percent of FRP tanks that rupture over time. Therefore, it is not clear from such new information that EPA's modeling assumption for the FRP rupture probability is wrong.

In one respect, the HWT failure model underestimated FRP tank failures. The model assumed that tank ruptures are the only structural form of failure for FRP tanks. Results from EPA's motor fuel tank survey indicate that FRP tanks also have the potential to develop slow leaks as a result of faulty construction. Thus, while the Agency agrees that the FRP rupture probability assumed in the model may not be completely accurate, in the absence of definitive data and for the purpose for which the model was used, the assumptions were reasonable.

E. Contingent Post-Closure Plans

Comment: One commenter stated that EPA should require contingent post-closure plans for facilities that install secondary containment after there is

evidence of leakage from the tank system. The commenter believes that it may be as difficult for these facilities to remove all contaminated material at closure as it would be for facilities that do not have secondary containment.

Response: EPA has addressed this issue in its requirements for corrective action for prior releases in order to obtain a permit. The HSWA requires that prior releases at facilities seeking a permit to manage hazardous waste be identified and that corrective action be taken during interim status and, if appropriate, that the requirement for corrective action be made a condition of a permit. Prior leakage also can be addressed, if appropriate, under authority granted under sections 3008(h), 3004(u), and 7003 of RCRA. As explained previously in section II.H, EPA is separately considering the broader issue of corrective action for currently non-permitted accumulation tanks systems at facilities not otherwise requiring a permit.

F. Integrity Assessments

Comment: One commenter asked that EPA alter the final regulation to require all tank system owners or operators to submit periodic tank integrity assessments to an EPA or state office rather than promulgate the proposed requirement that the assessments be kept on file at the facility. The commenter believes the proposed approach would limit private citizen access to these materials.

Response: EPA believes that a requirement to submit assessments would be unduly burdensome on owner/operators of tank systems, state agencies, and EPA. Under section 3007 of RCRA, EPA maintains the right to inspect these assessments at any time and can request and make available any assessment of interest to the public that is not entitled to confidential treatment. For this reason, the final rule requires only that periodic tank system integrity assessments be kept on file rather than submitted to the appropriate regulatory authority.

G. Leak Detection Standard

Comment: One commenter supported a leak testing standard of 0.05 gallons per hour based on his experience in using a specific test at his facility. The commenter also pointed out that his experience shows that EPA underestimated the cost of leak testing methods.

Response: A review of all available information on the reliability of tank system tightness tests indicates problems in routinely detecting leaks of 0.05 gallons per hour using test methods

similar to that used by the commenter. Thus, EPA is conducting further research on tank system tightness test methods, including a method similar to the one used by the commenter.

After re-evaluating the costs of performing tank system tightness tests on hazardous waste tank systems, EPA found that the costs of these tests had been underestimated at proposal; therefore, EPA has modified its estimate of these costs to reflect the experience of this and other commenters.

H. Wastewater Piping and Treatment Tanks

Comment: One commenter requested that EPA exempt wastewater piping and return lines used at surface impoundments. The commenter justified this request based on his judgment that this piping typically contains less than 0.1 percent hazardous constituents by volume. The same commenter asked that this regulation not be applied to wastewater treatment tank systems that currently are exempt from RCRA regulation because of the cost and similar relative percentages of waste constituent volumes.

Response: This regulation does not alter the permit status of wastewater treatment tank systems. Therefore, those units if now exempted from the hazardous waste management standards will not be required to comply with the hazardous waste tank system management standards established in this regulation. Available data show that piping systems can be a significant source of releases of hazardous wastes to the environment. For this reason, piping systems ancillary to hazardous waste tank systems are regulated by this final rule in those cases where an owner/operator can demonstrate that circumstances that exist at his facility are such that his system does not pose a substantial present or potential hazard to human health or the environment. EPA has provided a variance procedure to allow consideration of that information. (See section III.B.5.b.ii of this preamble.)

I. Risks of Double-Walled Pipes

Comment: Commenters asked that EPA consider the possibility of increased risks associated with double-walled pipes. The commenters suggested that double-walled pipes typically are manufactured in shorter lengths than single-walled pipes, requiring more fittings and flanges for similar length pipelines. The commenters pointed out that these connections are the most likely points of leakage.

Response: EPA acknowledges that an increase in the number of pipe connections may be necessary, but in many cases the connections can be of all welded design. Thus, the increased number of fittings would not necessarily present added risks. Additionally, interstitial monitoring of the double-walled piping system allows detection of leaks of hazardous wastes from the primary piping system before release to the environment. Therefore, secondary containment of piping systems and interstitial monitoring will reduce significantly the risks associated with piping.

J. Closure and Post-Closure Requirements

Comment: One commenter suggested that it is inappropriate for EPA to require removal or decontamination of contaminated soils unless the Agency defines a level of contamination that is acceptable.

Response: The final rule requires the removal or decontamination of all contamination at closure of the tank system. If this is not practicable, the regulation provides for post closure care of the unit. As explained in section IV.B.9 of this preamble, EPA is currently developing a policy on the broad issue of defining acceptable levels of contamination (i.e., how clean is clean) outside the scope of this rulemaking.

K. Incentive to Store in Drums

Comment: One commenter suggested that standards for 90-day accumulation tanks will lead to a switch to accumulation in drums. The commenter sees additional environmental risks as a result of the switch.

Response: EPA has placed permitting requirements on facilities storing wastes in containers in Subpart I of Part 264. To the extent that EPA determines that there is a significant shift to storage in containers and an increase in risk as a result, the Agency may consider further regulation of container storage.

Additionally, in a notice accompanying today's rulemaking, EPA is seeking public comment on the appropriateness of regulating accumulation facilities consistent with the management of hazardous waste in tank systems and containers at permitted facilities.

L. SPCC Regulations

Comment: One commenter suggests that existing Spill Prevention and Control Countermeasures (SPCC) regulations under the Clean Water Act provide sufficient protection from tank leakage.

Response: SPCC guidelines are designed to protect surface waters. Therefore, EPA believes that additional measures may be necessary to protect ground water. In the cases where facilities have provided adequate secondary containment that protects ground water, this secondary containment system may be appropriate for complying with this regulation.

M. 24-Hour Detection Requirement

Comment: One commenter suggested that immediate sensing of leaks should be required rather than the proposed requirement that the detection device be able to detect leaks within a 24-hour period.

Response: While it is certainly desirable to detect leaks as early as possible, it may not always be necessary to achieve "immediate sensing" of leaks to protect human health and the environment. It is the goal of today's final rule to ensure that hazardous waste tank systems are managed in a manner that prevents the migration of hazardous waste beyond a zone of engineering control (i.e., an area under the control of the owner/operator that, upon detection of a release, can be readily cleaned up prior to the release of hazardous constituents to ground water or surface waters) so that protection is afforded to human health and the environment. Furthermore, in many cases, site specific conditions (e.g., backfill characteristics, leak size, waste type) may not allow the immediate detection of a release. Thus, the Agency does not require immediate sensing of releases in this final regulation.

N. Future Designated Hazardous Wastes

Comment: Several commenters stated that the proposed rule had not taken into account those tank systems that are brought into RCRA at some future time due to additional solid wastes being designated as hazardous wastes.

Response: The Agency believes that the regulation should take into consideration the applicability of the requirements to such hazardous waste tank systems. As a result, four sections of today's regulations (i.e., §§ 264.192, 264.193, 265.192, 265.193) contain specific provisions for tank systems managing future designated hazardous wastes. In each of these sections, where compliance with a requirement must be made within a defined time interval beyond a certain date, the Agency has included a provision that allows the same time interval for compliance for owners and operators of tank systems managing any future-designated hazardous wastes as is allowed in

today's regulation for tank systems currently managing hazardous wastes.

VI. Relationship to Current RCRA Hazardous Waste Programs

A. State Authority

1. Applicability of Rules in Authorized States

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State. (See 40 CFR Part 271 for the standards and requirements for authorization.) Following authorization, EPA retains enforcement authority under sections 3008, 3013, and 7003 of RCRA, although authorized States have primary enforcement responsibility.

Prior to the Hazardous and Solid Waste Amendments of 1984 (HSWA), a State with final authorization administered its hazardous waste program entirely in lieu of EPA administering the Federal program in that State. The Federal requirements no longer applied in the authorized State, and EPA could not issue permits for any facilities in the State which the State was authorized to permit. When new, more stringent Federal requirements were promulgated or enacted, the State was obliged to enact equivalent authority within specified time frames. New Federal requirements did not take effect in an authorized State until the State adopted the requirements as State law.

In contrast, under section 3006(g) of RCRA, 42 U.S.C. 6926(g), new requirements and prohibitions imposed by the HSWA take effect in authorized States at the same time that they take effect in nonauthorized States. EPA is directed to carry out those requirements and prohibitions in authorized States, including the issuance of permits or those portions of permits affected by the requirements and prohibitions established by the HSWA, until the State is granted authorization to do so. While States must still adopt HSWA-related provisions as State law to retain final authorization, the HSWA applied in authorized States in the interim.

2. Effect on State Authorization

Certain portions of today's rule are promulgated pursuant to pre-HSWA authority, while other portions of today's rule are promulgated pursuant to provisions added by HSWA. Section 3001(d) of the HSWA mandates promulgation of standards applicable to small quantity generators; section 3004(o)(4) of the HSWA mandates promulgation of standards requiring

utilization of approved leak detection systems for new underground tanks; and section 3004(w) of the HSWA mandates promulgation of final permitting standards for underground tanks that cannot be entered for inspection. Therefore, sections of this regulation promulgated pursuant to HSWA authorities are the following: (a) interim status and permitting requirements applicable to tank systems owned and operated by small quantity generators (section 3001(d)); (b) leak detection requirements for all new underground tank systems (section 3004(o)(4)); and (c) permitting standards for underground tanks that cannot be entered for inspection (section 3004(w)).

The following specifically identifies which sections of today's rules are promulgated pursuant to HSWA for those categories outlined above.

(a) 3001(d) Requirements

Parts 264 and 265 requirements applicable to tank systems owned or operated by small quantity generators are promulgated as HSWA authorities.

(b) 3004(o)(4) Requirements

Secondary containment with interstitial monitoring provides new underground tanks with leak detection systems capable of detecting leaks to the environment at the earliest practicable time. Measures which are necessary to ensure that the secondary containment system is maintained and, therefore, that the leak detection system will work properly are included as HSWA authorities. The following sections of the regulations are HSWA authorities when they are applied to new underground tanks:

- 260.10
- 262.34(a)(i)—incorporates all HSWA authorities under § 265, Subpart J, which are promulgated pursuant to 3004(o)(4) and are listed under this paragraph (b)
- 264.190
- 264.192 (a)(1)(i), (a)(3), (a)(4), (a)(5), and (b)–(g)
- 264.193 (a)–(f), (g)(1), and (h)
- 264.195
- 265.190
- 265.192 (a)(1)(i), (a)(3), (a)(4), (a)(5), and (b)–(g)
- 265.193(a)–(f), (g)(1), and (h)
- 265.195
- 270.14(b)
- 270.16
- 270.72(e)

(c) 3004(w) Requirements

The following sections of the regulations are HSWA authorities when they are applied as permitting standards for underground tanks that cannot be entered for inspection:

- 260.10
- 264.110
- 264.140
- 2645.190–264.199
- 270.14(b)
- 270.16

The regulation listed under paragraphs (a), (b), and (c) above are promulgated pursuant to HSWA and will be effective in both authorized and unauthorized States. Tanks in these categories must comply with the Federal regulations promulgated today and with applicable State requirements. Underground tanks that cannot be entered for inspection will be required to obtain a RCRA permit from EPA, as well as any applicable State permits. New underground tanks will be required to obtain permits from both EPA and a State or a joint RCRA permit issued by both EPA and a State.

All sections of these regulations when applied to inground tank systems, aboveground tank systems, onground tank systems, and underground tank systems that can be entered for inspection are RCRA authorities. Requirements for new underground tank systems that are not section 3004(o)(4) requirements (see above) are RCRA requirements. Tank systems in these categories, which are located in unauthorized States, must meet all Federal requirements. Tanks in these categories in authorized States are not required to comply with today's rule until such time as the authorized State amends its rules in accordance with 40 CFR 271.(e)(2). However, these requirements are effective in unauthorized states by January 12, 1987.

a. HSWA Provisions. Those portions of today's rule which are being promulgated pursuant to sections 3001(d), 3004(o)(4) and 3004(w) of HSWA, are being added to Table 1 in § 271.1(j) which identifies the Federal program requirements implementing HSWA. These provisions take effect immediately in all states, regardless of their authorization status. States may apply for either interim or final authorization for the HSWA provisions identified in Table 1.

EPA will implement the HSWA portions of today's rule in authorized States until they modify their programs to adopt these rules and the modification is approved by EPA. For these portions of the rule, a State submitting a program modification may apply to receive either interim or final authorization under section 3006(g)(2) or 3006(b), respectively, on the basis of requirements that are substantially equivalent or equivalent to EPA's. The procedures and schedule for State program modifications are described in 40 CFR Part 271.21 and discussed below.

b. Non-HSWA Provisions. Those portions of today's rule which are not being promulgated pursuant to the HSWA will be applicable upon the Federal effective date only in those

States that do not have authorization. EPA will implement these requirements in unauthorized states. States will not be able to obtain interim authorization for the non-HSWA requirements because the statutory deadline has expired. In authorized States, the requirements will not be applicable until the State revises its program to adopt equivalent requirements under State law. The procedures and schedules for State program modifications are described in 40 CFR 271.21 and discussed below.

c. Program Modification Deadlines. Currently, § 271.21(e)(2) requires that States with final authorization must modify their programs within a year of promulgation of EPA's regulations if only regulatory changes are necessary, or within two years of promulgation if statutory changes are necessary. On January 6, 1986, the Agency proposed to modify the § 271.21 deadlines for State program modifications (see 50 FR 489–504). Under the proposal, States would have a longer time to modify their programs to implement non-HSWA rules. The program modification deadline varied depending upon the date of promulgation of the non-HSWA rule. Also, the proposal included a one-time special deadline for the HSWA provisions that occur before June 30, 1987. Since this regulation contains both HSWA and non-HSWA provisions, under the proposal, modification deadlines would vary depending on whether the requirements in today's rule are HSWA-related. The Agency expects to publish this authorization rule in final form by late summer. When promulgated, this rule will establish new deadlines for States to modify their programs for today's tank system rule.

States with authorized RCRA programs may already have requirements similar to those in today's rule. These State regulations have not been assessed against the Federal regulation being promulgated today to determine whether they meet the tests for authorization. Thus, a State is not authorized to implement these requirements in lieu of EPA until the State program modification is approved. Of course, States with existing standards may continue to administer and enforce their standards as a matter of State law. In implementing the Federal program, EPA will work with States under cooperative agreements to minimize duplication of effort. In some cases, EPA may be able to defer to the States in their efforts to implement their programs, rather than take separate actions under Federal authority. In those States authorized for portions of the tank permitting program, EPA will

coordinate permitting efforts with the State pursuant to the Memorandum of Agreement or other EPA/State joint permitting agreement.

States that submit official applications for final authorization less than 12 months after promulgation of EPA's regulations may be approved without including standards equivalent to those promulgated. However, once authorized, a State must modify its program to include standards substantially equivalent or equivalent to EPA's within the time periods discussed above.

B. Regulation of Underground Product Storage Tanks (The UST Program)

There were a number of comments touching on two issues related to the UST program. One group of commenters questioned the validity of using data from studies on petroleum storage systems as a basis for the proposed rule. EPA addressed this comment earlier in the preamble. Another group of commenters were concerned that today's final rules would become a precedent for the UST rules when they are promulgated.

In the preamble to the proposed rule, EPA cautioned against concluding that the proposed rules of June 26, 1985, would establish precedents for the Agency's effort to regulate, under Subtitle I of RCRA, underground storage tanks containing "regulated substances." EPA explained that, in fact, "the requirements proposed today, as they apply to underground hazardous storage tanks, may be significantly different in many ways from the standards that will be developed in the future for underground tanks storing regulated substances." (See 50 FR 26490; June 26, 1985.) Regulations governing underground storage tanks are being developed separately from the hazardous waste tank regulations.

Differences in statutory language, the number of tanks to be regulated, the regulatory scheme, and developing information about technical options and their reliability may cause regulations for underground storage tanks to differ from those for hazardous waste tank systems. For example, whereas the development of regulations for Subtitle C tank systems is based solely on the criterion of protection of human health and the environment, Subtitle I indicates that EPA may distinguish between different types of tanks and may consider other factors such as current industry practices, national consensus codes, and small business considerations. The underground storage tank regulations will apply to over 1,000,000 tank systems, a vastly greater universe than the hazardous

waste tank systems universe. In addition, Subtitle I does not require implementation of a permit system, a difference which may lead to a different regulatory approach. Currently, the Agency is actively studying methods of detecting leaks from tank systems. Results from these studies may indicate that leak detection methods whose reliability is unestablished today (e.g., soil gas monitoring in the unsaturated or excavation zone) may be found to be reliable before the underground storage tank regulations are issued. Finally, the Agency may take a different approach to regulating product storage if EPA determines that particular products, because of their value, are managed more reliably than hazardous wastes.

C. Relationship of Regulation to Section 3014(c) of RCRA

The Congress, in passing the Used Oil Recycling Act of 1980 (Pub. L. 96-463), and the Hazardous and Solid Waste Amendments of 1984, supplemented the basic requirements for regulation of hazardous waste with certain special requirements for recycled oil. These requirements are found in section 3014 of the Act. Section 3014(a) retains the language of section 7(b) of the Used Oil Recycling Act:

... The Administrator shall promulgate regulations . . . as may be necessary to protect the public health and the environment from hazards associated with recycled oil. In developing such regulations, the Administrator shall conduct an analysis of the economic impact of the regulations on the oil recycling industry. The Administrator shall ensure that such regulations do not discourage the recovery or recycling of used oil.

Section 242 of the 1984 Amendments also added the following phrase to the above paragraph, "consistent with the protection of human health and the environment" to make it clear that protection is of prime concern under section 3014, and that certain recycling practices may indeed be discouraged by regulation if necessary to ensure an adequate level of protection. (See H.R. Conf. Rep. No. 1133, 98th Cong. 2d Sess. 114 (1984)).

Section 3014(b) requires the Administrator to propose whether to list or identify used crankcase oil and other used oil as a hazardous waste under section 3001 of RCRA. EPA has proposed to list all used oil as a hazardous waste (50 FR 49258-49270; November 29, 1985) and has also proposed management standards for used oil generators, transporters, and recycling facilities (50 FR 49250-49258; November 29, 1985).

In listing used oil as a hazardous waste, and in devising management standards associated with the recycling of hazardous waste, EPA has attempted to take into account the effects such listing and standards will have on the ultimate disposition of used oil. The objective of the proposed regulations was to establish standards for the recycling of used oil that are most protective of the environment while not creating significant disincentives or barriers to the practice.

In keeping with the stated objective of section 3014 of RCRA in not discouraging recycling, while ensuring protection of human health and the environment, EPA proposed a special, reduced set of storage standards for recycled oil generators to minimize adverse small business and recycling impacts. EPA also proposed different and less stringent standards for small quantity recycled oil generators who may generate up to 1,000 kg/month of used oil, and do not accumulate used oil in quantities exceeding 1,000 kg. (This is not to be confused with Small Quantity Generators who generate greater than 100 but less than 1,000 kg/month of hazardous wastes; a large quantity generator of hazardous waste can still qualify as a small quantity recycled oil generator.) In the preamble to the proposed used oil management standards, EPA explained that such reduced standards for small quantity recycled oil generators would offer the following benefits: (1) reduce economic impacts on small businesses; (2) facilitate recycling; and (3) encourage small quantity recycled oil generators to recycle used oil rather than dispose it in a manner that may threaten human health and the environment.

Although the proposed regulation would generally reduce standards for storage of recycled oil, if promulgated as proposed, it would require that full secondary containment apply to tank systems at non-generating facilities storing such used oil. At this time, however, the rules are still in proposed form and EPA is in the process of evaluating comments submitted during the public notice period. The comments received were extensive, and have caused EPA to consider alternatives to the proposed regulation. In particular, EPA issued an extension to the public comment period in the March 10, 1986 **Federal Register** (51 FR 8206). In that notice, EPA solicited additional comment on a regulatory approach suggested by several commenters: list used oil as a hazardous waste only if it is disposed rather than recycled. EPA is in the process of evaluating the

additional comments received from this notice. EPA is particularly concerned about the impact on used oil recycling that would occur as a result of the proposed management standards and the proposed listing of used oil as a hazardous waste. EPA is also concerned about the impact of a used oil listing on insurance costs, as it would affect used oil recycling, as well as the effect of the proposed management standards and listing on the overall risks to human health and the environment posed by used oil recycling and/or disposal practices.

Today's rule does not address storage or treatment of used oil; rather, used oil management standards will be included in the used oil regulations scheduled to be issued in November 1986. That regulatory package will fully address all applicable tank standards for the storage of recycled used oil.

Today's regulatory package will establish standards, however, for used oil that is mixed with listed hazardous waste or that is mixed with characteristic hazardous waste and continues to exhibit a characteristic. This is because used oil, whether it is recycled or not, that is mixed with any such hazardous wastes continues to be regulated as a hazardous waste under the "mixture rule" (40 CFR 261.3(a)(2) (iii) and (iv)).

VII. Economic Analysis

The Agency undertook an analysis of the final hazardous waste tank regulatory amendments to determine the extent of associated cost and economic impacts on the regulated community. The regulated community that we analyzed includes existing or new interim status, permitted, and accumulation tanks, except new or existing small quantity generator (SQG) accumulation tanks. These analyses also provided the Agency with the necessary information for determining whether the revisions will constitute a major rule under Executive Order 12291 or have significant impacts on a substantial number of small businesses, which the Agency is required to consider under the Regulatory Flexibility Act.

The following discussion summarizes the methodology and results of the analyses supporting these findings. Further details on the cost and economic analyses for the final tank regulations can be found in the docket reports, *Cost Analysis of RCRA Regulations for Hazardous Waste Tank Facilities* and *Economic Impact Analysis of RCRA Regulations for Hazardous Waste Tank Facilities*.

A. Cost and Economic Impact Methodology

The analysis in these reports is based on the cost estimates for facilities sampled in the Office of Solid Waste Regulatory Impact Analysis (OSW RIA) and Small Quantity Generator (OSW SQG) surveys. The data from the RIA Tank and Generator survey indicate that the final tank regulations could affect facilities in a variety of two digit SIC's. The most prominent SIC's are chemicals and allied products; petroleum and coal products; fabricated metals; and electronic and electric equipment. For small quantity generator tank facilities, the most prominent two digit SIC's include Printing and Publishing, Primary Metal Industries, Automotive Dealers and Service Stations, and Auto Repair, Services, and Garages.

EPA estimated incremental compliance costs for Parts 262, 264, and 265 for each sample facility in the RIA surveys. The focus of the final rule for existing hazardous waste tank systems is the requirement for secondary containment. EPA projected these facility costs by summing the incremental compliance costs for all tanks at each facility in the data base. We estimated the incremental compliance costs from cost functions developed for tanks based on material of construction, size of the tank, and type of tank.

For existing regulated tanks, EPA estimated the cost of retrofitting full secondary containment at the time of the appropriate phase-in age (§ 265.193(a)) for each tank in the survey sample. During the interim period prior to phase-in of full secondary containment, we applied the annual cost of a periodic tank integrity assessment. For example, if an underground tank was reported to be 10 years old, we applied the cost of an annual integrity assessment for 5 years prior to retrofitting with full secondary containment at age 15. In addition, we estimated the cost of providing corrosion protection for all replacement steel tanks in contact with the soil. Depending on the tank system, other compliance cost estimates included recordkeeping and reporting of integrity assessments, contingency plans, and post-closure plans.

The generator and SQG surveys do not provide tank age data. Because this is a crucial factor in estimating compliance costs, the Agency assumed that the tank age distribution for storage tanks reported in the RIA Tank survey data, are representative of the accumulation tanks in the generator

surveys. This age distribution varies by type of tank (above, in, or underground). Thus, a median age of 6 years for a cradled storage tank is the median age EPA assumed for cradled accumulation tanks.

According to the SQG survey data, the Agency does not expect many SQG tank facilities to require compliance with the full interim status or permitting requirements of this final rule. The Agency has come to this conclusion based on the data from the SQG survey which indicate that most SQG tanks store waste for less than 180 days. In addition, the Agency believes that SQG tank facilities that currently store for longer than 180 (270) days and, therefore, would be subject to the interim status and permitting requirements in this final rule, may reduce their storage periods to less than 180 (270) days to avoid expensive permitting requirements such as the closure, contingent closure, and contingent post-closure plans.

Because the Agency expects so few SQG tank facilities to be subject to the interim status and permitting requirements in this final rule, we have not estimated a national cost for the regulated SQG tank population. Instead, Table 4 provides typical compliance costs for three SQG tank facility types.

Tables 5 and 6 display the incremental costs new tank facilities will face under the final tank permitting standards. The two smallest tanks in each of the tables are representative of the types of tanks that small quantity generators are likely to install. These costs represent installing new tanks that comply with the full secondary containment requirement. In addition, new steel double-walled tanks in contact with the soil must have corrosion protection.

TABLE 4.—ESTIMATED COMPLIANCE COSTS FOR TYPICAL SQG TANK FACILITIES SUBJECT TO INTERIM STATUS AND PERMITTING TANK REQUIREMENTS

Facility type	Initial	Compliance cost estimates		
		O&M	Annualized	
			Pre-tax	After-tax
Two underground tanks.	\$10,058	\$1,600 (yr 1-7), 640 (yr 8-20).	\$2,501	\$2,173
Two above-ground tanks.	4,795	986 (yr 1-8), 1,200 (yr 9-20).	1,661	1,434
One above-ground and one underground.	8,112	2,083 (yr 1-7), 803 (yr 8), 920 (yr 9-20).	2,646	2,288

Source: Cost Analysis for Hazardous Waste Tank Rule; June 1986.

TABLE 5.—INSTALLED BEFORE-TAX COSTS FOR NEW CARBON STEEL UNDERGROUND TANKS WITH FULL SECONDARY CONTAINMENT (\$1,000)

Number of tanks	Size of tanks (gallons)	Cost of tank systems w/o secondary containment			Cost of tank system w/secondary containment			Incremental cost of secondary containment		
		Initial	O&M	Annualized	Initial	O&M	annualized	Initial	O&M	Annualized
1	285	\$1.66	0	\$0.24	\$07.31	\$0.25	\$1.28	\$5.65	\$0.25	\$1.05
1	550	2.17	0	0.31	9.14	.25	1.54	6.97	.25	1.24
1	3,000	10.00	0	1.40	23.00	.25	3.50	13.00	.25	2.10
1	10,000	19.00	0	2.70	39.00	.25	5.80	20.00	.25	3.10
1	20,000	30.00	0	4.20	57.00	.25	8.10	27.00	.25	4.10
3	10,000	48.00	0	6.80	103.00	.25	14.80	55.00	.25	8.00

Source: Cost Analysis for Hazardous Waste Tank Rule; June 1986.

NOTE.—Full secondary containment costs included a double-walled tank, double-walled piping, and a leak detection system. The 285 and 550 gallon tanks have 15 feet of piping per tank, the remaining tanks have 50 feet of piping per tank.

TABLE 6.—INSTALLED BEFORE-TAX COSTS FOR NEW CARBON STEEL ABOVEGROUND TANKS WITH FULL SECONDARY CONTAINMENT (\$1,000)

Number of Tanks	Size of tanks (gallons)	Cost of tank systems w/o secondary containment			Cost of tank system w/secondary containment			Incremental cost of secondary containment		
		Initial	O&M	Annualized	Initial	O&M	Annualized	Initial	O&M	Annualized
1	275	\$0.69	\$0	\$0.10	\$01.26	\$0.25	\$0.43	\$0.57	\$0.25	\$0.33
1	550	1.48	0	0.21	2.16	.25	0.56	0.67	.25	0.35
1	3,000	7.00	0	1.00	10.00	.25	1.60	3.00	.25	0.60
1	10,000	14.00	0	1.40	20.00	.25	3.10	7.00	.25	1.20
1	125,000	114.00	0	16.20	151.00	.25	21.60	37.00	.25	5.40
4	10,000	51.00	0	7.20	74.00	.25	10.70	23.00	.25	3.50

Source: Cost Analysis for Hazardous Waste Tank Rule; June 1986.

NOTE.—Full secondary containment costs include a lined concrete pad and curbing beneath the tank. The 275 and 550 gallon tanks have 15 feet of piping per tank, the remaining tanks have 50 feet per tank.

Because we assume that underground tanks are retrofitted with full secondary containment by replacement with a double-walled tank, we have included the cost of corrosion protection. We assume that aboveground tanks are retrofitted with secondary containment by installing a lined concrete pad and berm; therefore, the tank is not in contact with the soil and does not require corrosion protection. As the tables indicate, there is a wide variation in the incremental cost of the new tank secondary containment requirement, depending upon the type, size, and number of tanks.

To estimate the economic impacts associated with the final regulatory costs, the Agency collected financial data for each facility in the RIA survey data base. By analyzing publicly-available financial information, the Agency assessed the ability of affected facilities, firms, and industries to bear the increased costs of the final regulations. The Agency first estimated net income of each firm in the OSW RIA data base. To determine if the compliance costs for a facility are significant, EPA investigated whether the ratio of annualized compliance costs to firm net income is greater than 20 percent. If so, a firm is identified as potentially having financial difficulties in complying with the regulations.

For firms identified as such, EPA examined each firm's financial profile to determine whether the firm has financial difficulty exclusive of the compliance costs, or has assets that could be redirected to finance compliance with

the final requirements. For this analysis, EPA determined the extent of impacts on facilities for the Nation.

To determine whether a substantial number of small businesses would be significantly affected by the final regulations, EPA compared average compliance costs for small businesses to net income levels of model small businesses for each affected industry. This analysis allowed the Agency to determine at what level compliance costs would be greater than 20 percent of the model small business net income. Based on a distribution of small business net incomes for each industry, the Agency estimated whether a substantial number of small businesses that must comply with the regulations may incur financial hardship as a result. If less than 20 percent of the small businesses are predicted to incur significant impacts, then EPA does not consider the regulations to result in significant small business impacts.

Similarly, to examine the impacts on the small quantity generator population, the Agency compared the range of potential compliance costs to model plant financial characteristics. The Agency used model plants for SQG facilities because actual facility financial data for the SQG survey sample were generally unavailable. These model plants differ in terms of the types and quantities of wastes generated, and in their financial characteristics. Two size categories of model plants were used to represent 42 industries: establishments with 1-9

employees and those with 10-49 employees.

B. Cost and Economic Impacts

EPA estimated total National compliance costs in four categories. The first category of compliance costs are initial costs. Initial costs are those which are incurred in the first year, but are not depreciable capital costs. An example of an initial cost is the cost of developing closure and post-closure contingency plans. The second category of compliance costs are the capital costs. Tank facilities may incur these costs in the first year or they may occur periodically over the life of the tank. Capital costs are depreciable costs. An example of a capital cost is the cost of a secondary containment system.

Third, EPA estimated operating and maintenance (O&M) compliance costs. O&M costs are incurred by tank facilities periodically during the year. These compliance costs include periodic inspections of monitoring equipment. Finally, EPA estimated annualized costs. Annualized costs represent the initial and capital costs on a yearly basis over the assumed 20-year life of the tank plus the O&M costs. All costs are calculated on a net present value and pre-tax basis. Net present value allows a standard comparison for varying compliance costs over time. Pre-tax costs represent the full compliance costs faced by the regulated community prior to receiving tax savings from capital depreciation.

The Agency estimated the total initial compliance costs of Parts 264 and 265 for existing permitted and interim status

hazardous waste tanks to be approximately \$5.0 million, total capital costs to be about \$120.0 million, and the total O&M costs to be about \$6.0 million. EPA estimates the total capital compliance costs of Part 262 for accumulation tanks subject to this regulation to be about \$31.6 million and the O&M costs to be about \$2.8 million. Because owner/operators of accumulation tanks are not required to develop closure and post-closure contingency plans, no initial compliance costs will be incurred by this portion of the regulated community.

To estimate the impacts of these final rule revisions, the Agency annualized before-tax facility compliance costs by the appropriate industry real cost of capital. National before-tax costs are the sum of the weighted facility annualized costs. The Agency estimated the annualized cost of Parts 264 and 265 amendments to be about \$23.7 million for approximately 1,700 storage and treatment tank facilities in the U.S. For the 2,100 accumulation tank facilities subject to this regulation, EPA estimated the annualized cost of the Part 262 amendments to be about \$7.3 million. Thus, the national total annualized cost of this final rule is about \$31.0 million.

In order to assess the potential national cost impact for leaking tanks that are less than 15 years old, EPA estimated the cost assuming all hazardous waste tank systems must be provided with full secondary containment immediately. This assumption results in a total annualized cost for the nation of \$39.0 million, an annualized increase of about \$8.0 million. More realistically, if we assume that 25 percent of the tank systems less than 15 years old are leaking, the total national annualized cost increases by about \$2.0 million to \$33.0 million. Thus, even under worst case situations, the national costs would not approach \$100 million. The annualized costs do not have a large increase because immediate provision of full secondary containment greatly reduces the O&M costs of integrity assessments.

The total estimated compliance costs for the final rule differ from those of the proposal for a number of reasons. Among the more prominent reasons are the following: first, the regulations have changed from requiring full secondary containment or the ground-water monitoring approach implemented within a year, to phasing-in full secondary containment based on tank age. Second, above ground piping is not required to have full secondary containment for straight lengths of piping that are visually inspected on a

daily basis, instead of for the entire piping system. Third, in response to public comment, we have increased our piping length assumptions for tank facilities with five or more tanks from 50 feet of piping per tank to 200 feet of piping per tank. Fourth, we estimate costs for accumulation tanks assuming that their characteristics are distributed like storage tanks, unlike at proposal where we showed a range of costs based on the assumption that all accumulation tanks are either aboveground or underground. Finally, for tank systems that are not required to retrofit full secondary containment immediately, we estimate the cost of an annual integrity assessment until the tank reaches the phase-in age.

The results of the financial analysis for storage and treatment tank facilities are based on a sample of 167 storage or treatment tank facilities with financial information available (out of 254 storage or treatment tank facilities in the OSW data base). We do not expect any of the facilities in the sample to be affected significantly or to close as a result of the regulations. We base this conclusion on our screening analysis of all 167 firms and a more thorough review of the compliance costs and financial conditions of 18 facilities not passing our initial screening analysis. This review focused on such things as the relationship of each firm's estimated compliance costs to total cash-flow (net income plus non-cash expenses such as depreciation, amortization, and depletion) and to assets.

For 82 percent of the 167 facilities in the sample, the annualized after-tax compliance costs represent only one percent or less of their firm's net income. Extrapolating these results to the nation shows similar results—81 percent of all potentially-affected facilities nationally are likely to incur annualized compliance costs that are one percent or less of their firm's net income. These costs do not represent substantial economic impacts on the affected firms.

For accumulation tank facilities, we based our conclusions on a sample of 234 facilities with financial information available (out of a total of 349 accumulation tank facilities in the OSW data base). As for the storage or treatment tank facilities, we do not expect any of the accumulation tank facilities to be affected significantly or to close as a result of the regulations. This conclusion is based on our screening analysis of all 234 firms and a more thorough review of the compliance costs and financial conditions of 37 facilities not passing our initial screening analysis. For 76 percent of the

accumulation tank facilities, annualized after-tax compliance costs represent one percent or less of their firm's net income.

Extrapolating from the results for accumulation tank facilities in the sample to the nation shows results similar to those found for the storage or treatment tank facilities. The OSW data base does not provide tank characteristic data for accumulation tanks by their type (e.g., above, in, or underground). Therefore, we assume that the population of accumulation tanks has basically the same characteristics as storage tanks. Using this assumption, we find that 81 percent of all potentially-affected facilities nationally are likely to incur annualized compliance costs that are one percent or less of their firm's net income. Again, these costs are not substantial.

The model estimated potential impacts on small quantity generator hazardous waste tank facilities based on the assumption that they would be subject to the Part 264 requirements of the final rule. The estimated cost assuming the SQG facilities had two underground tanks would result in 21 out of 84 model facilities experiencing significant impacts. The annualized cost assuming SQG facilities had two aboveground tanks would result in four model facilities experiencing significant impacts. Finally, the annualized cost assuming SQG facilities had one aboveground tank and one underground tank would result in 23 model facilities experiencing significant impacts.

The economic effects of the hazardous waste tank regulations on SQGs that are required to meet the Part 264 standards would vary widely from facility to facility depending upon financial strength, quantity of waste, number and type of tanks, current waste management practices, and changes required to comply with the regulations. Certain SQGs, given the variability of their financial strength and potential lack of waste management alternatives, may incur significant adverse financial effects. Because of data limitations, however, it is not possible to determine the frequency of these situations.

The economic analysis for permitted or interim status small quantity generator tank system facilities assumed that the facilities are all small businesses. Although these results seem to indicate that impacts may be significant for some small quantity generators that must comply with interim status and permitting requirements, a Regulatory Flexibility Analysis is not necessary because the Agency does not expect a substantial number of small businesses to be

significantly affected. The most important reason for this is that SQG facilities have accumulation tanks that will not be subject to this regulation. Additional reasons why the impacts on SQG facilities will be significantly less than the model suggests are the following:

- Most SQG tank facilities will have only one tank, thus reducing our estimates of economic impacts (a sensitivity analysis indicates that compliance costs for one permitted aboveground tank system result in zero significantly-affected model firms, while the compliance costs for one permitted underground tank system result in five significantly-affected model firms);
- SQG tank facilities make up only 10 to 15 percent of the total SQG population, most of which will not be significantly affected;
- None of the medium sized model firms in any industry were significantly affected, and, based on the SQG survey data, such firms are expected to compose two-thirds of the SQG tank population; and

Finally, we do not anticipate that requiring secondary containment for new tank systems will result in significant financial impacts. The incremental costs of providing secondary containment for new tank systems, as shown in Tables 5 and 6, are less than the compliance costs for existing tank systems under these new requirements. Thus, we expect even fewer impacts for facilities installing new tanks than found for facilities with existing tanks.

For example, we compared the incremental annualized cost for installing new small tanks in compliance with the final rule to the model financial data to assess potential impacts for small quantity generators. The results indicate that, at most, two model firms (of 84) may experience significant financial impacts as a result of complying with the new tank requirements. This is in contrast to the estimated 23 significantly-affected model firms for the analysis of compliance with full interim status and permitting requirements.

VIII. Supporting Documents

In preparing this final rule, the Agency has used many sources of data and information, the most significant of which are listed below. They have been placed in the rulemaking docket at U.S. Environmental Protection Agency, EPA RCRA Docket (Sub-basement), 401 M Street, SW., Washington, DC 20460. The docket is open from 9:30 a.m. to 3:30 p.m., Monday through Friday, except for Federal holidays. The public must make

an appointment to review docket materials by calling Mia Zmud at (202) 475-9327 or Kate Blow at (202) 382-4675.

The Agency has used the background documents supporting the existing RCRA tank regulation, the Agency's June 16, 1985, proposal to amend the existing RCRA tank regulation, and other information gathered since proposal.

The major sources of information are the following, which are available for viewing only at the EPA RCRA Docket:

1. "Hazardous Waste Tanks Risk Analysis," ICF, Incorporated and Pope-Reid Associates, Inc. (June 1986). The objective of this study was to analyze and assess the human health risks associated with releases of contaminants from hazardous waste tanks. An analysis included the population of four tank categories: RCRA-permitted storage tanks; treatment tanks that are not exempt under EPA's wastewater treatment tank (WWT) exemption; small quantity generator (SQG) tanks; and accumulation tanks (tanks that store waste for less than 90-days and are, therefore, not required to obtain an RCRA permit). The analysis focused on five regulatory scenarios, namely, no revised regulatory requirement (baseline); secondary), containment; partial secondary containment and ground-water monitoring), corrosion protection for portions of steel tanks in contact with the soil; and leak testing and ground-water monitoring.
2. Public Comments on the June 26, 1985 proposal to revise the existing RCRA tank standards. All the public comments received on the revised tank standards proposal are included in the docket at EPA Headquarters. These comments were considered by EPA in developing today's final rule.
3. Response to Public Comments on the Revised Hazardous Waste Storage and Treatment Tank Standards, Versar Inc. (June 1986). This document provides an analysis of public comments received in response to the proposed revised standards for hazardous waste storage and treatment tank systems. The analysis identified 54 issues in which a variety of comments by 89 commenters were identified and classified and the Agency's response was documented.
4. "Assessment of the Technical Environmental and Safety Aspects of Storage of Hazardous Waste in Underground Tanks," SCS Engineers, (February 1984). The objectives of this study were to define current practices for hazardous waste storage in underground tanks; evaluate these practices in relation to data on spills and damages and best engineering judgment; estimate the relative probability and magnitude of releases from underground tanks, and examine appropriate alternatives for prevention and/or migration of releases.
5. "Underground Tank Leak Detection Program Status Report," California Regional Water Quality Control Board—San Francisco Bay Region, (October 1983). The objectives of this study were to identify geographical areas (within the San Francisco Bay region) where the ground water is of particular concern, develop a facilities information questionnaire; develop subsurface investigation guidelines; identify priority facilities; and request the completion of subsurface investigations. The investigation focused on industrial facilities storing hazardous materials including: acids, metals, resins, solvents, and fuels. Included in the study were facilities with underground containment including: product storage tanks, waste tanks and sumps, fuel tanks, and piping systems associated with these tanks. The information includes questionnaire data on 1,918 facilities as well as the results of subsurface investigations at 80 facilities.
6. "Quarterly Status Report on Toxic Cleanup Cases," State of California—California Regional Water Quality Control Board—San Francisco Bay Region (March 1986). This report includes a brief summary and status of 144 toxic cleanup cases currently in progress. Information includes the extent of contamination and description of remedial action.
7. "Results of API Tank and Piping Leak Survey," American Petroleum Institute (1981). This study includes the statistical results of 1,717 completed "Tank and Piping Leak Survey Questionnaire" forms. The survey's primary purpose was to obtain information on the exact location of perforations in tanks to support the effectiveness of various tank testing procedures.
8. "Analysis of Causes of Release Incidents Based on the Underground Storage Tank Release Incidents Data Base," Versar, Inc. (June 1986). The objectives of this study were to investigate the causes of release incidents based on available information on 12,500 underground storage tank release incidents.
9. "Underground Motor Fuel Storage Tanks: A National Survey," Volumes I and II, USEPA, Office of Pesticides and Toxic Substances, Washington, DC (EPA 560/6-86-013) (June 1986).

IX. Executive Order 12291

Sections 2 and 3 of Executive Order 12291 (46 FR 13193; February 9, 1981) require that a regulatory agency determine whether a new regulation will be "major" and, if so, that a Regulatory Impact Analysis be conducted. A major rule is defined as one that is likely to result in: (1) an annual effect on the economy of \$100 million or more; (2) a major increase in costs and prices for consumers, individual industries, Federal, State, and local government agencies, or geographic regions; or (3) significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of the United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

As previously discussed in section VII of this preamble, today's final regulations will have none of the above effects. Because the final amendments to the regulations applicable to RCRA tank facilities do not meet the definition of a

major regulation, the Agency has not conducted a Regulatory Impact Analysis. EPA has prepared background information supporting this determination; this documentation is in the Economic Impact Analysis Report, which may be examined at the RCRA Public Docket Office.

X. Paperwork Reduction Act

The information collection requirements contained in this rule have been approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*, and have been assigned OMB control numbers 2050-0050.

XI. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (U.S.C. 601 *et seq.*), whenever an Agency is required to publish a general notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the impact of the rules on small entities (i.e., small business, small organizations, and small governmental jurisdictions). No regulatory flexibility analysis is required, however, if the head of the Agency certifies the rule will not have a significant economic impact on a substantial number of small entities. EPA has conducted an analysis of the impacts on small businesses, which is included in the Economic Impact Analysis Report (EIAR).

EPA has established guidelines for determining whether a regulatory flexibility analysis (RFA) is required to accompany a rulemaking package. The guidelines state that if at least 20 percent of the universe of "small entities" are affected by the rule, then a RFA is required. In addition, the EPA criteria should be applied to evaluate if a regulation will have a "significant impact" on small entities. If any one of the following four criteria is met, the regulation should be assumed to have a "significant impact":

- (1) Annual compliance costs will increase the relevant production costs for small entities by more than 5 percent;
 - (2) The ratio of compliance costs to sales will be 10 percent higher for small entities than for large entities;
 - (3) Capital costs of compliance will represent a significant portion of the capital available to small entities, taking into account internal cash flow plus external financing capabilities; or
 - (4) The costs of the regulation will likely result in closures of small entities.
- The Agency used a cash flow analysis to examine the extent to which the

compliance costs will represent a potentially significant portion of capital available to small entities and the likelihood of small business plant closures.

To determine whether a substantial number of small businesses would be significantly affected by the final regulations, EPA compared average compliance costs for small businesses to net income levels of model small business financial characteristics for each affected industry. This analysis allowed the Agency to determine at what level compliance costs would be greater than 20 percent of the model small business net income, thereby indicating significant impacts. Based on a distribution of small business net incomes for each industry, the Agency estimated whether a substantial number of small businesses that must comply with the regulations may incur financial hardship as a result. If less than 20 percent of the small businesses within each affected industry are predicted to incur significant impacts, then EPA does not consider the regulations to result in significant small business impacts.

Similarly, to examine the impacts of the affected small quantity generator population, the Agency compared the range of potential compliance costs to model plant financial characteristics. The Agency used model plants for SQG facilities because actual facility financial data for the SQG survey sample were generally unavailable. These model plants differ in terms of the types and quantities of wastes generated, and in their financial characteristics. Two size categories of model plants were used to represent 42 industries: establishments with 1-9 employees and those with 10-49 employees.

The analysis of the effects of the regulations on small businesses shows that less than 20 percent of potentially affected small businesses within each affected industry nationwide are likely to be significantly affected by the regulations. In addition, the plant closure analysis indicated that there would be no plant closures as a result of the regulations. Finally, our analysis of small quantity generators suggests that very few and certainly less than 20 percent of the affected small quantity generators will be significantly affected by this rule because most SQG tank facilities will not require interim status or storage permits.

The Economic Impact Analysis Report (EIAR) for this rulemaking provides a more detailed discussion of the Agency's methodology for, and findings from, assessing small business impacts attributable to the hazardous waste tank

rule. The EIAR is available for public viewing in the docket for today's rulemaking. On the basis of the analysis conducted, EPA has determined that this rulemaking will not have significant economic impact on a substantial number of small entities.

List of Subjects

40 CFR Part 260

Administrative practice and procedure, Confidential business information, Hazardous materials, Waste treatment and disposal.

40 CFR Part 261

Intergovernmental relations, Hazardous materials, Waste treatment and disposal, Recycling.

40 CFR Part 262

Hazardous materials, Waste treatment and disposal, Recycling.

40 CFR Part 264

Hazardous materials, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds, Waste treatment and disposal.

40 CFR Part 265

Hazardous materials, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds, Waste treatment and disposal, Water supply.

40 CFR Part 270

Administrative practice and procedure, Confidential business information, Hazardous materials transportation, Hazardous waste, Reporting and recordkeeping requirements, Water pollution control, Water supply.

40 CFR Part 271

Administrative practice and procedure, Confidential business information, Hazardous materials transportation, Hazardous waste, Indian lands, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Water pollution control, Water supply.

Dated: June 30, 1986.

Lee M. Thomas,
Administrator.

For the reasons set out in the preamble, Title 40 of the Code of Federal Regulations is amended as follows:

PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

40 CFR Part 260 is amended as follows:

1. The authority citation for Part 260 is revised to read as follows:

Authority: Secs. 1006, 2002(a), 3001 through 3007, 3010, 3014, 3015, 3017, 3018, and 3019 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), 6921 through 6927, 6930, 6934, 6935, 6937, 6938, and 6939).

2. Section 260.10 is amended by adding the following terms and definitions in alphabetical order:

§ 260.10 Definitions.

"Aboveground tank" means a device meeting the definition of "tank" in § 260.10 and that is situated in such a way that the entire surface area of the tank is completely above the plane of the adjacent surrounding surface and the entire surface area of the tank (including the tank bottom) is able to be visually inspected.

"Ancillary equipment" means 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 onsite, or to a point of shipment for disposal off-site.

"Component" means either the tank or ancillary equipment of a tank system.

"Corrosion expert" means a person who, by reason of his knowledge of the physical sciences and the principles of engineering and mathematics, acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks. Such a person must be certified as being qualified by the National Association of Corrosion Engineers (NACE) or be a registered professional engineer who has certification or licensing that includes education and experience in corrosion control on buried or submerged metal piping systems and metal tanks.

"Existing tank system" or "existing component" means a tank system or component that is used for the storage or treatment of hazardous waste and that is in operation, or for which installation has commenced on or prior to July 14, 1986. Installation will be considered to have commenced if the owner or operator has obtained all

Federal, State, and local approvals or permits necessary to begin physical construction of the site or installation of the tank system and if either (1) a continuous on-site physical construction or installation program has begun, or (2) the owner or operator has entered into contractual obligations—which cannot be canceled or modified without substantial loss—for physical construction of the site or installation of the tank system to be completed within a reasonable time.

"Inground tank" means a device meeting the definition of "tank" in § 260.10 whereby a portion of the tank wall is situated to any degree within the ground, thereby preventing visual inspection of that external surface area of the tank that is in the ground.

"Installation inspector" means a person who, by reason of his knowledge of the physical sciences and the principles of engineering, acquired by a professional education and related practical experience, is qualified to supervise the installation of tank systems.

"Leak-detection system" means a system capable of detecting the failure of either the primary or secondary containment structure or the presence of a release of hazardous waste or accumulated liquid in the secondary containment structure. Such a system must employ operational controls (e.g., daily visual inspections for releases into the secondary containment system of aboveground tanks) or consist of an interstitial monitoring device designed to detect continuously and automatically the failure of the primary or secondary containment structure or the presence of a release of hazardous waste into the secondary containment structure.

"New tank system" or "new tank component" means a tank system or component that will be used for the storage or treatment of hazardous waste and for which installation has commenced after July 14, 1986; except, however, for purposes of § 264.193(g)(2) and § 265.193(g)(2), a new tank system is one for which construction commences after July 14, 1986. (See also "existing tank system.")

"Onground tank" means a device meeting the definition of "tank" in § 260.10 and that is situated in such a way that the bottom of the tank is on the same level as the adjacent surrounding

surface so that the external tank bottom cannot be visually inspected.

"Sump" means any pit or reservoir that meets the definition of tank and those troughs/trenches connected to it that serves to collect hazardous waste for transport to hazardous waste storage, treatment, or disposal facilities.

"Tank system" means a hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.

"Underground tank" means a device meeting the definition of "tank" in § 260.10 whose entire surface area is totally below the surface of and covered by the ground.

"Unfit-for use tank system" means a tank system that has been determined through an integrity assessment or other inspection to be no longer capable of storing or treating hazardous waste without posing a threat of release of hazardous waste to the environment.

"Zone of engineering control" means an area under the control of the owner/operator that, upon detection of a hazardous waste release, can be readily cleaned up prior to the release of hazardous waste or hazardous constituents to ground water or surface water.

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

3. The authority citation for Part 261 continues to read as follows:

Authority: Secs. 1006, 2002(a), 3001, and 3002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), 6921, and 6922).

4. Section 261.4 is amended by adding paragraph (a)(8) to read as follows:

§ 261.4 Exclusions.

(a) * * *

(8) Secondary materials that are reclaimed and returned to the original process or processes in which they were generated where they are reused in the production process provided:

(i) Only tank storage is involved, and the entire process through completion of reclamation is closed by being entirely connected with pipes or other comparable enclosed means of conveyance;

(ii) Reclamation does not involve controlled flame combustion (such as

occurs in boilers, industrial furnaces, or incinerators);

(iii) The secondary materials are never accumulated in such tanks for over twelve months without being reclaimed; and

(iv) The reclaimed material is not used to produce a fuel, or used to produce products that are used in a manner constituting disposal.

PART 262—STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

40 CFR Part 262 is amended as follows:

5. The authority citation for Part 262 is revised to read as follows:

Authority: Secs. 1006, 2002, 3001, 3002, 3003, 3004, 3005, and 3017 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6906, 6912, 6922, 6923, 6924, 6925, and 6937).

6. Section 262.34 is amended by revising paragraphs (a)(1) and (d)(2), by redesignating existing paragraphs (d)(3) and (d)(4) as (d)(4) and (d)(5), respectively, and by adding a new paragraph (d)(3), as follows:

§ 262.34 Accumulation time.

(a) Except as provided in paragraphs (d), (e), and (f) of this section, a generator may accumulate hazardous waste on-site for 90 days or less without a permit or without having interim status, provided that:

(1) The waste is placed in containers and the generator complies with Subpart I of 40 CFR Part 265, or the waste is placed in tanks and the generator complies with Subpart J of 40 CFR Part 265, except § 265.197(c), and § 265.200. In addition, such a generator is exempt from all the requirements in Subparts G and H of 40 CFR Part 265, except for § 265.111 and § 265.114.

(d) ***

(2) The generator complies with the requirements of Subpart I of Part 265, except § 265.176;

(3) The generator complies with the requirements of § 265.201 in Subpart J of Part 265;

PART 264—STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

40 CFR Part 264 is amended as follows:

7. The Authority citation for Part 264 is revised to read as follows:

Authority: Secs. 1006, 2002, 3004, and 3005 of the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), 6924, and 6925).

8. The Table of Contents and heading of Part 264, Subpart J—Tanks, is revised to read as follows:

Subpart J—Tank Systems

Sec.

264.190 Applicability.

264.191 Assessment of existing tank system's integrity.

264.192 Design and installation of new tank systems or components.

264.193 Containment and detection of releases.

264.194 General operating requirements.

264.195 Inspections.

264.196 Response to leaks or spills and disposition of leaking or unfit-for-use tank systems.

264.197 Closure and post-closure care.

264.198 Special requirements for ignitable or reactive wastes.

264.199 Special requirements for incompatible wastes.

9. Section 264.15 is amended by revising paragraph (b)(4) to read as follows:

§ 264.15 General inspection requirements.

(b) ***

(4) The frequency of inspection may vary for the items on the schedule. However, it should be based on the rate of possible deterioration of the equipment and the probability of an environmental or human health incident if the deterioration or malfunction of any operator error goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, must be inspected daily when in use. At a minimum, the inspection schedule must include the terms and frequencies called for in §§ 264.174, 264.193, 264.195, 264.226, 264.253, 264.254, 264.303, and 264.347, where applicable.

10. Section 264.73 is amended by revising paragraph (b)(6) to read as follows:

§ 264.73 Operating record.

(b) ***

(6) Monitoring, testing, or analytical data where required by Subpart F and §§ 264.191, 264.193, 264.195, 264.226, 264.253, 264.254, 264.276, 264.278, 264.280, 264.303, 264.309, and 264.347.

11. Section 264.110 is amended by adding a new paragraph (b)(3) to read as follows:

§ 264.110 Applicability.

(b) ***

(3) Tank systems that are required under § 264.197 to meet the requirements for landfills.

12. Section 264.140 is amended by adding a new paragraph (b)(3) to read as follows:

§ 264.140 Applicability.

(b) ***

(3) Tank systems that are required under § 264.197 to meet the requirements for landfills.

13. The Subpart J—Tank Systems requirements are amended by revising the Subpart as follows:

Subpart J—Tank Systems

§ 264.190 Applicability.

The requirements of this Subpart apply to owners and operators of facilities that use tank systems for storing or treating hazardous waste except as otherwise provided in paragraphs (a) and (b) of this section or in § 264.1 of this part.

(a) Tanks that are used to store or treat hazardous waste which contains no free liquids and are situated inside a building with an impermeable floor are exempted from the requirements in § 264.193. To demonstrate the absence or presence of free liquids in the stored/treated waste, EPA Method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Publication No. SW-846) must be used.

(b) Tanks, including sumps, as defined in § 260.10, that serve as part of a secondary containment system to collect or contain releases of hazardous wastes are exempted from the requirements in § 264.193 of this subpart.

(Information collection requirement contained in paragraph (a) was approved by the Office of Management and Budget under control number 2050-0050.)

§ 264.191 Assessment of existing tank system's integrity.

(a) For each existing tank system that does not have secondary containment meeting the requirements of § 264.193, the owner or operator must determine that the tank system is not leaking or is unfit for use. Except as provided in paragraph (c) of this section, the owner or operator must obtain and keep on file at the facility a written assessment

reviewed and certified by an independent, qualified registered professional engineer, in accordance with § 270.11(d), that attests to the tank system's integrity by January 12, 1988.

(b) This assessment must determine that the tank system is adequately designed and has sufficient structural strength and compatibility with the waste(s) to be stored or treated, to ensure that it will not collapse, rupture, or fail. At a minimum, this assessment must consider the following:

(1) Design standard(s), if available, according to which the tank and ancillary equipment were constructed;

(2) Hazardous characteristics of the waste(s) that have been and will be handled;

(3) Existing corrosion protection measures;

(4) Documented age of the tank system, if available (otherwise, an estimate of the age); and

(5) Results of a leak test, internal inspection, or other tank integrity examination such that:

(i) For non-enterable underground tanks, the assessment must include a leak test that is capable of taking into account the effects of temperature variations, tank end deflection, vapor pockets, and high water table effects, and

(ii) For other than non-enterable underground tanks and for ancillary equipment, this assessment must include either a leak test, as described above, or other integrity examination, that is certified by an independent, qualified, registered professional engineer in accordance with § 270.11(d), that addresses cracks, leaks, corrosion, and erosion.

[Note.—The practices described in the American Petroleum Institute (API) Publication, Guide for Inspection of Refinery Equipment, Chapter XIII, "Atmospheric and Low-Pressure Storage Tanks," 4th edition, 1981, may be used, where applicable, as guidelines in conducting other than a leak test.]

(c) Tank systems that store or treat materials that become hazardous wastes subsequent to July 14, 1986, must conduct this assessment within 12 months after the date that the waste becomes a hazardous waste.

(d) If, as a result of the assessment conducted in accordance with paragraph (a), a tank system is found to be leaking or unfit for use, the owner or operator must comply with the requirements of § 264.196.

Approved by the Office of Management and Budget under control number 2050-0050.)

§ 264.192 Design and installation of new tank systems or components.

(a) Owners or operators of new tank systems or components must obtain and submit to the Regional Administrator, at time of submittal of Part B information, a written assessment, reviewed and certified by an independent, qualified registered professional engineer, in accordance with § 270.11(d), attesting that the tank system has sufficient structural integrity and is acceptable for the storing and treating of hazardous waste. The assessment must show that the foundation, structural support, seams, connections, and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection to ensure that it will not collapse, rupture, or fail. This assessment, which will be used by the Regional Administrator to review and approve or disapprove the acceptability of the tank system design, must include, at a minimum, the following information:

(1) Design standard(s) according to which tank(s) and/or the ancillary equipment are constructed;

(2) Hazardous characteristics of the waste(s) to be handled;

(3) For new tank systems or components in which the external shell of a metal tank or any external metal component of the tank system will be in contact with the soil or with water, a determination by a corrosion expert of:

(i) Factors affecting the potential for corrosion, including but not limited to:

(A) Soil moisture content;

(B) Soil pH;

(C) Soil sulfides level;

(D) Soil resistivity;

(E) Structure to soil potential;

(F) Influence of nearby underground metal structures (e.g., piping);

(G) Existence of stray electric current;

(H) Existing corrosion-protection measures (e.g., coating, cathodic protection), and

(ii) The type and degree of external corrosion protection that are needed to ensure the integrity of the tank system during the use of the tank system or component, consisting of one or more of the following:

(A) Corrosion-resistant materials of construction such as special alloys, fiberglass reinforced plastic, etc.;

(B) Corrosion-resistant coating (such as epoxy, fiberglass, etc.) with cathodic protection (e.g., impressed current or sacrificial anodes); and

(C) Electrical isolation devices such as insulating joints, flanges, etc.

[Note.—The practices described in the National Association of Corrosion Engineers

(NACE) standard, "Recommended Practice (RP-02-85)—Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems," and the American Petroleum Institute (API) Publication 1632, "Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems," may be used, where applicable, as guidelines in providing corrosion protection for tank systems.]

(4) For underground tank system components that are likely to be adversely affected by vehicular traffic, a determination of design or operational measures that will protect the tank system against potential damage; and

(5) Design considerations to ensure that:

(i) Tank foundations will maintain the load of a full tank;

(ii) Tank systems will be anchored to prevent flotation or dislodgment where the tank system is placed in a saturated zone, or is located within a seismic fault zone subject to the standards of § 264.18(a); and

(iii) Tank systems will withstand the effects of frost heave.

(b) The owner or operator of a new tank system must ensure that proper handling procedures are adhered to in order to prevent damage to the system during installation. Prior to covering, enclosing, or placing a new tank system or component in use, an independent, qualified installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of tank systems or component, must inspect the system for the presence of any of the following items:

(1) Weld breaks;

(2) Punctures;

(3) Scrapes of protective coatings;

(4) Cracks;

(5) Corrosion;

(6) Other structural damage or inadequate construction/installation.

All discrepancies must be remedied before the tank system is covered, enclosed, or placed in use.

(c) New tank systems or components that are placed underground and that are backfilled must be provided with a backfill material that is a noncorrosive, porous, homogeneous substance and that is installed so that the backfill is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported.

(d) All new tanks and ancillary equipment must be tested for tightness prior to being covered, enclosed, or placed in use. If a tank system is found not to be tight, all repairs necessary to

remedy the leak(s) in the system must be performed prior to the tank system being covered, enclosed, or placed into use.

(e) Ancillary equipment must be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.

[Note.—The piping system installation procedures described in American Petroleum Institute (API) Publication 1615 (November 1979), "Installation of Underground Petroleum Storage Systems," or ANSI Standard B31.3, "Petroleum Refinery Piping," and ANSI Standard B31.4 "Liquid Petroleum Transportation Piping System," may be used, where applicable, as guidelines for proper installation of piping systems.]

(f) The owner or operator must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided under paragraph (a)(3) of this section, or other corrosion protection if the Regional Administrator believes other corrosion protection is necessary to ensure the integrity of the tank system during use of the tank system. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation.

(g) The owner or operator must obtain and keep on file at the facility written statements by those persons required to certify the design of the tank system and supervise the installation of the tank system in accordance with the requirements of paragraphs (b) through (f) of this section, that attest that the tank system was properly designed and installed and that repairs, pursuant to paragraphs (b) and (d) of this section, were performed. These written statements must also include the certification statement as required in § 270.11(d) of this Chapter.

(Information collection requirements contained in paragraphs (a) and (g) were approved by the Office of Management and Budget under control number 2050-0050.)

§ 264.193 Containment and detection of releases.

(a) In order to prevent the release of hazardous waste or hazardous constituents to the environment, secondary containment that meets the requirements of this section must be provided (except as provided in paragraphs (f) and (g) of this section):

(1) For all new tank systems or components, prior to their being put into service;

(2) For all existing tank systems used to store or treat EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and

F027, within two years after January 12, 1987;

(3) For those existing tank systems of known and documented age, within two years after January 12, 1987 or when the tank system has reached 15 years of age, whichever comes later; and

(4) For those existing tank systems for which the age cannot be documented, within eight years of January 12, 1987; but if the age of the facility is greater than seven years, secondary containment must be provided by the time the facility reaches 15 years of age, or within two years of January 12, 1987, whichever comes later; and

(5) For tank systems that store or treat materials that become hazardous wastes subsequent to January 12, 1987, within the time intervals required in paragraphs (a)(1) through (a)(4) of this section, except that the date that a material becomes a hazardous waste must be used in place of January 12, 1987.

(b) Secondary containment systems must be:

(1) Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time during the use of the tank system; and

(2) Capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

(c) To meet the requirements of paragraph (b) of this section, secondary containment systems must be at a minimum:

(1) Constructed of or lined with materials that are compatible with the wastes(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure owing to pressure gradients (including static head and external hydrological forces), physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation (including stresses from nearby vehicular traffic).

(2) Placed on a foundation or base capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift;

(3) Provided with a leak-detection system that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time if the owner or operator can demonstrate to the Regional

Administrator that existing detection technologies or site conditions will not allow detection of a release within 24 hours; and

(4) Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment, if the owner or operator can demonstrate to the Regional Administrator that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours.

[Note.—If the collected material is a hazardous waste under Part 261 of this chapter, it is subject to management as a hazardous waste in accordance with all applicable requirements of Parts 262 through 265 of this chapter. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to a Publicly Owned Treatment Works (POTW), it is subject to the requirements of section 307 of the Clean Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR Part 302.]

(d) Secondary containment for tanks must include one or more of the following devices:

(1) A liner (external to the tank);

(2) A vault;

(3) A double-walled tank; or

(4) An equivalent device as approved by the Regional Administrator

(e) In addition to the requirements of paragraphs (b), (c), and (d) of this section, secondary containment systems must satisfy the following requirements:

(1) External liner systems must be:

(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;

(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event.

(iii) Free of cracks or gaps; and

(iv) Designed and installed to surround the tank completely and to cover all surrounding earth likely to come into contact with the waste if released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste).

(2) Vault systems must be:

(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;

(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;

(iii) Constructed with chemical-resistant water stops in place at all joints (if any);

(iv) Provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete;

(v) Provided with a means to protect against the formation of and ignition of vapors within the vault, if the waste being stored or treated:

(A) Meets the definition of ignitable waste under § 262.21 of this chapter; or

(B) Meets the definition of reactive waste under § 262.21 of this chapter, and may form an ignitable or explosive vapor.

(vi) Provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the vault if the vault is subject to hydraulic pressure.

(3) Double-walled tanks must be:

(i) Designed as an integral structure (i.e., an inner tank completely enveloped within an outer shell) so that any release from the inner tank is contained by the outer shell.

(ii) Protected, if constructed of metal, from both corrosion of the primary tank interior and of the external surface of the outer shell; and

(iii) Provided with a built-in continuous leak detection system capable of detecting a release within 24 hours, or at the earliest practicable time, if the owner or operator can demonstrate to the Regional Administrator, and the Regional Administrator concludes, that the existing detection technology or site conditions would not allow detection of a release within 24 hours.

[Note.—The provisions outlined in the Steel Tank Institute's (STI) "Standard for Dual Wall Underground Steel Storage Tanks" may be used as guidelines for aspects of the design of underground steel double-walled tanks.].

(f) Ancillary equipment must be provided with secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of

paragraphs (b) and (c) of this section except for:

(1) Aboveground piping (exclusive of flanges, joints, valves, and other connections) that are visually inspected for leaks on a daily basis;

(2) Welded flanges, welded joints, and welded connections, that are visually inspected for leaks on a daily basis;

(3) Sealless or magnetic coupling pumps, that are visually inspected for leaks on a daily basis; and

(4) Pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis.

(g) The owner or operator may obtain a variance from the requirements of this section if the Regional Administrator finds, as a result of a demonstration by the owner or operator that alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous waste or hazardous constituents into the ground water; or surface water at least as effectively as secondary containment during the active life of the tank system or that in the event of a release that does migrate to ground water or surface water, no substantial present or potential hazard will be posed to human health or the environment. New underground tank systems may not, per a demonstration in accordance with paragraph (g)(2) of this section, be exempted from the secondary containment requirements of this section.

(1) In deciding whether to grant a variance based on a demonstration of equivalent protection of ground water and surface water, the Regional Administrator will consider:

(i) The nature and quantity of the wastes;

(ii) The proposed alternate design and operation;

(iii) The hydrogeologic setting of the facility, including the thickness of soils present between the tank system and ground water, and

(iv) All other factors that would influence the quality and mobility of the hazardous constituents and the potential for them to migrate to ground water or surface water

(2) In deciding whether to grant a variance based on a demonstration of no substantial present or potential hazard, the Regional Administrator will consider:

(i) The potential adverse effects on ground water, surface water, and land quality taking into account:

(A) The physical and chemical characteristics of the waste in the tank system, including its potential for migration.

(B) The hydrogeological characteristics of the facility and surrounding land,

(C) The potential for health risks caused by human exposure to waste constituents,

(D) The potential for damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents, and

(E) The persistence and permanence of the potential adverse effects;

(ii) The potential adverse effects of a release on ground-water quality, taking into account:

(A) The quantity and quality of ground water and the direction of ground-water flow,

(B) The proximity and withdrawal rates of ground-water users,

(C) The current and future uses of ground water in the area, and

(D) The existing quality of ground water, including other sources of contamination and their cumulative impact on the ground-water quality;

(iii) The potential adverse effects of a release on surface water quality, taking into account:

(A) The quantity and quality of ground water and the direction of ground-water flow,

(B) The patterns of rainfall in the region,

(C) The proximity of the tank system to surface waters,

(D) The current and future uses of surface waters in the area and any water quality standards established for those surface waters, and

(E) The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality; and

(iv) The potential adverse effects of a release on the land surrounding the tank system, taking into account:

(A) The patterns of rainfall in the region, and

(B) The current and future uses of the surrounding land.

(3) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system but has not migrated beyond the zone of engineering control (as established in the variance), must:

(i) Comply with the requirements of § 264.196, except paragraph (d), and

(ii) Decontaminate or remove contaminated soil to the extent necessary to:

(A) Enable the tank system for which the variance was granted to resume operation with the capability for the detection of releases at least equivalent to the capability it had prior to the release; and

(B) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water; and

(iii) If contaminated soil cannot be removed or decontaminated in accordance with paragraph (g)(3)(ii) of this section, comply with the requirement of § 264.197(b).

(4) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system and has migrated beyond the zone of engineering control (as established in the variance), must:

(i) Comply with the requirements of § 264.196 (a), (b), (c), and (d); and

(ii) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water, if possible, and decontaminate or remove contaminated soil. If contaminated soil cannot be decontaminated or removed or if ground water has been contaminated, the owner or operator must comply with the requirements of § 264.197(b); and

(iii) If repairing, replacing, or reinstalling the tank system, provide secondary containment in accordance with the requirements of paragraphs (a) through (f) of this section or reapply for a variance from secondary containment and meet the requirements for new tank systems in § 264.192 if the tank system is replaced. The owner or operator must comply with these requirements even if contaminated soil can be decontaminated or removed and ground water or surface water has not been contaminated.

(h) The following procedures must be followed in order to request a variance from secondary containment:

(1) The Regional Administrator must be notified in writing by the owner or operator that he intends to conduct and submit a demonstration for a variance from secondary containment as allowed in paragraph (g) according to the following schedule:

(i) For existing tank systems, at least 24 months prior to the date that secondary containment must be provided in accordance with paragraph (a) of this section.

(ii) For new tank systems, at least 30 days prior to entering into a contract for installation.

(2) As part of the notification, the owner or operator must also submit to the Regional Administrator a description of the steps necessary to conduct the demonstration and a timetable for completing each of the steps. The demonstration must address each of the factors listed in paragraph (g)(1) or paragraph (g)(2) of this section;

(3) The demonstration for a variance must be completed within 180 days after notifying the Regional Administrator of an intent to conduct the demonstration; and

(4) If a variance is granted under this paragraph, the Regional Administrator will require the permittee to construct and operate the tank system in the manner that was demonstrated to meet the requirements for the variance.

(i) All tank systems, until such time as secondary containment that meets the requirements of this section is provided, must comply with the following:

(1) For non-enterable underground tanks, a leak test that meets the requirements of § 264.191(a) or other tank integrity method, as approved or required by the Regional Administrator, must be conducted at least annually.

(2) For other than non-enterable underground tanks, the owner or operator must either (i) conduct a leak test as in paragraph (i)(1) or (ii) of this section develop a schedule and procedure for an assessment of the overall condition of the tank system by an independent, qualified registered professional engineer. The schedule and procedure must be adequate to detect obvious cracks, leaks, and corrosion or erosion that may lead to cracks and leaks. The owner or operator must remove the stored waste from the tank, if necessary, to allow the condition of all internal tank surfaces to be assessed. The frequency of these assessments must be based on the material of construction of the tank and its ancillary equipment, the age of the system, the type of corrosion or erosion protection used, the rate of corrosion or erosion observed during the previous inspection, and the characteristics of the waste being stored or treated.

(3) For ancillary equipment, a leak test or other integrity assessment as approved by the Regional Administrator must be conducted at least annually.

[Note.—The practices described in the American Petroleum Institute (API) Publication Guide for Inspection of Refinery Equipment, Chapter XIII, "Atmospheric and Low-Pressure Storage Tanks," 4th edition, 1981, may be used, where applicable, as

guidelines for assessing the overall condition of the tank system.]

(4) The owner or operator must maintain on file at the facility a record of the results of the assessments conducted in accordance with paragraphs (i)(1) through (i)(3) of this section.

(5) If a tank system or component is found to be leaking or unfit for use as a result of the leak test or assessment in paragraphs (i)(1) through (i)(3) of this section, the owner or operator must comply with the requirements of § 264.196.

(Information collection requirements contained in paragraphs (c), (d), (e), (g), (h), and (i) were approved by the Office of Management and Budget under control number 2050-0050.)

§ 264.194 General operating requirements.

(a) Hazardous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, corrode, or otherwise fail.

(b) The owner or operator must use appropriate controls and practices to prevent spills and overflows from tank or containment systems. These include at a minimum:

(1) Spill prevention controls (e.g., check valves, dry disconnect couplings);

(2) Overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff, or bypass to a standby tank); and

(3) Maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.

(c) The owner or operator must comply with the requirements of § 264.196 if a leak or spill occurs in the tank system.

(Information collection requirements contained in paragraph (c) were approved by the Office of Management and Budget under control number 2050-0050)

§ 264.195 Inspections.

(a) The owner or operator must develop and follow a schedule and procedure for inspecting overfill controls.

(b) The owner or operator must inspect at least once each operating day:

(1) Aboveground portions of the tank system, if any, to detect corrosion or releases of waste;

(2) Data gathered from monitoring and leak detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and

(3) The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).

[Note.—Section 264.15(c) requires the owner or operator to remedy any deterioration or malfunction he finds. Section 264.196 requires the owner or operator to notify the Regional Administrator within 24 hours of confirming a leak. Also, 40 CFR Part 302 may require the owner or operator to notify the National Response Center of a release.]

(c) The owner or operator must inspect cathodic protection systems, if present, according to, at a minimum, the following schedule to ensure that they are functioning properly:

(1) The proper operation of the cathodic protection system must be confirmed within six months after initial installation and annually thereafter; and

(2) All sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly (i.e., every other month).

[Note.—The practices described in the National Association of Corrosion Engineers (NACE) standard, "Recommended Practice (RP-02-85)—Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems," and the American Petroleum Institute (API) Publication 1632, "Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems," may be used, where applicable, as guidelines in maintaining and inspecting cathodic protection systems.]

(d) The owner or operator must document in the operating record of the facility an inspection of those items in paragraphs (a) through (c) of this section.

(Information collection requirements contained in paragraph (a) and (d) were approved by the Office of Management and Budget under control number 2050-0050)

§ 264.196 Response to leaks or spills and disposition of leaking or unfit-for-use tank systems.

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:

(a) *Cessation of Use; prevent flow or addition of wastes.* The owner or operator must immediately stop the flow of hazardous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release.

(b) *Removal of waste from tank system or secondary containment*

system. (1) If the release was from the tank system, the owner/operator must, within 24 hours after detection of the leak or, if the owner/operator demonstrates that it is not possible, at the earliest practicable time, remove as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank system to be performed.

(2) If the material released was to a secondary containment system, all released materials must be removed within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment.

(c) *Containment of visible releases to the environment.* The owner/operator must immediately conduct a visual inspection of the release and, based upon that inspection:

(1) Prevent further migration of the leak or spill to soils or surface water; and

(2) Remove, and properly dispose of, any visible contamination of the soil or surface water.

(d) *Notifications, reports.* (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 its 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

(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/operator satisfies the

requirements of paragraphs (e)(2) through (4) of this section, the tank system must be closed in accordance with § 264.197.

(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 § 264.193 before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system that can be inspected visually. 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 §§ 264.192 and 264.193. 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 § 264.193 prior to being returned to use.

(f) *Certification of major repairs.* If the owner/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.

[Note.—The Regional Administrator may, on the basis of any information received that

there is or has been a release of hazardous waste or hazardous constituents into the environment, issue an order under RCRA sections 3004(w), 3008(h), or 7003(a) requiring corrective action or such other response as deemed necessary to protect human health or the environment.}

[Note.—See § 264.15(c) for the requirements necessary to remedy a failure. Also, 40 CFR Part 302 may require the owner or operator to notify the National Response Center of certain releases.]

(Information collection requirements contained in paragraphs (d), (e), and (f) were approved by the Office of Management and Budget under control number 2050-0050)

§ 264.197 Closure and post-closure care.

(a) At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste, unless § 261.3(d) of this Chapter applies. The closure plan, closure activities, cost estimates for closure, and financial responsibility for tank systems must meet all of the requirements specified in Subparts G and H of this Part.

(b) If the owner or operator demonstrates that not all contaminated soils can be practicably removed or decontaminated as required in paragraph (a) of this section, then the owner or operator must close the tank system and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills (§ 264.310). In addition, for the purposes of closure, post-closure, and financial responsibility, such a tank system is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in Subparts G and H of this Part.

(c) If an owner or operator has a tank system that does not have secondary containment that meets the requirements of § 264.193 (b) through (f) and is not exempt from the secondary containment requirements in accordance with § 264.193(g), then:

(1) The closure plan for the tank system must include both a plan for complying with paragraph (a) of this section and a contingent plan for complying with paragraph (b) of this section.

(2) A contingent post-closure plan for complying with paragraph (b) of this section must be prepared and submitted as part of the permit application.

(3) The cost estimates calculated for closure and post-closure care must reflect the costs of complying with the contingent closure plan and the

contingent post-closure plan, if those costs are greater than the costs of complying with the closure plan prepared for the expected closure under paragraph (a) of this section.

(4) Financial assurance must be based on the cost estimates in paragraph (c)(3) of this section.

(5) For the purposes of the contingent closure and post-closure plans, such a tank system is considered to be a landfill, and the contingent plans must meet all of the closure, post-closure, and financial responsibility requirements for landfills under Subparts G and H of this Part.

(Information collection requirements contained in paragraphs (a)–(c) were approved by the Office of Management and Budget under control number 2050-0050)

§ 264.198 Special requirements for ignitable or reactive wastes.

(a) Ignitable or reactive waste must not be placed in tank systems, unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the tank system so that:

(i) The resulting waste, mixture, or dissolved material no longer meets the definition of ignitable or reactive waste under §§ 261.21 or 261.23 of this Chapter, and

(ii) Section 264.17(b) is complied with; or

(2) The waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react; or

(3) The tank system is used solely for emergencies.

(b) The owner or operator of a facility where ignitable or reactive waste is stored or treated in a tank must comply with the requirements for the maintenance of protective distances between the waste management area and any public ways, streets, alleys, or an adjoining property line that can be built upon as required in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code," (1977 or 1981), (incorporated by reference, see § 260.11).

§ 264.199 Special requirements for incompatible wastes.

(a) Incompatible wastes, or incompatible wastes and materials, must not be placed in the same tank system, unless § 264.17(b) is complied with.

(b) Hazardous waste must not be placed in a tank system that has not been decontaminated and that previously held an incompatible waste or material, unless § 264.17(b) is complied with.

PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

40 CFR Part 265 is amended as follows:

14. The Authority citation for Part 265 continues to read as follows:

Authority: Secs. 1006, 2002(a), 3004, 3005, and 3015 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), 6924, 6925, and 6935).

15. The Table of Contents and the heading of Part 265, Subpart J—Tanks is revised to read as follows:

Subpart J—Tank Systems

Sec.	
265.190	Applicability.
265.191	Assessment of existing tank system's integrity.
265.192	Design and installation of new tank systems or components.
265.193	Containment and detection of releases.
265.194	General operating requirements.
265.195	Inspections.
265.196	Response to leaks or spills and disposition of leaking or unfit-for-use tank systems.
265.197	Closure and post-closure care.
265.198	Special requirements for ignitable or reactive wastes.
265.199	Special requirements for incompatible wastes.
265.200	Waste analysis and trial tests.
265.201	Special requirements for generators of between 100 and 1,000 kg/mo that accumulate hazardous waste in tanks.

16. Section 265.13 is amended by revising paragraph (b)(6) to read as follows:

§ 265.13 General waste analysis.

(b) * * *

(6) Where applicable, the methods that will be used to meet the additional waste analysis requirements for specific waste management methods as specified in §§ 265.200, 265.225, 265.252, 265.273, 265.314, 265.345, 265.375, and 265.402.

17. Section 265.15 is amended by revising paragraph (b)(4) to read as follows:

§ 265.15 General inspection requirements.

(b) * * *

(4) The frequency of inspection may vary for the items on the schedule. However, it should be based on the rate of possible deterioration of the

equipment and the probability of an environmental or human health incident if the deterioration, or malfunction, or any operator error goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, must be inspected daily when in use. At a minimum, the inspection schedule must include the items and frequencies called for in §§ 265.174, 265.193, 265.195, 265.226, 265.347, 265.377, and 265.403.

* * *

18. Section 265.73 is amended by revising paragraphs (b)(3) and (b)(6) to read as follows:

§ 265.73 Operating record.

* * *

(b) * * *

(3) Records and results of waste analysis and trial tests performed as specified in §§ 265.13, 265.200, 265.225, 265.252, 265.273, 265.314, 265.341, 265.375, and 265.402.

* * *

(6) Monitoring, testing, or analytical data when required by §§ 265.90, 265.94, 265.191, 265.193, 265.195, 265.276, 265.278, 265.280(d)(1), 265.347, and 265.377; and

* * *

19. Section 265.110 is amended by revising paragraph (b)(2) to read as follows:

§ 265.110 Applicability.

* * *

(b) * * *

(2) Tank systems that are required under § 265.197 to meet requirements for landfills.

* * *

20. Section 265.140 is amended by revising paragraph (b) to read as follows:

§ 265.140 Applicability.

* * *

(b) The requirements of §§ 265.144 and 265.146 apply only to owners and operators of disposal facilities and tank systems that are required under § 265.197 to meet the requirements for landfills

* * *

21. The Subpart J is revised to read as follows:

Subpart J—Tank Systems

§ 265.190 Applicability.

The regulations of this Subpart apply to owners or operators of facilities that use tank systems for storing or treating hazardous waste, except as otherwise provided in paragraphs (a) and (b) of this section or in § 265.1 of this part.

(a) Tanks that are used to store or treat hazardous waste containing no

free liquids and that are situated inside a building with an impermeable floor are exempted from the requirements of § 265.193 of this subpart. To demonstrate the absence or presence of free liquids in the stored/treated waste, EPA Method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Publication No. SW-846) must be used.

(b) Tanks, including sumps, as defined in § 260.10, that serve as part of a secondary containment system to collect or contain releases of hazardous wastes are exempted from the requirements in § 265.193.

(Information collection requirement contained in paragraph (a) was approved by the Office of Management and Budget under control number 2050-0050.)

§ 265.191 Assessment of existing tank system's integrity.

(a) For each existing tank system that does not have secondary containment meeting the requirements of § 265.193, the owner or operator must determine that the tank system is not leaking or is unfit for use. Except as provided in paragraph (c) of this section, the owner or operator must obtain and keep on file at the facility a written assessment reviewed and certified by an independent, qualified, registered professional engineer in accordance with § 270.11(d), that attests to the tank system's integrity by January 12, 1988.

(b) This assessment must determine that the tank system is adequately designed and has sufficient structural strength and compatibility with the waste(s) to be stored or treated to ensure that it will not collapse, rupture, or fail. At a minimum, this assessment must consider the following:

(1) Design standard(s), if available, according to which the tank and ancillary equipment were constructed;

(2) Hazardous characteristics of the waste(s) that have been or will be handled;

(3) Existing corrosion protection measures;

(4) Documented age of the tank system, if available, (otherwise, an estimate of the age); and

(5) Results of a leak test, internal inspection, or other tank integrity examination such that:

(i) For non-enterable underground tanks, this assessment must consist of a leak test that is capable of taking into account the effects of temperature variations, tank end deflection, vapor pockets, and high water table effects.

(ii) For other than non-enterable underground tanks and for ancillary equipment, this assessment must be

either a leak test, as described above, or an internal inspection and/or other tank integrity examination certified by an independent, qualified, registered professional engineer in accordance with § 270.11(d) that addresses cracks, leaks, corrosion, and erosion.

[Note.—The practices described in the American Petroleum Institute (API) Publication, Guide for Inspection of Refinery Equipment, Chapter XIII, "Atmospheric and Low-Pressure Storage Tanks," 4th edition, 1981, may be used, where applicable, as guidelines in conducting the integrity examination of an other than non-enterable underground tank system.]

(c) Tank systems that store or treat materials that become hazardous wastes subsequent to July 14, 1986 must conduct this assessment within 12 months after the date that the waste becomes a hazardous waste.

(d) If, as a result of the assessment conducted in accordance with paragraph (a) of this section, a tank system is found to be leaking or unfit for use, the owner or operator must comply with the requirements of § 265.196.

(Information collection requirements contained in paragraphs (a)–(d) were approved by the Office of Management and Budget under control number 2050-0050.)

§ 265.192 Design and installation of new tank systems or components.

(a) Owners or operators of new tank systems or components must ensure that the foundation, structural support, seams, connections, and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection so that it will not collapse, rupture, or fail. The owner or operator must obtain a written assessment reviewed and certified by an independent, qualified, registered professional engineer in accordance with § 270.11(d) attesting that the system has sufficient structural integrity and is acceptable for the storing and treating of hazardous waste. This assessment must include, at a minimum, the following information:

(1) Design standard(s) according to which the tank(s) and ancillary equipment is or will be constructed.

(2) Hazardous characteristics of the waste(s) to be handled.

(3) For new tank systems or components in which the external shell of a metal tank or any external metal component of the tank system is or will be in contact with the soil or with water, a determination by a corrosion expert of:

(i) Factors affecting the potential for corrosion, including but not limited to:

- (A) Soil moisture content;
- (B) Soil pH;
- (C) Soil sulfides level;
- (D) Soil resistivity;
- (E) Structure to soil potential;
- (F) Influence of nearby underground metal structures (e.g., piping);
- (G) Stray electric current;
- (H) Existing corrosion-protection measures (e.g., coating, cathodic protection), and

(ii) The type and degree of external corrosion protection that are needed to ensure the integrity of the tank system during the use of the tank system or component, consisting of one or more of the following:

- (A) Corrosion-resistant materials of construction such as special alloys, fiberglass-reinforced plastic, etc.;
- (B) Corrosion-resistant coating (such as epoxy, fiberglass, etc.) with cathodic protection (e.g., impressed current or sacrificial anodes); and
- (C) Electrical isolation devices such as insulating joints, flanges, etc.

[Note.—The practices described in the National Association of Corrosion Engineers (NACE) standard, "Recommended Practice (RP-02-85)—Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems," and the American Petroleum Institute (API) Publication 1632, "Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems," may be used, where applicable, as guidelines in providing corrosion protection for tank systems.]

(4) For underground tank system components that are likely to be affected by vehicular traffic, a determination of design or operational measures that will protect the tank system against potential damage; and

(5) Design considerations to ensure that:

- (i) Tank foundations will maintain the load of a full tank;
- (ii) Tank systems will be anchored to prevent flotation or dislodgement where the tank system is placed in a saturated zone, or is located within a seismic fault zone; and
- (iii) Tank systems will withstand the effects of frost heave.

(b) The owner or operator of a new tank system must ensure that proper handling procedures are adhered to in order to prevent damage to the system during installation. Prior to covering, enclosing, or placing a new tank system or component in use, an independent, qualified installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of tank systems, must

inspect the system or component for the presence of any of the following items:

- (1) Weld breaks;
- (2) Punctures;
- (3) Scrapes of protective coatings;
- (4) Cracks;
- (5) Corrosion;
- (6) Other structural damage or inadequate construction or installation.

All discrepancies must be remedied before the tank system is covered, enclosed, or placed in use.

(c) New tank systems or components and piping that are placed underground and that are backfilled must be provided with a backfill material that is a noncorrosive, porous, homogeneous substance and that is carefully installed so that the backfill is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported.

(d) All new tanks and ancillary equipment must be tested for tightness prior to being covered, enclosed or placed in use. If a tank system is found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the tank system being covered, enclosed, or placed in use.

(e) Ancillary equipment must be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion or contraction.

[Note.—The piping system installation procedures described in American Petroleum Institute (API) Publication 1615 (November 1979), "Installation of Underground Petroleum Storage Systems," or ANSI Standard B31.3, "Petroleum Refinery System," may be used, where applicable, as guidelines for proper installation of piping systems.]

(f) The owner or operator must provide the type and degree of corrosion protection necessary, based on the information provided under paragraph (a)(3) of this section, to ensure the integrity of the tank system during use of the tank system. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation.

(g) The owner or operator must obtain and keep on file at the facility written statements by those persons required to certify the design of the tank system and supervise the installation of the tank system in accordance with the requirements of paragraphs (b) through (f) of this section to attest that the tank system was properly designed and installed and that repairs, pursuant to paragraphs (b) and (d) of this section were performed. These written statements must also include the

certification statement as required in § 270.11(d) of this chapter.

(Information collection requirements contained in paragraphs (a) and (g) were approved by the Office of Management and Budget under control number 2050-0050.)

§ 265.193 Containment and detection of releases.

(a) In order to prevent the release of hazardous waste or hazardous constituents to the environment, secondary containment that meets the requirements of this section must be provided (except as provided in paragraphs (f) and (g) of this section):

(1) For all new tank systems or components, prior to their being put into service;

(2) For all existing tanks used to store or treat EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027, within two years after January 12, 1987;

(3) For those existing tank systems of known and documentable age, within two years after January 12, 1987, or when the tank systems have reached 15 years of age, whichever comes later;

(4) For those existing tank system for which the age cannot be documented, within eight years of January 12, 1987; but if the age of the facility age is greater than seven years, secondary containment must be provided by the time the facility reaches 15 years of age, or within two years of January 12, 1987, whichever comes later; and

(5) For tank systems that store or treat materials that become hazardous wastes subsequent to January 12, 1987, within the time intervals required in paragraphs (a)(1) through (a)(4) of this section, except that the date that a material becomes a hazardous waste must be used in place of January 12, 1987.

(b) Secondary containment systems must be:

(1) Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time during the use of the tank system; and

(2) Capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

(c) To meet the requirements of paragraph (b) of this section, secondary containment systems must be at a minimum:

(1) Constructed of or lined with materials that are compatible with the waste(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrological forces),

physical contact with the waste to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation (including stresses from nearby vehicular traffic);

(2) Placed on a foundation or base capable of providing support to the secondary containment system and resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression, or uplift;

(3) Provided with a leak detection system that is designed and operated so that it will detect the failure of either the primary and secondary containment structure or any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time if the existing detection technology or site conditions will not allow detection of a release within 24 hours;

(4) Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health or the environment, if removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours.

[Note.—If the collected material is a hazardous waste under Part 261 of this chapter, it is subject to management as a hazardous waste in accordance with all applicable requirements of Parts 262 through 265 of this chapter. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to Publicly Owned Treatment Works (POTWs), it is subject to the requirements of section 307 of the Clean Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR Part 302.]

(d) Secondary containment for tanks must include one or more of the following devices:

- (1) A liner (external to the tank);
- (2) A vault;
- (3) A double-walled tank; or
- (4) An equivalent device as approved by the Regional Administrator.

(e) In addition to the requirements of paragraphs (b), (c), and (d) of this section, secondary containment systems must satisfy the following requirements:

(1) External liner systems must be:

- (i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;
- (ii) Designed or operated to prevent run-on or infiltration of precipitation

into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;

(iii) Free of cracks or gaps; and

(iv) Designed and installed to completely surround the tank and to cover all surrounding earth likely to come into contact with the waste if released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste).

(2) Vault systems must be:

(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;

(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;

(iii) Constructed with chemical-resistant water stops in place at all joints (if any);

(iv) Provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete;

(v) Provided with a means to protect against the formation of and ignition of vapors within the vault, if the waste being stored or treated:

(A) Meets the definition of ignitable waste under § 262.21 of this chapter, or

(B) Meets the definition of reactive waste under § 262.21 of this chapter and may form an ignitable or explosive vapor; and

(vi) Provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the vault if the vault is subject to hydraulic pressure.

(3) Double-walled tanks must be:

(i) Designed as an integral structure (i.e., an inner tank within an outer shell) so that any release from the inner tank is contained by the outer shell;

(ii) Protected, if constructed of metal, from both corrosion of the primary tank interior and the external surface of the outer shell; and

(iii) Provided with a built-in, continuous leak detection system capable of detecting a release within 24 hours or at the earliest practicable time, if the owner or operator can demonstrate to the Regional Administrator, and the Regional Administrator concurs, that the existing

leak detection technology or site conditions will not allow detection of a release within 24 hours.

[Note.—The provisions outlined in the Steel Tank Institute's (STI) "Standard for Dual Wall Underground Steel Storage Tank" may be used as guidelines for aspects of the design of underground steel double-walled tanks.]

(f) Ancillary equipment must be provided with full secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of paragraphs (b) and (c) of this section except for:

(1) Aboveground piping (exclusive of flanges, joints, valves, and connections) that are visually inspected for leaks on a daily basis;

(2) Welded flanges, welded joints, and welded connections that are visually inspected for leaks on a daily basis;

(3) Sealless or magnetic coupling pumps that are visually inspected for leaks on a daily basis; and

(4) Pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis.

(g) The owner or operator may obtain a variance from the requirements of this Section if the Regional Administrator finds, as a result of a demonstration by the owner or operator, either:

(1) That alternative design and operating practices, together with location characteristics, will prevent the migration of hazardous waste or hazardous constituents into the ground water or surface water at least as effectively as secondary containment during the active life of the tank system or (2) that in the event of a release that does migrate to ground water or surface water, no substantial present or potential hazard will be posed to human health or the environment. New underground tank systems may not, per a demonstration in accordance with paragraph (g)(2) of this section, be exempted from the secondary containment requirements of this section. Application for a variance as allowed in paragraph (g) of this section does not waive compliance with the requirements of this Subpart for new tank systems.

(1) In deciding whether to grant a variance based on a demonstration of equivalent protection of ground water and surface water, the Regional Administrator will consider:

(i) The nature and quantity of the waste;

(ii) The proposed alternate design and operation;

(iii) The hydrogeologic setting of the facility, including the thickness of soils between the tank system and ground water; and

(iv) All other factors that would influence the quality and mobility of the hazardous constituents and the potential for them to migrate to ground water or surface water.

(2) In deciding whether to grant a variance, based on a demonstration of no substantial present or potential hazard, the Regional Administrator will consider:

(i) The potential adverse effects on ground water, surface water, and land quality taking into account:

(A) The physical and chemical characteristics of the waste in the tank system, including its potential for migration,

(B) The hydrogeological characteristics of the facility and surrounding land,

(C) The potential for health risks caused by human exposure to waste constituents,

(D) The potential for damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents, and

(E) The persistence and permanence of the potential adverse effects;

(ii) The potential adverse effects of a release on ground-water quality, taking into account:

(A) The quantity and quality of ground water and the direction of ground-water flow,

(B) The proximity and withdrawal rates of water in the area,

(C) The current and future uses of ground water in the area, and

(D) The existing quality of ground water, including other sources of contamination and their cumulative impact on the ground-water quality;

(iii) The potential adverse effects of a release on surface water quality, taking into account:

(A) The quantity and quality of ground water and the direction of ground-water flow,

(B) The patterns of rainfall in the region,

(C) The proximity of the tank system to surface waters,

(D) The current and future uses of surface waters in the area and any water quality standards established for those surface waters, and

(E) The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality; and

(iv) The potential adverse effects of a release on the land surrounding the tank system, taking into account:

(A) The patterns of rainfall in the region, and

(B) The current and future uses of the surrounding land.

(3) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system but has not migrated beyond the zone of engineering control (as established in the variance), must:

(i) Comply with the requirements of § 265.196, except paragraph (d); and

(ii) Decontaminate or remove contaminated soil to the extent necessary to:

(A) Enable the tank system, for which the variance was granted, to resume operation with the capability for the detection of and response to releases at least equivalent to the capability it had prior to the release, and

(B) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water; and

(iii) If contaminated soil cannot be removed or decontaminated in accordance with paragraph (g)(3)(ii) of this section, comply with the requirements of § 264.197(b);

(4) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system and has migrated beyond the zone of engineering control (as established in the variance), must:

(i) Comply with the requirements of § 265.196(a), (b), (c), and (d); and

(ii) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water, if possible, and decontaminate or remove contaminated soil. If contaminated soil cannot be decontaminated or removed, or if ground water has been contaminated, the owner or operator must comply with the requirements of § 265.197(b);

(iii) If repairing, replacing, or reinstalling the tank system, provide secondary containment in accordance with the requirements of paragraphs (a) through (f) of this section or reapply for a variance from secondary containment and meet the requirements for new tank systems in § 265.192 if the tank system is replaced. The owner or operator must comply with these requirements even if contaminated soil can be

decontaminated or removed, and ground water or surface water has not been contaminated.

(h) The following procedures must be followed in order to request a variance from secondary containment:

(1) The Regional Administrator must be notified in writing by the owner or operator that he intends to conduct and submit a demonstration for a variance from secondary containment as allowed in paragraph (g) of this section according to the following schedule:

(i) For existing tank systems, at least 24 months prior to the date that secondary containment must be provided in accordance with paragraph (a) of this section; and

(ii) For new tank systems, at least 30 days prior to entering into a contract for installation of the tank system.

(2) As part of the notification, the owner or operator must also submit to the Regional Administrator a description of the steps necessary to conduct the demonstration and a timetable for completing each of the steps. The demonstration must address each of the factors listed in paragraph (g)(1) or paragraph (g)(2) of this section.

(3) The demonstration for a variance must be completed and submitted to the Regional Administrator within 180 days after notifying the Regional Administrator of intent to conduct the demonstration.

(4) The Regional Administrator will inform the public, through a newspaper notice, of the availability of the demonstration for a variance. The notice shall be placed in a daily or weekly major local newspaper of general circulation and shall provide at least 30 days from the date of the notice for the public to review and comment on the demonstration for a variance. The Regional Administrator also will hold a public hearing, in response to a request or at his own discretion, whenever such a hearing might clarify one or more issues concerning the demonstration for a variance. Public notice of the hearing will be given at least 30 days prior to the date of the hearing and may be given at the same time as notice of the opportunity for the public to review and comment on the demonstration. These two notices may be combined.

(5) The Regional Administrator will approve or disapprove the request for a variance within 90 days of receipt of the demonstration from the owner or operator and will notify in writing the owner or operator and each person who submitted written comments or requested notice of the variance decision. If the demonstration for a variance is incomplete or does not

include sufficient information, the 90-day time period will begin when the Regional Administrator receives a complete demonstration, including all information necessary to make a final determination. If the public comment period in paragraph (h)(4) of this section is extended, the 90-day time period will be similarly extended.

(i) All tank systems, until such time as secondary containment meeting the requirements of this section is provided, must comply with the following:

(1) For non-enterable underground tanks, a leak test that meets the requirements of § 265.191(a) must be conducted at least annually;

(2) For other than non-enterable underground tanks and for all ancillary equipment, an annual leak test, as described in paragraph (i)(1) of this section, or an internal inspection or other tank integrity examination by an independent, qualified, registered professional engineer that addresses cracks, leaks, corrosion, and erosion must be conducted at least annually. The owner or operator must remove the stored waste from the tank, if necessary, to allow the condition of all internal tank surfaces to be assessed.

[Note.—The practices described in the American Petroleum Institute (API) Publication Guide for Inspection of Refining Equipment, Chapter XIII, "Atmospheric and Low Pressure Storage Tanks," 4th edition, 1981, may be used, when applicable, as guidelines for assessing the overall condition of the tank system.]

(3) The owner or operator must maintain on file at the facility a record of the results of the assessments conducted in accordance with paragraphs (i)(1) through (i)(3) of this section.

(4) If a tank system or component is found to be leaking or unfit-for-use as a result of the leak test or assessment in paragraphs (i)(1) through (i)(3) of this section, the owner or operator must comply with the requirements of § 265.196.

(Information collection requirements contained in paragraphs (c)–(e) and (g)–(i) were approved by the Office of Management and Budget under control number 2050–0050.)

§ 265.194 General operating requirements.

(a) Hazardous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the secondary containment system to rupture, leak, corrode, or otherwise fail.

(b) The owner or operator must use appropriate controls and practices to prevent spills and overflows from tank or secondary containment systems. These include at a minimum:

(1) Spill prevention controls (e.g., check valves, dry discount couplings);

(2) Overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff, or bypass to a standby tank); and

(3) Maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.

(c) The owner or operator must comply with the requirements of § 265.196 if a leak or spill occurs in the tank system.

(Information collection requirements contained in paragraphs (c) were approved by the Office of Management and Budget under control number 2050–0050.)

§ 265.195 Inspections.

(a) The owner or operator must inspect, where present, at least once each operating day:

(1) Overfill/spill control equipment (e.g., waste-feed cutoff systems, bypass systems, and drainage systems) to ensure that it is in good working order;

(2) The aboveground portions of the tank system, if any, to detect corrosion or releases of waste;

(3) Data gathered from monitoring equipment and leak-detection equipment, (e.g., pressure and temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and

(4) The construction materials and the area immediately surrounding the externally accessible portion of the tank system including secondary containment structures (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation);

[Note.—Section 265.15(c) requires the owner or operator to remedy any deterioration or malfunction he finds. Section 265.196 requires the owner or operator to notify the Regional Administrator within 24 hours of confirming a release. Also, 40 CFR Part 302 may require the owner or operator to notify the National Response Center of a release.]

(b) The owner or operator must inspect cathodic protection systems, if present, according to, at a minimum, the following schedule to ensure that they are functioning properly:

(1) The proper operation of the cathodic protection system must be confirmed within six months after initial installation, and annually thereafter; and

(2) All sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly (i.e., every other month).

[Note.—The practices described in the National Association of Corrosion Engineers (NACE) standard, "Recommended Practice

(RP-02-85)—Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems," and the American Petroleum Institute (API) Publication 1632, "Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems," may be used, where applicable, as guidelines in maintaining and inspecting cathodic protection systems.]

(c) The owner or operator must document in the operating record of the facility an inspection of those items in paragraphs (a) and (b) of this section.

(Information collection requirements contained in paragraphs (a)–(c) were approved by the Office of Management and Budget under control number 2050–0050.)

§ 265.196 Response to leaks or spills and disposition of leaking or unfit-for-use tank systems.

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:

(a) *Cessation of use; prevent flow or addition of wastes.* The owner or operator must immediately stop the flow of hazardous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release.

(b) *Removal of waste from tank system or secondary containment system.* (1) If the release was from the tank system, the owner or operator must, within 24 hours after detection of the leak or, if the owner or operator demonstrates that that is not possible, at the earliest practicable time remove as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank system to be performed.

(2) If the release was to a secondary containment system, all released materials must be removed within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment.

(c) *Containment of visible releases to the environment.* The owner or operator must immediately conduct a visual inspection of the release and, based upon that inspection:

(1) Prevent further migration of the leak or spill to soils or surface water; and

(2) Remove, and properly dispose of, any visible contamination of the soil or surface water.

(d) *Notifications, reports.* (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

(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.

(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.

(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.

[Note.—The Regional Administrator may, on the basis of any information received that there is or has been a release of hazardous waste or hazardous constituents into the environment, issue an order under RCRA sections 3004(w), 3008(h), or 7003(a) requiring corrective action or such other response as deemed necessary to protect human health or the environment.]

[Note.—See § 265.15(c) for the requirements necessary to remedy a failure. Also, 40 CFR Part 302 requires the owner or operator to notify the National Response Center of a release of any "reportable quantity." (Information collection requirements contained in paragraphs (d)–(f) were approved by the Office of Management and Budget under control number 2050–0050.)

§ 265.197 Closure and post-closure care.

(a) At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste, unless § 261.3(d) of this Chapter applies. The closure plan, closure activities, cost estimates for closure, and financial responsibility for tank systems must meet all of the requirements specified in Subparts G and H of this Part.

(b) If the owner or operator demonstrates that not all contaminated

soils can be practicably removed or decontaminated as required in paragraph (a) of this section, then the owner or operator must close the tank system and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills (§ 265.310). In addition, for the purposes of closure, post-closure, and financial responsibility, such a tank system is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in Subparts G and H of this Part.

(c) If an owner or operator has a tank system which does not have secondary containment that meets the requirements of § 265.193(b) through (f) and which is not exempt from the secondary containment requirements in accordance with § 265.193(g), then,

(1) The closure plan for the tank system must include both a plan for complying with paragraph (a) of this section and a contingent plan for complying with paragraph (b) of this section.

(2) A contingent post-closure plan for complying with paragraph (b) of this section must be prepared and submitted as part of the permit application.

(3) The cost estimates calculated for closure and post-closure care must reflect the costs of complying with the contingent closure plan and the contingent post-closure plan, if these costs are greater than the costs of complying with the closure plan prepared for the expected closure under paragraph (a) of this section.

(4) Financial assurance must be based on the cost estimates in paragraph (c)(3) of this section.

(5) For the purposes of the contingent closure and post-closure plans, such a tank system is considered to be a landfill, and the contingent plans must meet all of the closure, post-closure, and financial responsibility requirements for landfills under Subparts G and H of this Part.

(Information collection requirements contained in paragraphs (a)–(c) were approved by the Office of Management and Budget under control number 2050–0050.)

§ 265.198 Special requirements for ignitable or reactive wastes.

(a) Ignitable or reactive waste must not be placed in a tank system, unless:

(1) The waste is treated, rendered, or mixed before or immediately after placement in the tank system so that:

(i) The resulting waste, mixture, or dissolved material no longer meets the definition of ignitable or reactive waste

under §§ 261.21 or 261.23 of this Chapter; and

(ii) Section 265.17(b) is complied with; or

(2) The waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react; or

(3) The tank system is used solely for emergencies.

(b) The owner or operator of a facility where ignitable or reactive waste is stored or treated in tanks must comply with the requirements for the maintenance of protective distances between the waste management area and any public ways, streets, alleys, or an adjoining property line that can be built upon as required in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code," (1977 or 1981), (incorporated by reference, see § 260.11).

§ 265.199 Special requirements for incompatible wastes.

(a) Incompatible wastes, or incompatible waste and materials, must not be placed in the same tank system, unless § 265.17(b) is complied with.

(b) Hazardous waste must not be placed in a tank system that has not been decontaminated and that previously held an incompatible waste or material, unless § 265.17(b) is complied with.

§ 265.200 Waste analysis and trial tests.

In addition to performing the waste analysis required by § 265.13, the owner or operator must, whenever a tank system is to be used to treat chemically or to store a hazardous waste that is substantially different from waste previously treated or stored in that tank system; or treat chemically a hazardous waste with a substantially different process than any previously used in that tank system:

(a) Conduct waste analyses and trial treatment or storage tests (e.g., bench-scale or pilot-plant scale tests); or

(b) Obtain written, documented information on similar waste under similar operating conditions to show that the proposed treatment or storage will meet the requirements of § 265.194(a).

[Note.—Section 265.13 requires the waste analysis plan to include analyses needed to comply with §§ 265.198 and 265.199. Section 265.73 requires the owner or operator to place the results from each waste analysis and trial test, or the documented information, in the operating record of the facility.]

§ 265.201 Special requirements for generators of between 100 and 1,000 kg/mo that accumulate hazardous waste in tanks.

(a) The requirements of this section apply to small quantity generators of more than 100 kg but less than 1,000 kg of hazardous waste in a calendar month, that accumulate hazardous waste in tanks for less than 180 days (or 270 days if the generator must ship the waste greater than 200 miles), and do not accumulate over 6,000 kg on-site at any time.

(b) Generators of between 100 and 1,000 kg/mo hazardous waste must comply with the following general operating requirements:

(1) Treatment or storage of hazardous waste in tanks must comply with § 265.17(b).

(2) Hazardous wastes or treatment reagents must not be placed in a tank if they could cause the tank or its inner liner to rupture, leak, corrode, or otherwise fail before the end of its intended life.

(3) Uncovered tanks must be operated to ensure at least 60 centimeters (2 feet) of freeboard, unless the tank is equipped with a containment structure (e.g., dike or trench), a drainage control system, or a diversion structure (e.g., standby tank) with a capacity that equals or exceeds the volume of the top 60 centimeters (2 feet) of the tank.

(4) Where hazardous waste is continuously fed into a tank, the tank must be equipped with a means to stop this inflow (e.g., waste feed cutoff system or by-pass system to a stand-by tank).

[Note.—These systems are intended to be used in the event of a leak or overflow from the tank due to a system failure (e.g., a malfunction in the treatment process, a crack in the tank, etc.).]

(c) Generators of between 100 and 1,000 kg/mo accumulating hazardous waste in tanks must inspect, where present:

(1) Discharge control equipment (e.g., waste feed cutoff systems, by-pass systems, and drainage systems) at least once each operating day, to ensure that it is in good working order;

(2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges) at least once each operating day to ensure that the tank is being operated according to its design;

(3) The level of waste in the tank at least once each operating day to ensure compliance with § 265.192(c);

(4) The construction materials of the tank at least weekly to detect corrosion or leaking of fixtures or seams; and

(5) The construction materials of, and the area immediately surrounding,

discharge confinement structures (e.g., dikes) at least weekly to detect erosion or obvious signs of leakage (e.g., wet spots or dead vegetation).

[Note.—As required by § 265.15(c), the owner or operator must remedy any deterioration or malfunction he finds.]

(d) Generators of between 100 and 1,000 kg/mo accumulating hazardous waste in tanks must, upon closure of the facility, remove all hazardous waste from tanks, discharge control equipment, and discharge confinement structures.

[Note.—At closure, as throughout the operating period, unless the owner or operator can demonstrate, in accordance with § 261.3(c) or (d) of this chapter, that any solid waste removed from his tank is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of this chapter.]

(e) Generators of between 100 and 1,000 kg/mo must comply with the following special requirements for ignitable or reactive waste:

(1) Ignitable or reactive waste must not be placed in a tank, unless:

(i) The waste is treated, rendered, or mixed before or immediately after placement in a tank so that (A) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under § 261.21 or § 261.23 of this Chapter, and (B) § 265.17(b) is complied with; or

(ii) The waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react; or

(iii) The tank is used solely for emergencies.

(2) The owner or operator of a facility which treats or stores ignitable or reactive waste in covered tanks must comply with the buffer zone requirements for tanks contained in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code," (1977 or 1981) (incorporated by reference, see § 260.11).

(f) Generators of between 100 and 1,000 kg/mo must comply with the following special requirements for incompatible wastes:

(1) Incompatible wastes, or incompatible wastes and materials, (see Appendix V for examples) must not be placed in the same tank, unless § 265.17(b) is complied with.

(2) Hazardous waste must not be placed in an unwashed tank which previously held an incompatible waste

or material, unless § 265.17(b) is complied with.

PART 270—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

40 CFR Part 270 is amended as follows:

22. The authority citation for Part 270 continues to read as follows:

Authority: Secs. 1006, 2002, 3005, 3007, 3019, and 7004 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912, 6925, 6927, 6939, and 6974).

23. Section 270.14 is amended by revising paragraphs (b)(5) and (b)(13) to read as follows:

§ 270.14 Contents of Part B: general requirements.

* * * * *

(b) * * *

(5) A copy of the general inspection schedule required by § 264.15(b); include where applicable, as part of the inspection schedule, specific requirements in §§ 264.174, 264.193(i), 264.195, 264.226, 264.254, 264.273, and 264.303.

* * * * *

(13) A copy of the closure plan and, where applicable, the post-closure plan required by §§ 264.112, 264.118, and 264.197. Include, where applicable, as part of the plans, specific requirements in §§ 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, and 264.351.

* * * * *

24. Section 270.16, is revised to read as follows:

§ 270.16 Specific Part B information requirements for tank systems.

Except as otherwise provided in § 264.190, owners and operators of facilities that use tanks to store or treat hazardous waste must provide the following additional information:

(a) A written assessment that is reviewed and certified by an independent, qualified, registered professional engineer to the structural integrity and suitability for handling

hazardous waste of each tank system, as required under §§ 264.191 and 264.192;

(b) Dimensions and capacity of each tank;

(c) Description of feed systems, safety cutoff, bypass systems, and pressure controls (e.g., vents);

(d) A diagram of piping, instrumentation, and process flow for each tank system;

(e) A description of materials and equipment used to provide external corrosion protection, as required under § 264.191(c);

(f) For new tank systems, a detailed description of how the tank system(s) will be installed in compliance with § 264.192 (b), (c), (d), and (e);

(g) Detailed plans and description of how the secondary containment system for each tank system is or will be designed, constructed, and operated to meet the requirements of § 264.193 (a), (b), (c), (d), (e), and (f);

(h) For tank systems for which a variance from the requirements of § 264.193 is sought (as provided by § 264.193(g)):

(1) Detailed plans and engineering and hydrogeologic reports, as appropriate, describing alternate design and operating practices that will, in conjunction with location aspects, prevent the migration of any hazardous waste or hazardous constituents into the ground water or surface water during the life of the facility, or

(2) A detailed assessment of the substantial present or potential hazards posed to human health or the environment should a release enter the environment.

(i) Description of controls and practices to prevent spills and overflows, as required under § 264.194(b); and

(j) For tank systems in which ignitable, reactive, or incompatible wastes are to be stored or treated, a description of how operating procedures and tank system and facility design will achieve compliance with the requirements of §§ 264.198 and 264.199.

(Information collection requirements contained in paragraphs (a)-(j) were approved by the Office of Management and Budget under control number 2050-0050.)

§ 270.72 [Amended].

25. In § 270.72, paragraph (e) is amended by adding the following sentence after the last sentence:

§ 270.72 Changes during interim status.

* * * * *

(e) * * * Changes under this section do not include changes made solely for the purpose of complying with requirements of § 265.193 for tanks and ancillary equipment.

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

26. The authority citation for Part 271 continues to read as follows:

Authority: Sec. 1006, 2002(a), and 3006 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), and 6926).

§ 271.1 [Amended]

27. In § 271.1, paragraph (j) is amended by adding the following entry to Table 1 in chronological order by date of publication:

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Date	Title of Regulation	Federal Register Reference
July 14, 1986.....	Hazardous Waste Tank Regulations ¹ —260.10; 262.34(a)(1); 264.110; 264.140; 264.190–264.199; 265.110; 265.140; 265.190–265.200; 270.14(b); 270.16; and 270.72(e).	51 FR [Insert page number]

¹These regulations implement HSWA only to the extent that they apply to tank systems owned or operated by small quantity generators, establish leak detection requirements for all new underground tank systems, and establish permitting standards for underground tank systems that cannot be entered for inspection.

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