

BACKGROUND DOCUMENT

RESOURCE CONSERVATION AND RECOVERY ACT
SUBTITLE C - HAZARDOUS WASTE MANAGEMENT

SECTION 3004 - STANDARDS APPLICABLE TO
OWNERS AND OPERATORS OF HAZARDOUS WASTE
TREATMENT, STORAGE, AND DISPOSAL FACILITIES

40 CFR PART 265

GENERAL COMMENTS ON STORAGE

SUBPART I - INTERIM STATUS STANDARDS FOR THE USE AND MANAGEMENT
OF CONTAINERS

SUBPART L - INTERIM STATUS STANDARDS FOR WASTE PILES

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF SOLID WASTE

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I. INTRODUCTION

This is one of a series of background documents accompanying promulgation of the initial hazardous waste management regulations issued under Subtitle C of the Resource Conservation and Recovery Act. These regulations represent EPA's initial efforts to control hazardous wastes from the point of generation, through transportation, treatment, and storage, to the point of ultimate disposal.

This document, and the others in this series, attempt to explain why the regulations were developed and why they have come to be written the way they are. In so doing, EPA addresses: (a) the Congressional mandate for regulation, (b) the need for the regulation based on threats and impacts to human health and the environment, (c) precedents set by state and other Federal regulations and, perhaps most importantly, (d) analysis of and response to the many comments received on the proposed version of these regulations, which were published in the Federal Register on December 18, 1978.

This background document is limited in scope to containers and piles and to issues concerning storage in general. Wastes are commonly stored and transported in containers and stored in piles. Special requirements for transportation of containers are included in Part 263. Wastes containing no liquids can be disposed in containers but, under these regulations, only in accordance with the landfill requirements of Subpart N. Disposal in piles (as opposed to storage) must also meet the landfill requirements of Subpart N. Treatment can be, but is not often, carried out in containers and piles. Since

disposal in piles and in containers is covered by the landfill regulations, these regulations and this background document focus on storage of hazardous wastes in containers and piles, and those few instances where treatment is carried out in them.

The proposed regulations allowed storage only in tanks and containers. This flowed from the Agency's no-discharge view of storage. The Agency has reevaluated its⁵ view of storage, and the current regulations now permit storage in other devices and facilities as well, including piles and surface impoundments. The general regulations on storage have therefore been incorporated as appropriate into the regulations for specific devices and facilities, and the section labeled "storage" has been deleted. Comments on the proposed storage regulations are still relevant to the interim status regulations, of course, and are addressed here. The Agency has also recognized that treatment may occasionally be conducted in piles and containers, although the regulations of piles and containers are focused on storage.

These regulations and this document are also limited to those standards applicable during the interim status period, i.e., during that period between the effective date of the regulations and the receipt of a permit by a particular facility. In general, the Agency is promulgating for interim status only those requirements which:

- (a) can be implemented by the regulated community within the six-month period between the time these regulations are promulgated and their effective date, and

- (b) do not require large capital expenditures for items which require approval as part of the permitting process
- (c) can be implemented directly by the regulated community without the need for consultation with or interpretation by the Agency

These criteria were only used as a general guide in selecting interim status standards. The Agency has included other standards in the interim status regulations when it believed that the benefits to be gained by a certain provision justified it. The Agency has also revised many of the proposed standards so that the variance procedures ("notes" in the proposed regulations) do not require interaction with the Agency. The Agency believes that a number of the technical requirements for design and construction of container storage facilities and facilities storing in piles cannot properly be implemented during interim status. The costs of upgrading these facilities may be considerable, and the designs will require Agency approval, which is properly part of the permit issuance process. The Agency is convinced that these interim status standards for storage, which primarily improve operating procedures, will substantially reduce the incidence of careless and sloppy storage practices, which have all too frequently resulted in serious problems in the past.

Key Definitions

1. Statutory Definitions

The following statutory definitions in Section 1004 of RCRA are pertinent to the hazardous waste container and pile standards under Section 3004:

- (33) "The term 'storage', when used in connection with hazardous waste, means the containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste."
- (3) "The term 'disposal' means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters."

2. Regulatory Definitions

The following terms, which are defined in Part 261, are also key to this area of regulation:

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

[Comment: The portability of containers is the primary distinguishing characteristic which separates containers from tanks.]
- "Incompatible waste" means a hazardous waste which is unsuitable for:
 - (i) Placement in a particular device or facility because it may cause corrosion or decay of containment materials (e.g., container inner liners or tank walls); or
 - (ii) Commingling with another waste or material under uncontrolled conditions because the commingling might produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes, or gases, or flammable fumes or gases.

(See Appendix I in this background document for examples).

[Comment: This definition has been changed slightly from the proposed version in two ways. First, the phrase "under uncontrolled conditions" has been added, in response to comments, to make it clear that waste which are commingled under controlled conditions as a treatment process (e.g., acidic and basic wastes for neutralization) are not "incompatible waste" under these regulations and may, therefore, be mixed in storage containers.

In addition, a subparagraph relating to the proposed Air Human Health and Environmental standards has been dropped, since those standards are no longer part of these regulations. The elimination of the Air Human Health and Environmental standard is discussed elsewhere in this background document.]

- "Pile" means any non-containerized accumulation of solid, non-flowing hazardous waste that is used for treatment or storage.

[Comment: This is a new definition, included as a result of the decision to allow hazardous wastes to be stored in other than tanks and containers. Piles are primarily used as a storage device. This definition requires that storage in piles release

no wastes or hazardous waste constituents to the soil or surface waters. Thus, unless the piled waste does not leach or is protected from rainfall and surface runoff in some manner, it must be constructed so as to contain leachate and runoff. Piled wastes which do not provide this safeguard will be considered to be landfills and will be subject to the landfill regulations.]

- "Storage" means the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

[Comment: This new definition expands and clarifies the definition in the Act. It makes clear that the difference between storage and disposal is one of intent to remove the waste after a limited time, rather than any difference in facilities and equipment.]

- "Surface impoundment" or "impoundment" means a facility or part of a facility which is a natural topographic depression, man-made excavation or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.
- "Tank" means 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 the structural support.

The following definitions have been removed from the Part 260 regulations: storage facility, empty container, and triple rinsed. Either these terms are no longer used or the Agency has concluded that the regulatory definitions would add nothing to the meanings of the terms which are obvious from their common meaning and context in the regulations. Some or all of these terms may be defined in later promulgations if it becomes necessary.

II. RATIONALE FOR REGULATION

A. Statutory Authority

Section 3004 of the Solid Waste Disposal Act, as substantially amended by the Resource Conservation and Recovery Act (RCRA) of 1976, as amended (42 USC §§ 6901 et. seq.), requires the Environmental Protection Agency (EPA) to promulgate regulations establishing performance standards applicable to owners and operators of hazardous waste treatment, storage, and disposal facilities, as may be necessary to protect human health and the environment. Sections 3004(3) and (4) further require that these standards include, but not be limited to, requirements with respect to:

"(3) treatment, storage, or disposal of all such waste received by the facility pursuant to such operating methods, techniques, and practices as may be satisfactory to the Administrator"; [and]

"(4) the location, design, and construction of such hazardous waste treatment, disposal, or storage facilities."

To comply with this mandate, therefore, it is necessary to establish regulations that will assure that human health and the environment are protected from the potential adverse effects of storing hazardous waste.

B. Damage Cases

EPA has received numerous reports of health and environmental damage caused by improper storage of hazardous wastes. The following summarize some of the more graphic cases:

- (a) In 1977, a 20,000-gallon storage tank filled with highly-flammable waste (a solvent and ethyl acetate) exploded at a chemical waste disposal site in New Jersey. Eleven other storage tanks were ruptured in the blast, releasing heavy chemical fumes. Three tanks were blown into the air and thrown several hundred feet across the plant. The tanks were interconnected by a common vapor recovery system, which may have allowed the flame to spread through the system to all the tanks. The tanks were being renovated by a contractor at the time of the fire. The cause of the explosion is suspected to be improper welding, a lighted cigarette, or some other worker-related incident. Six workmen were killed and 30 others injured.(1,2)
- (b) An employee transferred two 5-gallon cans of waste vinyl cyanide, and water from a still to a supposedly empty waste drum. As the employee rolled the drum to a storage area across the road, it exploded. Waste material sprayed the employee. The drum was thrown approximately 48 feet, wrapping around a steel guard post. The employee received thermal and possible chemical burns to both feet. The exothermic reaction that caused the drum to rupture was probably a combination of cyanoethylation and polymerization as a result of mixing of the wastes.(3)
- (c) In 1973, a major chemical company in Virginia contracted with a processing firm in Alabama to pick up, haul, and dispose of approximately 10,000 drums of aramite waste, containing 30 to 80 percent sulfuric acid. Most of the wastes were shipped in 208-liter (55-gallon) steel drums and 190-liter (50-gallon) fiber drums. The wastes brought to Alabama were never processed and remained in two open-storage areas and in one enclosed warehouse. As a result of weathering, physical stress, and the corrosive and harsh nature of the wastes, many of the drums stored in the two open areas disintegrated, and their contents spread over the adjacent ground. Already present at the two open-storage areas were piles of fibrous wastes, which were only partially covered with a thin layer of plastic. In addition to contaminating local waters (chemical analysis of samples of drainage water from the storage site indicated a very high acidity and high concentrations of heavy metals), the storage of waste at the three locations presented other problems. In March of 1976, a fire broke out at the site and two firefighters became ill, presumably because they inhaled toxic fumes.(4,5)

- (d) On at least two occasions, waste storage lagoons have broken, spilling large volumes of wastes into the Allegheny River in Pennsylvania. On one occasion in 1968, a waste refining sludge containing oils, acid wastes, and alkyl benzene sulfonate flowed three miles down a tributary to the Allegheny, killing 4.5 million fish. The dike of another refinery waste lagoon broke in 1972. Initially, the township lowered the dike in order to drain off the supernatant waters. When heavy rains came, the already weakened lagoon eroded to a point where sludge on the bottom of the lagoon was released, killing 450,000 fish along a 60-mile stretch of the river. The discharge was characterized by a pH of 1.7.⁽⁶⁾
- (e) Lagooned wastes from a company in Nockamixon Township, Pennsylvania, had been the source of ground water, stream, and soil contamination. The company, which was in operation from 1965 to 1969, bought industrial wastes from other plants, extracted copper, and stored the rest of the toxic liquids in lagoons. Three of the cement lagoons developed open seams at the bottom and leaked toxic fluids into an adjacent creek, killing all aquatic life. After an injunction was issued requiring the wastes to be treated, the company defaulted, leaving 3-1/2 million gallons of toxic wastes on the site. Heavy rains, in April 1970, caused the lagoon to overflow and spill the hazardous wastes (e.g., acids) into the creek, which is a tributary of the Delaware River. County officials then built a dike around the area. Soil contamination persists at the site and the entire area is devoid of vegetation. The wastes were finally neutralized and ocean-dumped in 1971.⁽⁶⁾
- (f) An open gate valve in a retention lagoon at a chemical company in Venango County, Pennsylvania, resulted in the release of phenolic substances in Oil Creek. Some of the fish and turtles in the creek were killed.⁽⁶⁾
- (g) A firm engaged in the disposal of spent chemicals was storing and disposing of toxic chemical wastes at two Louisiana locations. At one of these sites, several thousand drums of waste (some with and some without lids) were in storage. Many of the drums were leaking, and visible vapors were emanating from the area. All of the pine trees beside the storage area were killed as a result of this leakage.⁽⁷⁾
- (h) A U.S. Army arsenal, 10 miles northeast of Denver, produced chemical intermediates, toxic items, and munitions during WWII. Portions of the arsenal were leased to a pesticide

manufacturer after WWII. The nerve agent GB was produced by the Army from 1953-57. In the early 1970's, mustard gas and GB stocks were destroyed. All industrial wastes were discharged into an unlined basin until 1957, when a 93-acre, asphalt-lined basin was installed for containment of all wastes. Beginning in the early 1950's, crop damage from use of shallow irrigation wells was reported. The principal contaminant was sodium chloride, at 2,000-3,000 ppm levels. Other contaminants present were chlorate and a 2-4-D-like compound. A 12,000-foot deep injection well was drilled in 1961 for waste disposal, but injection was halted in 1966, when a correlation with earthquakes in the Denver area was shown. Ground water sampling in the mid-1950's showed widespread contamination from sodium, chloride, and chlorate. In 1974, DIMP (diisopropylmethyl phosphonate) from GB manufacture and DCPD (dicyclopentadiene) from pesticide operations were discovered in both on-post and off-post shallow wells. No adverse health effects or crop damage has been found from the DIMP and DCPD. Thirty-three other compounds, including DBCP (dibromochloropropane) and fluoride, have been reported in on-post wells. In 1978, a bentonite barrier on the north boundary coupled with an effective carbon absorption water treatment plant, and down gradient recharge of water has eliminated off-post discharge of contaminants. Water quality in off-post shallow wells has improved. Inorganic ions have dropped to non-toxic levels. Expansion of the barrier-carbon absorption system is presently underway.⁽⁸⁾

- (i) A manufacturer of agricultural herbicides in Oconto County, Wisconsin, produced salt wastes containing arsenic, 7,500 tons of which were piled for storage on a loading dock within 10 feet of the Menominee River. The total amount of arsenic-containing industrial waste stored at the site was 90,000 tons. Arsenic concentrations of up to 6,000 ppm were found in ground water and concentrations of 200 ppm in the river sediments just offshore. The ground water contamination extended to a depth of 40 feet. In the latter part of 1978, the last of the waste was trucked away to a disposal site.^(9,10)
- (j) Officials found 1,500 steel drums of various hazardous wastes, some leaking chemicals, stored in the open just outside the city limits in Travis County, Texas. This site is located within the recharge zone of an aquifer which supplies water for domestic and stock-watering purposes. At a later date, investigators found another 3,000 barrels of wastes stored in West Travis County. The wastes

included acids, heavy metals, volatile liquids, waste oil, and other toxic and corrosive substances. The eight industries that contracted with the "disposal" company to legally dispose of the wastes have agreed to repay the State for removing the waste to a solid waste disposal site.(11,12)

- (k) Since 1867, asbestos product manufacturers have accumulated nearly 2 million cubic yards of assorted industrial wastes in open piles in a small Pennsylvania town. The original generator of the wastes went out of business in 1962. Since then, two other companies have been responsible for enlarging the spoils piles. The atmosphere around the piles contains asbestos fibers, as a result of wind erosion. An air monitoring program, conducted by the U.S. Environmental Protection Agency in October 1973, indicated ambient background levels of asbestos to be 6 ng/m³. An asbestos level of 9.6 ng/m³ was found at a playground near the largest waste pile. Values obtained near active disposal piles range from 114 to 1,745 ng/m³. A high pH level in a nearby stream has resulted from runoff from the piles. The State has ordered and gotten compliance for closing of the site. The ongoing (as of October 1979) closure plan includes halting additions to the piles, stabilizing the piles, reducing erosion and runoff by planting vegetation on the piles, and fencing them off. The State is confident that the piles now present no human health hazard.(6)
- (1) In Brooklyn Center, Minnesota, in January 1979, a wooden storage building containing fertilizers, pesticides, and herbicides burned to the ground. Either a welder or a heater, which were located at one end of the storage building where "shop" activities (i.e., repair work) were performed, is thought to have been the origin of the flame. The fire spread quickly through the highly-flammable, solvent-based liquid pesticides. Large quantities of water used by the firemen to extinguish the flame carried the 150 chemical products into a creek and onto the surrounding ice and snow. The resulting 2,000 cubic yards of contaminated snow, ice, and soil were disposed elsewhere. Pesticides have been found at high levels in the ground water at approximately 7 feet, and the top 6 to 12 inches of soil in the creek are heavily contaminated.(13,14) While the materials stored were products, not wastes, in this case, the result would have been the same had they been waste materials.

- (m) In Elizabeth, New Jersey, a hazardous waste incinerator closed in early 1979, leaving behind 40,000 rusting and leaking drums at the facility. Police complained of nausea and weakness from nitric acid leaking from deteriorating drums. EPA inspectors found many of the drums corroding and deteriorating. Many of the drums were perched on a drainage canal bank; others were sitting on the curb. Rainfall runoff was polluting the canal.^(15,16) In April 1980, after the facility was closed by State authorities, the site erupted in a spectacular explosion and fire which spread possibly noxious fumes across the city.
- (n) A hazardous waste recovery operation in Lowell, Massachusetts, closed in 1977, leaving behind numerous storage tanks and leaking drums full of wastes. Runoff from the facility was thought to be polluting the storm sewers and nearby surface streams. The freezing and thawing cycles were thought to be accelerating decomposition of the drums.⁽¹⁷⁾
- (o) In 1976, a hazardous waste incinerator operator in Shakopee, Minnesota, was forced to close by county officials due to numerous pollution control code violations. Approximately 1-1/2 million gallons of wastes were left in deteriorating drums. The air was reported tainted with fumes.⁽¹⁸⁾ In 1973, the same facility suffered a major fire in its drum storage area, which took hours to bring under control. Toxic fumes were spread over wide areas.^(18,19)

These damage incidents illustrate how human health and the environment can be affected by improper storage of hazardous waste. Unless the storage of hazardous wastes is strictly regulated, the nation can expect similar damage incidents to continue.

C. Basis for the Regulation

It is clear from the language of RCRA that Congress intended the Agency to write regulations to control storage of hazardous wastes. The review of past damages, above, confirms the wisdom of Congress.

The proposed regulations were designed to eliminate problems of the type discussed above.

To summarize, problems arise from storage of hazardous wastes when:

- (a) ignitable or reactive wastes explode or catch fire, exposing workers and the nearby public to direct injury and to toxic gases
- (b) wastes are mixed with incompatible wastes or other incompatible materials, causing toxic emissions, fires, and explosions
- (c) wastes are placed in devices (tanks, basins, containers) with which they are incompatible, causing deterioration of the device and resulting in leakage which, in turn, can contaminate ground water and surface water and release volatile materials to the air.

These problems also arise when treatment and disposal facilities are used with wastes for which they were not adequately designed.

As discussed in the Introduction, this document deals with "storage" in general and, more specifically, with management (primarily storage) of hazardous wastes in piles and containers. Not only are piled and containerized wastes potential sources of the human health and environmental hazards mentioned above, but they are frequently used as de facto disposal devices without any real safeguards. Often they are simply abandoned. The ultimate result is often ground water and surface water pollution, poisoning or chemical burns to animals or children from direct contact, and destruction of vegetation from air emissions.

Containers (bags, jugs, drums, cans, etc.) are used not only to store hazardous wastes, but also to ship millions of tons of products, many of them also very hazardous (pesticides, drugs, solvents, and other chemicals). When emptied, unless carefully cleaned, they can also present a significant hazard, since significant quantities of the hazardous materials shipped in them inevitably adhere to the walls. Most often they are burned, buried, and piled, presenting the same types of hazards as uncontrolled disposal of containers full of hazardous wastes. EPA recognizes this hazard and has decided to specify the conditions under which an empty container is a hazardous waste under Part 261 (§261.33(c)).

In addition to RCRA, Congress previously recognized problems with specific hazardous wastes when they passed the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA). Under these Acts, EPA developed recommended procedures for storage and disposal of pesticides and pesticide containers, and regulations controlling storage of polychlorinated biphenyls (PCB's).

Many states also have recognized the human health and environmental threats posed by "empty" containers and by waste storage container areas. A number of states have developed or are developing regulations covering storage in containers and empty containers.

In developing these regulations, the Agency reviewed these Federal and state regulations and operating guidelines. This review

was instrumental in identifying regulatory options and alternatives, which were then further evaluated by EPA. Additionally, other states developed regulations concurrently with the development of these regulations, recognizing the need for many of the same regulations. Following is a short discussion of those standards which relate to containers (there are no similar regulations for waste piles to the Agency's knowledge):

- a. EPA Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers⁽²⁰⁾--These recommended procedures were developed to implement Section 19 of the Federal Insecticide, Fungicide, and Rodenticide Act, and include disposal recommendations for managing waste pesticides and guidelines for selecting sites, for storing pesticides, and for inspecting storage areas. Some guidelines for operating container storage areas are also included. Some of the principles in EPA's regulations for segregating wastes were developed in these procedures.
- b. EPA Regulations for Polychlorinated Biphenyls⁽²¹⁾--These regulations include standards, which were developed under the Toxic Substances Control Act, for the storage of PCB's and PCB wastes. They include requirements for the design of storage facilities, for routine inspection, for control of container leakage, and requirements for spill prevention control and countermeasure plans (SPCC). These PCB standards presented precedents and alternatives which the Agency used in developing these regulations.
- c. Minnesota Hazardous Waste Regulations⁽²²⁾--In regulations recently promulgated, the Minnesota Pollution Control Agency developed comprehensive storage regulations for hazardous wastes. Many are directly analogous to these regulations. They include requirements that containers be closed during storage except during filling and emptying, that the container's construction materials or its liner must be compatible with the waste with which it comes in contact, that storage containers of incompatible wastes must be segregated, and that containers must be regularly inspected to determine if any leaks have occurred.

- d. Washington Hazardous Waste Regulations⁽²³⁾--In its regulations, Washington State has required that hazardous wastes be stored in closed containers. The regulations also specify that wastes must be stored in a manner that prevents incompatible wastes from mixing and reacting.
- e. Texas Technical Guidelines for Noncompatible Wastes⁽²⁴⁾--These guidelines develop basic guidance for managing incompatible wastes and provide alternative regulatory approaches, which were considered during development of these regulations.
- f. California Hazardous Waste Regulations⁽²⁵⁾--The California hazardous waste regulatory program was the first substantive program in the United States. Including recently proposed regulations, the California program is very comprehensive and has served as a model for other states and, indeed, for parts of the present regulations. California's storage standards include, among other things, a requirement to separate containers containing incompatible wastes and a prohibition on adding wastes to unwashed containers. Both are concepts that have been further developed and incorporated into these regulations. The Agency also found regulations promulgated by California⁽²⁶⁾ for used pesticide containers to be helpful in developing the present regulations.
- g. South Carolina Regulations⁽²⁷⁾--South Carolina's pesticide container storage and disposal regulations contain requirements similar to these regulations. South Carolina's draft Hazardous Waste Management Regulations⁽²⁸⁾ include the following proposed standards for storage in containers. They propose that:
 - (a) storage containers must be covered
 - (b) if a container is not in good condition, the hazardous waste must be recontainerized
 - (c) containers must be separated or protected from each other if they contain incompatible wastes
 - (d) a container must be compatible with the wastes in them
 - (e) a container may not be refilled with incompatible waste unless it has been washed.

South Carolina also recognizes the hazardous nature of containers that contained hazardous residues. They have proposed that these containers be treated to render them nonhazardous; if not, they must be disposed of as a hazardous waste.

- h. Oregon Regulations--Oregon's pesticide regulations require triple rinsing (See §261.33(c)) as a decontamination technique.⁽²⁹⁾ Oregon's Hazardous Waste Management Regulations⁽³⁰⁾ require that hazardous waste be adequately contained to minimize the possibility of spills or other means of escape to the environment.
- i. Louisiana Hazardous Waste Management Rules and Regulations⁽³¹⁾--Louisiana requires that incompatible wastes should not be stored together, and that storage facilities containing incompatible wastes should be sufficiently separated to prevent mixing as a result of a spill, tank failure, or other cause.
- j. Tennessee Draft Hazardous Waste Management Regulations⁽³²⁾--These regulations propose that incompatible wastes should not be stored in common containers and that wastes should be compatible with the containers in which they are placed.

EPA's knowledge of and familiarity with state waste storage regulations and guidelines indicates that:

- Control of storage by states is a recent phenomenon and is not yet widespread. Recent activity has been, in large measure, a result of the development of the Federal RCRA program.
- Many permit applications to states for waste disposal facilities also include storage facilities. The procedures for waste storage are reviewed (along with the remainder of the application) by the state personnel, who decide to approve or reject on a case-by-case basis.
- Most state hazardous waste storage restrictions emphasize the protection of water resources.
- Existing state hazardous waste storage regulations generally involve design and operating standards.

III. ANALYSIS OF COMMENTS RECEIVED ON THE GENERAL STANDARDS FOR STORAGE: "NO-DISCHARGE" AND "CONTAINERIZATION"

This section of the background document and the section that follows discuss comments received from the public on the December 18, 1978, proposed regulations, 43 FR 243:59007. As mentioned previously, comments addressed in this background document will be limited to those dealing with the interim status regulations for containers, piles, and storage in general. This section discusses principally the comments on the Agency's interpretation of the definitions of storage and disposal.

A. Summary of the Proposed Regulation

The proposed regulations required that hazardous waste be stored in either a storage tank or a storage container (§250.44(a)), and that the storage prevent all discharges and emissions of wastes and waste constituents into the environment (§250.44(b)). Although only the "no-discharge" requirement was proposed as an interim status requirement, the two issues are so interrelated that they are best discussed together.

B. Rationale for the Proposed Regulations

The Resource Conservation and Recovery Act of 1976 (RCRA) defines "storage" to mean the ". . . containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste" (Section 1004 (33)). "Disposal" is defined in RCRA as follows:

"'Disposal' means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste, or any constituent thereof, may enter the environment or be emitted into the air or discharged into any waters, including ground waters." (Section 1004(3))

In its proposed regulations (§250.44(b)), EPA interpreted these definitions as prohibiting the discharge of hazardous wastes from storage facilities. Therefore, the proposed regulations (§250.44(a)) limited storage of hazardous waste to tanks or storage containers, the only types of storage devices that are normally enclosed to eliminate air emissions, and also built of sufficiently impermeable materials to prevent seepage of wastes into wastes into ground water.

C. Comments Received on These Subjects

EPA received the following comments on its proposal to require "no-discharge" from storage facilities:

- a. The imposition of a no-discharge performance standard is:
 - overly stringent and unrealistic because it is technically impossible to design storage facilities so that no discharge occurs
 - inconsistent with the concept of controlled emissions allowed under the Clean Air Act and the Clean Water Act
 - inconsistent with the rest of the intent of §3004 of RCRA, which is to minimize the adverse effects on health and the environment from storage, treatment, and disposal of hazardous waste. The standard should focus on the "contamination" of the air or water.
 - a proper interpretation of the Act
- b. Two alternative performance standards for storage facilities were proposed:

- the potential for discharge should be minimized
- no detrimental (or significant) discharge should occur

The following comments were submitted on EPA's proposal that wastes be stored only in tanks and containers:

- a. The requirement that all waste must be stored in storage tanks and containers is overly restrictive because:
 - hazardous waste may be stored in other environmentally sound manners
 - bulk solid or semi-solid waste may not be conducive to containerization because of the nature or volume of the waste
- b. Flexible standards should be written for each storage technique (basins, piles, surface impoundments, etc.).
- c. It is unnecessary to store non-volatile waste in covered devices.
- d. Organic waste and asbestos waste should be required to be stored in covered storage devices in order to reduce fire hazards, airborne contaminants, and odor nuisances.

A comment was also received that greater distinction needs to be made between storage and disposal facilities. In some cases (drilling operations, for example), storage may be equivalent to disposal.

D. Analysis of and Response to Comments and Rational for Final Regulations

As a result of comments, EPA has reevaluated this issue and concluded that its interpretation of "storage," which resulted in the "no-discharge" requirement for storage, needed to be changed. Difficulties inherent in the interpretation of storage in the proposed regulations can be summarized as follows:

- (a) Storage in lagoons, basins, piles, and open tanks apparently was either: (1) not allowed, or (2) would have to comply with the disposal requirements, many of which, such as the post-closure care requirements, did not appear applicable if all waste and residue were to be removed when storage was completed.
- (b) Closing of all tanks is neither necessary nor cost-effective, since many low-volatility wastes are routinely stored in the open with no apparent ill effects.⁽³³⁾
- (c) Since wastes can be "disposed" in landfills and lagoons where some emissions are tolerated, there appears to be no supportable reason for the overly stringent requirement to enclose all storage operations. Moreover a complete ban on all air emissions appears impracticable.

The Agency has re-evaluated its interpretation of the definitions of "storage" and "disposal" and the regulations that result from this interpretation. The Agency has determined that the central factor that separates storage from disposal is that storage is "containment . . . either on a temporary basis or a period of years." The Agency has decided, therefore, that the proper focus for regulation of storage facilities is to ensure that human health and the environment are protected during storage facility site life, and that owners and operators of the storage facility provide financial responsibility for closure including the costs for removal of hazardous waste and residue for the site at the end of the temporary or finite period. This, then, is the essence of the difference between "storage" and "disposal," i.e., whether the waste and its hazardous residuals are to be removed at some point. And from the standpoint of regulatory strategy, this is the question of most interest. There is no inherent reason, for example, why wastes should not be stored or

disposed in a surface impoundment--the technical requirements to protect the public during operation will be about the same in either case. The temporal question is the important one: Will the waste be removed when the facility is closed? If yes, then as a storage facility, the final regulations: (1) should require more money in the closure trust fund (or acceptable alternative), since it must cover removal of the waste; but (2) no post-closure care financial assurance will be necessary, since the post-closure requirements do not apply; and (3) require a facility design (liners, etc.) sufficient to protect human health and the environment during the life of the site. If the wastes are not to be removed, then the regulations should require a smaller closure deposit, but impose substantial requirements, both technical and financial, for post-closure care because protection of human health and the environment must extend well beyond closure.

In summary, the essential difference between "storage" and "disposal" is in the intent of the operator to remove the wastes at closure, rather than in whether there are any discharges.

The Agency disagrees, however, with the suggestion that "no discharge" of waste liquids to the land or water is not possible. While it may be theoretically true that "everything is permeable to some extent," as a practical matter, the permeability of the construction materials (steel, concrete, etc.) commonly used for storage devices is so low that the rate of liquid escape is not measurable or detectable without highly sophisticated equipment, unless the integrity of

the structure has been breached. The purpose of the regulations is to detect leakage from the storage structure as a result of damage to it, not seepage through relatively impermeable materials. Any significant leachate or liquid waste leakage into the surrounding soil constitutes a failure of the storage device and may pose a potential threat to ground water and surface water supplies. Thus, standards for containers and tanks focus on the prevention of leaks and require remedial actions following leak detection.

The Agency has decided to delete the special storage section and allow storage in piles, basins, and surface impoundments, provided they are designed to minimize discharge to the surrounding environment.

With the deletion of the requirement to completely eliminate emissions from storage facilities, the technical requirements for any one type of device are essentially the same, whether it is used for storage, treatment, or disposal. (The one exception involves those few requirements which are necessary for post-closure ground water protection in the case of disposal.) Any specific requirements for storage are incorporated in the specific facility sections (tanks, basins, impoundments, etc.). The Agency believes that this modification to the regulatory format will make it easier to determine just which regulations apply to each type of facility.

E. Summary of Interim Status Regulations

As a result of these comments, EPA's final interim status storage regulations:

- a. allow storage in containers, piles, tanks (open or closed), and surface impoundments, and
- b. do not contain a special section (formerly §250.44) on storage. Any special requirements applicable to storage in specific types of facilities (tanks, piles, impoundments, etc.) are now included within the regulations covering specific devices (tanks, impoundments, etc.)

This section will deal with those comments and issues which are relevant to the interim status standards for containers. Some of the comments relate to the proposed regulatory section of general storage which has been dropped from these final regulations. Those comments are relevant to tanks, surface impoundments and storage devices as well as to containers.

IV. ANALYSIS OF COMMENTS RECEIVED ON STANDARDS FOR STORAGE IN CONTAINERS

SUBJECT: COMPATIBILITY

A. Summary of Proposed Regulations

The proposed regulations required that storage tanks and containers or their liners be compatible with the waste to be contained (§250.44(h)) and that the incompatible wastes be physically separated (§250.44-2(d)). Additionally, the proposed regulations prohibited placing hazardous waste into an unwashed storage tank or container that previously held an incompatible waste (§250.44(i)).

B. Rationale for the Proposed Regulations

Reactions between incompatible substances may produce potentially hazardous conditions, such as heat generation, fires, explosions, or the release of toxic substances (see Paragraph (2), Section II A (Damage Cases) for examples of this type of incident). If such reactions occur in closed systems, such as tanks or sealed containers, the heat and pressure generated may cause the container to explode. Reactions between a waste and the wall of a container, tank, or other device may weaken the structure or cause a leak. The intent of the proposed regulations was to prevent this type of damage by preventing hazardous waste from coming in contact with container construction materials or other wastes with which it is incompatible. Appendix I, attached, gives examples of incompatible wastes.

C. Comments Received on this Subject

- a. The prohibition on placing hazardous waste into a storage tank or container which previously held an incompatible waste is unnecessary, particularly when:
 - the container or tank is empty
 - the container or tank is suitable for both caustic and acidic substances
- b. Hazardous waste should not be added to any unwashed container, since workers at a facility may not know what the container previously held or how, if at all, the new waste will react with the waste which was previously stored in the container.

D. Analysis of and Response to Comments and Rationale for the Final Regulations

(1) Incompatibility Requirement is Unnecessary

Unless tanks or containers are cleaned (washed), they are seldom completely empty. The pumps and drain valves used for emptying a drum or tank are seldom capable of removing the last drops and, in any event, waste adheres to the walls of the containers. Thus, even though a tank or container may be essentially "empty," the residues that are left may react adversely with a "new" waste to be stored in the tank or container; hence, the need to wash the tank or container before placing another waste in it if the "new" waste is incompatible with the original waste.

Even though tanks or containers may be suited to both acidic and basic wastes, reactions between them can generate heat and gases which are sometimes toxic or explosive. Such reactions can be violent, especially for the more concentrated acids and bases. There are also other potential reactions between incompatible wastes which

should be considered. An incident occurred in California when hot chromic acid waste was inadvertently added to a drum containing methylene chloride waste from degreasing operations. The workshop was sprayed with chemicals following a violent eruption.⁽³⁾ In a similar incident, a violent exothermic reaction occurred during the transfer of vinyl cyanide waste to a supposedly empty drum.⁽³⁾ Therefore, compatibility of the container or tank construction material with both types of wastes does not make mixing them in the same container safe. If, however, the ensuing reactions are within the limits specified in the general requirements for ignitable, reactive, and incompatible wastes (§265.17(b)) then acids and bases may be mixed in the same tank or container. Wastes may also react with the tank or drum construction materials. For example, certain plastics are softened and dissolved by aromatic solvents (e.g., polyvinyl chloride (PVC) is softened by methylethyl ketone (MEK). Such reactions could cause accelerated deterioration of a container, leading to release of its contents (leaking). Therefore, the compatibility requirements of the regulations are necessary for tanks and containers, just as they are necessary for other devices.

As a result of comment, the Agency has broadened the container compatibility requirements to provide that wastes stored in containers must be either constructed of or lined with materials which are compatible with the waste. This addition recognizes that it is the material which comes into contact with the waste which is important

in determining compatibility. Thus, plastic-lined steel containers, a common design, are acceptable for a variety of wastes which are compatible with the plastic, but not the steel. In such cases, the plastic liner must be capable of containing the waste such that contact will not take place between the steel liner and the waste.

(2) Workers May Add Incompatible Wastes

The training programs mandated by §265.16 are designed, among other things, to teach the facility personnel which wastes may be incompatible, and familiarize them with the precautions on mixing incompatible wastes. If owners and operators carry out comprehensive training programs, the danger of workers not recognizing when wastes are incompatible and mixing them in the same container should be minimized.

The Agency believes, however, that it is incumbent upon owners and operators to train their employees sufficiently to recognize incompatible wastes if they are going to place hazardous wastes in unwashed containers. Further, there are many situations in which it is acceptable to place waste in unwashed containers. Therefore, it would be unnecessary and burdensome to require that all containers be washed between each use. The Agency expects that owners and operators will institute some means of identifying the previous contents of empty containers, such as labels, records, segregated storage, or tests, if empty containers are not routinely washed.

(3) Separation of Incompatible Waste

Since leakage of containers could cause incompatible waste to commingle in storage areas, the Agency is requiring that containers with incompatible wastes be separated from one another by a sufficient distance to prevent commingling in the event of leakage, or by physical barriers (e.g., dikes, berms, walls, or other structures). In the proposed regulations, physical barriers were required. The Agency agrees with commenters, however, that, if separated sufficiently, leaking wastes will not commingle. This relatively inexpensive precautionary measure will help prevent one source of dangerous reactions, which can cause fires, explosions, and dangerous gas emissions as a result of mixing of incompatible wastes from leaking containers.

E. Summary of Final Interim Status Regulation (§§265.172, 265.177)

Wastes may not be stored in containers made of materials with which the wastes may react, unless the container is protected by a non-reactive lining. Incompatible wastes may not be stored together in the same container unless they result in no deleterious reaction as described in §265.17(b). They may be mixed under controlled conditions as a treatment process. Residues must be washed from containers before wastes are added which might result in a deleterious reaction with the residues. Hazardous wastes in containers must be physically separated (by space or barrier) from other materials with which they might react.

SUBJECT: EMPTY, NONCOMBUSTIBLE CONTAINERS

A. Summary of the Proposed Regulation

The proposed regulation (§250.44-2(f)) authorized three options for managing of emptied, noncombustible containers which previously contained hazardous waste. The three options were:

- a. The containers could be cleaned at a permitted hazardous waste site and sent to a recovery operation.
- b. The containers could be sent to a permitted drum reconditioner.
- c. The containers could be reused with the same or compatible wastes.

B. Rationale for the Proposed Standard

The emphasis of most of these regulations was clearly on protecting public health and the environment. However, Section 1003 of the Act indicates that one of the objectives of the Act is "to conserve valuable material and energy resources." In this regulation, the Agency attempted to implement Congress' objective by requiring that empty drums and other noncombustible containers be reused or recycled. Recycling often serves to protect public health and the environment by lessening volume to hazardous waste that must be placed in the ground where they remain potentially hazardous for long periods.

C. Comments Received on this Subject

- a. EPA should allow noncombustible containers, like combustible containers (§250.44-2(e)), to be disposed of in a landfill which meets the requirements of proposed §250.452 because:

- the disposal of noncombustible storage containers in an approved landfill can protect human health and the environment to at least the same degree as the three authorized options
 - landfill disposal may provide a greater degree of protection, since it eliminates the multiple rehandling of the containers that characterizes the three authorized options
 - the regulation is inconsistent with the landfiling regulations, which allow full, noncombustible drums to be buried
 - recovering or reusing containers may be uneconomical and/or environmentally more dangerous than disposing of them because of a number of factors, which include:
 - distance of the drum source from a disposal site
 - distance of the drum source from a drum reconditioner
 - cost of setting up a permitted cleaning facility on-site
 - cost of shipping empties
 - difficulty of cleaning drums
 - recycling drums may be impossible where the drum shows evidence of damage or corrosion
- b. Noncombustible containers which have been cleaned so that they are no longer a hazardous waste:
- should be allowed to be disposed of in a sanitary landfill which meets the criteria of Section 4004
 - are not subject to control under Subtitle C. Therefore, the proposed Section 250.44-2(f)(1), which requires that drums which have been cleaned be sent to a drum reconditioner or to a recovery facility, should be modified by eliminating Subparts (i) and (ii)
- c. Regarding the option authorizing a container to be transported to a permitted drum reconditioner, with appropriate manifest (proposed §250.44-2(f)(2)):

- the requirement that the drum reconditioner be permitted is inconsistent with the Agency's statement that "empty drums that formerly contained hazardous waste, but which are being delivered for reconditioning and reuse" will not be considered to be "other discarded materials," and, thus, are not subject to control under Subtitle C. Thus, the drum reconditioning facility is not a hazardous waste facility and does not need a permit.
- d. The regulations should clarify whether partially or nearly empty drums are considered to be empty drums.
- e. EPA should allow methods other than triple rinsing to decontaminate empty and partially empty drums, since triple rinsing is not always adequate or economical. The Agency should specify approved methods and agents for cleaning empty drums.
- f. Plastic-lined containers in which the hazardous material has come into contact with the plastic lining and not the container should be exempted from these regulations.
- g. Plastic containers are omitted from the regulations. Often they can be cleaned and reused.

D. Analysis of and Response to Comments and Rationale for Final Regulations

The proposed regulation has been deleted from the regulations on containers. Some contaminated containers are listed as hazardous wastes, under Part 261 of these regulations, if they are discarded. They then must be managed as hazardous wastes. The following discussion states the Agency's response to the individual comments.

(1) Landfilling of Noncombustible Containers Should Be Allowed
(Comment a)

Although the proposed regulation was in part intended to protect human health and the environment from hazards posed by contaminated containers, it was also partly intended to implement one of the objectives of Section 1003 of RCRA -- to promote the recycling and

recovery of material and energy resources. The Agency has reconsidered its position, in light of the comments on this proposed regulation, and has changed the focus of this regulation to the protection of human health and the environment through the appropriate management of hazardous waste. As a result, no special restrictions are now placed on contaminated containers that are hazardous wastes, beyond those placed on other hazardous wastes. They may therefore be landfilled or otherwise properly disposed of. Under the provisions of Part 261, they may also be reused.

(2) Cleaned Containers Are Not a Hazardous Wastes (Comment b)

Several commenters noted that the proposed list of hazardous wastes (§250.14(a)) expressly excluded triple-rinsed containers formerly containing many chemicals listed in Appendices III, IV, and V (43FR 58962-3), and Appendix XII (44FR 4904). These commenters were correct in pointing out that, if not hazardous, they should not be covered by the Subtitle C regulations. The Agency agrees that, when triple rinsed with a suitable solvent, empty containers pose very little residual hazard. The rationale for triple rinsing was developed as part of EPA's Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers.⁽³⁵⁾ Hsieh et al. showed that repeated (six) rinsings with small volumes of water effectively remove up to 98.20% of all chemical residues remaining in small metal drums after they were emptied and drained (until the dripping stopped). Three rinsings with water removed 98.12% while

retained in drums even when they are drained as completely as possible.(38) As a result, the Agency believes that rinsing is one effective method for removal of residual wastes and that triple rinsing with a suitable diluent is capable of removing most of the remaining waste. Rinsing more often than three times does not yield substantial additional benefit. The Agency believes that the rationale for rinsing pesticide containers holds for containers of hazardous materials as well, since there are no inherent differences between pesticides and other hazardous materials which would make triple rinsing an unacceptable procedure for the other materials.(36,37,38)

(3) Drum Reconditioners are Not Hazardous Waste Facilities
(Comment c)

Similarly, one commenter observed that the definition of "other discarded material," in §250.10(b)(1), exempts wastes destined for reuse from control under RCRA. This commenter then contends that recycling facilities (drum reconditioners) need not be permitted, since they do not handle hazardous wastes. This interpretation of the proposed regulations is correct and the commenter properly notes that the proposed regulations were, therefore, inconsistent. In the final regulations, listed hazardous wastes, including empty containers that previously contained listed substances in §261.33(e), which are recycled are subject to all of the controls of Parts 262 and 263 and to the requirements of Parts 264 and 265 in so far as storage is concerned. Actual treatment of the wastes in the recycling process

is not subject to these regulations. The rationale backing the Agency's decision to defer coverage of most recycled hazardous wastes is discussed in depth in the Preamble to the Part 261 regulations.

(4) Other Decontamination Procedures (Comment e)

Other commenters requested that the Agency allow and even specify other acceptable decontamination procedures besides triple rinsing. The Agency agrees that there are a number of decontamination methods which might prove as effective as triple rinsing, including a number of waste-specific chemical processes and even incineration. However, there are far too many processes, and they are too waste-specific for the Agency to identify them all. Therefore, the regulation will allow the operator to demonstrate decontamination equivalent to triple rinsing. Those wishing to use this variance need only obtain and retain the necessary comparative data; approval by the Regional Administrator is not necessary. It should be pointed out that: (a) triple rinsing may produce a hazardous waste which must be dealt with in accordance with the regulations, and (b) processes other than rinsing may constitute a treatment of the hazardous waste remaining in the container and will, therefore, require a permit, unless the decontaminated drum is reused rather than disposed of.

(5) Clarifying "Empty" (Comment d)

One commenter asked for clarification of when a drum is "empty," noting that there is always a residue in drums, even when they are

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completely drained. The Agency recognizes this fact, and is using the words "empty" and "emptied" in the practical, rather than the absolute, sense. Larger containers, such as drums, are usually aspirated or pumped out. This leaves a small residue on the bottom. This should never be more than one inch and, in most cases, is substantially less. The amount of residue is subject to both the physical characteristics of the material left in the drum and the methods used to empty the drum. EPA has not found it necessary to define what constitutes an empty drum and thus the term is no longer used. For those who may be interested, however, the Agency considers a drum empty when no further material can be removed by whatever method is being used for withdrawing the material. If the material is poured out, empty would normally be drip dry. If pumped or aspirated, the container would be empty when no more material could be removed by these methods.

(6) Plastic-Lined Containers (Comment f)

The Agency recognizes that it is common practice to fit steel containers (drums) with plastic liners which are removable. It is also common to bond plastic or other protective coatings directly to the steel. In both cases, the plastic is intended to protect the steel from deterioration and contamination by the waste or hazardous substance. In the former case, however, the plastic liner can be removed and managed as a hazardous waste, leaving an uncontaminated steel drum. This is not possible where the plastic (or other

coating) is bonded to the drum. The Agency has accommodated the suggestion of the commenters by allowing the steel outer container to be managed as non-hazardous if the inner liner is removed.

(7) Plastic Containers (Comment g)

The Agency agrees that plastic containers can often be cleaned and reused. The omission of plastic containers in the proposed regulations does not mean that these containers were omitted from coverage.

E. Summary of Final Interim Status Regulation (§264.173)

The Agency has reconsidered its proposed requirement which limited management of empty noncombustible containers to recycling and recovery options. EPA agrees that, as a legal matter, it cannot prohibit environmentally-sound waste management priorities under Section 3004 simply because they do not further the resource recovery objectives of Section 1003. Thus, the proposed requirements do not appear in the final regulations. As was identified by the context of a number of the comments, the question really goes to whether emptied containers are a hazardous waste. The Agency has concluded that such wastes are hazardous unless triple rinsed or cleaned by an equivalent method and has so indicated in §261.33(c). (Section 261.33(c) also provides that a container from which an inner liner has been removed is not a hazardous waste.) Therefore, while an emptied container is not required to be recycled, it must be managed as a hazardous waste if it is a hazardous waste in accordance with §261.33(c). Containers

which are to be recycled are not covered by these regulations (§261.6) unless the residual material is either a listed hazardous waste or a material listed in §261.33(e). Triple rinsed containers are no longer hazardous wastes (§261.33(c)). The reader is referred to the Preamble to Part 261 for further discussion.

SUBJECT: INSPECTIONS

A. Summary of Proposed Regulation

EPA's proposed interim status regulations (§250.40(c)(2)(v)) required that storage facilities be inspected daily in accordance with requirements of the visual inspection standards (§250.43-6).

B. Rationale for the Proposed Regulation

The reasoning behind the requirements for all owners and operators (including owners and operators of storage facilities) to routinely inspect their operations is discussed in detail in the background document entitled "Inspections." In brief, the purpose is to detect noticeable deterioration or obvious malfunctions so that they can be remedied before they affect the environment or public health. The Agency believes that this administrative procedure will be successful in preventing many potentially serious problems through early detection.

C. Comments Received on the Proposed Standard

- a. The standard should be deleted because it is redundant and unnecessary, in view of the requirements of §250.43-6.

- b. It is unreasonable to require owners/operators to visually inspect their storage facilities on weekends and holidays. This is particularly true for facilities which manage "marginally-hazardous" waste.
- c. The standard referring to visual inspection should begin as follows: "As a minimum, an owner/operator . . ." (the commenter did not explain why he thought this phrase should be added to the standard).
- d. Daily inspection is unnecessary. Weekly, biweekly, or monthly would be adequate.

D. Analysis of and Response to Comments

The inspection requirements (§265.15) now call for the owner or operator to design his or her own inspection schedule, identifying the items to be inspected and the frequencies of inspection. However, for reasons discussed in the background document on inspections, some minimum requirements are being included in the regulatory sections dealing with specific types of facilities.

One of the major problems with drum storage is the deterioration of drums on exposure to the elements and damage to them during handling (by forklift trucks, falling of stacked drums, etc.). There are no studies which specifically relate to how long a steel drum will last under a given set of meteorological conditions while storing given waste types. However, many inspections have been conducted of facilities storing drummed-waste and leaking drums are frequently reported. Associated pollution problems include contamination of surface water and ground water, pollution of the air through evaporation of volatile chemicals, and fires and explosions associated with

ignitable wastes. Of the damage cases previously discussed (Section II. B), the following are particularly pertinent:

- well pollution and fire in Anniston, Alabama⁽⁴⁾
- visible emissions and environmental damage in Louisiana⁽⁷⁾
- leaking drums in a ground water recharge zone in Texas⁽¹¹⁾
- nitric acid fumes from leaking drums in New Jersey⁽¹⁵⁾
- surface water pollution in Lowell, Massachusetts⁽¹⁷⁾
- toxic emissions and fire in Shakopee, Minnesota^(18,19)

Inspections of drum storage areas on a periodic basis is an effective way to detect leaks, often before they become serious. Redrumming and cleanup are then usually effective in preventing pollution incidents. Where severe corrosion is noted, wastes can be redrummed before leaks even occur. As with any inspection program, the more frequent the inspection, the better. However, given the relatively slow rate of drum deterioration due to corrosion, the Agency recognizes that there is a maximum frequency beyond which more frequent inspections would add little or no additional protection. As a practical matter, inspection should be frequent enough to detect corrosion before it results in leaks, and to detect leaks before the escape of pollutants can cause a hazardous condition. The appropriate frequency will vary, depending on such factors as waste type, container construction, climate, and other site-specific conditions. There is not sufficient data available on these factors to permit the Agency to develop a formula for evaluating all of these factors and arriving at a precise inspection frequency.

EPA agrees with those commenters who contended that weekly inspection for leaks and corrosion, which is likely to identify problems before they result in serious environmental or human health problems. More frequent (daily) inspections would result in little improvement in the detection of leaking or deteriorating drums except where the problem results from operating damage (punctures from forklifts, falling drums, etc.). In the latter case, operators are normally aware that the damage has occurred and, since it is normally acute (i.e., a major leak), cleanup and redrumming should commence immediately.

Monthly or biweekly inspections might be adequate under some circumstances. However, considering the extremely poor practices that have all too frequently characterized drum storage of hazardous wastes, and that many of these problems could be corrected by regular inspection and maintenance, the Agency believes that it is important to establish some minimum inspection period for all facilities. Adequate protection of the human health and the environment suggest that uncertainties in the appropriate inspection frequency be resolved in favor of more rather than less frequent inspections. In addition, at least one facility with which the Agency is familiar is currently conducting inspections on a weekly basis.⁽⁴⁰⁾ Finally, the Agency believes that the cost of performing inspections, contrary to the views of some commenters, is likely to be small.⁽³⁹⁾ Therefore, the final regulations require weekly inspections of container storage areas.

E. Summary of Final Status Regulation (§265.174)

As part of the inspection schedule required by §265.15, container storage areas must be inspected at least weekly for leaks and deterioration.

SUBJECT: REPACKAGING OF LEAKING CONTAINERS

A. Summary of Regulation

The proposed regulations (§250.44-2(a)) required that wastes in leaking or damaged containers be recontainerized. It was also proposed for inclusion as one of the interim status standards. No comments were received on this proposal, and it has been retained in these final interim status regulations (§265.171). A minor clarification has been added, which specifically allows an owner or operator to take wastes from a leaking container directly to treatment, disposal, or another mode of storage, rather than re-drumming.

B. Rationale for the Standard

Leaking of hazardous wastes from containers can result in ground water pollution, emission of vapors and gases to the air, reactions with other leaking wastes, and fires. Several damage cases previously discussed demonstrated these problems. The 1973 Alabama incident (Case No. 3 in the Damage Cases, Section II.3 of this document), involving 10,000 drums of aramite waste, is an example of leaking drums causing ground water and surface water problems.⁽⁴⁾ The Louisiana case (Case No. 7), involving storage of drummed volatile wastes, is an example of both air and water pollution.⁽¹⁷⁾

The Shakopee, Minnesota, fire at an incinerator drum storage area (Case No. 15) typifies the fire potential from these facilities.(18,19) It is important, therefore, that wastes in drums which are leaking or have been damaged, or are deteriorating, be recontainerized as soon as possible.

SUBJECT: PROHIBITION ON DAMAGING CONTAINERS

A. Summary of the Regulation

Since no comment was received, the Agency has retained the requirement that containers must not be managed in a way which may rupture the container or cause it to leak.

B. Rationale for the Standard

Although §265.171 requires repackaging of leaking containers, this requirement (§265.172) has been retained for enforcement purposes. Although an inspector may not find any containers which are actually leaking, they may be managed in a place or in a manner which could readily cause damage or leaking, e.g., from a forklift. This provision will allow EPA to take action in those cases.

SUBJECT: CONTAINERS MUST BE KEPT CLOSED

A. Summary of the Regulation

Containers must be kept closed, except when adding or removing wastes (§265.173(a)). This is a new standard; it was not proposed.

B. Rationale for the Standard

Although "container" was defined to be "any portable enclosure ...," this new standard will eliminate the possibility of any

misunderstanding regarding the implicit assumption in the proposed rules that containers must be closed when stored. To be transported safely, containers must be closed, i.e., have lids or bungs; thus, the word "enclosure" in the definition. Since all containers have lids or closable bungs, it is good operating practice to keep them closed during storage. Keeping containers closed prevents overflow and possible reaction from rainfall, limits unintentional direct contact, reduces the potential for emissions to the air, reduces the potential for spillage, and reduces the possibility of fire.

SUBJECT: IGNITABLE AND REACTIVE WASTE IN CONTAINERS

A. Summary of the Regulation

A 50-foot buffer zone is required between the property line and a storage facility containing ignitable and reactive wastes in containers (§265.176). This is a new standard; it was not proposed.

B. Rationale for the Standard

One of the acute problems with storage areas for containerized hazardous waste involves fires and explosions, and violent reactions. On July 4, 1973, a spectacular fire erupted in an incinerator drum storage area of a chemical waste disposal company in Shakopee, Minnesota (Case No. 15 in the Damage Cases, Section II. B of this document). Drums of exploding wastes flew through the air like rockets.^(18,19) Similarly, as discussed in the damage case section (Case No. 3), several firefighters became ill fighting a fire in Alabama, where aramite wastes were stored.⁽⁴⁾ These kinds of

incidents pose an immediate threat to the health and safety of anyone near the scene, as a result of burns or inhaling of toxic gases.

The National Fire Protection Association (NFPA) has been accumulating experience and information on necessary distances between drum storage areas and nearby residences, business places, and other public places. These have been codified in the Flammable and Combustible Code of 1977. The Code requires a 50 foot minimum distance between the container area and the facility property line.⁽⁴¹⁾

The Agency believes that this code provides a reasonable basis for setback limits or buffer zones for protecting human health from the acute effects of explosions, fires, and violent reactions of ignitable and reactive wastes. The Agency knows of no other data available on which it could base different buffer zones for these types of waste. The Agency is not certain that these limits will be fully adequate for large storage areas or for those with highly explosive wastes or wastes which give off highly toxic gases. However, the other requirements in this regulatory package are designed to prevent fires and explosions from ever occurring. EPA will be monitoring the effectiveness of these regulations in protecting those who reside or work near hazardous waste facilities that handle ignitable and reactive wastes. Revision will be made if data shows it is necessary.

SUBJECT: PAPER BAGS

A. Summary of Proposed Regulation

The proposed regulation required that paper bags contaminated with hazardous waste be stored in closed secondary containers (§250.44-2(g)).

B. Rationale for the Proposed Regulation

The intent of the proposed regulation was to minimize the potential for release to the environment of residual hazardous materials adhering to empty paper bags. The disposal of pesticide bags, in particular, has caused problems from direct contact of animals and people with contaminated bags, and wind dispersion. For example, in one case, a load of "empty" insecticide bags was dumped adjacent to a field where cattle were pastured; the wind blew the bags into the pasture and 14 cattle died after licking the bags.⁽⁴²⁾ Burning has been a common technique for disposing of "empty bags." This practice can volatilize toxic chemicals and release hazardous gases. In a study where "empty" pesticide bags were burned, investigators found 7.9 mg of parathion per cubic meter of air.⁽⁴³⁾ Placing these bags in containers for proper disposal would have prevented these problems.

C. Comments Received on this Subject

- a. The requirement is unnecessarily burdensome and expensive because:

- it is good common business sense to prevent loss of material by making sure that only a small amount of material adheres to paper bags and, thus, the hazard potential from material remaining in bags is small
 - more hazardous material per month could conceivably be put into a refuse landfill by a nonregulated small generator than from paper bags disposed of in trash; therefore, contaminated paper bags should be exempted
 - using a secondary container will take up more available space than if the paper bags were compacted with other trash from the plant
 - supplying secondary containers for paper bags is costly; therefore, the requirement should be deleted or should be amended to allow paper bags to be compacted with plant trash
- b. Paper bags will use up valuable permitted landfill capacity, which is in short supply.
- c. Paper bags should not have to be containerized if they are to be disposed of on-site in such a manner that they are prevented from being blown from the facility, e.g., covered in a landfill.

D. Analysis of and Response to the Comments and Rationale for Final Regulations

As a result of the comments, the Agency has reconsidered the proposed requirement. Obtaining secondary containers may prove difficult and costly for many facilities that routinely bury empty bags. The Agency has found that those facilities which would have to purchase drums to comply with the proposed regulation would have to pay up to \$10 each for reconditioned drums.⁽⁴⁴⁾ Each drum could hold 500 bags, depending on the size of the bag and if carefully placed. If crumpled, only about 50 to 100 could be placed.⁽⁴⁵⁾ Since hazardous materials also tend to be expensive materials, the amount left

in bags is normally quite small. A study of pesticide residues in paper bags performed in Illinois indicates that an average of only about 2.3 ounces of pesticides remained in the bag.⁽⁴⁶⁾ Further, when these contaminated bags constitute a hazardous waste, they must be managed in accordance with the rest of the Subtitle C regulations, unless the generator generates less than the small quantity cutoff (see the background document entitled "Special Requirements for Hazardous Waste Generated by Small Quantity Generators"). The Agency believes these other hazardous waste regulations will adequately protect public health and the environment. The Agency agrees that empty bags disposed of on-site in permitted facilities should present no real public health problem if they are managed carefully in accordance with the other regulations.

Those commenters who suggested that generators of small volumes could contribute more hazardous waste to a non-permitted site than most generators of contaminated bags may be technically correct. Much of the weight of the bags is paper or plastic, not hazardous material. However, the residue in these bags is usually a hazardous chemical product which may be considerably more potent (concentrated) than most hazardous wastes. The Agency believes that, in terms of risk to the public health, the concentrated chemical products left in bags may pose a hazard that is equal to or greater than an equal volume of many of the hazardous wastes. It should be pointed out that those who generate less than the small quantity limit of contaminated

bags (paper and plastic, and residue) are also exempted from these regulations.

There were two comments dealing with the volume of bags--one suggested bags would take less landfill room if they could be compacted with plant trash and sent to a refuse landfill. The other suggested that landfills should more properly be reserved for more potent wastes. The Agency disagrees with both comments. As mentioned previously, the problems associated with mismanaged "empty" paper bags can rival those of other types of hazardous wastes, because of the pure chemical nature and, thus, high toxicity of many of the residues in the bags. If they are generated in significant quantities, these bags belong in hazardous waste facilities just as much as do other commonly accepted hazardous wastes. They should not be mixed with trash in "dumpsters," where the chemicals can be dispersed into the air or drip out if carried by liquids in wet trash. The total amount of bags which might contain hazardous wastes has been estimated at 320,000 tons/year.⁽⁴⁵⁾ However, many of these contain pesticides and fertilizers which are generated by farmers, homeowners, small generators, and other generators who have been exempted from these regulations. The 100,000 tons or so of contaminated paper bags which would be subject to these regulations would constitute less than one percent of the total volume of covered wastes. The Agency does not believe this volume will seriously affect the available hazardous waste management capacity.⁽⁴⁵⁾ The

commenter provided no information to support his claim that available capacity, on a national basis, will be seriously affected and that contaminated bags pose no substantial hazard if simply disposed of in quantity in refuse landfills.

E. Summary of Final Interim Status Regulations

As a result of the comments, the Agency has deleted the requirement for packaging contaminated bags in secondary containers (drums). The Agency believes that the general Subtitle C management regulations will adequately deal with the problem and assure adequate protection of human health and the environment. The Agency will be monitoring the effectiveness of these regulations in protecting human health from mismanagement of non-containerized "empty" bags and may repropose similar controls at a later time if it appears that they are needed.

SUBJECT: REQUESTS FOR EXEMPTION

Requests were received from various commenters asking that certain wastes or facility types receive outright exemptions or special consideration from the storage and container regulations.

A. Comments Received on this Subject

- a. Storage is defined to exclude wastes stored for 90 days or less. There is no recognition of waste characteristics or quantities. The requirement favors large generators; small generators will take longer to accumulate enough waste to improve transportation economies. The 90-day cutoff will prevent them from protecting these economies.
- b. Owners or operators who stockpile wastes in pools should be exempted from the storage requirements if they can show that the practice does not adversely affect human health and the environment.

- c. Bulk liquid terminals which are in the business of handling large volumes of commercial products, and which are in compliance with EPA's other regulations regarding control of discharges to navigable waters, the soil, and ground water, should be regulated differently for the relatively small volumes of residues that they generate than storage facilities which are in the sole business of hazardous waste management.
- d. Noncombustible containers with less than a 30-gallon capacity should be exempted from the management requirements for empty containers. This exemption is consistent with the proposed exemption of generators of small volumes of wastes (less than 100 kg/mo) and the exemption of household hazardous waste.
- e. Storage on-site for less than 90 days prior to shipment to an on-site treatment or disposal facility should also be exempted.

B. Analysis of and Response to the Comments

These comments are similar only in that they request an exemption. They must be considered individually.

(a) The 90-day Exclusion is Unfair to Small Business (Comment a)

The first commenter misinterpreted the proposed Subpart B (Section 3002) requirements. Section 250.25 of the proposed regulations required that every generator place wastes that are to be shipped into storage tanks complying with these regulations, or into shipping containers in compliance with DOT requirements (which also comply with these regulations). Those generators who accumulate for less than 90 days on-site are exempted from obtaining a permit under Part 122, Subparts A and B, but must store in containers or tanks which comply with the Department of Transportation packaging requirements and the requirements of Part 262 (§262.34), which are similar in content to these requirements.

The rationale and comment summary and analysis on this requirement are contained in the background document entitled "Standards Applicable to Generators of Hazardous Waste." The incremental cost of keeping wastes for more than 90 days before shipment, as compared to storing them less than 90 days, is largely the cost of obtaining the permit in compliance with the non-technical requirements, since the operator must, in any case, bear the cost of meeting the technical requirements which are very similar to this section. Also, although storage in lagoons and piles is now allowed, operators using those methods of storage for less than 90 days will not be eligible for the permit exemption. That is to say that storing wastes in lagoons or piles for less than 90 days before shipping them offsite will require a permit, whereas short-term storage in tanks and containers will not. This difference recognizes the relatively large volumes normally managed in impoundments and piles. The Agency believes also that lagoons and piles are relatively more accessible to the elements, more prone to serious accident (liner puncture, spillage, etc.), and are less secure than tanks and containers. Tanks and containers are structurally more sturdy and can readily be checked for leakage. Impoundments are ongoing operations in which leakage is difficult to detect. For these reasons, the Agency feels that the oversight and approval process embodied in the permitting procedures is necessary for adequate control.

(b) Stockpiled Wastes Should Be Exempted (Comment b)

The point of the comment on an exemption for stockpiled wastes is not clear. The commenter may be objecting to the limitation of storage to tanks and containers. As discussed previously, the Agency has amended the regulations to allow bulk storage in piles and also in surface impoundments. The commenter may also be advocating the exemption on the ground that it takes longer than 90 days to accumulate enough volume for sale, for economic shipment, or possibly for reuse. While this may be true in some cases, the Agency is unable to support a longer period, on the basis of protection of human health and the environment. Drums start to deteriorate with time, as noted previously. Also, if the time period is left open-ended, many less reputable generators could simply claim that stockpiled wastes were "stored" for future use or shipment when, in fact, that "storage" represents ultimate disposal. The primary reason for the 90-day storage exemption is not based on protecting human health, although the Agency believes the impact on human health will be negligible, since the tanks and containers must meet the technical standards anyway. The Agency's charge is to regulate the handlers and disposers of the wastes, not the generators; thus, the exemption makes sense. Another important reason for the exemption is the Agency's inability to deal with the extra thousands of permits which would be necessary. Virtually every one of the generators that ship their wastes must have some temporary storage prior to shipment. EPA

estimates this number to be over sixty thousand. The Agency could not manage the permitting of all those tanks and container storage areas. In any event, generators are required to store their wastes in facilities which meet technical requirements similar to these regulations. It is only the permitting process and the non-technical requirements which they are not subject to, and that only when the temporary storage is carried out in containers or tanks. In the Agency's view, the impact on the public health of this exemption will be negligible.

(c) Bulk Liquid Terminals Should Be Exempt (Comment c)

The Agency is unable to allow any distinction between bulk liquid terminals and other generators of hazardous wastes. Hazardous wastes stored there, or generated there as a result of tank clean-outs, etc., are similar in type and hazard potential to other hazardous wastes.⁽⁴⁷⁾ If these facilities generate less than the amount which qualifies them for the small quantity exemption, they are not subject to these regulations, just as any other facility generating small quantities is not subject to them.

(d) Small Noncombustible Containers Should Be Exempt (Comment d)

Based on considerations of human health and the environment, the Agency is unable to justify exempting noncombustible containers of less than 30-gallon capacity from regulations which would apply to larger containers. Smaller containers have more "wall area" than larger containers in relation to the volume of the container. For

example, for equivalent total capacity, five-gallon containers have more than twice the wall area as 55-gallon drums.⁽⁴⁸⁾ Therefore, since the amount of residue depends, to a large extent, on the contaminated wall area, smaller containers should contain more residual hazardous material than large ones per unit volume. The Agency disagrees that exempting small containers is in any way related to the small quantity exemption. While it is true that it takes more small containers to reach the monthly limit, the small quantity limit is based on total hazardous waste generated, and is unrelated to the quantity of the increments. The Agency also disagrees that exemption of small containers is related to the exemption of household refuse. While it is true that most household hazardous wastes occur in small containers, the household waste exemption is based on Congressional intent, as recorded in Senate Report No. 94988 (94th Congress, 2nd session, p. 16). Congress recognized the impracticality of trying to regulate the hundred million or so household generators. This has nothing to do with the incremental quantity of wastes generated by others.

Thus, small containers have not been exempted from the definition of hazardous waste. The circumstances under which containers are a hazardous waste can now be found in §261.33(c).

(e) Temporary Storage Prior to Shipment to an On-Site Facility Should Be Exempted (Comment e)

The primary reason for the temporary exemption of storage by generators prior to shipment off-site is based on the Agency's desire

to avoid the permitting burden for the tens of thousands of tank or drum storage areas that would not otherwise need a permit. Where on-site treatment or disposal is practiced, a permit will be required in any case. Inclusion of temporary storage facilities in the permit application should have no real impact on either the applicant or the Agency.

C. Summary of Interim Status Regulations

No exemptions were made to the final regulations covering containers, piles, or other management as a result of these comments.

SUBJECT: QUANTITY LIMITATIONS

A. Comment Received on the Subject

Limitations should be placed on the amount of waste that can be stored at storage facilities at any one period of time. This will not only reduce the potential harmful effect of the waste, but will provide additional safeguards against a company going bankrupt and leaving behind thousands of drums.

B. Analysis and Response to the Comment

The Agency sees much merit in the suggestion and in the reasoning behind it. A quantity limitation would tend to limit the impact of any catastrophe which might befall a storage area--if there are fewer drums to explode, presumably the danger and damage will be less. Also, the abandonment of stored drums of waste by "treatment" facilities has been a major problem.(15,17,18,19) (Note: Most treatment facilities have inventory storage facilities associated

with them to stabilize the waste feed supply to the treatment unit.) However, after considerable discussion, the Agency decided that an equitable, non-arbitrary quantity limitation would be very difficult to develop and, in the final analysis, the Agency believes its financial regulations, coupled with the permit procedures and other requirements, will solve the abandonment or bankruptcy problem.

To be supportable, any time or quantity limit should be related to the type of waste to be stored, the design and construction of the containment device used to store the material (drum or tank), the climatic conditions under which storage is to take place, and many other factors. At this time, EPA does not have sufficient data on the integrity of containers holding different types of wastes under different types of climatic conditions to write storage limitation standards. The Agency does plan to conduct this type of analysis in the future. Therefore, if such limitations are warranted, the Agency will develop and propose standards at a later date.

Under these interim status regulations, facilities must estimate the cost of closure in accordance with the closure requirements, and as a result of the Phase II financial requirements (currently being repropose), will be required to provide a cash deposit, a surety bond or other allowable mechanism to ensure that the money to pay for closure will be available. For those operations with storage facilities, part of the cost of closure is the cost of disposing of the maximum inventory of stored wastes the owner or operator expects to

have on hand at any one time. The owner or operator is, therefore, not allowed to store more wastes than his deposit (or bond or other alternative) can cover in disposal costs. The closure regulations and financial requirements for closure require that he determine the cost of removing or disposing of the maximum inventory of wastes which will be accumulated at the facility during the life of the site. The estimated cost of removing or disposing of these wastes will determine, in part, the size of the trust fund (or other alternative) which will be deposited. During interim status, these requirements will be incumbent upon owners and operators, and the Agency will enforce them through routine inspections. Later, the maximum inventory quantity determined by the owner or operator will be incorporated as a limit in the permit. The Agency believes this approach will accomplish, on a case-by-case basis, more protection against abandonment of stored wastes than would a more arbitrary, across-the-board limitation. The Agency will monitor the effectiveness of these requirements in protecting the public against abandonment of wastes. If necessary, additional regulations can be proposed at a later date.

V. INTERIM STATUS STANDARDS FOR MANAGEMENT OF WASTES IN PILES

In the proposed regulations, the Agency anticipated that piles of wastes could be managed in compliance with the landfill requirements. At that time the Agency had focused primarily on the large volume piles such as mining culm piles, where the pile really constitutes disposal, i.e., there is no plan to remove the waste in the foreseeable future. As mentioned earlier, the Agency received a number of comments suggesting that storage be allowed in devices other than containers and tanks, and specifically in piles. These commenters further pointed out that while the landfill regulations might be suitable for large piles, they are not practical for temporary storage of wastes in piles. The Agency agrees that small temporary storage piles require different management than large disposal piles. Accordingly, the Agency has designed the Subpart L requirements to relate specifically to small scale temporary storage piles. The owner or operator of a pile may chose to manage it in accordance with either the Subpart L pile regulations or the Subpart N landfill requirements. The additional requirements are as follows:

A. Wind Dispersal

Owners and operators must protect piles containing hazardous wastes from wind dispersal through management techniques such as covering (§265.251).

Rationale for the Standard

The example of the Pennsylvania asbestos waste piles^(49,50) graphically demonstrates the need for control of blowing wastes from piles. An air monitoring program, conducted by EPA in October 1973, indicated ambient background levels of asbestos, a known carcinogen, to be 6 ng/m³. An asbestos level of 9.6 ng/m³ was found at a playground near the largest waste pile. While this pile is a disposal pile and would not fall under the waste pile regulations, similar problems could be posed by storage piles.

This regulation is designed to cause owners of waste piles that are subject to wind erosion to take steps of their choosing to keep wastes from being dispersed by the wind. A suggested mechanism, included as an example, is covering, probably either with soil or tarpaulins. Some techniques would be effective with certain wastes, others with other wastes. The owner or operator of the facility is best able to develop an adequate cost-effective technique based on the properties of the wastes that he manages.

B. Waste Analysis

Incoming shipments of waste must be sampled and analyzed before adding the waste to a pile (§265.252). This is to be part of the Waste Analysis Plan required by Section 265.13. It must include a simple visual comparison, which may be supplemented by other quick physical or chemical tests, such as pH. The analysis performed must differentiate between incompatible wastes received at the facility

which could conceivably be placed in piles. If no incompatible wastes are received which can be piled, then the regulation does not apply.

Rationale for the Standard

The possible impact associated with incompatible wastes was discussed in the damage case section and in the discussion of compatibility in this section of the background document. The waste analysis requirement is designed to ensure that incoming shipments are not mistakenly added to an incompatible pile. The experience of existing waste management facilities confirms that wastes actually received are not always those which were expected.^(52,53,54) A simple color or texture comparison should prevent many dangerous mistakes that could result from mixing mislabeled, incompatible wastes into existing piles.

In the proposed General Facility Standards, there was a general requirement (§250.43(h)) that each truckload be sampled for certain characteristics. However, this was not proposed as part of the Interim Status Standards. Nonetheless, the Agency believes it is important to prevent problem reactions caused by accidentally mixing incompatible wastes in piles, and can see no reason not to incorporate this relatively simple, inexpensive requirement, which meets the criteria qualifying it as an Interim Status Standard.

C. Containment (265.256 and 265.257)

These requirements contain the bulk of the design requirements for piles of hazardous wastes. Besides the requirements for closure, the major difference in the requirements between disposal piles and storage piles is that the former must have ground-water monitoring to detect contamination. If leachate or run-off from a pile is a hazardous waste, then owners and operators of the latter must either prevent the formation of leachate and run-off or control hazardous leachate and run-off.

If the owner or operator chooses to prevent the formation of leachate and run-off, he must protect the pile from precipitation and run-on, and must not place any liquids or wastes containing free liquids on the pile. (See the preamble section on landfills for a discussion of free liquids.) Piles kept in buildings will typically meet this requirement.

Alternatively, in order to control leachate and run-off, the pile must be placed on an impermeable base so that leachate and run-off can be collected, and run-on must be diverted away from the pile. The collected leachate and run-off must be managed as a hazardous waste, and an NPDES permit will be required if the leachate and run-off is discharged through a point source to waters of the United States.

Rationale for the Standard

Other than for wind dispersal, the most likely pollution potential from piles comes from erosion and "washing" of the pile from rainfall, and from run-off from other areas of the facility. Leaching through the soil to the ground water is another likely possibility. These regulations are designed to prevent that. The pile regulations are designed to cover smaller piles used primarily for temporary storage. As §265.250 explains, the owner or operator may alternately choose to manage a waste pile in accordance with the landfill regulations. These pile regulations require that waste be contained, i.e., that rainfall runoff which contacts the waste does not enter the environment, either through the soil or surface runoff. The landfill regulations allow more latitude in design, particularly during the interim status period, but require ground water monitoring. The Agency expects that most larger, longer-term "piles," such as slag heaps and beneficiation wastes, when hazardous, will be managed as landfills. The smaller, more temporary piles are more likely to be managed according to these pile regulations.

Placing an impermeable base under an existing pile may entail the expense of moving the pile. However, the Agency believes that, since piles may be operated for a number of years under interim status (and without ground-water monitoring), this safeguard must be imposed at the outset. Those existing piles for which this proves

impractical may be covered or may be managed as landfills, where different protective measures are relied upon.

D. Ignitable and Reactive Wastes

Ignitable and reactive wastes cannot be placed in piles, unless adding them into the pile makes them non-flammable or non-reactive, or the waste is protected from sources of ignition or from any material or conditions which may cause it to react (§265.256). Wastes can also be pretreated to make them non-flammable or non-reactive. In this case, once they no longer meet the definition of an ignitable or reactive waste, in accordance with Part 261, management of them is no longer covered by the hazardous waste regulations.

Rationale for the Standard

It is not common practice to store highly ignitable or reactive wastes of any kind in piles. There is too great a chance that they will be accidentally ignited by discarded matches, or even lightning. It is also true that many of the more highly ignitable wastes are volatile liquids that are not amenable to piling. The potential problems are obvious. Piles of reactive wastes may react violently to form toxic gases, or may explode when the proper conditions occur. Toxic fumes would also be likely with some hazardous, ignitable wastes. Piles of highly flammable wastes could conceivably ignite with explosive force. The Agency, therefore, believes it is necessary to prevent the open piling of ignitable or reactive wastes.

With regard to the variance procedure employed, the reader may note that, if the waste is treated so that it no longer meets the ignitable or reactive waste definitions, it may be added to any pile. Some may argue that, if so treated, the waste is not hazardous and, thus, is not subject to these regulations anyway. That is true if the waste is hazardous only because it is ignitable or reactive. Also, the regulation allows mixing of ignitable or reactive wastes into a pile if, after the mixing operation, the mixed pile no longer has the characteristic of ignitability or reactivity. The Agency has no knowledge of anyone practicing such a mixing technology with piles, but believes the flexibility should be present to allow it, since similar practices are allowed at other types of facilities.

E. Incompatible Wastes (§265.257)

The Agency has adopted standards for the storage of incompatible wastes in piles similar to those for containers. Incompatible wastes must not be stored in the same pile, unless the resulting reactions do not cause fires, explosions, emissions of toxic gases, or present other hazards to human health or the environment, as provided in §265.17(b), the general facility standard which deals with incompatible wastes. Wastes stored in piles must be physically separated from other wastes or materials with which they are incompatible. Similarly, wastes cannot be piled on the same area that previously held an incompatible waste, unless the area has been decontaminated sufficiently so that deleterious reactions do not occur.

Rationale for the Standard

These requirements are designed to prevent reactions between two wastes and between wastes and other materials. Such reactions could occur should waste from the pile come into contact with a nearby waste or material as a result of containers or tanks leaking on the piles, growing until they intersect.

VI. FINAL LANGUAGE, INTERIM STATUS REGULATIONS

SUBPART I - USE AND MANAGEMENT OF CONTAINERS

§265.170 Applicability

The regulations in this Subpart apply to owners and operators of all hazardous waste facilities that store containers of hazardous waste, except as §265.1 provides otherwise.

§265.71 Condition of Containers

If a container holding hazardous waste is not in good condition, or if it begins to leak, the owner or operator must transfer the hazardous waste from this container to a container that is in good condition, or manage the waste in some other way that complies with the requirements of this Part.

§265.172 Compatibility of Waste with Container

The owner or operator must use a container made of or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired.

§265.173 Management of Containers

- (a) A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste.
- (b) A container holding hazardous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.

[Comment: A container that is a hazardous waste listed in §§261.31 or 261.33 of this Chapter must be managed in

compliance with the regulations of this Part. Reuse of containers in transportation is governed by U.S. Department of Transportation regulations, including those set forth in 49 CFR 173.28.]

§265.174 Inspections

The owner or operator must inspect areas where containers are stored, at least weekly, looking for leaks and for deterioration caused by corrosion or other factors.

[Comment: See §265.171 for remedial action required if deterioration or leaks are detected.]

§265.175 [Reserved]

§265.176 Special Requirements for Ignitable or Reactive Waste

[Interim Final]

Containers holding ignitable or reactive waste must be located at least 15 meters (50 feet) from the facility's property line.

[Comment: See §265.17(a) for additional requirements.]

§265.177 Special Requirements for Incompatible Wastes

- (a) Incompatible wastes, or incompatible wastes and materials (see Appendix V for examples), must not be placed in the same container, unless §265.17(b) is complied with.
- (b) Hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material (see Appendix V for examples), unless §265.17(b) is complied with.
- (c) A storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device.

[Comment: The purpose of this is to prevent fires, explosions, gaseous emissions, leaching, or other discharge of hazardous waste or hazardous waste constituents which could result from the mixing of incompatible wastes or materials if containers break or leak.]

§§265.178 - 265.189 [Reserved]

SUBPART L - WASTE PILES

§265.250 Applicability

The regulations in this Subpart apply to owners and operators of facilities that treat or store hazardous waste in piles, except as §265.1 provides otherwise. Alternatively, a pile of hazardous waste may be managed as a landfill under Subpart N.

§265.251 Protection from Wind [Interim Final]

The owner or operator of a pile containing hazardous waste which could be subject to dispersal by wind must cover or otherwise manage the pile so that wind dispersal is controlled.

§265.252 Waste Analysis [Interim Final]

In addition to the waste analyses required by §265.13, the owner or operator must analyze a representative sample of waste from each incoming movement before adding the waste to any existing pile, unless: (1) the only wastes the facility receives which are amenable to piling are compatible with each other, or (2) the waste received is compatible with the waste in the pile to which it is to be added. The analysis conducted must be capable of differentiating between the

types of hazardous waste the owner or operator places in piles, so that mixing of incompatible waste does not inadvertently occur. The analysis must include a visual comparison of color and texture.

[Comment: As required by §265.13, the waste analysis plan must include analyses needed to comply with §§265.256 and 265.257. As required by §265.73, the owner or operator must place the results of this analysis in the operating record of the facility.]

§265.253 Containment [Interim Final]

If leachate or runoff from a pile is a hazardous waste, then either:

- (a) The pile must be placed on an impermeable base that is compatible with the waste under the conditions of treatment or storage, run-on must be diverted away from the pile, and any leachate and run-off from the pile must be collected and managed as a hazardous waste; or
- (b) (1) The pile must be protected from precipitation and run-on by some other means; and
- (2) No liquids or wastes containing free liquids may be placed in the pile.

[Comment: If collected leachate or runoff is discharged through a point source to waters of the United States, it is subject to the requirements of Section 402 of the Clean Water Act, as amended.]

- (c) The date for compliance with paragraphs (a) and (b)(1) of this Section is 12 months after the effective date of this Part.

§§265.254 - 265.255 [Reserved]

§265.256 Special Requirements for Ignitable or Reactive Waste
[Interim Final]

Ignitable or reactive waste must not be placed in a pile,

unless:

- (1) Addition of the waste to an existing pile (i) results in the waste or mixture no longer meeting the definition of ignitable or reactive waste under §§261.21 or 261.23 of this Chapter, and (ii) complies with §265.17(b); or
- (2) The waste is managed in such a way that is protected from any material or conditions which may cause it to ignite or react.

§265.257 Special Requirements for Incompatible Wastes [Interim Final]

- (a) Incompatible wastes, or incompatible wastes and materials (see Appendix V for examples), must not be placed in the same pile, unless §265.17(b) is complied with.
- (b) A pile of hazardous waste that is incompatible with any waste or other material stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials, or protected from them by means of a dike, berm, wall, or other device.

[Comment: The purpose of this is to prevent fires, explosions, gaseous emissions, leaching, or other discharge of hazardous waste or hazardous waste constituents which could result from the contact or mixing of incompatible wastes or materials.]

- (c) Hazardous waste must not be piled on the same area where incompatible wastes or materials were previously piled, unless the area has been decontaminated sufficiently to ensure compliance with §265.17(b).

§§265.258 - 265.269 [Reserved]

APPENDIX I

EXAMPLES OF POTENTIALLY INCOMPATIBLE WASTES

Many hazardous wastes, when mixed with other wastes or materials at a hazardous waste facility, can produce adverse effects on human health and the environment in the following ways: (1) by generating heat or pressure, (2) by violent reaction, (3) by generating or releasing flammable or toxic fumes and gases, (4) by fire or explosions, (5) by releasing toxic substances in case of fire or explosion, and (6) by generating flammable or toxic gases.

Below are examples of potentially incompatible wastes, waste components, and materials, along with the adverse consequences resulting from mixing materials in one group with materials in another group. The list is intended as a guide for owners/operators of treatment, storage, and disposal facilities and for permitting officials, to show the need for special precautions when managing these potentially incompatible waste materials or components.

This list is not intended to be exhaustive. An owner or operator must, as the regulations require, adequately analyze his wastes so that he can avoid creating uncontrolled substances or reactions of the type listed below, whether they are listed below or not.

It is possible for potentially incompatible wastes to be mixed in a way that precludes a reaction (e.g., adding acid to water rather than water to acid) or that neutralizes them (e.g., a strong acid

mixed with a strong base), or that controls substances produced (e.g., by generating flammable gases in a closed tank equipped so that ignition cannot occur, and burning the gases in an incinerator).

In the lists below, the mixing of a Group A material with a Group B material may have the potential consequence as noted.

<u>Group 1-A</u>	<u>Group 1-B</u>
Acetylene sludge	Acid sludge
Alkaline caustic liquids	Acid and water
Alkaline cleaner	Battery acid
Alkaline corrosive liquids	Chemical cleaners
Alkaline corrosive battery fluid	Electrolyte acid
Caustic wastewater	Etching acid liquid or solvent
Lime sludge and other corrosive alkalies	Liquid cleaning compounds
Lime wastewater	Pickling liquor and other corrosive acids
Lime and water	Spent acid
Spent caustic	Spent mixed acid
	Spent sulfuric acid

Potential consequences: Heat generation, violent reaction.

<u>Group 2-A</u>	<u>Group 2-B</u>
Asbestos waste and other toxic wastes	Cleaning solvents
Beryllium wastes	Data processing liquid
Unrinsed pesticide containers	Obsolete explosives
Waste pesticides	Petroleum waste
	Refinery waste
	Retrograde explosives
	Solvents
	Waste oil and other flammable and explosive wastes

Potential consequences: Release of toxic substances in case of fire or explosion.

Group 3-A

Aluminum
Beryllium
Calcium
Lithium
Magnesium
Potassium
Sodium
Zinc powder and other reactive
metals and metal hydrides

Group 3-B

Any waste in Groups 1-A or 1-B

Potential consequences: Fire or explosion, generation of
flammable hydrogen gas.

Group 4-A

Alcohols
Water

Group 4-B

Any concentrated waste in
Groups 1-A or 1-B
Calcium
Lithium
Metal hydrides
Potassium
Sodium
SO₂CL₂, SOCL₂, PCL₃, CH₃SiCl₃,
and other water-reactive
wastes

Potential consequences: Fire, explosion, or heat generation;
generation of flammable or toxic gases.

Group 5-A

Alcohols
Aldehydes
Halogenated hydrocarbons
Nitrated hydrocarbons and other
reactive organic compounds and
solvents
Unsaturated hydrocarbons

Group 5-B

Concentrated Groups 1-A or 1-B
wastes
Group 3-A wastes

Potential consequences: Fire, explosion, or violent reaction.

Group 6-A

Group 6-B

Spent cyanide and sulfide solutions Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide or
hydrogen sulfide gas.

Group 7-A

Group 7-B

Chlorates and other strong
oxidizers

Chlorine

Chlorites

Chromic acid

Hypochlorites

Nitrates

Nitric acid, fuming

Perchlorates

Perranganates

Peroxides

Acetic acid and other organic
acids

Concentrated mineral acids

Group 2-B wastes

Group 3-B wastes

Group 5-A wastes and other
flammable and combustible
wastes

Potential consequences: Fire, explosion, or violent reaction.

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