

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

BACKGROUND DOCUMENT

40 CFR PART 265

SUBPART O INTERIM STATUS STANDARDS FOR HAZARDOUS WASTE INCINERATION

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF SOLID WASTE

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I. INTRODUCTION

This is one of a series of documents providing support and background information for regulations issued under Section 3004 of the Resource Conservation and Recovery Act of 1976. Each Background Document describes a regulation as originally proposed, summarizes and responds to comments received that relate to that original proposal, and indicates the Agency's rationales for final regulations.

On December 18, 1976, the Agency proposed permanent status standards for incineration of hazardous waste (43 Federal Register 59008-59009). That proposal is summarized in Attachment I. The Agency is still considering the extensive comments that were received on all aspects of that proposal. However, the Agency has decided to issue limited interim status standards for hazardous waste incinerator facilities on an interim final basis. These will apply to each facility during the time between submittal of the application for a permit and the issuance of a permit.

One commenter, while asking that the permanent status standards for monitoring and inspection of incinerators be made applicable during the interim period, pointed out that the Agency has predicted that the ultimate permitting process may take years to complete. The Agency agrees that the long period makes some minimal level of regulation necessary during the interim status period to protect human health and the environment. Accordingly, the interim status standards for incineration have brought together and detailed some of

the rules originally proposed as general facility standards. The criteria used by the Agency in selecting the appropriate standards for interim status are discussed in this Background Document.

Other commenters expressed concern that the proposed incineration regulations would inhibit the development of alternative thermal treatment techniques. These concerns prompted the Agency to develop a new Subpart P - Thermal Treatment. This new subpart is dealt with in the background document entitled "Thermal Treatment."

A number of comments were received requesting emission variances during "start-up" periods. These comments reminded the Agency of a dangerous practice which is sometimes used to cut costs, wherein hazardous wastes are burned under less than sufficient conditions during startup periods. Thus, an interim status standard has been added, requiring the attainment of steady-state conditions using non-hazardous, auxiliary fuel, if necessary, before waste is added.

The interim final status of these regulations means that the Agency will continue to receive and consider comments upon them for a period of 90 days from date of issuance. As a result of these comments, the Agency may revise, add, or delete specific requirements. However, these regulations are in force and effective on the date six months after promulgation. The complete text of these interim status standards can be found in Part IV of this document.

A. RCRA Mandate for the Regulation

The Congress of the United States, in Section 3004 of Subtitle C of the Resource Conservation and Recovery Act (RCRA) of 1976 (PL 94-580), required that the Administrator of the U.S. Environmental Protection Agency:

"...promulgate regulations establishing such performance standards, applicable to owners and operators of facilities for the treatment, storage, or disposal of hazardous waste identified or listed under this Subtitle, as may be necessary to protect human health and the environment. Such standards shall include, but need not be limited to, requirements respecting - ...

- (3) treatment, storage, or disposal of all such wastes received by the facility pursuant to such operating methods, techniques, and practices as may be satisfactory to the Administrator;
- (4) the location, design, and construction of such hazardous waste treatment, disposal, or storage facilities;"
[emphasis added].

The term "treatment" is defined in Section 1004(34) of the Act to mean:

"...any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste non-hazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume..."

One objective of incinerating hazardous waste is normally to change the physical form or chemical composition of the waste so as to render it non-hazardous. Incineration may also render the waste "safer for transport, amenable for recovery, amenable for storage, or reduced in volume." Therefore, incineration is a treatment process within the meaning of the Act, and the Agency is mandated to produce

operating, location, design, and construction regulations for the incineration of hazardous waste adequate to protect human health and the environment.

B. Key Definitions

The definitions given in Part 260 should aid the reader in understanding this specific document and the interim status standards. Some of those definitions are provided here for readers' convenience. Changes relevant to these interim status standards are discussed after each definition:

1. "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.
2. "Disposal Facility" means a facility or part of a facility at which hazardous waste is intentionally placed into or on any land or water, and at which waste will remain after closure.
3. "Facility" means all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combinations of them).
4. "Hazardous Waste" means a hazardous waste as defined in §261.3 of this Chapter.
5. "Incinerator" means an enclosed device using controlled flame combustion, the primary purpose of which is to thermally break down hazardous waste. Examples of incinerators are rotary kiln, fluidized bed, and liquid injection incinerators.

This definition has been modified from the proposed rules as a result of a number of comments. There were several who urged that energy recovery units (boilers or other facilities where the waste is used as fuel) should be excluded

from coverage under these regulations since they were alleged to be more efficient and have higher destruction efficiencies than incinerators. Comments also suggested that these rules would inhibit use of wastes as a resource (fuel). Therefore, given the energy crisis and EPA's interest in promoting resource recovery, these commenters suggested that the Agency should exempt incinerators and furnaces which utilize the heating value of wastes. There was one additional comment which urged similar treatment for furnaces which recover materials from hazardous wastes, for example, furnaces which thermally regenerate spent activated carbon.

For reasons discussed in the background document on exemptions, most residual materials destined for energy or material recovery operations will not presently be regulated. It follows, then, that facilities burning these materials, such as utility boilers and cement kilns, to recover the energy value inherent in them, are not now considered hazardous waste facilities. Thus, boilers and cement kilns have been removed from the list of examples of incinerators in the definition. It should be noted, however, as discussed in the background document entitled "Purpose, Scope and Applicability," listed wastes in Part 261 are subject to the transportation and storage requirements of these regulations, even when destined for recovery or reuse. Thus, a listed waste which is burned in a boiler for heat recovery, will require a manifest to be transported, and storage of it before burning will be subject to the storage requirements and will ultimately require a permit. The boiler itself will not at this time be subject to the regulations.

One commenter suggested that the definition be expanded to include facilities, other than those using flame combustion, to thermally degrade hazardous wastes. Examples suggested were molten salt incinerators and pyrolysis units. The Agency disagrees. Incinerator regulations which may ultimately involve controls of excess air, temperatures, and so on, are designed specifically to relate to flame oxidation units. Other types of thermal treatment facilities, which operate on different principals, do not always meet and may not need to meet the conditions specified for flame combustion in order for them to be effective and protective of human health and the environment. Examples include those suggested by the commenter, as well as wet air oxidation (Zimmerman or Zimpro process) and microwave plasma destruction. These processes are being regulated under a new Subpart P - Thermal Treatment.

Another commenter felt that listing of examples of incinerators placed an unfair stigma on units of the same type (i.e., fluidized beds, kilns, etc) which do not burn hazardous wastes. While some uninformed people might attach such a stigma, the Agency is unable to see the significance of it. These rules do not cover any facility which does not burn hazardous wastes. As far as the public is concerned, it has been EPA's experience that it is the fact that the facility manages hazardous wastes, not the type of facility, which elicits the serious public concern about such facilities. The Agency believes that, for the sake of clarity, it is important to give examples of the types of equipment which meet the definition.

One commenter urged that experimental incinerators should not be covered by the definition since, during experiments, it is not possible to guarantee that all of the criteria (temperatures, retention time, etc.) mandated in the proposed regulations will be met. The Agency agrees that experimental tests, whether in full-scale or pilot units, are absolutely essential to implementation of these regulations, and that it is not possible to predict, with absolute certainty, that all of the proposed requirements will be met during the test. However, it is the Agency's experience in running such tests that, for such experiments to be safe, they must be meticulously planned and closely monitored and controlled. Therefore, the Agency has chosen to impose upon experimental burns the control mechanism provided by the permitting process as described in Part 122.

6. "Treatment" means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste; or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, or amenable for storage, or reduced in volume.

The following definitions have been removed from the Part 260 regulations: fugitive emissions, monitoring, and retention time. Either these terms are no longer used or the Agency has concluded that regulatory definitions would add nothing to the meaning 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 THE REGULATIONS

The Agency encourages incineration in properly designed and operated facilities as a management technique which is preferable to land disposal of hazardous wastes. Incineration of hazardous waste, as compared to landfilling, open dumping, and disposal in streams, has not been widely practiced. However, with State laws eliminating open dumping and inadequate landfilling, interest in incineration as a means of hazardous waste destruction is increasing. Incineration is capable of destroying the hazardous nature of organic wastes, while simultaneously reducing the volume of remaining wastes. Agency tests have demonstrated that incineration of a broad range of hazardous wastes can be conducted safely and properly using existing technology.¹

Incineration can be conducted improperly, however. In the past, hazardous wastes have been burned in the open, in drums, in makeshift burners, often without emission controls, and many times without proper combustion conditions to ensure proper destruction. Improper burning can lead to emission of odors and toxic gases and fumes, uncontrolled fires and explosions, and the production of hazardous residues which, if not managed properly, can pose as much of a hazard as the original waste.

The potential for damage to the environment and to human health is also related to the type of waste incinerated. For example, sludges from oil and solvent recovery operations often contain heavy

metals including lead.² Uncontrolled incineration of sludges containing metals could result in significant air emissions of these hazardous heavy metal constituents, or other toxic chemical compounds formed from them.³

Even properly designed incinerators have limitations regarding the kinds and characteristics of the hazardous materials they can safely treat. Significant amounts of water or other noncombustible components of the waste can affect attainable incineration temperatures, appropriate feed rates, the amount of auxiliary fuel necessary, and the adequacy of control equipment. Failure to respect these limitations can increase the probability of environmental and human health injuries.

A. Incidents Involving Improper Incineration

Recently, incineration of hazardous waste, both adequate and inadequate, has been increasing. Several damage incidents and near incidents have come to the Agency's attention. A few, summarized below, serve to illustrate the potential problems associated with improper incineration:

1. In early 1974, following reports of air and ground water pollution caused by the incineration of hazardous wastes, the Air Compliance Division of the Connecticut Department of Environmental Protection closed two organic solvent recovery operations. One of the operations, in Southington, Connecticut, was contaminating the air with heavy metals from the incineration of solvent recovery sludges which contained lead and zinc. Additionally, the company's operations contaminated the soil and ground water in the area and the company's own well. Incineration ceased in early 1974.

In Beacon Falls, Connecticut, a similar operation was closed for reasons of air pollution.⁴

2. An incinerator in Grafton, Ohio, has been the target of numerous citizens complaints for unpleasant odors and air pollution. Odors, which normally signify organic emissions, are a common problem at incinerators due to the volatility of many of the wastes. Release of odoriferous materials usually occurs as a result of careless handling of the waste, fugitive emissions, or incomplete combustion. The area surrounding the facility is reported to have become contaminated with unburned Kepone on one occasion.⁵
3. An on-site investigation by EPA officials at a closed hazardous waste facility in Seymour, Indiana, revealed that a makeshift incinerator had been used to destroy hazardous wastes. The unit was little more than an open burning operation with an air blower to supply extra air.⁶
4. An incinerator in Chicago, Illinois, was shut down in August 1976, after numerous violations of stack emission standards. The City of Chicago was able to close the facility down when three violations of air standards (particulates, opacity, and odors) occurred within a 180-day period. The facility has since reopened, after extensive modification of its air pollution control equipment. To date, the City has issued permits allowing only a limited number of wastes to be burned.⁷
5. In April 1977, the State of New York shut down a liquid waste incinerator run by Pollution Abatement Services at Oswego, New York. The facility was a constant source of odor complaints from local residents. The State Division of Air Resources sampled the incinerator stack several times and found, in one case, a particulate level of 10 times the allowable limit. After the facility was closed, the State of New York was left with a one-million gallon lagoon, four 50,000-gallon tanks and 8,500 drums of waste materials.⁸

It is clear from these incidents that unless incineration regulations are written and implemented, damage incidents can be expected to continue.

B. Basis for the Interim Status Standards

1. Interim Status Standards

Given the Congressional mandate to protect human health and the environment from inadequate hazardous waste treatment and the demonstrated human health and environmental problems associated with inadequate treatment via incineration, the Agency proposed a full set of permanent status incinerator regulations on December 18, 1978. (Attachment I gives a summary of the proposed regulations and a brief synopsis of the comments received). These proposed regulations included permanent status standards and very limited interim status standards for chemical, physical, and biological treatment. Interim status standards are applicable during the period of time between submittal of an application for a permit and the granting of a permit.

The Agency has determined that it is important to bring some additional control over incineration and other thermal treatment by promulgating additional interim status standards. This background document and the associated regulations are limited to those regulations which are to be in effect during the interim status period. Regulations covering the permanent status period, the period after permitting, will be issued in the next few months. At that time the complex technical questions raised by commenters will be addressed.

These interim status standards have been organized to bring together all of the regulations that will most directly affect

hazardous waste incineration facilities during the period between the time they apply for a permit under the permanent status standards and the time the Agency completes action on that application. Thus, the inspection and the waste analysis requirements specific to incinerators, which were separately listed in the 1978 proposal, are listed here. A commenter also suggested that the proposed permanent standards for trial burns and operational emissions monitoring be made applicable during the interim status period. Since these do not meet the interim status criteria (outlined below), the Agency will not do this. However, a requirement that waste be burnt only at proper operating temperatures is consistent with the ISS criteria, and comments asking for an operational variance during start-up periods made the Agency aware of a serious potential for environmental hazards from this practice. Thus, the requirement of pre-heating to proper operating conditions was added to these interim status standards.

2. Criteria for Interim Status Standards

In general, the Agency used the following criteria to indicate which regulations should be adopted during the interim status period: (1) can reasonably be implemented by the regulated community within the six-month period between promulgation and the effective date of the regulations; (2) do not require large capital expense for items which require approval and, thus, might be altered as part of the permitting process; and (3) can be implemented directly by the

regulated community with the need for minimal consultation with or interpretation by the Agency. The rationale for these decision criteria is discussed in the preamble to the Part 264 and 265 regulations and in the "General Issues Concerning Interim Status Standards" Background Document entitled ~~"Purpose, Scope and Applicability"~~. It should be understood, however, that the Agency used the criteria only as guidance in deciding which standards to require during interim status. They are not hard-and-fast rules. The Agency has gone beyond these guidelines where it appeared justified, and may do so again.

For incineration facilities, the proposed technical performance and design requirements do not meet these criteria and, thus, cannot readily be implemented during interim status. The time required and the costs of conducting trial burns and upgrading most existing facilities will be considerable, and the designs will require Agency approval during the permitting process. The Agency has, however, developed threshold standards for incineration which can be implemented during the interim status period. These have been designed primarily to improve operating procedures, i.e., to eliminate the careless and sloppy practices which have resulted in serious problems in the past. They do meet the criteria for interim status standards.

Specifically, requirement §265.343, that the incinerator be brought to its steady state operating condition before hazardous wastes are introduced meets the criteria because: (1) it requires no EPA approval or interpretation, (2) any capital expenditures

necessary to install auxiliary fuel capability are not likely to be the topic of disagreement during permitting activities, and (3) it can be implemented with little lead time needed to obtain and install equipment.

The requirement of §265.345, that off-site hazardous wastes be analyzed before the owner or operator treats them, meets the criteria because: (1) it can be implemented with no EPA involvement, since the sampling and analytical procedures are largely left to the owner or operator; (2) it can commence as soon as any necessary testing equipment is delivered; and (3) it requires only limited (and necessary) expense for the purpose of procuring testing equipment (if not already available).

The requirement of §265.347, for instrument monitoring and control equipment and emission inspection, meets the criteria because: (1) it can be begun by incinerator operators immediately, (2) it requires no interpretation by the Agency, and (3) it requires no capital expenditures, since only existing, in-place equipment and instruments must be inspected.

Finally, the requirement §265.351, that hazardous waste and hazardous residues (including sludges, ash, etc.) be removed from the incinerator at closure will be incorporated as part of the closure plan required by Subpart G (Closure and Post Closure) to be prepared during interim status. This will be subject to Agency review and approval before it is implemented. Implementation of these requirements will not be necessary until closure which may be years in the

future but they may require significant capital expenditures. These rules are being promulgated despite the interim status criteria because of the importance the Agency places on proper closure. For further discussion of the closure requirements during interim status use the background document entitled "Closure and Post-Closure Care."

3. The Experience Base for Incineration Regulations

In developing both the proposed regulations and these interim status standards, the Agency made use of its own experience in testing destruction of hazardous wastes in incinerators^{1,9} and of the pooled experience of the member countries of the NATO Committee on Challenges to Modern Society. The Agency has also relied upon state and national regulatory experience.

EPA, under the Clean Air Act, has promulgated standards for ubiquitous pollutants such as sulfur dioxide and for certain hazardous air pollutants such as mercury and lead. For example, these include emission standards for particulates from solid waste and sewage sludge incinerators.¹⁰ However, these controls were not developed to deal specifically with hazardous waste incinerators in mind. There are, moreover, an almost infinite variety of toxic chemical entities which could be emitted as a result of improper incineration of hazardous wastes. This results from the almost infinite variety of chemical species which make up hazardous waste. It is difficult, expensive and time consuming to gather rigorous data on threshold levels for area-wide health effects for these potential

emissions. Because of the procedures required for the regulation of any hazardous air pollutant under the Clean Air Act, it has not been practical to rely on pollutant-by-pollutant emission standards under Section 112 of the Clean Air Act as a means of protecting human health from emissions associated with hazardous waste incineration. Yet, common sense, public concern, and sporadic incidents suggest that the problem is already serious and can be expected to become acute with the expected increase in the volume of hazardous wastes incinerated and the number of incinerator sites.

Therefore, while the Agency has been able to utilize its experience with the Clean Air Act, it was necessary to design the proposed regulations around performance criteria for destruction efficiency and design and operating requirements based on the RCRA statutory requirement to protect human health and the environment. Attainable performance criteria were developed, based on the results of a series of trial burns and analyses conducted in 1975 and 1976 with 14 different wastes in 7 different full-scale commercial incinerators.¹ These tests provided core data for development of the proposed regulations, and the operational knowledge gained in that test series supports the requirements designed for interim status.

The only federal regulations currently in effect which relate specifically to hazardous waste incineration are embodied in EPA's PCB disposal regulations.¹¹ These regulations require that certain PCB wastes be incinerated. Land disposal is not allowed for these

materials. The regulation also includes destruction and combustion efficiency requirements; specifications for temperature, retention time, and excess air; requirements for inspecting (monitoring) operating conditions; and for automatic feed cutoff in the event of a malfunction. The PCB regulations also call for formal test burn procedures and for the installation of scrubbers. The requirements parallel the proposed RCRA regulations to a considerable degree, and were helpful during development of the proposed regulations, primarily in suggesting alternative regulatory approaches and ensuring comprehensiveness of coverage.

In addition to adopting to varying degrees, EPA's Clean Air Act standards, some States have found it necessary to control hazardous waste incineration directly. The work done by these States in developing their regulations and their experiences in implementation was reviewed by the Agency during development of the December 18, 1978 proposal and these interim status regulations.

In the absence of regulations specifically addressing emissions from incinerators burning hazardous waste, States have restricted the operations of hazardous waste incinerators by the authority of a general protection or "nuisance" rule. The following general nuisance rule of the Wisconsin Department of Natural Resources is typical:

NR 154. Control of Hazardous Pollutants. General Limitations.
No person shall cause, suffer, allow, or permit emissions into the ambient air hazardous substances in such quantity, concentration, or duration as to be injurious to human health, plant,

or animal life unless the purpose of that emission is for the control of plant or animal life. Hazardous substances include, but are not limited to, the following materials, their mixtures, or compounds: asbestos, beryllium, cadmium, chlorine, fluorine, lead, mercury, pesticides, or radioactive material.¹²

While this type of the rule provides no specific regulatory guidelines, the general authority of similar statutes has been used to impose a variety of emission restrictions on a case-by-case basis in different States.

An initial survey of specific state regulations relevant to these interim status standards revealed the following:

Arkansas - The Arkansas Solid Waste Disposal code has such relevant incineration requirements as continuous temperature monitoring, reporting, and ash disposal only into an approved site.¹³

California - The "Minimum Standards for management of Hazardous and Extremely Hazardous Wastes" require that operators of off-site facilities "shall inspect wastes before accepting them to ensure that the delivered waste has essentially the same general properties as identified by the producer on the manifest."¹⁴

Pennsylvania - Solid Waste rules require that incinerator ash disposal be approved by the Department of Environmental Resources, and that liquid effluents shall be treated as an industrial waste and handled as approved by the Department of Environmental Resources.¹⁵

Several states, including Missouri, Nevada, Tennessee, and South Carolina, are currently in the process of proposing regulations covering hazardous waste incineration facilities.

III. ANALYSIS OF AND RESPONSE TO COMMENTS RELEVANT TO THE INTERIM STATUS STANDARDS

Many of the comments received went to technical points or issues that will be resolved only in the general status (Phase II) regulations to be promulgated late in 1980. These are not discussed here. Other comments raised issues relevant to any RCRA regulation of hazardous waste incineration. These are discussed immediately below. Finally, comments specifically relevant to these Interim Status Standards are discussed after the general issues raised.

Issue #1 General Issues

A. Summary of Comments

1. Incineration should be regulated in three ways: emissions should be controlled by the Clean Air Act, effluents by the NPDES system, and land disposal by Subtitle D of RCRA. Legislative history does not indicate that Section 3004 "disposal" was intended to include incineration.
2. Design and operation regulations are a mistake. The owner or operator should be allowed to determine how to operate the process so as to meet performance standards.

B. Analysis of and Response to General Issue Comments

1. Hazardous Waste Incineration Falls Within the RCRA Statute

The commenters' discussion of whether hazardous waste incineration falls within the Section 1004(3) definition of "disposal" is not to the point. The Agency is regulating incineration as "treatment" of hazardous wastes. Section 1004(34) defines treatment:

- (34) The term "treatment," when used in connection with hazardous waste, means any method, technique, or process, including neutralization, designed to change the biological character or composition of any hazardous waste so as to neutralize waste and render it non-hazardous, safe for

transport, amenable for recovery, amenable for storage, or reduced in volume. Such term includes any activity or processing designed to change the physical form or chemical composition of hazardous waste so as to render it non-hazardous.

As a process designed to render hazardous waste non-hazardous and reduced in volume, incineration falls squarely within this definition. The Agency's statutory mandate to regulate such treatment processes is thus found in Section 3004, which requires that the Administrator promulgate standards for the treatment of hazardous wastes. This mandate also serves the objectives of the statute, defined by Congress in Section 1003(4) as, among other things, "regulating the treatment... of hazardous wastes which have adverse affects on health and the environment." In addition, incineration of hazardous wastes was discussed extensively in EPA's 1974 Report to Congress: Disposal of Hazardous Wastes, a document that strongly influenced Congressional development of RCRA. The Administrator's authority in this matter is made even more clear later in Section 3004, which says that standards set by the Agency "shall include, but need not be limited to, requirements respecting--

- (3) treatment...of all such wastes...pursuant to such operating methods, techniques, and practices as may be satisfactory to the Administrator."

Some commenters suggested that the proposed regulations should be replaced by, or were in conflict with, the Clean Air Act. Congress, in Section 1006(b), required the Administrator to integrate RCRA with the Clean Air Act, but "only to the extent that it can be

done in a manner consistent with the goals and policies expressed in this Act..." It is significant that Congress, in Section 1006(a), omitted the Clean Air Act from a list of statutes that were specified as unaffected by RCRA's provisions. As a result, the Administrator has substantial discretion to determine the interplay between RCRA and the Clean Air Act, so as to best effect the purposes of both statutes. Since incineration of hazardous waste poses dangers that go beyond the general concerns of the Clean Air Act, it is appropriate to regulate such facilities under RCRA. Also, incinerator sites will be receiving manifested wastes, temporarily storing hazardous wastes, and (usually) generating hazardous wastes in their ash and scrubber effluents. Thus, regulating their operations under RCRA has the added advantage of minimizing the regulatory paperwork applicable to each facility.

The Clean Air Act controls air contaminant emissions largely on a pollutant-by-pollutant basis, or on a pollutant-facility basis. Its regulations include area-wide standards for relatively ubiquitous pollutants such as sulfur dioxide and lead, and for certain hazardous air pollutants, such as beryllium and vinyl chloride. Such action is adequate and necessary for the pollutants and facilities heretofore regulated (e.g., particulates from steam fired power plants, vinyl chloride emissions from vinyl chloride production plants). In contrast, a case-by-case, chemical by chemical, regulatory approach is not practical for control of hazardous waste incineration. The

hazardous air pollutant provisions of Section 112 of the Clean Air Act, 42 U.S.C. §7412, require the use of extensive procedures for each pollutant regulated.

The pollutant species which could be emitted from incineration of hazardous wastes number in the tens of thousands. Many of them could be acutely toxic or carcinogenic. The procedures of the Clean Air Act are less effective and efficient in such situations. RCRA has authority to control emissions broadly through destruction and combustion performance standards and directly through operating and design standards. These standards can be more effectively applied to the entire mix of pollutants treated in each facility. Thus, the Agency has decided to regulate hazardous waste incinerators and other thermal treatment devices directly under RCRA.

Effluent discharges to surface waters, however, will still require NPDES permits. These RCRA regulations do not cover surface water discharges. Finally, removal of ash or other residues generated by an incinerator to landfills or other sites will have to comply with RCRA hazardous waste regulations for generators if the waste is hazardous. There are no provisions of regulations issued by the Agency under the Clean Air Act or the Clean Water Act which are incompatible with these RCRA requirements. It should be noted that these interim status standards do not apply to the incineration of PCB items. These are regulated under 40 CFR 761.40. At a later time, the Agency intends to integrate the PCB requirements with these RCRA requirements.

2. Performance Standards are the Best Approach

The Agency believes that performance standards are desirable and, in fact, the destruction and combustion efficiency requirements and the halogen removal requirements which were proposed were types of operational performance standards. The use of performance standards tends to encourage innovative technologies and provides maximum cost-effectiveness and flexibility to the owner and operator. Very specific design requirements, on the other hand, tend to freeze technology. The Agency does not agree, however, that RCRA regulations should depend solely and totally on performance standards.

There are a number of "good management practices," which are currently routinely practiced by the reputable and knowledgeable incinerator operators, which the Agency believes should be practiced by anyone, regardless of the waste and incinerator types employed. Some of these "good management practices" have been included in these interim status regulations. These threshold operating requirements are based on the belief that it is better to prevent injury to human health through careful management than to take after-the-fact enforcement measures when poor management has led to an inevitable breach of a performance standard.

Issue: #2 Allowance of Variances During Startup Periods

A. Synopsis of the Proposed Regulations

The proposed regulations (Section 250.45-1(d)) required that incinerators operate at 1000°C with at least a two-second residence

time and at least 2 percent excess air (except for halogenated aromatics which required 1200°C for 2 seconds and at least 3 percent excess air) whenever burning hazardous wastes. Similarly, a 99.9 percent combustion efficiency and 99.99 percent destruction efficiency were required whenever burning hazardous wastes. These standards are not requirements for the interim status period.

B. Summary of Comments

1. Define a one-hour startup period after wastes are introduced before destruction efficiency and combustion efficiency requirements are applied.
2. Allowance should be made for excursions and operational variations during startups and shutdowns.

C. Analysis of and Response to Comments and Rationale for the Final Regulation

The Agency cannot agree with the request for a variance during startup and shutdown times. Such an allowance would open the door to the possibility of an incinerator being allowed to spew out significant quantities of hazardous wastes. Test burns in the past have indicated that it is good management practice, and entirely feasible, to use auxiliary fuel to bring the incinerator up to steady-state operating conditions before burning hazardous wastes. The Agency's test burn experience has demonstrated that, if preheating to standard conditions is coupled with careful control, dangerous temperature and residence time deviations can be eliminated when waste feed commences.^{1,9}

While there may be a small increase in operating costs caused by increased reliance on auxiliary fuels, that cost is clearly outweighed by the human health benefits of proper incineration. This regulation, as a side benefit, will prevent unscrupulous owners and operators from gaining an economic advantage over reputable facilities.

The Agency agrees that combustion condition variations, with attendant deviations in destruction efficiencies and increased emissions, are most likely to occur during startup periods. If the practice suggested by these comments becomes widespread, significant health and environmental damages are likely to result. Therefore, while the Agency is currently unready to implement permanent combustion, operating, and performance standards, it is reasonable and necessary to require owners and operators of existing facilities to achieve steady-state operating conditions within the incinerators using auxiliary fuel before introducing any hazardous waste. Reputable firms currently practice this safeguard, regardless of the design capability of their incinerator.¹⁶

D. Summary of the Interim Status Regulations

As a result of comments received from the combustion efficiency deviations during startup periods, the Agency is requiring (Section 265.343) all incinerators during the interim status period to achieve steady state temperature and air flow conditions using auxiliary fuel before adding any hazardous waste.

Issue #3 Analysis of Wastes

A. Synopsis of the Proposed Regulation

In Section 250.43(g) of the proposed General Facility Standards, the owner or operator of any facility, including an incinerator, was required to obtain a detailed analysis of each hazardous waste stream at least annually. Also, owners and operators were required (Section 250.43(h)) to sample each truckload of hazardous waste received and analyze it for appearances, specific gravity, pH, and vapor pressure.

In the incineration section (Section 250.45-1(b)(1) (i), (ii) and (iii)), these requirements were proposed to be extended to trial burns by requiring analysis of: (1) the waste for halogens and principal hazardous components, (2) ash and scrubber wastes for principal hazardous components, and (3) exhaust gas for halides, CO, CO₂, O₂, and particulates.

B. Comments Received

Most of the general comments received on these requirements are addressed in the Background Document entitled "Waste Analysis." The few comments relating specifically to incinerators can be summarized as follows:

1. Required testing and analysis are unnecessary for certain wastes, or are too expensive.
2. It is not clear what is to be tested and what owners and operators are to do with the information thus gathered.
3. Testing should not be required except to: (a) identify waste as hazardous, and (b) provide necessary information to the owner or operator to allow him to make decisions concerning safe management.

C. Analysis and Response to the Comments and Rationale for the Final Regulation

The Agency based the proposed general requirements for making a detailed chemical and physical analysis of the wastes on the belief that, to properly determine the adequacy of a facility (incinerator, in this case) to manage a given waste, the operator must know something about the waste (compatibility, heating value, primary pollutants, etc.) However, since the necessary properties varied by facility type (i.e., tanks, incinerators, or landfills), the Agency did not specify exactly what should be tested for, except in the case of incineration where halogens and hazardous components were mandated for trial burns in order to determine the efficiency of the incinerator to remove the halogen and destroy the principle hazardous components. A number of commenters on other sections agreed with the second commenter, i.e., that the standard did not adequately spell out what is to be tested and what is to be done with the information obtained. The Agency agrees and has decided to require all facility owners and operators to develop a waste analysis plan which will detail the characteristics of a waste which he must know in order to adequately manage the waste. This plan is discussed in detail in the background document entitled "Waste Analysis." However, since all owners and operators are not equally knowledgeable, the Agency has decided to place minimum and more specific analytical requirements within the facility regulation sections. This will guarantee that, as a minimum, owners and operators will obtain at least rudimentary

information on a new hazardous waste which will enable them to evaluate the capability of their equipment and techniques to manage it.

For wastes to be incinerated, the Agency will not require trial burns during the interim status period. The Agency has not fully developed its test protocol and trial burns are fully useful only in conjunction with the permitting process. Nevertheless, reputable incinerator operators have found it necessary to know certain waste characteristics prior to burning wastes which they have not previously burned.^{17,18} Based on such industry experience, the Agency will require incinerator operators to include the following information on new wastes in their waste analysis plan: heating value, halogens, sulfur, lead and mercury.

Heating value analysis is necessary to determine adequate operating parameters, such as rate of auxiliary fuel feed. Hydrogen chloride and sulfur dioxide are commonly recognized air pollutants which result from combustion of wastes containing chlorinated organic compounds and sulfur compounds. Sulfur dioxide emissions are causative agents for an increasingly worrisome problem acid rain. Also, hydrogen halides, particularly HCL and HF, can cause serious corrosion problems in a thermal treatment system. This can lead to rapid deterioration of the structural and operating integrity of the thermal treatment system.

Sampling is also necessary for certain heavy metals which are known to be hazardous, which are likely to be emitted, and for which

some guidance on emission levels is available. The Agency has decided to require waste sampling for lead and mercury during interim status.

Lead is oxidized during combustion and is emitted from uncontrolled incinerators as a particulate.¹⁹ Lead has been found to produce an adverse effect on public health. The Criteria Document for lead which served as a basis upon which the Administrator on October 5, 1978 published a National Ambient Air Quality Standard for lead summarizes the relationships between airborne lead and its effects on man.²⁰ Lead enters the body principally through ingestion and inhalation with consequent absorption into the blood stream and distribution to all body tissues. Uncontrolled incineration of waste containing lead can be a significant lead emission source. EPA set ambient air quality standards for lead in 43FR 46246.

Mercury compounds vaporize readily when heated and, during combustion, are emitted to the atmosphere from uncontrolled incineration. Mercury has been found to cause or contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness. On March 31, 1971, the Administrator listed mercury as one of three hazardous air pollutants for which he intended to establish emission standards.²¹ The publication entitled "Background Information on Development of National Emission Standards for Hazardous Air Pollutants; Asbestos, Beryllium and Mercury" describes the health criteria for the EPA standards for mercury.²²

Elemental mercury has been shown to be carcinogenic while methyl mercury is considered to be the most hazardous of mercury compounds. The National Emission Standard for Mercury published under the authority of Section 112 of the Clean Air Act on October 14, 1975 is applicable to stationary sources that incinerate wastewater treatment sludge.²³

As more information is received, the Agency may add to or modify these minimum analysis requirements. Also, the general status regulations (Phase II) to be promulgated later in 1980 will contain provisions to control emission of these pollutants. Until that time the Agency recommends that facilities consider relevant Clean Air Act standards when determining their emission levels. (40 CFR 61.52 prescribes emission limits for mercury from incinerators of wastewater treatment sludges. 43FR, 46246-46277 sets ambient air standards for lead which should not be exceeded as a result of emissions from any stationary source.)

Most incinerator operators find it useful to obtain additional information such as viscosity and solids content, but the Agency believes that certain types of facilities would not need this information to operate safely. Therefore, while viscosity and solids content analyses are not required for all incinerators, where they are relevant, they must be included in the waste analysis plan.

These criteria are issued on an interim final basis, but they (like the general waste analysis requirements) will be in effect

throughout the interim status period. The Agency believes that the additional cost of these analyses will be limited, since facilities will need such information for their own safety. On the other hand, the dangers of not properly analyzing wastes prior to incineration are simply too high to be tolerated throughout the potentially lengthy period prior to the issuance of a permit.

Thus, the Agency disagrees with the first comment that basic information which will allow an evaluation of combustibility and pollutant potential can be "too expensive" or unnecessary. The Agency has dropped the requirement for annual reanalysis to reduce expense for possibly unnecessary analytical work. Since the requirement is for a one time analysis, the cost, using standard laboratory analytical procedures, would usually be less than \$500.^{24,25} Reputable incinerator operators usually ask the generators to provide this information or else analyze the waste themselves and include the cost in their charges to the generator.^{17,18}

D. Summary of the Final Interim Status Regulation (§265.345)

As part of the waste analysis plan required by §265.13, the owner or operator must obtain a sample of each new waste to be incinerated and analyze it sufficiently to establish normal combustion conditions and the potential for emissions. At the minimum, this analysis must include heating value, halogen and sulfur content, and the concentrations of specified heavy metals.

Issue #4 Instrument Monitoring and Facility Inspection

A. Synopsis of the Proposed Regulation

During both trial and operating burns, the following parameters (§250.45-1(c)) were to be monitored and recorded:

1. combustion temperature
2. exhaust gas CO and O₂ concentrations continuously, and
3. waste, fuel, and excess air feed at least every 15 minutes.

These requirements were not proposed for the interim status period.

B. Summary of Comments

1. New equipment to monitor gas emissions (particularly CO) would be expensive.
2. 15-minute inspection of waste flows is unnecessarily rigorous.
3. Points of measurement are unclear.
4. NO_x, SO_x, and CO₂ should be added to the list of monitored effluents. One commenter suggested they be included during interim status.

C. Analysis of and Response to Comments and Rationale for the Final Regulation

The Agency believes it unwise to require specific monitoring equipment, such as the proposed continuous oxygen and carbon monoxide instrumentation, during the interim status period. The first commenter is correct: this equipment is expensive and complex.²⁶ The design of these systems and their sampling locations will be the subject of Agency review during the permit process and, thus, it is unwise to require their installation before that interaction can take

place. Also, lead time on purchases of instrumentation of this type can be lengthy. When coupled with design and installation time, it may not be possible to implement these requirements within the available six months. For similar reasons, the Agency does not believe that NO_x, SO_x, and CO₂ measurements should be required during interim status, as was suggested by one commenter.

At this time, however, it appears that at least some of the benefits of monitoring and inspecting can be realized simply by requiring that combustion and emission control monitoring equipment already in place be monitored on a regular basis and appropriate corrections made, if this will ensure that (within the design limitations of the existing equipment) the combustion and emission control conditions will not be allowed to wander unmonitored and uncontrolled. It also seems reasonable and prudent to set up routine inspection schedules to observe visible emissions from the stack; monitor for fugitive emissions, odors, or smoke; and to look for leaks, spills, and inoperative alarm and control systems. As discussed in the Background Document covering inspections, routine inspections can often detect a malfunction or operator error before it leads to a human health or environmental incident. The omission of these requirements in the proposed interim status standards was an oversight on the part of the Agency.

EPA disagrees with the commenter who stated that a 15-minute inspection frequency for waste flow is unnecessarily rigorous. The

instruments (or other devices) which measure the combustion conditions (temperature, retention time, excess air, and turbulence) should be monitored and corrections made as often as possible, continuously and automatically where possible. The relevant control points on which the combustion conditions depend in most incinerators include waste feed rate, auxiliary fuel feed, and air flow. Variations in any of these, or in the heating value of either the waste or the auxiliary fuel, can quickly lead to poor combustion conditions and to emission of incompletely burned wastes. Some facilities already have some of these control loops (temperature via auxiliary fuel flow, for example) operating on a continuous basis.¹⁶ The Agency encourages such continuous control, but will insist that any such controls and, even more importantly, any manual control loops (where the operator makes the correction), be monitored or inspected at least every 15 minutes.

No specific data base can demonstrate the wisdom of the precise 15-minute frequency. It is based on the Agency's generalized engineering expertise and the specific knowledge of incinerator operations gained in the 1975 and 1976 test burns. In some cases, where combustion conditions are subject to rapid swings, arguments can be made that more frequent monitoring and control is needed. This is, however, a facility specific situation and depends on design parameters, such as the effectiveness of the instrumentation and the response period once control changes are made. Thus, it is more

appropriately treated during the permitting process. Therefore, in developing the inspection schedule required in §265.15, more frequent monitoring and control activities should be conducted where appropriate (see the Inspection Background Document for discussion of Inspection Schedule development).

The 15-minute schedule is a minimum. The Agency does not believe that control loops which affect combustion conditions and, thus, combustion efficiency should ever be allowed to wander out of control for longer than that period of time. Even where automatic control is installed, it is necessary to check the instrumentation to ensure that it is functioning. The 15-minute minimum ensures that improper conditions do not persist for longer than that period. Because of the short time interval between a malfunction and possible emission of hazardous materials, no incinerator of hazardous wastes should operate unattended.

The Agency feels similarly about existing control loops which might effect emissions or which could result in spills. These could vary, depending on the design of the equipment, but often include scrubber water flows, scrubber water pH and, perhaps, level controls on tanks. They must similarly be inspected on a 15-minute basis.

All of these inspections are to be part of the Inspection Schedule called for in Section 265.15, and significant results are to be recorded in accordance with the provisions of that section. Additionally, stack emissions should be monitored hourly and the entire

facility inspected at least daily for leaks, spills, fugitive emissions, odors, and smoke. All of these can result in human health or environmental impacts if not detected early. Control system alarms must also be inspected daily to be sure they are functioning. Again, no body of information can specifically support any given frequency. Based on its own experience, however, with incinerator test burns, the Agency believes that inspections at these frequencies will uncover problems in time to prevent serious incidents. Further, the cost impact of conducting these inspections is expected to be small, given the fact that an operator must be on duty to run an incinerator anyway. For further discussion of the rationale for routine inspections, the reader is referred to the background document on inspections.

D. Summary of the Interim Status Regulations (§265.347)

During interim status, the Agency believes many of the benefits of the proposed monitoring requirements can be realized by simply requiring operators to routinely monitor and make appropriate corrections to the control equipment already installed. Similarly, in accordance with the inspection schedule provisions of §265.15 and the other sections dealing with facility standards (landfills, tanks, etc.), routine inspection for malfunctions, spills, etc., are being required during the interim status period. Specifically, as part of the inspection schedule, operators must inspect (monitor):

1. existing (in place) combustion and emission control instruments and make appropriate corrections, to maintain steady-state combustion conditions. at least every 15 minutes,

2. stack plume for normal appearance (opacity and color) at least hourly, and
3. the entire unit, daily, for leaks, spills, fugitive emissions, odors, and smoke.

Issue #5 Residue Management and Closure Requirements

A. Synopsis of the Proposed Regulation

In the General Facility Standards (§250.43(e)) of the proposed regulations, owner or operators of any facility (including an incinerator) were required to consider any residue generated by the treatment (or storage) of a hazardous waste as a hazardous waste.

B. Summary of Comments

1. Regulations must specifically address the disposition of incinerator ash.
2. Regulations must protect human health and the environment from the leachate of hazardous waste ash which is temporarily stored.
3. The California State leaching test should be used to determine the leaching potential of ash from incineration of hazardous wastes.

C. Analysis and Response to Comments and Rationale for the Final Regulation

The Agency agrees with the first comment and has clarified that waste from incineration of hazardous wastes is also hazardous, in a comment in the final regulations. Section 261.3(c) should also address the concerns of the second commenter since leachate discharged from the stored ash resulting from incineration of a hazardous waste would also be a hazardous waste unless either the leachate or the ash had been tested and found not to be hazardous in accordance with §260.22. The Agency responded to these comments in this

way because of the difficulties in designating toxic wastes. These problems are outlined below. For a fuller discussion, see the background document entitled "Criteria for Listing/Delisting."

The Agency has determined that test procedures for identifying if a waste is a toxic waste by virtue of its being carcinogenic, mutagenic, teratogenic, or bioaccumulative have not been sufficiently developed for routine use by waste generators in determining if their waste is subject to regulation under Part 261. As a result the toxicity characteristic in Part 261 now is limited to test procedures that focus on the concentration in the waste of those metals and pesticides for which there are National Primary Drinking Water Standards. These procedures have been sufficiently developed and will be used by waste generators to determine if their waste is a toxic waste and thus subject to regulation. Despite the current lack of sufficiently developed test procedures the Agency has retained comprehensive criteria for listing other toxic wastes including those which are carcinogenic, mutagenic, teratogenic, and bioaccumulative. Thus, many wastes are listed as hazardous because data has shown that they are carcinogenic or otherwise toxic even though they do not meet the characteristics in Part 261.

This anomaly (a waste listed as hazardous for reasons other than its meeting one of the characteristic tests in Part 261) leads to some potentially troublesome loopholes. For example, an owner or operator could superficially "treat" a waste which is listed because

it is carcinogenic and claim that the "treatment" has produced a new waste. And since the new waste (residue from the "treatment") is not listed and does not contain the heavy metals or pesticides which would cause it to fail the characteristic for toxicity in Part 261, it would not be considered hazardous and would be unregulated. It might, however, be just as carcinogenic as the original waste.

To close this loophole, the Agency has added a requirement (§261.3(c)) that "any solid waste that is discharged, spilled, or otherwise removed from a treatment, storage, or disposal facility that contains any hazardous waste will continue to be considered a hazardous waste..." unless it can be shown to be nonhazardous in accordance with the delisting procedures in §260.22. Thus any residue (ash, scrubber water, scrubber sludge, precipitator dust, etc.) deriving from incineration of any hazardous waste, is a hazardous waste itself, unless the owner or operator shows by means of the procedures for delisting (§260.22) that it is not hazardous. For a more complete analysis of these requirements, the reader is referred to the background document dealing with the definition of hazardous waste.

The third comment suggested reliance on the 30-day California leaching test. This test would be more severe than EPA's Extraction Procedure promulgated under Part 261. The Agency's rationale for rejection of the California test is explained in the background document entitled "Toxicity Characteristic." The Agency is unable to

require that incinerator ash residue from hazardous waste burns should be subject to a more severe test of hazard potential (the California test) than other potentially hazardous wastes which will be evaluated using EPA's Extraction Procedure.

To be consistent with the format and requirements of the other facility specific requirements (landfills, surface impoundments, etc.) and the closure and post-closure requirements (Subpart G), Section 265.351 has been reoriented to specify what must be done with residues at closure. Section 265.114 of the general closure and post-closure requirements specifies that equipment must be decontaminated and Section 265.113(a) requires that remaining hazardous wastes must be removed. For incinerators, Section 265.351 amplifies and further defines these requirements specifying that remaining hazardous residues, including ash, scrubber waters, and scrubber sludges, must be removed at closure.

D. Summary of the Interim Status Regulation (§265.351)

Facility owners or operators must remove any remaining hazardous wastes and residues at closure. A comment clarifies that any waste or residue removed from an incinerator must be managed as a hazardous waste unless the owner or operator can demonstrate that it is not in accordance with §261.3(d).

IV. TEXT OF INTERIM STATUS STANDARDS

Subpart 0 - Incinerators

§265.340 Applicability

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

[§265.341 Reserved]

[§265.342 Reserved]

§265.343 General operating requirements [Interim Final]

Before adding hazardous waste, the owner or operator must bring his incinerator to steady state (normal) conditions of operation--including steady state operating temperature and air flow--using auxiliary fuel or other means.

[§265.344 Reserved]

§265.345 Waste analysis [Interim Final]

In addition to the waste analyses required by §265.13, the owner or operator must sufficiently analyze any waste which he has not previously burned in his incinerator to enable him to establish steady state (normal) operating conditions (including waste and auxiliary fuel feed and air flow) and to determine the type of pollutants which might be emitted. At a minimum, the analysis must determine:

- (a) Heating value of the waste;
- (b) Halogen content and sulfur content in the waste; and
- (c) Concentrations in the waste of lead and mercury, unless the owner or operator has written, documented data that show that the element is not present.

[Comment: As required by §265.73, the owner or operator must place the results from each waste analysis, or the documented information, in the operating record of the facility.]

[§265.346 Reserved]

§265.347 Monitoring and inspections [Interim Final]

The owner or operator must conduct, as a minimum, the following monitoring and inspections when incinerating hazardous waste:

- (1) Existing instruments which relate to combustion and emission control must be monitored at least every 15 minutes. Appropriate corrections to maintain steady state combustion conditions must be made immediately either automatically or by the operator. Instruments which relate to combustion and emission control would normally include those measuring waste feed, auxiliary fuel feed, air flow, incinerator temperature, scrubber flow, scrubber pH, and relevant level controls.
- (2) The stack plume (emissions) must be observed visually at least hourly for normal appearance (color and opacity). The operator must immediately make any indicated operating corrections necessary to return visible emissions to their normal appearance.
- (3) The complete incinerator and associated equipment (pumps, valves, conveyors, pipes, etc.) must be inspected at least daily for leaks, spills, and fugitive emissions, and all emergency shutdown controls and system alarms must be checked to assure proper operation.

[§§265.348 - 265.350 Reserved]

§265.351 Closure [Interim Final]

At closure, the owner or operator must remove all hazardous waste and hazardous waste residues (including but not limited to ash, scrubber waters, and scrubber sludges) from the incinerator.

[Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate, in accordance with §261.3(d) of this Chapter, that the residue removed from his incinerator is not a hazardous waste, the owner or operator

becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of this Chapter.]

[§§265.352-265.369 Reserved]

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ATTACHMENT I
THE 1978 PROPOSAL

A. Synopsis of the Regulations as Proposed

The proposed regulations for incineration of hazardous wastes were published as §250.45-1 in 43 Federal Register, No. 243, December 18, 1978. They placed on owners or operators a number of performance requirements coupled with various operating standards, most of which were intended to help insure that the performance criteria were regularly met.

The performance criteria required that incinerators burning hazardous wastes achieve a destruction efficiency of 99.99% or better, and a combustion efficiency of at least 99.9%; that particulate emissions be less than 270 mg/scm³ (0.12 gr/scf) at zero excess air; that fugitive emissions be controlled; and that emission controls remove more than 99 percent of the halogens when hazardous wastes containing more than 0.5 percent halogens were burned.

Proposed operating regulations required that owners/operators monitor and record significant variables at 15-minute intervals; that trial burns be conducted, analyzed, and reported to the Regional Administrator before each new and "significantly different" hazardous waste was incinerated; and that the wastes be retained for 2 seconds at 1000°C combustion temperature (1200°C for halogen containing wastes) and more than 2 percent excess oxygen (3 percent for halogen containing wastes). A "note" or variance provided that incinerators

need not comply with the detailed combustion criteria if an equivalent combustion efficiency could be achieved by other means. A device to automatically cut off waste feed whenever combustion or scrubber conditions changed significantly was a final requirement.

B. Synopsis of Comments Received on Proposed Regulations

The Agency received approximately 241 comments on the proposed regulations. Many of these dealt with broad and general issues, such as the propriety of applying any design and operating requirements, rather than relying solely on performance criteria based on destruction. Some comments questioned the Agency's statutory authority to regulate hazardous waste incineration under RCRA at all. Conflicts with the regulation of particulate emissions under the Clean Water Act were cited.

Many comments were essentially technical. One comment suggested that turbulence criteria be added to the time and temperature requirements. Others suggested that measurement methodology was unclear or difficult to apply, and that the measurement locations and frequencies for emission and effluent temperature measurements needed to be specified. Three comments pointed to dangers inherent in automatic cutoff devices, and suggested that gradual shutdowns were preferable.

A middle range of comments accepted the general framework of the proposed regulations, but felt specific criteria were unnecessary or infeasible. In particular, it was claimed that the halogen destruction levels appropriate for chlorine were more stringent than those

necessary or possible for other halogens, such as bromides or iodides. Similar comments suggested that the general 99.99 percent destruction efficiency requirement was impractical and very costly, and would divert wastes from relatively "safe" incineration into dangerous, long-term landfills. Some comments suggested varying destruction efficiency in accord with each waste's degree of hazard.

The high cost of trial burns and of trial burn analysis was frequently mentioned. There was considerable confusion about the practical impact of the requirement that a new trial burn be held before each "significantly different" new waste was incinerated. Several comments pointed out that the almost infinite variety of chemical mixtures making up wastes made this requirement both incredibly expensive and impossible to apply with certainty. A few comments focused on the vagueness of the requirement that fugitive emissions be controlled.

Finally, many comments suggested specific exemptions or additional inclusions to the regulations when finally promulgated. The most important of these dealt with clarifying the status of waste oils and solvents, of incinerator ash residue and scrubber effluents, and of cement kiln incinerators and utility boilers burning hazardous wastes for their thermal value.

This document has considered those comments relevant to any regulatory scheme for hazardous waste incineration and relevant to the limited interim status standards set forth here. The remaining