
Chapter 2

Shaping an Ocean Incineration Program: Key Policy Issues

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Shaping an Ocean Incineration Program: Key Policy Issues

If Congress decides to allow the development of an ocean incineration program, several key regulatory and policy issues will need to be resolved to provide an equitable, efficient, and environmentally sound approach to managing the activity. Despite debate over the significance or means of resolving the outstanding issues, general agreement exists as to what the issues are. This chapter examines some of the issues that are key to the design of an ocean incineration program. The discussion provides a range of policy or regulatory options that might be used to resolve these issues.

For each issue, the discussion describes current controls or approaches,¹ followed by a range of ad-

¹Discussions of EPA's approach generally refer to the approach set out in EPA's proposed Ocean Incineration Regulation (50 FR 8222, Feb. 28, 1985). Many of the provisions discussed in this report are expected to change in the process of finalizing the regulation, but the changes cannot yet be identified and, therefore, cannot serve as a basis for discussion.

ditional or more extensive controls and approaches that are oriented toward the same general end.

The chapter discusses technical issues, which primarily concern the incineration technology; non-technical issues, which concern institutional or social structures that affect regulation of ocean incineration; and issues, both technical and nontechnical, that influence how ocean incineration fits into an overall waste management strategy. The chapter also discusses several additional issues that have generated significant public concern.

TECHNICAL ISSUES AND OPTIONS

Controlling Stack Emissions From Incinerator Ships

Current Controls

EPA's proposed regulation would approach this issue indirectly, controlling waste composition and incinerator performance, rather than limiting the emissions themselves. The regulation would limit the quantities of metals allowed in wastes to be incinerated, as a means of controlling particulate and metal emissions. Two methods of monitoring incinerator performance would be used to control emissions of unburned or partially burned waste. First, trial burns would determine operating conditions that would achieve the required destruction efficiency (DE) (see ch. 7), and all subsequent burns would have to utilize these conditions. Second, incinerator operators would be required to monitor

combustion efficiency (CE) continuously and maintain a minimum level, which would serve as a partial surrogate for the DE requirement.

Under the proposed regulation, no limitations or standards would be specified for particular components of the emissions themselves. Instead, the regulations would require compliance with two environmental performance standards. First, acid-forming emissions (primarily hydrogen chloride gas) would be limited to amounts that would not change the alkalinity of the water by more than 10 percent. Second, emissions would be limited to amounts that would not 'unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems or economic potentialities or recreational or commercial shipping or boating or recreational use of beaches or shorelines. Such amounts would generally be

determined by referring to appropriate marine water quality criteria, where they exist.

Additional Controls

Numerous more stringent controls on ocean incinerator emissions have been proposed. The following discussion focuses on two types of additional controls: those that are not currently imposed on either land-based or ocean incinerators but that are relevant to both; and those that are currently imposed on land-based incinerators but would not be imposed on ocean incinerators under EPA's proposed regulation.

Proposals Applicable to Incineration Both on Land and At Sea.—Five proposals for additional controls would be relevant to both land-based and ocean incineration.

1) **Redefine *Destruction Efficiency To Provide a Measure of Complete Destruction of All the Waste Constituents That Are Present.***—EPA would require demonstration of the ability to attain a minimum destruction efficiency for a preselected set of parent compounds known as Principal Organic Hazardous Constituents (POHCs). The compounds chosen as POHCs would be present in high concentrations in the waste and/or difficult to destroy completely by burning. The definition of DE would be based on two major assumptions: 1) that if a compound disappeared, it must have been completely destroyed; and 2) that if the preselected compounds were abundant and were more difficult to destroy than were all other components, the rest of the waste would be destroyed with equal or greater efficiency. The validity of both assumptions, however, has been questioned by several observers, including EPA's Science Advisory Board:

As long as the definition of DE addresses only the disappearance of the parent POHC and does not take into account products of partial decomposition or products newly synthesized in the incineration process, the definition is limited in its ability to aid in the assessment of total emissions and subsequent assessments of environmental exposures (12).

Several alternative approaches to determining DE have been proposed (12, 15). Some have been used in actual testing of incinerator vessels, and EPA is currently conducting research to evaluate

their validity and potential use (5). The alternative definitions are based on a total destruction efficiency, or TDE, derived by measuring the total quantity of organic material released in emissions. Several variants of this approach have been used, including measuring emissions of organically bound chlorine or of difficult-to-incinerate tracer compounds added to the waste prior to incineration.

The DE standard measures performance by focusing on what incineration destroys and removes from wastes. The standard does not regulate what actually comes out of the incinerator. It provides no measure of the absolute **quantity** of organic material released into the environment, EPA has considered adopting two other standards that would measure actual emissions (14). One is a mass emission **rate** standard, which would regulate the quantity of organic emissions released per unit of time; the other is a mass emission **concentration** standard, which would limit the quantity of emissions per unit of volume. Although these standards provide measures that could be used directly to assess exposure and risk, the only bases for setting the standards would be technology or risk. Technology is already used as a basis for the DE standard; risk would have to be derived on a facility-by-facility basis, which would impose tremendous data, monitoring, and administrative burdens.

For these reasons, EPA opted for the uniform performance-based DE standard. Particularly harmful constituents, however, might warrant action to regulate emissions further by limiting the rate at which wastes can be burned or by requiring a higher DE. Permits for incineration of wastes containing polychlorinated biphenyls (PCBs), in fact, have limits on PCB content or the rate at which the wastes can be fed into the incinerator (48 FR 48986, Oct. 21, 1983).

2) **Require Complete Analysis of the Chemical Characteristics of the Emissions That Would Arise Under a Variety of Operating Conditions. Based on Such a Characterization, Emissions Standards for Particular Components May Be Needed.**—The Science Advisory Board (SAB) found that "incinerators can be built and run under a set of optimal conditions so that the DE for the selected POHCs can meet specified criteria of 99.99 percent (for most wastes) to 99.9999 percent (for PCBs)." Because

DE would not be measured on a continuous or even periodic basis, however, the SAB found that it would not adequately account for variability in incinerator performance, particularly for incinerator upsets, which might be brief but could significantly reduce the time-averaged DE.

Calculating DE during deliberately created upset conditions or monitoring DE continuously during operational burns, as well as trial burns, has been proposed. Unfortunately, current analytical methodologies are not rapid enough for DE to serve as a means of monitoring incinerator performance. EPA proposed relying on combustion efficiency as the best available substitute for DE, although a strong correlation between CE and DE has not been established. The SAB called on EPA to develop a revised DE that adequately accounts for the well established variability in how incinerators perform.

The SAB also recommended that a complete characterization of incinerator emissions be performed, analyzing the chemical composition of the emissions produced under a variety of operating conditions. Many observers have called for the characterization and regulation of metal *emissions*, based on anticipated environmental effects. This proposal may be particularly important because, under EPA's proposed regulation, waste limitations would control the amount of individual metals allowed in the waste, but would not control the waste's *aggregate* metal concentration (see proposal 5 below).

Both land-based and ocean incinerators could be significant sources of nitrogen and sulfur oxides and of other hazardous air pollutants. The EPA regulation, however, would not require control over or even consistent monitoring for such components in stack emissions. Both the Resource Conservation and Recovery Act (RCRA) and the Clean Air Act regulate land-based incinerators, but emissions standards apply only to total particulate and acid gases. For ocean incineration, acid-forming emissions are regulated through an environmental performance standard for *seawater*, but this standard does not regulate any substances as hazardous air pollutants.

3) Require Tests of the Short-Term and Long-Term Toxicity of Emissions. —The SAB called on EPA to determine the toxicity of representative in-

cinerator emissions in a manner that would address both short- and long-term effects. The tests should be performed on a representative number and range of species and life stages. The tests should also account for environmental mechanisms that are capable of concentrating emission products (e.g., by trapping organic constituents in the ocean surface microlayer; see ch. 9).

4) Limit Emissions of Products of Incomplete Combustion (PICS). —Data on the generation and toxicity of PICS are scarce, although such highly toxic compounds as dioxins and dibenzofurans have been identified among the PICS created in hazardous waste incinerators. EPA's proposed regulation would not regulate PICS, partly because of the lack of data on how operating conditions are correlated with the formation of PICS. EPA has, however, offered two possible approaches to controlling PICS under future regulations (50 FR 8247, Feb. 28, 1985).

First, emissions limits could be established on a PIC-by-PIC basis, reflecting the applicable water quality criteria or marine aquatic life no-effect levels. Water quality criteria, however, currently do not exist for most PICS and would have to be developed. Moreover, monitoring for PICS could not be carried out during routine operations because of the complexity of analysis required.

A second approach would be to limit the total quantity of unburned hydrocarbons allowed in emissions. In effect, this approach would set an upper limit on PIC emissions, but individual PICS would not be identified or limited.

5) Limit Metal Emissions. —The proposed Ocean Incineration Regulation would specifically limit the amount of each of 14 metals that could be present in waste to be incinerated at sea (50 FR 8244, Feb. 28, 1985). Two types of limitations were proposed, one on the wastes that are initially accepted for incineration and one on the final blended waste fed to the incinerator.

Concentrations of each of the metals in *wastes accepted* for incineration at sea would be limited to 500 parts per million (ppm) per metal. The *aggregate* concentration of all metals in the waste, however, would not be limited. Thus, a waste containing metals far exceeding 500 ppm could be le-

gaily accepted for incineration. Critics also point out that no scientific basis exists for setting the metal limitations at 500 ppm, and that the limitations should be metal-specific and risk-based. In practice, the actual concentrations of metals in wastes that have been incinerated at sea have generally been far below the 500 ppm level (see ch. 8), so lowering this standard—at least for the more toxic metals—might not significantly affect the range of wastes that could be accepted for ocean incineration.

Because incinerator ships do not have scrubbers, all metals in the waste are presumed to exit through the stack directly into the environment. In light of this, EPA proposed a second limitation, in this case on the concentrations of metals in the final **blended waste that is fed to the incinerator**. These concentrations would be limited to amounts such that the resulting **emissions** would not exceed marine water quality criteria, after accounting for initial atmospheric and oceanic dispersion.² This limitation is scientifically based, since marine water quality criteria are developed on the basis of metal-specific toxicity data. Of the metals listed above, EPA has determined that mercury, silver, and copper must be limited below the 500 ppm level to meet marine water quality criteria (50 FR 51362, Dec. 16, 1985).

The proposed regulation would appear to provide special treatment for mercury and cadmium because of their special treatment in international (London Dumping Convention, or LDC) and domestic ocean dumping regulations. Emissions of these two metals, however, actually would be subject to the same standards as would other metals; that is, they would be limited “to that amount which if directly dumped would not exceed **their applicable water quality criteria**” (emphasis added). Thus, despite language apparently singling out these two metals, the proposed regulation would limit all 14 metals in the same manner.

Finally, in addition to the absolute amount, the **chemical form** of a metal plays an important role in determining the metal's environmental fate and effects (see ch. 7). The chemical forms, as well as

quantities, of particular metals in incinerator emissions have not been fully determined. Undertaking such a characterization of the emissions would be essential for justifying the lack of a requirement for scrubbers on incineration vessels. Further regulation of metal emissions might well be warranted, given EPA's finding that most of the human health risks associated with ocean incineration would be derived from metal emissions (1 1).

The potential need for stricter regulation of metal emissions also applies to land-based incinerators, where total particulate are regulated, but no monitoring or regulation of individual metals is required.

Proposals Extending Current Land-Based Incineration Requirements to Ocean Incineration. —Two proposals would extend to ocean incineration some requirements that currently apply only to land-based incineration.

1) **Require Air Pollution Control Equipment on Incinerator Ships.** —This is a major focus of the debate over ocean incineration, and reflects the major technical and regulatory difference between land-based and ocean incineration. See chapter 1 for OTA'S analysis of this issue.

2) **Require Secondary Chambers and/or Longer Residence Times on Incinerator Ships.** —EPA's initial proposal for regulating land-based incinerators under RCRA specified minimum operating conditions for residence time (how long the wastes must reside in the incinerator) and temperature. In promulgating its final regulations, however, EPA opted for what it considered a ‘more flexible’ system based on performance standards. An exception to this approach is made for land-based incineration of PCBs regulated under the Toxic Substances Control Act (TSCA), which specifies minimum temperature and residence times.

EPA proposed an intermediate approach for regulating ocean incineration, to comply with international requirements under the LDC. Minimum temperatures would be required for the wall and flame of the incinerator, unless the trial burn established that DE and CE requirements could be met at lower temperatures. A minimum residence time (lower than that required under TSCA for land-based incineration of PCBs) would also be specified.

²Marine water quality criteria have been developed for all 14 of the metals specified by EPA.

Critics of EPA's proposed ocean incineration regulation have argued that, relative to land-based incineration, ocean incineration technology is less safe because it employs a shorter residence time. Although not specifically required to do so, land-based rotary kiln incinerators are generally designed to include secondary chambers or afterburners, which expose volatilized waste to a second flame to ensure complete combustion. This design keeps wastes in the combustion zone longer, which is considered necessary for incinerating solids and sludges.

Liquid wastes, however, are often injected directly into the afterburner section of a rotary kiln, which means their residence time is relatively short. In addition, land-based liquid injection incinerators (like ocean-based incinerators) typically have no afterburner section. On land, therefore, liquid wastes generally are subject to shorter residence times than are solid or sludge wastes. Given the relative ease with which liquids are incinerated, short residence times may be sufficient for destruction.

Finally, as noted by the SAB (12), liquid injection incinerators on land and at sea generally employ higher temperatures than do rotary kilns. Generally, an inverse relationship exists between the residence time and the temperature required to attain a particular DE; that is, the higher the temperature, the shorter the time required to completely destroy the waste.

Thus, the important distinctions are not between land-based and ocean incineration, but rather between liquid wastes and solid and sludge wastes, and between liquid injection and rotary kiln technologies. A shorter residence time alone is not sufficient evidence of inadequate destruction of wastes.

Because residence time is primarily determined by the design of the combustion chamber or chambers, only limited increases in residence time are possible once a facility has been constructed. Therefore, the residence time of existing ocean incinerators could *not* be substantially lengthened.

Although considerable controversy over this issue has arisen in the debate over ocean incineration, EPA has maintained that relying on performance standards rather than design criteria ensures sufficient waste destruction, while providing flexibility and accommodating a variety of designs.

Based on available information, this conclusion seems warranted.

Reducing Transportation Risks Associated With Ocean Incineration

Regulations governing hazardous waste transportation are scattered among numerous Federal agencies, and additional requirements often exist at the State and local levels. Although examining in detail the adequacy of the regulatory framework or coordination among various authorities exceeds the scope of this study, certain issues specifically related to ocean incineration can be identified and addressed.³

Current Controls

Transporting hazardous waste over land for the purpose of incineration at sea could involve the use of both highway and rail vehicles and would be subject to regulation primarily by the Department of Transportation (DOT). EPA's proposed ocean incineration regulation would not address land transportation activities. Instead, EPA argues, "controls imposed by programs specially designed and experienced in the area of land transportation are best able to provide protection against environmental risks during that phase of ocean incineration activities" (50 FR 8225, Feb. 28, 1985).

Waste transfer activities at port facilities would be subject to U.S. Coast Guard (USCG) regulations. EPA generally would defer to the USCG's special expertise and would not incorporate all USCG requirements into the permitting process for ocean incineration, although the USCG would have authority to recommend such permit requirements. EPA proposed that applicants for permits be required to prepare contingency plans detailing the procedures to be followed if spills occurred; the USCG would have review authority over the plans.

USCG regulations would also govern a ship's transit from the port facility to the incineration site. The USCG has authority to invoke several measures to ensure safe transit, including:

- providing a USCG escort and shiprider,

³Another OTA assessment examines this issue in the context of transportation of hazardous materials in general (8).

- restricting transit to daylight hours or particular weather conditions,
- establishing a moving safety zone around the vessel, and
- requiring the vessel to broadcast a Notice to Mariners to avoid its route.

Imposing such measures falls under the jurisdiction of the Captain of the Port (COTP) and typically occurs as part of the permitting process, based on the COTP's evaluation of the particular conditions of each port. For the recently denied research burn in the North Atlantic, the COTP of Philadelphia incorporated all four measures into the research permit, which would have governed transit from the harbor to the open ocean.

The USCG is currently developing a set of instructions specifically for ocean incineration, designating a full range of measures (including those listed above) for COTPs to consider when determining what particular permits should require.⁴

Additional Controls

Two general approaches might address the problem of multiagency jurisdiction over ocean incineration activities.

Comprehensive Regulations.—Comprehensive regulations covering all aspects of ocean incineration could be developed under one agency (presumably EPA). The proposed Ocean Incineration Regulation obviously would not accomplish this bureaucratic feat, and EPA lacks the statutory authority to propose regulations that would. If the development of such regulations is desired, Congress would need to provide the necessary authority under the Marine Protection, Research, and Sanctuaries Act (MPRSA) or another statute.

Improved Regulatory Coordination.—A second, alternative approach would leave jurisdictions over distinct activities divided among various agencies, capitalizing on the USCG's particular expertise and experience, but would improve interagency coordination and would tailor regulations to the unique features of ocean incineration. Several steps in addition to those proposed by EPA would be necessary to accomplish this end.

⁴Commander C. Huber, U.S. Coast Guard, personal communication, June 1986.

1) **Cross-Reference Regulations.**—At a minimum, EPA regulations should specifically cite those regulations that, although promulgated and enforced by other agencies, would apply to ocean incineration.

2) **Clarify Regulatory Requirements and Jurisdictions.**—Regulatory requirements and agency jurisdictions would have to be clarified, perhaps by an Interagency Memorandum of Understanding, which some observers have recommended. Others believe, however, that because no actual conflicts exist between agency authorities or regulations, what would really be needed would be a clear guidance manual for agencies and the public. The manual would define agencies' authorities and responsibilities, cross-reference all applicable regulations, and state how the regulations applied to ocean incineration.⁵

3) **Develop Criteria for Selecting Ports.**—To govern or guide the selection of ports for ocean incineration activities, EPA should develop criteria analogous to those specified under the proposed regulation for selecting ocean incineration sites. These criteria should address the full range of factors that bear on using or developing a port facility, including such diverse issues as marine, highway, and rail traffic patterns; the nature and safety of access routes and their surroundings; the resources, capabilities, and emergency preparedness of local authorities; and the environmental sensitivity and economic value of areas that might be affected. Because so many topics would need to be considered, and because the potential exists for conflict with local governments that have authority over port development, the process of developing the criteria should involve all relevant Federal, State, local, and public interests.

Additional Regulatory Initiatives.—Both EPA and USCG are developing regulatory programs governing ocean incineration. Several specific aspects of these programs relating to transportation risks might require or warrant further attention to effectively address major public concerns.

1) **Designate Several Sites and Ports.**—Designating several ocean sites and port facilities for ocean incineration would help to reduce the distances

⁵EPA is currently developing such a manual (13).

wastes would have to be transported, thereby reducing importation of wastes from other regions. The existence of several sites could at least theoretically increase public acceptance of ocean incineration, by lessening the risk any single community or region would have to bear, and by allowing wastes to be disposed of close to where they are generated. The major public opposition to using the Port of Philadelphia for a research burn in the North Atlantic as an alternative to the previously used Gulf Coast port and site, however, suggests that designating several sites might actually increase opposition by creating multiple “backyards.

2) *Tailor Waste Handling and Transportation Regulations Specifically to Ocean Incineration.* — The USCG is currently promulgating construction and design standards that would be specific for incineration vessels. Other USCG regulations, including requirements for certifying and operating waterfront facilities and for safely transferring bulk liquid cargoes other than oil, are more general in nature and may not be applicable to, or sufficiently account for, special problems associated with ocean incineration vessels and operations.⁶

Several technical or design features of the various existing and proposed ocean incineration technologies bear directly on transportation safety. These include containerization versus bulk storage and transfer, and self-propelled versus barge vessels (see ch. 6).

Incorporating Technological Improvements

Current Approach

In adopting a performance-based approach to regulating both ocean and land-based incineration, EPA established performance standards that reflect the capabilities of current incineration technologies to destroy waste and the detection limits of current sampling technologies. As EPA stated in its rationale for requiring a 99.99 percent destruction efficiency (a standard more stringent than that required under international law), “there is extensive data

indicating that such destruction efficiencies are attainable and can be routinely measured in incinerators burning a wide range of organic wastes’ (50 FR 8245, Feb. 28, 1985). Moreover, EPA argued that such an approach could both accommodate a broad spectrum of incinerator designs and maintain a high uniform level of performance.

The various existing and proposed technologies for ocean incineration differ in ways that could significantly affect the performance and safety of the incineration process itself, and of associated activities. Chapter 6 describes and compares these technologies in more detail.

The existence of alternative technologies creates a tension between two opposing approaches to regulatory policy. On the one hand, the regulatory framework must strive to incorporate superior design features that would allow performance standards to be upgraded, ensuring that such standards would not simply become the lowest common denominator. On the other hand, specifying particular design features in regulations might discourage the development of better designs and could render obsolete existing facilities that were designed to comply with standards regarded as sufficient at an earlier time. The latter phenomenon is typically addressed through ‘grandfathering’ or by applying standards to new sources only.

Many observers have argued that existing incinerator ships represent ‘first generation’ technology and should not be accorded the status of best available technology. Other observers disagree, arguing that, in addition to meeting all regulatory requirements, existing designs are “proven” technologies, in contrast to newer designs, which are either untested or lack sufficient operational experience.

Additional Approaches

EPA’s proposed Ocean Incineration Regulation would not address the issue of how to incorporate better design features or to upgrade the performance standards for incineration vessels. Although many aspects of the problem extend well beyond this single regulation, certain steps could be taken to address its application to ocean incineration.⁷

⁶The USCG is currently developing regulations that govern the handling and transfer of chemical substances; the regulations would be analogous to those that already apply to oil (Commander C. Huber, U.S. Coast Guard, personal communication, June 1986).

⁷Because none of these steps is required under RCRA, they would represent a departure from the approach used for regulation of land-based incineration.

Comparing Technologies.—Congress could require EPA to conduct a detailed comparison of the various existing, proposed, and emerging ocean incineration technologies, with respect to such factors as performance, cost, and availability. This evaluation should be ongoing or subject to periodic updating, in order to identify promising new research and development efforts.

Reviewing Permits.—The periodic review of permits for ocean incineration provides a natural point at which to consider whether additional regulatory requirements should be introduced or

whether operating conditions or design features should be changed. EPA could institute such an evaluation as part of the permit review process.

Developing New Regulatory Approaches.—Congress could require EPA to examine the possibility of developing best available technology or new source performance standard approaches for regulating ocean incineration. Such approaches might provide means to increase the stringency of performance standards as technology capable of achieving them became available.

NONTECHNICAL ISSUES AND OPTIONS

Regulating Land-Based and Ocean Incineration Equitably

Current Approach

Land-based incineration facilities are regulated under RCRA (although incineration of PCBs is covered under TSCA), whereas ocean incineration vessels are regulated under the primary authority of MPRSA. Existing or proposed regulatory requirements for these two types of facilities differ in several ways, some of which are the subject of considerable controversy (see below).

The desirability of having different requirements for land-based and ocean incineration depends on numerous nontechnical factors, and therefore technical analysis alone generally cannot justify maintaining or eliminating the differences. For example, the shiprider requirement applicable only to ocean incineration may, in part, reflect the fact that public surveillance of incinerators would be much more difficult at sea than on land. This requirement therefore might be necessary to address the “out-of-sight, out-of-mind” concerns of the public and the regulator.

Clearly, equitable regulation of land-based and ocean incineration does not mean simply adopting identical sets of regulatory requirements. The technical and nontechnical bases for any differential regulations, however, should be thoroughly scrutinized and made as explicit and open to review as possible.

The issue of equitability raises larger questions concerning the adequacy of current legislative authority to regulate ocean incineration. Because it falls under MPRSA, ocean incineration is regulated as a form of ocean dumping. Although certain aspects of this activity (i. e., release of emissions directly into the marine environment) do constitute a form of ocean dumping, the fundamental purpose of the activity—waste destruction—might not be adequately addressed through MPRSA’S legislative authority.

Regulatory Differences.—Listed below are requirements that apply exclusively to or are more stringent for one of the two technologies. Many of these requirements are discussed in detail in other sections of this report and are mentioned here only for the sake of comparison. Extensive rationales support many of the differences, so the more detailed discussions should be consulted for a full understanding of the issue.

Requirements That Apply Exclusively to or Are More Stringent for Land-Based Incineration.—At least three requirements apply only to land-based incineration or apply to it more stringently than to ocean incineration.

1. Emissions standards are specified for particulates and hydrogen chloride gas for land-based incinerators; no emission standards are specified for ocean incinerators, although environmental performance standards and mon-

itoring requirements that are not required of land-based incineration would be required for ocean incineration.

2. Air pollution control or particulate equipment is required for land-based incinerators if the emissions standards would otherwise be exceeded. Under TSCA, such equipment must be present if PCBs are burned.
3. For land-based incineration of PCBs, TSCA requires a minimum temperature of 1,200° C + 100° C for a 2.0-second residence time, or 1,600° C + 100° C for a 1.5-second residence time, with the temperature to be measured at the wall or flame of the incinerator. No operating conditions are specified for non-PCB wastes. For ocean incineration of all wastes, EPA proposes to require a minimum 1-second residence time and a minimum temperature of 1,250° C measured at the flame and 1,100° C measured at the incinerator wall.

Requirements That Apply Only to Ocean Incineration. — Several requirements apply to ocean incineration but not to land-based incineration:

- Waste analysis and operational monitoring data for each ocean burn would have to be submitted to EPA. Monitoring data would have to be recorded using an automatic tamper-resistant or tamper-detectable device.
- A limitation on metals content of wastes would be specified for ocean incineration but not for land-based incineration.
- Environmental monitoring would have to be conducted periodically during and following ocean incineration burns but not land-based incineration.
- EPA would have to review and approve the qualifications of ocean incineration company personnel involved in monitoring and analyzing waste.
- A full-time EPA shiprider, and possibly a USCG shiprider as well,⁸ would be required to be on board for each ocean burn.
- Government inspection of ocean incineration

vessels and port facilities (yearly by USCG, on demand by EPA) would be required.

- Transfer of wastes to the vessel at dockside would have to be supervised by the USCG.
- Each applicant for an ocean incineration permit would have to assess and report to EPA the potential effects of the applicant's loading and transportation activities on endangered species. EPA would have to prepare a formal endangered species assessment as part of the site designation process.
- As specified under MPRSA, each permit applicant would be required to demonstrate a need to incinerate wastes at sea.

Involving the Public in Decisions

Perhaps the major obstacle to developing a program of ocean incineration is the high degree of organized public opposition.⁹ A full analysis of the historical and current basis for the opposition goes beyond the scope of this study; indeed, many of the issues raised *in* the public debate have broad application extending well beyond the confines of ocean incineration or even hazardous waste management. The importance of such issues in determining policy for ocean incineration, however, cannot be overstated.

Current Approach

Although EPA's fulfillment of the public hearing requirements set forth under MPRSA has provided for ample *expression* of public opinion, it has not succeeded in abating opposition or assuring the public of EPA's ability to develop an environmentally sound program. Moreover, although public opposition to incineration was a major factor in halting ocean incineration until regulations were promulgated, it is questionable whether the means that are available to EPA for ensuring public participation are capable of truly responding to public concerns.

⁸This decision falls under the authority of the Captain of the Port, as discussed previously. At least for the initial burns, the USCG fully anticipates requiring a shiprider to accompany the vessel during harbor and bay transit.

⁹For an excellent discussion of the major areas of public concern and approaches to addressing them, see the recent EPA Hearing Officer's Report (13) and the accompanying Summary of Public Comments.



Photo credit: Valley Morning Star, Harlingen, Texas

Over 6,000 people attended a U.S. Environmental Protection Agency public hearing held in Brownsville, Texas, in 1983. The hearing, which concerned whether a permit should be granted for Incineration of PCB- and DDT-containing wastes in the Gulf of Mexico, was the largest public hearing in EPA history and reflected intense public concern about the technology.

Additional Approaches

Two general approaches have been suggested for addressing the issue of public opposition: first, mechanisms providing for greater or more meaningful public participation in decisionmaking; and second,

measures for resolving specific issues of public concern.

Increasing Public Participation.—Several approaches would increase public involvement in decisionmaking, which could decrease opposition to ocean incineration:

- provide for public participation, through citizen advisory panels, in the permitting process and in selecting ports and incineration sites;
- develop national criteria or guidance for selecting ports in a manner that addresses public concerns and involves the public and local interests;
- develop a more explicit approach to involving State and local concerns in the decisionmaking process; and
- develop a broad waste management strategy and educate the public as to how incineration fits into it.

Resolving Specific Concerns.—Several approaches for resolving specific concerns warrant further attention:

- provide for adequate liability and public protection in the event of accidental spills or damages arising from incineration operations; in particular, provide adequate mechanisms for injured parties to recover damages;
- designate several ports and incineration sites to more equitably distribute the risks and burdens of ocean incineration;
- reopen the designation process for the Gulf Coast incineration site;
- carry out more research before proceeding with operational ocean incineration; and
- consider an applicant's compliance history in deciding whether to grant a permit.

VIEWING OCEAN INCINERATION IN A BROAD CONTEXT

The Effect of Ocean Incineration on the Development of Better Alternatives

Current Approach

Many critics of ocean incineration have argued that because ocean incineration would conceivably provide a cheap management option for liquid organic wastes, companies would choose ocean incineration instead of investing in waste reduction and recovery or better treatment technologies.¹⁰ Proponents counter that ocean incineration would fill a niche by providing the best treatment option for wastes that do not, for economic or technical reasons, offer great potential for recovery or reduction.

OTA'S analysis indicates that, for several reasons, ocean incineration would have a very limited effect on overall incentives for developing superior hazardous waste *management* practices:

- As the findings described in chapter 1 indicate, in the near future, only modest increases are expected in the use of recovery, recycling, and new treatment technologies for liquid organic hazardous wastes. These practices are expected to be applied mostly to nonincinerable wastes and would not be affected by the availability of ocean incineration as an option (see ch. 3).
- Only a small fraction (less than 10 percent) of all hazardous waste is suitable for ocean incineration, and the amount actually available for burning at sea would probably be significantly smaller, because of geographic, regulatory, and economic constraints. Realistic projections of the size of the market for ocean incineration indicate a small fleet of ships handling a very small fraction of all hazardous wastes.
- Predicting how future waste **reduction** activity would affect the ocean incineration market, and vice versa, is difficult because the necessary data are lacking and no meaningful way exists to measure waste reduction. Enormous potential obviously exists for such activity to significantly decrease the quantities of wastes

¹⁰The inadequacy of liability provisions for waste generators that choose ocean incineration also discourages better waste management, according to the critics. This issue is examined later in this chapter.

requiring management; at least in the short term, however, major institutional, economic, and attitudinal obstacles to waste reduction remain. "

- Ocean incineration costs waste generators considerably more than do the other forms of management and disposal used for most incinerable wastes today. This cost differential might actually increase incentives for capital investment in recovery and reduction options, particularly when an economic return (even a relatively long-term return) on the investment could be anticipated.
- A portion of the ocean incineration market actually consists of wastes generated during the purification or recovery of chemicals (e. g., distillation wastes). These wastes, which can result from preferred management practices such as waste recovery, still require disposal or treatment, and are prime candidates for incineration.

Additional Approaches

Although ocean incineration would be unlikely to impede the development of better waste management practices in the current climate, Congress and EPA might want to ensure, for example, that incinerable wastes that were (or became) recoverable would be directed toward the best available management practices. Several policy directives or regulatory requirements that would specifically apply to users of ocean incineration might be considered that would make waste generators more accountable for properly managing their wastes.

Providing Accountability .—Precedent and a potential model for instituting accountability might already exist. The Ocean Dumping Regulations (40 CFR 227.14-227. 16) explicitly require that each applicant for a permit to dump waste in the ocean must provide information on what processes generated the wastes, how it was previously disposed of, what other alternatives have been explored, and why the waste now needs to be dumped in the ocean.

¹¹Another OTA assessment, to be released in fall of 1986, explores these issues in detail (9).

Section 224 of the 1984 RCRA Amendments provides a step in the same direction for hazardous waste generators that dispose of wastes by methods regulated under RCRA. Although the effectiveness of regulations implementing Section 224 remains to be seen, the section is intended: 1) to require generators to develop waste reduction or detoxification programs on a waste-specific basis, and to report periodically on the progress of these programs; and 2) to certify on manifests that the treatment or disposal option to be used is 'that practicable method currently available to the generator which minimizes the present and future threat to human health and the environment.

Applying such an approach to ocean incineration might be complicated by the fact that the permit applicants do not generate the waste but only transport and dispose of wastes that generally would come from numerous sources. Thus, evaluating and justifying the need to incinerate the wastes might be beyond the applicants' capabilities. This complication is one of the reasons that EPA's proposed Ocean Incineration Regulation would not require permit applicants to adhere to this requirement of the Ocean Dumping Regulations.

Nevertheless, operators of ocean incineration vessels could be required to gather waste-specific information from generators and submit it as part of their applications for permits. Such a requirement might, however, place the permit applicant in the difficult position of having to obtain data from potential clients and then wait for a determination from EPA before accepting or refusing the clients' wastes. Alternatively, waste generators seeking to use ocean incineration could be required, through regulatory provisions developed to address this aspect of the 1984 RCRA Amendments, to justify their need to use ocean incineration. Where appropriate, approval could be made contingent on compliance with a waste reduction schedule.

Directing Wastes to Better Alternatives. -Additional measures could include regulatory restrictions on the ocean incineration of wastes for which recovery or recycling capacity existed or could be developed. Economic approaches, such as imposing a tax on waste incinerated at sea, provide another possible avenue for ensuring that inciner-

able wastes would be directed toward preferred practices.¹²

Other less direct options might include measures to encourage the development and introduction of superior technologies for incinerable wastes. For example, Congress might consider providing direct incentives for research and development efforts and establishing a formal institutional structure for demonstrating new technologies. Such an approach might be especially useful for managing particularly troublesome wastes, such as PCBs.

Understanding the Impacts of Ocean Incineration Relative to Those of Other Alternatives

Many observers maintain that ocean incineration's possibilities and limitations in managing hazardous wastes have been inadequately defined and insufficiently exposed to public scrutiny and debate. This situation is one symptom of a much larger deficiency: the lack of a comprehensive national hazardous waste management strategy.

One of the major obstacles to developing such a strategy is the scarcity of comparative data on the potential effects and applications of available and emerging technologies. In the course of this study, OTA encountered major gaps in information about basic aspects of the waste management problem that greatly impede the development of sound policy. Congressional attention to several general problem areas might significantly strengthen our understanding of what a technology like ocean incineration can and cannot accomplish. Congress might want to:

- provide for more comparative research into waste management technologies by the Federal Government (e. g., by EPA and the National Oceanic and Atmospheric Administration), by industry (accomplished through incentives), and by universities (supported by Federal grants);

¹²Unless it were applied to all waste management practices, or at least to those considered less environmentally sound than ocean incineration, such a tax might divert wastes to the less sound options.

- mandate and provide sufficient resources for establishing and maintaining more comprehensive and accessible databases on waste generation and disposal, number and status of management facilities, and numerous other basic areas; and
- ensure that current data-collection and monitoring efforts are designed, managed, and coordinated in a manner that *generates useful* and accessible information for use in decision-making.

OTHER ISSUES AND PUBLIC CONCERNS

In addition to the key policy issues discussed above, several other policy issues have become major public concerns in the debate over ocean incineration. This section describes and analyzes each of these issues and, wherever possible, highlights potential approaches to resolving them.

Demonstrating a Need for Ocean Incineration

Current Approach

Under provisions of both the London Dumping Convention and the Marine Protection, Research, and Sanctuaries Act, before a permit can be granted for the dumping of any waste at sea, the *need* for such dumping must be established. Because it falls under the definitions of ocean dumping used by both the LDC and MPRSA, ocean incineration would be subject to the requirement for a needs assessment.¹³ The Eighth Consultative Meeting of Contracting Parties held in 1984 (cited in the preamble to the proposed Ocean Incineration Regulation; 50 FR 8247, Feb. 28, 1985) interpreted the need provision of the LDC to mean that:

... other means of disposal should be considered in the light of a comparative assessment of human risks; environmental costs; hazards (including accidents) associated with treatment, packaging, transport, and disposal; economics (including energy costs); and exclusion of future uses of disposal areas, for both sea disposal and the alternatives. If the foregoing analysis shows the land alternatives to be more practical, a license for sea disposal should not be given.

The requirement to establish need has been incorporated into the proposed Ocean Incineration Regulation (Section 234.50) in a manner that EPA claims to be generally consistent with the LDC interpretation. Under the proposed regulation, need would not be defined solely in terms of capacity, so that even if sufficient land-based capacity existed, need for the ocean alternative could still be demonstrated: ‘Need will be presumptively demonstrated if ocean incineration poses less or no greater risks than practicable land-based alternatives’ (50 FR 8247, Feb. 28, 1985).

EPA’s proposed approach to demonstrating need is to prepare a *generic* needs assessment for ocean incineration on a national scale, rather than on a case-by-case basis.¹⁴ The generic needs analysis would provide a rebuttable presumption of need for individual permit applications, placing on those who challenged permit applications the burden of proving that no need existed. EPA presented two rationales for such an approach:

1. The issue of ocean incineration is only a part of a larger problem of hazardous waste management, which requires solutions and management technologies to be looked at from a broad perspective far beyond the capabilities of the permit applicants.
2. The permit applicants do not generate the waste but only transport and dispose of waste that generally comes from numerous sources. Because applicants would lack the necessary information, evaluating and justifying the need to incinerate the wastes would be beyond their capabilities.

¹³The requirement to establish a need for ocean incineration is a unique feature of the Marine Protection, Research, and Sanctuaries Act. Establishment of need is *not* required for land-based incineration or any other land-based waste disposal technology.

¹⁴EPA is apparently reconsidering its proposed generic needs approach in preparing its final Ocean Incineration Regulation, opting for the permit-by-permit approach embodied in the Ocean Dumping Regulations.

Additional Approaches

EPA's approach to defining need is emerging as a major point of contention in the ocean incineration debate. Critics of the technology argue: 1) that the burden of proof should lie with EPA to prove that ocean incineration is as safe as, or safer than, other available alternatives; 2) that need should be evaluated on a permit-by-permit basis; and 3) that the EPA's presumptive definition would be inconsistent with the intent of the MPRSA and LDC.

The controversy over the need for ocean incineration is in many respects related to the general issue of **accountability**. Public concern has been widespread that ocean incineration would largely free waste generators of accountability for wastes incinerated at sea. Accountability in this context would have two components: first, accountability for reducing wastes as much as possible (as initiated under the 1984 RCRA Amendments); and second, accountability with respect to legal liability for releases of waste. Implementing a mechanism for ensuring that generators would be held accountable would help to resolve the objections that ocean incineration would: 1) undermine incentives for waste reduction; and 2) allow generators to dispose of their waste with little or no liability, because of the difficulty of tracing waste back to its source or assigning liability to individual generators.

Setting Liability Requirements

Current Approaches

Many of the problems concerning liability that apply to ocean incineration reflect the much broader crisis in environmental liability generally. The growing difficulty in obtaining affordable commercial pollution liability insurance threatens all handlers of waste, hazardous and otherwise. Except as it directly relates to land-based and ocean incineration facilities, however, an analysis of liability is beyond the scope of this study.

At the outset, liability limits must be distinguished from financial responsibility requirements. Liability limits, which are commonly set by statutes, represent specified maximum amounts of money that parties can be legally required to pay for damages. Financial responsibility requirements,

which can be set by statutes or regulations, are designed to assure that parties undertaking certain activities have sufficient financial resources to meet liabilities the parties might incur. Therefore, the liability limit and the required level of financial responsibility are commonly the same.

The MPRSA establishes no liability limits for any of the activities it covers, including ocean incineration; nor does the Act explicitly authorize EPA to impose a financial responsibility requirement through regulation. In the proposed Ocean Incineration Regulation, however, EPA indicated the clear need to impose such a requirement and solicited comments on an appropriate level of financial responsibility to be required of companies that seek to incinerate hazardous wastes at sea. EPA suggested a range of \$50 million to \$500 million (50 FR 8233, Feb. 28, 1985).

EPA's authority to impose any such requirement through its Ocean Incineration Regulation has been questioned (7), particularly because certain other statutes and regulations already apply to incineration vessels.

For purposes of comparison, the following discussion summarizes existing liability and financial responsibility requirements that apply to land-based and ocean incineration.

Land-Based Incineration.—Two Federal statutes invoke liability and financial responsibility requirements that apply to land-based hazardous waste treatment, storage, and disposal facilities, including land-based incinerators. RCRA sets 'sudden and accidental' liability limits and financial responsibility requirements at \$1 million per accident or \$2 million annually. Limits for damages and third-party claims due to 'gradual pollution' are higher: \$3 million per incident or \$6 million annually. The latter limits, however, currently apply only to landfills, surface impoundments, and land treatment facilities, not to incinerators. Further liability and financial responsibility requirements might be imposed on incinerators under regulations developed in response to RCRA's provisions for closure and corrective action, although these requirements would probably be determined on a facility-by-facility basis.

Superfund (formally known as the Comprehensive Environmental Response, Compensation, and Lia-

bility Act, or CERCLA) specifies a much higher liability limit of \$50 million plus the costs of cleanup for some land-based hazardous waste treatment, storage, and disposal facilities, including land-based incinerators. (Corresponding regulations specifying levels of financial responsibility have not yet been developed under CERCLA, however, so land-based incinerators do not have to demonstrate their financial ability to meet the required level of liability. Given this, the applicable financial responsibility requirements are those specified under RCRA.)

Ocean Incineration.—EPA's proposed regulation was noncommittal on the issue of financial responsibility and solicited public comment on a proposed range of \$50 million to \$500 million for ocean incineration permittees.

Several existing statutory limitations, however, apply to incineration vessels (7). The oldest is based *on* maritime law, dating back to 1851, limiting the legal liability of vessel owners to the value of the vessel plus its cargo after the accident.

Congress has enacted two additional statutes that address liability as it applies to ocean incineration vessels.

Section 311 of the Clean Water Act.—This provision limits legal liability for pollution damages to \$150 per gross ton, which amounts to \$300,000 to \$600,000 for existing incineration vessels. An identical financial responsibility requirement is specified.

Section 107 of the Current CERCLA.—This Superfund provision specifies a liability limit of \$5 million to cover both damages to natural resources and the costs of responding to the release of a hazardous substance. The statute also imposes an identical financial responsibility requirement.

Thus, CERCLA'S \$5 million liability limit and financial responsibility requirement appear to represent the current limits applicable to ocean incineration vessels.

Additional Approaches

Recent amendments to CERCLA offered in both Houses of Congress (and agreed on in conference) would bring the liability limit for incineration vessels up to the level required of land-based inciner-

ators, which is \$50 million plus the cost of responding to the accident. In addition, the \$50 million limit would apply to damages resulting from faulty incineration or other releases of waste, and would extend liability to the generators and transporters of the waste in addition to the vessel owners.

The amendments would also extend current financial responsibility requirements for land-based incinerators to ocean incineration vessels, but the exact amount of financial responsibility is not specified. Instead, the amendments provide EPA with the discretion to set financial responsibility requirements, with the explicit expectation that these requirements should be commensurate with those for other activities that have similar levels of risk.

If adopted, these amendments to CERCLA apparently would resolve the issue of whether EPA has the statutory jurisdiction to require liability insurance in excess of the limitations established under statutory law, or to invoke strict liability requirements for ocean incineration vessels.

Remaining Questions

Marine insurance policies are also subject to several legal defenses. For example, such policies typically do not cover damages resulting from acts of God. Most policies provide no coverage unless negligence by the vessel's owner or operator can be proved. Nor does coverage generally extend to damages resulting from the actual incineration process itself. In other words, coverage applies to damage arising from *sudden and accidental* events, such as spills, but not to damages from *gradual pollution*, such as incinerator emissions.¹⁵ How such defenses and limitations would apply to releases from an ocean incineration vessel is currently an open question.

Another major remaining question concerns liability for damages to third parties. Critics have argued that existing law does not adequately provide for private parties to recover damages they have sustained from spills of hazardous substances. Pro-

¹⁵Damages arising from *federally permitted* releases are excluded from coverage under CERCLA. This immediately raises the question of how to distinguish damage caused by permitted releases from damage caused by nonpermitted releases.

posed amendments to MPRSA would remove barriers to third-party suits, but they do not address the acknowledged difficulty third parties encounter in collecting damages.¹⁶ Prospects for collecting damages are particularly slim when no evidence of direct physical damage can be offered, even though indirect or reputational damage may have been substantial. This issue is complicated by the extreme uncertainty entailed in estimating damages from hazardous waste spills.

Availability and Costs of Liability Insurance

A major factor influencing the insurance market for incineration vessels is their lack of operating experience in this country. In addition, insurance is much more difficult to obtain and more expensive when coverage is desired for damages resulting from both the incineration function and the transportation function the vessels serve.

A recent study prepared for EPA assessed the market availability and potential costs of obtaining liability insurance for incineration vessels (I). Based on interviews with insurance industry representatives, the study estimated that coverage of \$50 million would require a premium of about \$5 million annually, or 10 percent of the liability limit. In contrast, a policy that meets the CERCLA-mandated \$5 million liability limit would carry an annual premium of \$20,000. The higher premium for incineration vessels could increase per-ton rates by as much as 63 percent, according to the study, and would make insurance costs the chief operating expense for ocean incineration.¹⁷

Evaluating the Effect of Ocean Incineration on Land-Based Incineration 18

The Land-Based Perspective

Land-based incineration companies have strongly argued that ocean incineration is not needed, because the market for incineration of or-

ganic liquid wastes will not significantly increase (e.g., see refs. 2,6). They also argue that sufficient liquid waste incineration capacity already exists on land.

Moreover, these companies believe that **sludge and solid wastes** are best incinerated by using **high-energy** organic liquid wastes to provide the needed fuel, and they have suggested that the market for land-based incineration of sludges and solids, but not liquids, will increase. The companies have expressed concern that ocean incineration might draw off much of the available high-energy liquid waste, because of the economies of scale that the large at-sea incinerators would provide. If this occurred, the land-based incinerator companies would have to purchase raw fuel to burn sludges and solids, which they argue would be less cost-effective and less environmentally sound.

Land-based incineration companies base their views of future needs on the following analysis: Because liquid wastes are highly amenable to recovery or other treatment, the quantities of liquids available for incineration will decline, with a concomitant increase in quantities of sludges and highly viscous liquids which would result from the treatment and which could only be incinerated on land. These companies do not believe that the 1984 RCRA land disposal restrictions will greatly increase liquid waste volumes available for incineration, because most of the organic wastes currently landfilled are sludges and solids.¹⁹

The Ocean Perspective

On the other side of the issue, proponents of ocean incineration predict that the gap between capacity and demand for liquid waste incineration would continue growing if ocean incineration were not permitted. The proponents cite EPA's market analysis (10), which suggests this gap may be as high as sevenfold. This study is highly controversial, however, because of the myriad assumptions on which it is based (see ch. 3).

¹⁶These amendments, to Section 106 of MPRSA, were adopted on June 26, 1986, by the House-Senate conference on H.R. 2005, which would reauthorize CERCLA (W. Stelle, House Committee on Merchant Marine and Fisheries, personal communication, July 10, 1986).

¹⁷These results have been disputed by some ocean incineration industry representatives. Based on their experience, these representatives argue that the costs and difficulty of obtaining liability insurance for ocean incineration are overstated.

¹⁸See ch. 3 for further analysis of the arguments presented here.

¹⁹This view appears to overlook liquids that are disposed in surface impoundments and deep wells. Some of these liquids could be incinerated. The use of these options also will be restricted under the 1984 RCRA Amendments, although at a slower pace than for landfills.

Ocean incineration companies believe that land-based incinerators are simply wary of the competition. High-energy liquid wastes form a very competitive market, in which land-based incineration companies already compete with industrial boilers and furnaces (e. g., cement kilns) as well as waste recyclers. Proponents of ocean incineration argue that land-based incinerators who want to continue to use liquid wastes as fuel for co-incinerating solids and sludges would only be able to obtain the liquid wastes by charging generators lower rates than those charged by their competitors. If land-based incinerators lost this market and had to resort to buying raw fuel, the costs could and would be passed on to the sludge and solid waste generators in the form of higher incineration charges.

Finally, proponents of ocean incineration argue that, in its absence, greater quantities of hazardous waste would be disposed of using land alternatives known to be unsafe, including illegal dumping, which would be far less acceptable than the potential risks posed by ocean incineration.

Designating Sites for Ocean Incineration

The proposed Ocean Incineration Regulation lists the Gulf of Mexico Incineration Site as the only currently designated site for ocean incineration and states that the site may be used for up to 10 years. Many members of the public and several elected officials, including the governors of two Gulf States, have argued that the designation process for the Gulf site should be reopened because conditions have substantially changed since its initial designation in 1976.²⁰ The changes include the discovery of valuable new fisheries in the area and increased ship traffic and navigational hazards. Questions have also arisen about the adequacy of opportunities for public participation in the initial decision and about whether EPA has complied with the Agency's own proposed criteria for site designation.

Finally, the 10-year designation has been challenged as too long a period to account for changing conditions and to accommodate any findings derived from environmental monitoring; an alternative proposal for 3-year designation with annual review has been proposed (for example, see ref. 16).

EPA has countered that the site still meets its initial selection criteria, and that it would also have to satisfy the new requirements for site designation (carrying capacity and a monitoring plan) before it could be used for operational burns.

The same issue has surfaced with respect to the proposed North Atlantic Incineration Site. An environmental impact statement (EIS) was prepared on the site in 1981, but changed conditions (including use of the adjacent 106-mile deepwater dumpsite for the dumping of sewage sludge) have led to requests that the 1981 EIS be updated (13). Updating the EIS for the Gulf site would also be warranted, given that it was initially designated in 1976 (see ch. 11).

Considering Applicants' Compliance Records

Current Approaches

Many concerned citizens and elected officials have suggested that an applicant's prior compliance record with Federal, State, or local environmental laws be included as a criterion in EPA's evaluation of applications for ocean incineration permits.²¹ Texas has included such a provision in the State's new (and as yet untested) hazardous waste management act (16). EPA has rejected such proposals on the grounds that equitable criteria for such an evaluation are impossible to develop. As an alternative, EPA has proposed a permit-by-permit determination of an applicant's ability to meet all permit requirements and the development of an enforcement strategy to guide the response to a violation of a permit.

Additional Approaches

This issue is especially troublesome, because of its close link to the larger issue of public confidence in EPA and ocean incineration companies to carry out this program in the safest possible manner. At a minimum, EPA should evaluate whether the available means are adequate: 1) to ensure that applicants can (and do) meet all permit requirements, 2) to hold permittees fully liable for any damages that might result, 3) to enforce all provisions of the

²⁰A petition calling for the withdrawal of designation of the Gulf site has been submitted to EPA by Texas Rural Legal Aid (3).

²¹For a detailed discussion of this position and the precedents for its adoption, see ref. 4.

regulations, and 4) to provide for sufficient penalties for violations. It is also essential that the results of such a review be communicated to the public in an open manner.

In addition, further attention should be given to developing appropriate means of considering the integrity and environmental compliance records of applicants for ocean incineration permits (13). Although a workable solution to this problem would be difficult to formulate, permit proceedings should at least provide full disclosure of applicants' records, including opportunities for applicants to explain relevant mitigating or changed circumstances. If, in preparing its final regulations, EPA ultimately decides to reject direct consideration of past compliance in evaluating permit applications, the rationale for the decision deserves more than the sort of passing mention provided in the proposed Ocean Incineration Regulation (50 FR 8248, Feb. 28, 1985).

Determining Appropriate Operating Permit Length and Renewal Provisions

Current Approach

EPA's proposed Ocean Incineration Regulation would grant operating permits for ocean incineration for 10 years, subject to renewal after 5 years (or more frequently at the request of the Assistant Administrator). Renewals would require approval of a new application and satisfactory completion of a new trial burn. EPA argues that shorter permit terms would not provide sufficient economic incentive for companies to enter the market or allow them to make sufficiently long-term commitments to waste generators (50 FR 8232, Feb. 28, 1985).

Additional Approaches

Although such concerns are legitimate, a permit length of 10 years at the initiation of a new program appears excessive. The length of the term is

especially troublesome in light of the existing permit terms under other environmental regulations:

- a 3-year term for ocean-dumping permits under MPRSA;
- a 5-year term for discharge permits under the Clean Water Act;
- a requirement under the London Dumping Convention for a survey (including a trial burn) to be conducted every 2 years; and
- a 10-year term, with review every 5 years, for the well established land-based incineration program under RCRA.

Two provisions of the proposed regulations affecting permit renewal are also problematic. First, the review process appears to be limited to successful completion of a trial burn, and would not provide for reconsideration of the many factors that might have changed since initial granting of the permit: for example, the need for ocean incineration of the particular wastes to be burned; the environmental characteristics of the incineration site with respect to factors such as data obtained from monitoring, the presence of endangered species, or other or increased use of the site; and needed or desired changes in operating conditions, monitoring, or sampling protocols. Nor would the review appear to allow an opportunity to make more substantial changes as needed to reflect advances in ocean incineration technology or the scientific understanding of incinerator emissions, environmental impacts, and so forth. Particularly if a 10-year permit length were to be considered, a **substantive** review would be essential.

Second, as currently formulated, the proposed regulation would provide for continued operation beyond the end of the permit term in the event of a delay on the part of EPA in processing a permit reapplication. This provision is difficult to justify, given: 1) the small number of permits (and therefore, the relatively small administrative burden) likely to be involved; and 2) the real need for the criteria listed above to be reexamined prior to continued operation.

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