



Permitting Hazardous Waste Incinerators

INTRODUCTION

Incineration reduces the volume of hazardous waste and breaks down the chemical constituents of the waste into their less toxic residues. A well-operated incinerator can destroy hazardous waste safely.

The use of incinerators to manage hazardous waste is likely to increase in the near future. This development reflects a growing understanding on the part of industry, regulatory agencies, and the public that incineration is safer than its chief alternative—disposal in landfills—for many types of hazardous wastes. It also reflects recent regulatory changes. In the 1984 Amendments to the Resource Conservation and Recovery Act (RCRA), for example, Congress placed stringent restrictions on the land disposal of untreated hazardous waste. These limitations are to be phased in by 1990.

To ensure that hazardous waste incinerators are safe and effective, the Environmental Protection Agency (EPA) and the states regulate them by requiring that they obtain a permit to operate. The permitting process that an incinerator owner or operator must follow is strict.

Public involvement is a required and important part of the permitting process. EPA has prepared this publication to inform the public about the

process for permitting incinerators, and to encourage public participation.

USING INCINERATORS TO TREAT HAZARDOUS WASTE

Incineration can effectively treat many types of hazardous wastes, such as dioxin and organic solvents. In addition, contaminated soil from the cleanup of abandoned hazardous waste sites can be incinerated. So can gases, liquids, solids, sludge, and slurries containing hazardous waste. Some types of incinerators even allow for the recovery of energy and recycling of chemical by-products. Incineration reduces the volume of waste that would require expensive hazardous waste land disposal. Therefore, a growing number of companies favor building new incinerators or converting existing furnaces to burn hazardous wastes.

For decades, industrial incinerators have burned waste products. More recently, hazardous waste incineration techniques have been refined so that wastes are burned more effectively. Important conditions for proper incineration include high temperatures (usually 1500-2500 degrees Fahrenheit), enough time within the incinerator, sufficient oxygen, and proper mixing of the waste with oxygen.

Several kinds of incinerators are suitable for treating hazardous wastes. The rotary kiln incinerator—used primarily for burning solids—and the liquid injection incinerator account for roughly 90 percent of all incineration of hazardous wastes in the United States. Other designs include the fluidized-bed incinerator, the multiple hearth incinerator, and co-incineration methods.

PERFORMANCE STANDARDS FOR HAZARDOUS WASTE INCINERATORS

An incinerator's performance is measured by how completely it destroys hazardous waste. Incinerators must demonstrate they can meet several performance standards to be approved to operate. No incinerator can burn 100 percent of the waste fed to it. However, the EPA performance standards require an incinerator to destroy or remove 99.99 percent of the organic hazardous constituents. This percentage is called the destruction and removal efficiency (DRE). For dioxins and PCBs, the required DRE is 99.9999 percent. A DRE of 99.99 percent means that one molecule of the hazardous constituents out of every ten thousand molecules is not burned or removed and is vented from the facility through its

The Congress, in an effort to address the nation's growing concern about its hazardous and solid waste problem, enacted the Resource Conservation and Recovery Act (RCRA). The Hazardous and Solid Waste Amendments of 1984 greatly expanded RCRA and the Environmental Protection Agency's (EPA) authority to manage these wastes.

As a result, EPA is promoting regulations and programs to reduce, recycle, and treat wastes; restrict land disposal; and require corrective action for releases of hazardous waste into the environment. EPA's Office of Solid Waste, through its publications, aims to foster public understanding and encourage citizen involvement in helping to manage the national waste crisis.

smoke stack. A DRE of 99.9999 percent means that one molecule out of every million is not destroyed. Other performance standards require that gaseous hydrogen chloride be reduced by 99 percent, or to 4 pounds per hour. Furthermore, and that particulate matter—very small particles of debris—in stack emissions must be kept to a minimum (180 milligrams per dry standard cubic meter).

Current performance standards do not explicitly address emissions of metals or products of incomplete combustion (PICs). The burning of some wastes may release small quantities of metals through the smoke stacks. These metals usually adhere to particulate matter. Therefore, restrictions on particulate matter emissions help prevent emissions of metals in quantities that may pose a threat to public health or the environment.

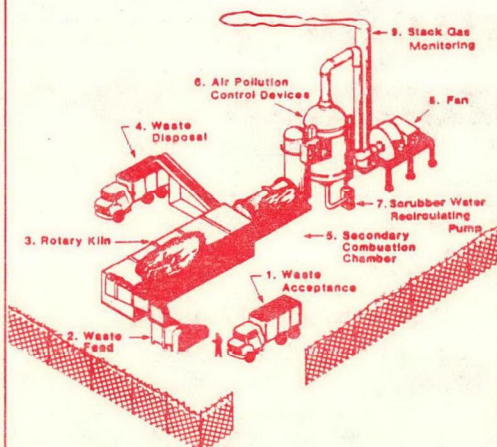
Products of incomplete combustion (PICs) are products that are not totally destroyed by incineration. PICs occur in any combustion process—such as in automobile engines, boilers, barbecues, woodstoves—when some organics are only partially destroyed or when new compounds are formed. PICs are present in very small quantities and are predominantly non-toxic emissions. According to current EPA data, PICs do not present an unacceptable risk.

An incinerator must demonstrate compliance with performance standards during a performance test called a trial burn. The conditions under which the incinerator operates during the trial burn are then included in the permit to assure continued compliance.

THE TRIAL BURN

Before conducting a trial burn, the incinerator operator usually develops a trial burn plan. The trial burn plan describes (1) the content of the waste to be fed into the incinerator (waste feed); (2) operating conditions to be tested under the most adverse situations; (3) monitoring and sampling tests to be conducted;

(4) how trial burn data will be analyzed; and (5) how sampling results are to be verified and reported.



A TYPICAL
ROTARY KILN INCINERATOR

From the list of chemicals making up the waste feed, the applicant proposes several of the most difficult compounds to burn. The selected compounds are referred to as the Principal Organic Hazardous Constituents, or POHCs. POHCs are selected because if they are destroyed to the required DRE of 99.99 percent, the destruction of more easily burned compounds will be even more complete. Sometimes a more easily burned but highly toxic compound is also selected as one of the POHC compounds. This is to make sure that such a toxic component is destroyed during incineration.

During the trial burn, the owner and operator, with EPA or state oversight, must measure emissions from the incinerator for POHC compounds, particulate matter, and hydrogen chloride. Using those measurements, EPA can then determine whether the incinerator meets the performance standards.

The information that is gathered during the trial burn, confirming that the facility can meet the DRE under specified conditions, is used to set the final permit conditions. The facility must then maintain these specified operating conditions at all times when burning hazardous waste. When operating conditions deviate from those in the permit, the waste feed must be automatically stopped.

THE PERMITTING PROCESS

Under RCRA, the Federal government and many state governments are authorized to oversee hazardous waste facilities. Regulations issued under RCRA in 1980 enable Federal and state governments to better control the treatment, storage, and disposal of hazardous wastes. In addition, the regulations set up a process for issuing strict operating permits to facilities that properly manage such wastes and for closing those that fail to do so.

A permit specifies the conditions under which the facility can operate. These conditions include, for example, the allowable range for incinerator temperatures, the types of waste which may be burned in the incinerator, and provisions for automatic shutdown if permit conditions are violated. Adequate security procedures, facility inspections, personnel training, contingency planning for emergencies, use of the RCRA manifest waste-tracking system, and accurate record-keeping must also be ensured. Moreover, owners and operators must describe plans for securely closing the facility at the end of its useful life.

Existing Facilities

Facilities that already existed when the regulations took effect operate under "interim status." Interim status allows a facility to continue operating under a set of specific standards until a final permit decision is made. Existing incinerators with interim status must follow the stringent permitting process outlined on these pages.

The EPA and state agencies oversee operations at facilities that have interim status. By 1989, EPA must issue or deny final permits to incinerator facilities having interim status. About 150 of these are awaiting permit decisions. The majority of these facilities are located near the chemical plants or manufacturing sites where waste is generated.

PERMIT PROCESS STEPS

For Existing Incinerators with Interim Status

1. Submit Part A. Applicant provides general information, such as the name and location of the facility, its owner, type of waste accepted, maximum capacity, and other environmental permits governing the facility. This step is required to obtain interim status. Most existing incinerators submitted Part A in 1980.

2. Submit Part B. Applicant provides detailed information specific to the individual facility. This information enables EPA to evaluate the proposed design and operation of an incinerator. Completion of a Part B application is long and complex. It also includes a trial burn plan and/or trial burn data or data from a similar incinerator. (The following steps reflect when a trial burn plan is submitted with the application.)

3. Review of application. EPA reviews application and trial burn plan. Trial burn plan is evaluated to see if it would adequately test the performance of the unit. During this period EPA may ask for more information. EPA or the state approves the trial burn plan.

4. Trial burn. Applicant conducts the trial burn with EPA or state staff in attendance.

5. Trial burn analysis and review. Applicant submits data and information on incinerator's performance during trial burn. EPA reviews information and may request additional data from applicant.

6. Preparation of draft permit. If the trial burn demonstrates that the incinerator meets performance standards, EPA prepares a draft permit. Permit includes operating conditions based on the data gathered during the trial burn. If it appears that a facility is unable to meet statutory or regulatory standards, a "Notice of Intent to Deny" is prepared. Either

way, acceptance or denial of the permit, a 45-day public comment period must be held.

7. Public comment on draft permit. EPA solicits, reviews, and responds to public comments. Public comment period is at least 45 days. A public hearing will also be held if requested.

8. Permit determination. Final permit is issued or denied depending on public comment and the facility's ability to meet RCRA regulations. Final permit describes operating conditions for the facility, and is effective for up to ten years. If denied a permit, a facility must comply with closure/post closure requirements.

New Facilities

For new facilities, a RCRA permit application and trial burn plan must be approved and proposed for public comment. If a complete EPA and state review shows that the proposed incinerator design and trial burn plan are acceptable, and public comments are addressed, a four-phase permit will be issued. This permit establishes the conditions to be met by the facility following its construction. Each phase of the permit specifies operating conditions for that portion of the incinerator's operation.

PERMIT PROCESS STEPS

For New Facilities

1. Submit Parts A and B. Applicant includes a trial burn plan with the permit application.

2. Review of application. EPA performs technical review of the incinerator's design to determine if the incinerator is likely to meet the performance standards.

3. Preparation of draft permit. EPA prepares a draft permit that includes a trial burn plan and facility design specifications. It also includes operating conditions under which the facility is expected to meet the performance standards.

4. Public comment on draft permit. EPA publishes for public comment the draft permit and trial burn plan. The public comment period is at least 45 days. If requested, a public hearing is held.

5. Four-phase permit. After EPA review and public comment, a four-phase permit is issued or the application is denied. A permit would establish the conditions to be met by the facility following its construction.

6. Start-up/Shake-down period (Phase One). This phase allows limited burning of wastes to help stabilize the new facility's operations.

7. Trial burn (Phase Two). Emissions and operating conditions are monitored to determine if performance standards are met. This period usually lasts two weeks or less.

8. Post-trial burn (Phase Three). In this phase, the incinerator may operate under specified limits for several months, while trial burn results are reviewed.

9. Final operating conditions (Phase Four). If the incinerator meets the performance standards during the trial burn, the incinerator is allowed to operate under the final operating conditions in the permit. Some modifications to these conditions may be necessary based on the trial burn results. If the incinerator does not pass the trial burn, the permit may be modified to allow an additional trial burn. A major modification of the permit, such as a second trial burn, would require a new public comment period.

PUBLIC INVOLVEMENT IN THE PERMIT PROCESS

Community involvement in the permit process is strongly encouraged. Procedures to ensure public involvement vary from state to state and often overlap with EPA efforts. Whether or not EPA or a state

decides to issue or deny a permit, a public notice will appear in two local news papers and at least a 45-day comment period will be held. Information about the permit, usually in a newsletter or fact sheet, will be provided to interested community members. Additional information and a copy of the draft permit will be available from EPA or the state.

If anyone submits a written request for one during the comment period, EPA will hold a public hearing. Any testimony provided at the hearing would become part of a formal record. In addition, EPA may hold informal meetings with community members to hear their views and respond to questions.

During the comment period, written comments and questions may also be submitted to EPA. All concerns must be considered before a final decision on a permit is made. Moreover, EPA must prepare "Response to Comments" within 60 days after the close of the comment period. This document responds to major comments and explains what, if any, provisions of the draft permit have been changed.

The public comment period ensures that EPA fully considers the public's concerns regarding the effects of a facility on human health, safety, and the environment. And technical or factual comments from the public can influence the provisions and

safeguards of the final permit or cause a permit to be denied. Citizens often offer useful information to EPA about the applicant or the facility site. Practical information contributed by the public about the impact of the permit on community services can be invaluable, as well. For example, is the applicant's contingency plan feasible given the capabilities of the local fire department?

For new facilities, the public comment period occurs prior to construction. Public comments may be directed toward important decisions--for instance, the design specifications, selection of the POHCs, waste feed components, contin-

gency planning, site security, trucking routes, and the need for noise controls. For existing facilities, already operational, community members may wish to comment on trial burn results, monitoring and operating procedures, site security, noise control, and trucking routes.

For both existing and new facilities, EPA conducts public involvement efforts to keep community members informed and to respond to public inquiries during the lengthy permit review process. Again, public involvement is encouraged. Solving the nation's hazardous waste problem is up to everyone.

For more information on the permitting of hazardous waste incinerators contact:

Toll free RCRA/Superfund Hotline: 800-424-9346 or, in the Washington, D.C. area, call 382-3000.

Or contact EPA Regional Offices:

Region I
JFK Federal Building
Boston, MA 02203
(617) 573-9644

Region II
26 Federal Plaza
New York, NY 10278
(212) 264-8682

Region III
841 Chestnut Building
Philadelphia, PA 19107
(215) 597-7940

Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365
(404) 347-3433

Region V
230 S. Dearborn Street
13th Floor (HR-11)
Chicago, IL 60604
(312) 353-0398

Region VI
First International Bldg.
1201 Elm Street
Dallas, TX 75270
(214) 655-6785

Region VII
726 Minnesota Avenue
Kansas City, KS 66101
(913) 236-2888

Region VIII
999 18th Street
One Denver Pl., Suite 1300
Denver, CO 80202-2413
(303) 293-1676

Region IX
215 Fremont Street
San Francisco, CA 94105
(415) 974-8026

Region X
1200 Sixth Avenue
Seattle, WA 98101
(206) 442-1099

**United States
Environmental Protection Agency
Office of Solid Waste
Washington, DC 20460**