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PART II



ENVIRONMENTAL PROTECTION AGENCY

SOLID WASTE DISPOSAL

Proposed Guidelines for
Thermal Processing and Land
Disposal of Solid Wastes

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Parts 240, 241]

SOLID WASTE DISPOSAL PROGRAMS

Proposed Solid Waste Management Guidelines for Thermal Processing and Land Disposal of Solid Wastes

Background.—The Solid Waste Disposal Act of 1965 (Public Law 89-272) was amended in October 1970 by the Resource Recovery Act (Public Law 91-512). In amending the act (sec. 209), the Congress charged the Administrator of the U.S. Environmental Protection Agency (EPA), " . . . in cooperation with appropriate State, Federal, interstate, regional, and local agencies, and allowing for public comment by other interested parties. . . ." to recommend to appropriate agencies and to publish in the FEDERAL REGISTER guidelines for solid waste management systems (sec. 209(a) Public Law 91-512). These guidelines were to be consistent with public health and welfare, air and water quality standards, and adaptable to appropriate land use plans.

The EPA began development of the guidelines shortly after the passage of the Resource Recovery Act in 1970. However, efforts had begun much earlier with the predecessor agencies of EPA in developing state-of-the-art documents on which sound guidelines could be based and supported. These efforts resulted in two initial documents, "Sanitary Landfill Design and Operation" and "Municipal Scale Incinerator Design and Operation." Both of these documents are published and available for use and application in the field of solid waste management.

In developing the above documents, the EPA and its predecessor agencies utilized the knowledge and skills of individuals recognized as national and international experts in the field of solid waste management. In addition, during the draft stages, these documents were reviewed and critiqued by a variety of Federal agencies, all State solid waste agencies were solicited for comment, and a variety of professional organizations and societies was also requested to review, critique, and comment on the draft documents. Such rigorous reviews resulted in two documents which comprise detailed sources of information for sanitary landfilling and municipal-scale incineration practices.

Introduction to guidelines.—This issuance is the first indication of the intent of the Administrator to promulgate guidelines for land disposal and thermal processing operations. Both guidelines are written to establish requirements for the land disposal and thermal processing of municipal-type solid waste materials, whereas the recommended procedures are based on sanitary landfilling and municipal-scale incineration practices. These guidelines do not deal with other process and unit operations of solid waste management or with special waste materials such as hazardous, agricultural, and mining wastes. EPA guid-

ance on the specific practice of land disposal of milled solid waste is contained in a position statement issued in November 1972.

Both guidelines are recommended to State, interstate, regional, and local government agencies and are mandatory for Federal agencies. The final promulgation of the guidelines will therefore serve two basic purposes, namely: (1) Establish EPA recommended guidelines for adoption by State and local governmental agencies; and (2) establish mandatory guidelines for direct implementation by Federal agencies (see subsequent discussion of Federal agency compliance).

The draft guidelines now being issued by EPA for comment preparatory to promulgation have been reviewed by Federal, State, and local agencies, as well as by appropriate professional organizations and societies. They represent, in their present form, the judgments on the part of EPA regarding what is necessary to assure both environmental protection and satisfactory and acceptable design and operation of land disposal and thermal processing facilities. They represent objectives that are achievable using today's technology, while providing flexibility for unique and specific climatological, geological, geographical, and related conditions.

Land disposal guidelines.—The most widely applied environmentally acceptable solid waste land disposal method available today is sanitary landfilling. A sanitary landfill is an engineered land disposal facility at which solid waste is spread in thin layers, compacted to the smallest practical volume, and covered with soil each operating day in a manner that minimizes environmental hazards. The sanitary landfill constitutes the basic goal to be achieved in the land disposal guidelines.

The prescribed land disposal guidelines are intended to provide for operations that will have minimum impact on the environment and they will apply to both existing and future facilities. The guidelines do not establish new standards, but set forth requirements to insure that the design, construction, and operation of land disposal sites meet the health and environmental standards for the area in which they are located. Land disposal facility operations are expected to conform to the most stringent Federal, State, or local standards that are legally applicable to the operation of such facilities.

The requirements section of the guidelines delineate minimum levels of performance required at land disposal facilities. While it is impossible to delineate all the techniques required at every potential site, the recommended procedures that support each basic requirement are intended to emphasize specific items of concern. Owners and operators of land disposal sites are expected to employ the most efficient techniques and operating practices to satisfy the requirements. The recommended procedures represent such methods and techniques based on current knowledge for meeting the requirements. If techniques other than

those specified are used, it is the obligation of the proposed facility's owner and operator to demonstrate to the responsible agency in advance that such techniques will, in fact, meet the requirements.

Thermal processing guidelines.—The prescribed thermal processing guidelines are applicable to facilities that are designed to process or are processing 50 tons or more solid waste per 24-hour day (40 CFR parts 60 and 76). The application of this capacity criterion will be interpreted to mean any facility that is designed to process or is processing 50/24 tons or more of solid waste per hour. Guidance for facilities processing less than 50/24 tons of solid waste per hour will be provided by EPA at a later date. The prescribed guidelines are intended to provide for thermal processing with minimum adverse impact on the environment and apply to both existing and future facilities. Thermal processing facility operations are expected to conform to the most stringent Federal, State, or local standards that are legally applicable to the operation of such facilities.

The requirements section of the guidelines delineate minimum levels of performance required at thermal processing facilities. Although it is impossible to delineate all the techniques needed to meet the requirements, the recommended procedures are intended to emphasize specific items of concern. Owners and operators of facilities are expected to employ the most efficient techniques and operating practices to satisfy the requirements. The recommended procedures represent such methods and techniques based on current knowledge for meeting the requirements. If techniques other than those specified are used, it is the obligation of the owner of the proposed facility to demonstrate to the responsible agency in advance that such techniques will, in fact, meet the requirement.

Federal agency compliance.—Section 211 of the Solid Waste Disposal Act, as amended, requires that all Federal executive agencies (as defined in section 105 of Title 5, United States Code) comply with any guidelines developed by the EPA. Compliance with guidelines issued under the authority of section 211 is required of each Federal agency:

1. Having jurisdiction over any real property or facility which involves it in solid waste disposal activities;
2. That enters into a contract with any person for the operation of any Federal property or facility, and where contract performance involves solid waste disposal activities;
3. That permits the use of Federal property for the disposal of solid waste;
4. That issues licenses or permits for disposal of solid waste or conducts activities which generate solid waste and which, if conducted by someone other than the agency, would require a license or permit from such agency for the disposal of such waste.

The management of solid waste generated by Federal agencies was first subject to Federal control in 1966 with the

Issuance of Executive Order 11282—Prevention, Control, and Abatement of Air Pollution by Federal Activities and regulations to implement the order (40 CFR 76.8). These documents generally prohibited the open burning of solid waste in urban areas and the use of open dumps. The thrust of these documents was to control air pollution, not to control solid waste practices. Executive Order 11507—Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities was issued in 1970, but again it did not specifically address the management of solid waste practices by Federal activities. It is the intent of EPA to seek revision of Executive Order 11507 constituting the basic compliance system for the guidelines and to proceed with the subsequent development of an OMB circular to formally establish procedures to be followed by Federal agencies.

Response requested.—The EPA recognizes several factors on which it is soliciting comment and advice via this notification in the FEDERAL REGISTER. EPA invites particular comments from Federal agencies, non-Federal agencies and particularly agencies utilizing Federal land for solid waste management purposes on:

1. The probable range of annual costs of Federal agency compliance with the guidelines.

2. The likely impact, particularly on communities disposing of their solid waste on Federal lands.

3. Planning for Federal agency compliance with the guidelines.

In addition, the EPA invites public comments, reviews, and critiques of the guidelines. Interested parties may submit written comments in triplicate to the Deputy Assistant Administrator for Solid Waste Management Programs, U.S. Environmental Protection Agency, Washington, D.C. 20460. All comments received on or before June 26, 1973, will be considered.

Receipt of comments will be acknowledged, but the Deputy Assistant Administrator for Solid Waste Management Programs will not provide substantive responses to individual comments. All comments will be available for public inspection during normal business hours of the EPA headquarters in Washington, D.C.

This notice of proposed guidelines is issued under the authority of section 209(a) of the Solid Waste Disposal Act of 1965 (Public Law 89-272), as amended by the Resource Recovery Act of 1970 (PL-913).

WILLIAM D. RUCKELSHAUS,
Administrator.
APRIL 13, 1973.

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AUTHORITY.—Sec. 209(a) of the Solid Waste Disposal Act of 1965 (Public Law 89-272) as amended by the Resource Recovery Act of 1970 (Public Law 913).

Subpart A—General Provisions

§ 240.100 Scope.

(a) A thermal processing facility for solid wastes must be operated in conjunc-

tion with a final land disposal facility. Land disposal is required in accordance with the Environmental Protection Agency's guidelines for the land disposal of solid wastes for both residues from the thermal processing operation and those nonhazardous wastes which cannot be thermally processed for reasons of health, safety, or technological limitation.

(b) The prescribed guidelines are applicable to thermal processing facilities designed to process or which are processing 50 tons or more per day of municipal-type solid wastes. The application of this capacity criterion will be interpreted to mean any facility designed to process or actually processing 50/24 tons or more per hour. These guidelines reflect concern with protection of the total environment, are consistent with public health and welfare, air and water quality standards, and are adaptable to appropriate land-use plans. The prescribed guidelines are intended to provide for proper thermal processing with minimum adverse impact on the environment. They incorporate the concept that the operator of a facility must meet the most stringent standards that are legally applicable to the operation of the facility. Pursuant to section 211 of the Solid Waste Disposal Act, as amended, these guidelines are mandatory for Federal agencies. In addition they are recommended to State, interstate, regional, and local government agencies for use in their activities.

(c) The requirement sections contained herein delineate minimum levels of performance required of any solid waste thermal processing operation. The recommended procedures sections are presented to suggest preferred methods by which the objectives of the requirements can be realized. The recommended procedures are based on the practice of incineration of large facilities (50 tons per day or more) processing municipal solid waste. If techniques other than the recommended procedures are used or wastes other than municipal wastes are processed, it is the obligation of the facility's owner and operator to demonstrate to the responsible agency in advance that techniques employed will satisfy the requirements.

(d) The guideline requirements are considered to be generally applicable to the thermal processing of all solid waste materials. However, the guidelines do not apply to hazardous, agricultural, and mining wastes because of the lack of sufficient information upon which to base recommended procedures.

§ 210.101 Definitions.

As used in these guidelines:

(a) "Air": "Overfire air" means air, under control as to quantity and direction, introduced above or beyond a fuel bed by a natural, induced, or forced draft. "Underfire air" means any forced or induced air, under control as to quantity and direction, that is supplied from beneath and which passes through the solid wastes fuel bed.

(b) "Bottom ash" means the solid material that remains on a hearth or

falls off the grate after thermal processing is complete.

(c) "Combustibles" means materials that can be ignited at a specific temperature in the presence of air to release heat energy.

(d) "Design capacity" means the weight of solid waste of a specified gross calorific value that a thermal processing facility is designed to process in 24 hours of continuous operation; usually expressed in tons per day.

(e) "Facility" means all thermal processing equipment, buildings, and grounds at a specific site.

(f) "Fly ash" means suspended particles, charred paper, dust, soot, and other partially oxidized matter carried in the products of combustion.

(g) "Free moisture" means liquid that will drain freely by gravity from solid materials.

(h) "Furnace" means the chambers of the combustion train where drying, ignition, and combustion of waste material and evolved gases occur.

(i) "Grate siftings" means the materials that fall from the solid waste fuel bed through the grate openings.

(j) "Gross calorific value" means heat liberated when waste is burned completely and the products of combustion are cooled to the initial temperature of the waste. Usually expressed in British thermal units per pound.

(k) "Hazardous waste" means waste materials that are: (1) Toxic or poisonous; (2) corrosive; (3) irritating or sensitizing; (4) radioactive; (5) biologically infectious; (6) explosive; or (7) flammable and that present a significant hazard to human health and the environment. They include, but are not limited to, those materials and concentrations of materials that are determined to be toxic by the Secretary of Health, Education, and Welfare pursuant to section 20(6) of the Occupational Safety and Health Act of 1970 (Public Law 91-596).

(l) "Incineration" means the controlled process by which solid, liquid, or gaseous combustible wastes are burned and changed into noncombustible gases.

(m) "Incinerator" means a facility consisting of one or more furnaces in which wastes are burned.

(n) "Infectious waste" means: (1) Equipment, instruments, utensils, and fomites of a disposable nature from the rooms of patients who are suspected to have or have been diagnosed as having a communicable disease and must, therefore, be isolated as required by public health agencies; (2) laboratory wastes, including pathological specimens (i.e., all tissues, specimens of blood elements, excreta, and secretions obtained from patients or laboratory animals) and disposable fomites (any substance that may harbor or transmit pathogenic organisms) attendant thereto; (3) surgical operating room pathologic specimens and disposable fomites attendant thereto and similar disposable materials from outpatient areas and emergency rooms.

(o) "Municipal solid wastes" means, normally, residential and commercial solid wastes generated within a community.

(p) "Open burning" means burning of solid wastes in the open, such as in an open dump.

(q) "Open dump" means a land disposal site at which solid wastes are disposed of in a manner that does not protect the environment, are susceptible to open burning, and are exposed to the elements, vectors, and scavengers.

(r) "Plans" means reports and drawings, including a narrative operating description, prepared to describe the facility and its proposed operation.

(s) "Residue" means all the solids that remain after completion of thermal processing, including bottom ash, fly ash, and grate siftings.

(t) "Responsible agency" means the organizational element that has the legal duty to insure that owners, operators, or users of facilities comply with these guidelines.

(u) "Sanitary landfill" means a land disposal site employing an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying cover materials at the end of each operating day.

(v) "Sludge" means the accumulated semiliquid suspension of settled solids, deposited from waste waters or other fluids in tanks or basins.

(w) "Solid wastes" means garbage, refuse, sludges, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants.

(x) "Special wastes" means non-hazardous solid wastes requiring handling other than normally used for municipal solid waste.

(y) "Thermal processing" means processing of waste material by means of heat.

(z) "Vector" means a carrier, usually an arthropod, that is capable of transmitting a pathogen from one organism to another.

Subpart B—Requirements and Recommended Procedures

§ 210.200 Solid wastes accepted.

§ 240.200-1 Requirement.

In consultation with the responsible agencies, the designer and owner/operator shall determine what wastes shall be accepted and shall identify any special handling required. Only wastes for which the facility has been specifically designed shall be accepted.

§ 240.200-2 Recommended procedures: Design.

(a) In addition to the residential and commercial wastes normally processed at municipal-scale incinerators, certain special wastes might be considered for processing. These include: Certain bulky wastes (e.g., demolition and construction debris, tree stumps, large timbers, furniture, and major appliances), digested and dewatered sludges from waste water treatment facilities, raw sewage sludges, and septic tank pumpings.

(b) If the facility is designed to handle special wastes, special areas should be provided for storage while they await processing.

§ 240.200-3 Recommended procedures: Operations.

(a) Storage areas for special wastes should be clearly marked.

(b) Facility personnel should be thoroughly trained in any unusual handling required by acceptance of special wastes.

§ 240.201 Solid wastes excluded.

§ 240.201-1 Requirement.

Using information provided to them by the waste generator/owners, the responsible agency, the facility owner/operator, and the designer shall jointly determine specific wastes to be excluded and shall identify them in the plans. The generator/owner of excluded wastes and the responsible agency shall jointly determine an alternative method of disposal for excluded wastes. The criteria used to determine whether a waste is unacceptable shall include the facility's capabilities, the chemical and biological characteristics of the waste, and the safety of personnel. Disposal of pesticides and pesticide containers shall be consistent with the Federal Environmental Pesticides Control Act of 1972 (Public Law 92-516) and recommended procedures promulgated thereunder.

§ 240.201-2 Recommended procedures: Design.

(a) Provision for storing, handling, and removing hazardous or excluded wastes inadvertently left at the facility should be considered in design.

(b) Examples of wastes which should be considered for exclusion from the facility include: Hazardous wastes, very large carcasses, automobile bodies, dewatered sludges from water treatment plants, and industrial process wastes.

§ 240.201-3 Recommended procedures: Operations.

(a) Regular users of the facility should be given a list of excluded materials, and it should also be displayed prominently at the facility entrance. If a regular user persists in making unacceptable deliveries, he should be barred from the installation and reported to the responsible agency.

(b) The operating plan should specify the procedures and precautions to be taken if unacceptable wastes are delivered to the facility or are improperly left

there. Operating personnel should be thoroughly trained in such procedures.

§ 240.202 Site selection.

§ 240.202-1 Requirement.

Site selection and utilization shall comply with appropriate Federal, State, or local health, environmental, planning, and solid wastes management agency requirements and plans.

§ 240.202-2 Recommended procedures: Design.

(a) Whenever possible, thermal processing facilities should be located in areas zoned for industrial use and having adequate utilities to serve the facility.

(b) The site should be accessible by permanent roads leading from the public road system.

(c) Environmental factors, climatological conditions, and socioeconomic factors should be given full consideration as selection criteria.

§ 240.202-3 Recommended procedures: Operations.

Not applicable.

§ 240.203 General design.

§ 240.203-1 Requirement.

A plan for the design of the facility shall be prepared or approved by a professional engineer. A list of major considerations and the rationale for the decision on each consideration shall be approved by the responsible agency prior to authorizations for construction. This information shall remain available for review.

§ 240.203-2 Recommended procedures: Design.

(a) The types, amounts (by weight and volume), and characteristics of all solid wastes expected to be processed should be determined by survey and analysis. The gross calorific value of the solid wastes to be processed should be determined to serve as a basis for design.

(b) Resource recovery in the form of heat utilization or direct recovery of materials should be considered in the design.

(c) The facility should be designed to be compatible with the surrounding area, easy to maintain, and consistent with the land use of the area.

(d) Employee convenience facilities and plant maintenance facilities should be provided. Adequate lighting throughout the facility should be provided.

(e) The corrosive and erosive action of recirculated process waters should be controlled either by treating them or by using materials capable of withstanding the adverse effects of the waters.

(f) Facility design capacity should consider such items as variations in volume of waste, equipment downtime, and an alternate disposal capability.

(g) Facility systems and subsystems should be designed to assure standby capability in the event of breakdown. Provision for standby water and power should also be considered.

(h) Instrumentation should be provided to determine such factors as: The

weight of incoming and outgoing materials (the same scale system may be used for both); total combustion airflow rates; underfire and overfire airflows and the quantitative distribution of each; selected temperatures and pressures in the furnace, along gas passages, in the particulate collection device, and in the stack; electrical power and water consumption of critical units; and rate of operation. The smoke density, the concentration of carbon monoxide, or the concentration of hydrocarbons in the stack gases should be monitored. Measurement of the pH should be considered for effluent waters. Continuously recording instrumentation should be used as much as possible.

(i) Audible signals should be provided to alert operating personnel of critical operating unit malfunctions.

(j) Sampling capability should be designed into the facility so that each process stream can be sampled, and the utilities required to do so should be close at hand. The sampling sites should be so designed that personnel can safely sample without interfering with normal plant operations.

(k) A laboratory should be included in the design.

§ 240.203-3 Recommended procedures: Operations.

Not applicable.

§ 240.204 Water quality.

§ 240.204-1 Requirement.

All waters discharged from the facility shall be sufficiently treated to meet the most stringent of applicable water quality standards, including those established under the authority of the Federal Water Pollution Control Act, as amended, and in existing State or local standards.

§ 240.204-2 Recommended procedures: Design.

(a) Effluent waters should not be discharged indiscriminately. Consideration should be given to onsite treatment of process and waste waters before discharge.

(b) Recirculation of process waters should be considered.

§ 240.204-3 Recommended procedures: Operations.

(a) When monitoring instrumentation indicates excessive discharge contamination, appropriate adjustments should be made to lower the concentrations to acceptable levels.

(b) In the event of an accidental spill, the local regulatory agency should be notified immediately.

§ 240.205 Air quality.

§ 240.205-1 Requirement.

Emissions shall not exceed existing air quality or emission standards established by the U.S. Environmental Protection Agency (as published in parts 60 and 76 of this chapter for new and existing installations, respectively) under the authority of the Clean Air Act, as amended, or State or local air quality or emission standards, if the latter are more stringent.

§ 240.205-2 Recommended procedures: Design.

(a) These requirements should be met by using appropriate air pollution control technology.

(b) All emissions, including dust from vents, should be controlled.

§ 240.205-3 Recommended procedures: Operations.

When monitoring instrumentation indicates excessive emissions, appropriate adjustments should be made to lower the emission to acceptable levels.

§ 240.206 Vectors.

§ 240.206-1 Requirement.

Conditions shall be maintained that are unfavorable for the harboring, feeding, and breeding of vectors.

§ 240.206-2 Recommended procedures: Design.

Thermal processing facilities should be designed for ease of cleaning. Areas favorable for breeding of vectors should be avoided.

§ 240.206-3 Recommended procedures: Operations.

(a) A housekeeping schedule should be established and maintained. As a minimum the schedule should provide for cleaning the tipping and residue areas as spillages occur, emptying the solid waste storage area at least weekly, and routinely cleaning the remainder of the facility.

(b) Solid waste and residue should not be allowed to accumulate at the facility for more than 1 week.

§ 240.207 Aesthetics.

§ 240.207-1 Requirement.

The incinerator facility shall be designed and operated at all times in an aesthetically acceptable manner.

§ 240.207-2 Recommended procedures: Design.

The facility should be designed so that it is physically attractive. The tipping area should be screened from public view and the grounds should be landscaped.

§ 240.207-3 Recommended procedures: Operations.

(a) A routine housekeeping and litter removal schedule should be established and implemented so that the facility regularly presents a neat and clean appearance.

(b) Solid wastes that cannot be processed by the facility should be removed from the facility at least weekly. Open burning or open dumping of this material should be prohibited.

§ 240.208 Residue.

§ 240.208-1 Requirement.

Sludge and other solid waste products resulting from a thermal process shall be disposed of in an environmentally acceptable manner, in conformance with the U.S. Environmental Protection Agency's guidelines for the land disposal of solid wastes or State or local regulations if the latter are more stringent.

Systems to recover resources in the residue may be used, but the systems must be designed and operated in a manner that protects the environment. Unwanted residue materials remaining after the recovery operation shall be disposed of on land as required by the guidelines for the land disposal of solid wastes.

§ 240.208-2 Recommended procedures: Design.

Thermal processing facilities should be so designed as to allow for removal from the site of residue or other solids in a manner that protects the environment.

§ 240.208-3 Recommended procedures: Operations.

(a) The furnace operator should visually observe the quality of the bottom ash at least twice per shift and record in the operating log the estimated percentage of unburned combustibles.

(b) If residue or fly ash is collected in a wet condition, it should be drained of free moisture. Transportation of these materials, and also of dry ones, should be by means that prevent the loads from shifting, falling, leaking, or blowing from the container.

§ 240.209 Safety.

§ 240.209-1 Requirement.

Incinerators shall be designed, operated, and maintained in a manner to protect the health and safety of personnel associated with the operation. Pertinent provisions of the Occupational Safety and Health Act of 1970 (Public Law 91-596) and regulations promulgated thereunder shall apply.

§ 240.209-2 Recommended procedures: Design.

(a) Attention should be given to the safety of operators and vehicles through the provision of safety devices.

(b) Fire control equipment should be provided.

(c) Methods and/or equipment for removal of an injured person from the storage pit should be available.

§ 240.209-3 Recommended procedures: Operations.

(a) Detailed procedures should be developed for operation during such emergency situations as power failure, air or water supply failure, equipment breakdowns, and fire. These procedures should be posted in prominent locations, implemented by the staff as required, and upgraded and revised periodically.

(b) Oxygen masks should be available at convenient locations and their use reviewed periodically with facility personnel.

(c) Training in first aid practices and emergency procedures should be given all personnel.

(d) Personal safety devices such as hard hats and safety glasses and shoes should be provided for plant personnel and visitors.

(e) If a regular user persistently poses a safety hazard, he should be barred

from the facility and reported to the responsible agency.

§ 240.210 General operations.

§ 240.210-1 Requirement.

The thermal processing facility shall be operated and maintained in a manner that assures it will meet the design requirements. An operations manual describing the various tasks to be performed, operating procedures, and safety precautions for various areas of the facility shall be developed and shall be readily available for reference by plant personnel.

§ 240.210-2 Recommended procedures: Design.

Not applicable.

§ 240.210-3 Recommended procedures: Operations.

(a) The facility supervisor should be experienced in the operation of the type of facility designed.

(b) Alternate and standby disposal and operating procedures should be established for implementation during emergencies, air pollution episodes, and shutdown periods.

(c) Upon completion of construction of the facility, provision should be made for instruction of the staff in proper operation and maintenance procedures.

(d) A routine maintenance schedule should be established and followed.

(e) As-built engineering drawings of the facility should be provided at the conclusion of construction of the facility. These should be continuously updated to show modifications by the owner and should be readily available. A schematic showing the relationships of the various subsystems should also be available.

(f) Key operations should be prominently posted.

(g) Equipment manuals, catalogs, and spare parts lists should be readily available at the facility.

(h) A continuing, on-going training program for facility operating personnel should be provided.

§ 240.211 Records.

§ 240.211-1 Requirement.

The owner/operator of the thermal processing facility shall provide records and monitoring data as required by the responsible agency.

§ 240.211-2 Recommended procedures: Design.

Continuously recording instrumentation should be used as much as possible.

§ 240.211-3 Recommended procedures: Operations.

(a) Operating records should be kept in a daily log and should include as a minimum:

(1) The total weight of solid waste received during each shift, including the number of loads received, the ownership or specific identity of delivery vehicles, the source and nature of the solid wastes accepted, and any charges levied.

(2) Furnace and combustion chamber temperatures, including explanations for

prolonged, abnormally high and low temperatures.

(3) Rate of operation such as grate speed.

(4) Overfire and underfire air volumes and pressure and distribution recorded at least every 60 minutes and as changes are made.

(5) Weights of bottom ash, grate siftings, and fly ash.

(6) Estimated percentages of unburned material in the bottom ash.

(7) Water used on each shift for bottom ash quenching and scrubber operation. Representative samples of process waters should be taken at least once per shift and analyzed as recommended by the responsible agency.

(8) Power produced and utilized each shift. If steam is produced, production totals and consumption rates should be recorded.

(9) Auxiliary fuel used each shift.

(10) Gross calorific value of daily representative samples of bottom ash, grate siftings, and fly ash. (Sampling time should be varied so that all shifts are monitored on a weekly basis.)

(11) Emission measurements and laboratory analyses required by the responsible agency.

(12) Continuous records of monitoring instruments.

(13) Problems encountered and methods of solution.

(b) An annual report should be prepared which includes at least the following information:

(1) Minimum, average, and maximum daily volume and weight of waste received and processed, summarized on a monthly basis.

(2) A summary of the laboratory analyses including at least monthly averages.

(3) Number and qualifications of personnel in each job category, total man-hours per week, number of State certified or licensed personnel, staffing deficiencies, and serious injuries and their causes.

(4) An identification and brief discussion of major operational problems and solutions.

(5) Adequacy of operation and performance with regard to environmental requirements, the general level of housekeeping and maintenance, testing and reporting proficiency, and recommendations for corrective actions.

(c) Methodology for evaluating the facility's performance should be developed. Evaluation procedures recommended by the U.S. Environmental Protection Agency such as "Testing Manual for Solid Waste Incinerators," Office of Solid Waste Management Programs, should be used whenever possible.

APPENDIX—RECOMMENDED BIBLIOGRAPHY

(1) The Solid Waste Disposal Act, as amended, Title II, Public Law 89-272, 89th Congress, S. 308, Oct. 20, 1965, Public Law 91-512, 91st Congress, H.R. 11333, Oct. 25, 1970, Washington, U.S. Government Printing Office, 1971.

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PART 241—GUIDELINES FOR THE LAND DISPOSAL OF SOLID WASTES

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APPENDIX—RECOMMENDED BIBLIOGRAPHY

AUTHORITY.—Sec. 209(a) of the Solid Waste Disposal Act of 1965 (Public Law 89-272) as amended by the Resource Recovery Act of 1970 (Public Law 91-224).

Subpart A—General Provisions

§ 241.100 Scope.

(a) These guidelines are intended to provide for land disposal site operations that will have minimal impact on the environment. The guidelines do not establish new standards but set forth requirements and recommended procedures to ensure that the design, construction, and operation of both existing and future land disposal sites meet the health and environmental standards for the area in which they are located. They incorporate the concept that the operator of a land disposal site must meet the most stringent standards that are legally applicable to the operation of the site. Pursuant to section 211 of the Solid Waste Disposal Act, as amended, these guidelines are mandatory for Federal agencies. In addition they are recommended to State, interstate, regional, and local government agencies for use in their activities.

(b) The requirement sections contained herein delineate minimum levels of performance required of any solid waste land disposal site operation. The recommended procedures sections are presented to suggest preferred methods by which the objectives of the requirements can be realized. The recommended procedures are based on the practice of sanitary landfilling municipal solid waste; normally, residential, and commercial solid waste generated within a community. Sanitary landfilling is the most widely applied environmentally acceptable land disposal method. If techniques other than the recommended procedures are used, or wastes other than municipal solid wastes are disposed, it is the obligation of the proposed facility's owner and operator to demonstrate to the responsible agency in advance that the techniques employed will satisfy the requirements.

(c) The guidelines are considered to be generally applicable to the land disposal of all solid waste materials. How-

¹ Further guidance may be found in the EPA publication, "Sanitary Landfill Design and Operation," which served as a basis for the development of these guidelines.

ever the guidelines do not apply to hazardous, agricultural, and mining wastes because of the lack of sufficient information upon which to base recommended procedures. Concerning the specific practice of land disposal of milled solid waste EPA guidance is contained in a position statement issued in November 1972.

§ 241.101 Definitions.

As used in these guidelines:

(a) "Cell" means compacted solid wastes that are enclosed by natural soil or cover material in a land disposal site.
(b) "Cover material" means soil or other suitable material that is used to cover compacted solid waste in a land disposal site.

(c) "Daily cover" means cover material that is spread and compacted on the top and side slopes of compacted solid waste at least at the end of each operating day in order to control vectors, fire, moisture, and erosion and to assure an aesthetic appearance.

(d) "Final cover" means cover material that serves the same functions as daily cover but, in addition, may be permanently exposed on the surface.

(e) "Free moisture" means liquid that will drain freely by gravity from solid materials.

(f) "Ground water" means water present in the saturated zone of an aquifer.

(g) "Hazardous wastes" means waste materials that are: (1) Toxic or poisonous; (2) corrosive; (3) irritating or sensitizing; (4) radioactive; (5) biologically infectious; (6) explosive; or (7) flammable and that present a significant hazard to human health and the environment. They include, but are not limited to, those materials and concentrations of materials that are determined to be toxic by the Secretary of Health, Education, and Welfare pursuant to section 206 of the Occupational Safety and Health Act of 1970 (Public Law 91-596).

(h) "Infectious waste" means: (1) Equipment, instruments, utensils, and fomites of a disposable nature from the rooms of patients who are suspected to have or have been diagnosed as having a communicable disease and must, therefore, be isolated as required by public health agencies; (2) laboratory wastes, including pathological specimens (i.e., all tissues, specimens of blood elements, excreta, and secretions obtained from patients or laboratory animals) and disposable fomites (any substance that may harbor or transmit pathogenic organisms) attendant thereto; (3) surgical operating room pathologic specimens and disposable fomites attendant thereto and similar disposable materials from outpatient areas and emergency rooms.

(i) "Intermediate cover" means cover material that serves the same functions as daily cover, but must resist erosion for a longer period of time, because it is applied on areas where additional cells are not to be constructed for extended periods of time.

(j) "Leachate" means liquid that has percolated through solid waste and has

extracted dissolved or suspended materials from it.

(k) "Municipal solid wastes" means normally, residential, and commercial solid waste generated within a community.

(l) "Open burning" means burning of solid wastes in the open, such as in an open dump.

(m) "Open dump" means a land disposal site at which solid wastes are disposed of in a manner that does not protect the environment, is susceptible to open burning, and is exposed to the elements, vectors, and scavengers.

(n) "Plans" means reports and drawings, including a narrative operating description, prepared to describe the land disposal site and its proposed operation.

(o) "Residue" means all the solids that remain after completion of thermal processing, including bottom ash, fly ash, and grate siftings.

(p) "Responsible agency" means the organizational element that has the legal duty to ensure that owners, operators, or users of land disposal sites comply with these guidelines.

(q) "Runoff" means the portion of precipitation that drains from an area as surface flow.

(r) "Salvaging" means the controlled removal of waste materials for utilization.

(s) "Sanitary landfill" means a land disposal site employing an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying cover material at the end of each operating day.

(t) "Scavenging" means uncontrolled removal of solid waste materials.

(u) "Sludge" means the accumulated semiliquid suspension of settled solids deposited from waste waters or other fluids in tanks or basins.

(v) "Solid wastes" means garbage, refuse, sludges, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities. It does not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants.

(w) "Vector" means a carrier, usually an arthropod, that is capable of transmitting a pathogen from one organism to another.

(x) "Water table" means the upper water level of a body of ground water.

(y) "Working face" means that portion of the land disposal site where solid wastes are discharged and are spread and compacted prior to the placement of cover material.

Subpart B—Requirements and Recommended Procedures

§ 241.200 Solid wastes accepted.

§ 241.200-1 Requirement.

In consultation with the responsible agencies, the designer and owner/operator shall determine what wastes shall be accepted and shall identify any special handling required. Only wastes for which the facility has been specifically designed shall be accepted.

§ 241.200-2 Recommended procedures: Design.

The plans should specify the procedures to be employed for wastes requiring special handling.

§ 241.200-3 Recommended procedures: Operations.

(a) Routine sanitary landfill techniques of spreading and compacting solid wastes and placing cover material at the end of each operating day should be used to dispose of municipal solid wastes.

(b) Certain bulky wastes, such as automobile bodies, furniture, and appliances, should be crushed on solid ground and then pushed onto the working face near the bottom of the cell. Other bulky items, such as demolition and construction debris; tree stumps, and large timbers, should be pushed onto the working face near the bottom of the cell.

(c) Procedures for disposing of dead animals have been established by law in most States, and the operation should comply accordingly. In most cases, small carcasses should be placed on the working face with other municipal solid wastes and covered immediately. In the absence of applicable State laws, large carcasses should be placed in a pit and provided with a cover of compacted soil or other suitable material.

(d) Water treatment plant sludges containing no free moisture and digested waste water treatment plant sludges containing no free moisture should be placed on the working face along with municipal solid wastes and covered with soil or municipal solid wastes. The quantities accepted should be determined by operational problems encountered at the working face.

(e) Incinerator and air pollution control residues should be incorporated into the working face and covered at such intervals as necessary to prevent them from becoming airborne.

§ 241.201 Solid waste excluded.

§ 241.201-1 Requirement.

Using information supplied by the waste generator/owner, the responsible agency, the disposal site owner/operator and designer shall jointly determine specific wastes to be excluded and shall identify them in the plans. The generator/owner of excluded wastes and the responsible agency shall jointly determine an alternative method of disposal for excluded wastes. The criteria used to

determine whether a waste is unacceptable shall include the hydrogeology of the site, the chemical and biological characteristics of the waste, and the safety of personnel. Disposal of pesticides and pesticide containers shall be consistent with the Federal Environmental Pesticides Control Act of 1972 (Public Law 92-516) and recommended procedures and regulations promulgated thereunder.

§ 241.201-2 Recommended procedures: Design.

Under certain circumstances it may be necessary to accept special wastes at land disposal sites. The following special wastes require specific approval for acceptance at the site by the responsible agency: Hazardous wastes, infectious institutional wastes, bulk liquids and semiliquids, sludges containing free moisture, highly flammable or volatile substances, raw animal manure, septic tank pumpings, raw sewage sludge, and certain industrial process wastes. Where the use of the disposal site for such wastes is planned, a special assessment is required of the following items: The site characteristics, nature and quantities of the waste, and special design and operations precautions to be implemented to ensure environmentally safe disposal.

§ 241.201-3 Recommended procedures: Operations.

Regular users of the land disposal site should be provided with a list of the materials to be excluded. The list should also be displayed prominently at the site entrance. If a regular user persists in making unacceptable deliveries, he should be barred from the site and reported to the responsible agency.

§ 241.202 Site selection.

§ 241.202-1 Requirement.

Site selection and utilization shall comply with appropriate Federal, State, or local health, environmental, planning, and solid waste management agency requirements and plans.

§ 241.202-2 Recommended procedures: Design.

(a) Site development plans should be prepared or approved by a professional engineer and should include:

(1) Initial and final topographies at contour intervals of 5 feet or less;

(2) Land use and zoning within one-quarter mile of the site including location of all residences, buildings, wells, water courses, arroyos, rock outcroppings, roads, and soil or rock borings. All airports within 5 miles of the site should be identified to aid in assessing the potential hazard of birds to aircraft.

(b) Plans should describe the projected use of the completed land disposal site. In addition to maintenance programs and provisions, where necessary, for monitoring and controlling decomposition gases and leachate, the plans should address the following ultimate use criteria:

(1) *Cultivated area.*—The major concern if the completed site is to be cultivated is that the integrity of the final cover not be disturbed by agricultural cultivation activities. In this regard, a sufficient depth of cover material to allow cultivation and to support vegetation should be applied in addition to that recommended for final cover.

(2) *Structures.*—It is not recommended practice to construct major structures on a completed land disposal site. If major structures are to be built near a completed land disposal site, a professional engineer should approve their design and construction including provision for protection against potential hazards of solid waste decomposition gases.

(c) The hydrogeology of the site should be evaluated in order to design site development in a manner to protect or minimize the impact on ground water resources. Unacceptable hydrogeologic conditions may be altered to render the site acceptable, but all alterations should be detailed in the plans. Precipitation, evapotranspiration, and other climatological conditions should be considered in site selection and design.

(d) Characteristics of on-site soil should be evaluated with respect to their effects on site operations, such as vehicle maneuverability.

(e) Environmental factors, climatological conditions, and socioeconomic factors should be given full consideration as selection criteria.

§ 211.202-3 Recommended procedures: Operations.

(a) The site should be accessible to vehicles which the site is designed to serve by all-weather roads leading from the public road system; temporary roads should be provided as needed to deliver wastes to the working face.

(b) The site should not be located in an area where the attraction of birds would pose a hazard to low-flying aircraft.

§ 211.203 Design.

§ 211.203-1 Requirement.

Plans for the design, construction, and operation of the site shall be prepared or approved by a professional engineer. The plans shall be submitted to the responsible agency for review and, if warranted, approval.

§ 211.203-2 Recommended procedures: Design.

Not applicable.

§ 211.203-3 Recommended procedures: Operations.

Not applicable.

§ 211.204 Water quality.

§ 211.204-1 Requirement.

The design, construction, and operation of the land disposal site shall minimize environmental hazards and shall conform to the most stringent of applicable ground and surface water quality standards and requirements. Ap-

plicable standards are existing Federal, State, or local standards that are legally enforceable.

§ 211.204-2 Recommended procedures: Design.

(a) Plans should include:

(1) Current and projected use of water resources in the potential zone of influence of the land disposal site.

(2) Ground water elevation and movement and proposed separation between the lowest point of the lowest cell and the predicted maximum water table elevation.

(3) Potential interrelationship of the land disposal site, local aquifers, and surface waters based on historical records or other sources of information.

(4) Background and initial quality of water resources in the potential zone of influence of the land disposal site.

(5) Proposed location of observation wells, sampling stations, and testing program planned, when appropriate.

(6) Description of soil and other geologic material to a depth adequate to allow evaluation of the water quality protection provided by the soil and other geologic material.

(7) Provision for surface water runoff control to minimize infiltration and erosion of cover material.

(8) Potential of leachate generation and proposed control systems, where necessary, for the protection of ground and surface water resources.

(b) If a land disposal site is located in a flood plain, it should be protected against at least the 50-year design flood by impervious dikes and other appropriate means to prevent the floodwaters from contacting municipal solid waste.

§ 211.204-3 Recommended procedures: Operations.

(a) Surface water courses and runoff should be diverted from the land disposal site (especially from the working face) by devices such as trenches, conduits, and proper grading. The land disposal site should be constructed and graded so as to promote rapid surface water runoff without excessive erosion. Regrading should be done as required during construction and after completion to avoid ponding of precipitation and to maintain cover material integrity.

(b) Leachate collection and treatment systems should be used where necessary to protect ground and surface water resources.

(c) Municipal solid wastes and leachate therefrom should not be allowed to contact ground or surface water so as to impair the water's use.

§ 211.205 Air quality.

§ 211.205-1 Requirement.

The design, construction, and operation of the land disposal site shall minimize environmental hazards and shall conform to the most stringent of applicable ambient air quality standards and source control regulations.

§ 211.205-2 Recommended procedures: Design.

Plans should include an effective dust control program.

§ 211.205-3 Recommended procedures: Operations.

Open burning of municipal solid waste should be prohibited.

§ 211.206 Gas control.

§ 211.206-1 Requirement.

Decomposition gases generated within the land disposal site shall be controlled on site, as necessary, to avoid posing a hazard to occupants of adjacent property.

§ 211.206-2 Recommended procedures: Design.

Plans should assess the need for gas control and indicate the location and design of any vents, barriers, or other control measures to be provided.

§ 211.206-3 Recommended procedures: Operations.

(a) Decomposition gases should not be allowed to migrate laterally from the land disposal site to endanger occupants of adjacent properties. They should be vented to the atmosphere directly through the cover material, cutoff trenches, or ventilation systems in such a way that they do not accumulate in explosive or toxic concentrations, especially within structures. (Information on the limits of flammability of gases is available in such references as the "Handbook of Chemistry and Physics" 44th ed. Cleveland, Chemical Rubber Publishing Co., 1962, 3604 pp.)

(b) Decomposition gases should not be allowed to concentrate in a manner that will pose an explosion or toxicity hazard.

§ 211.207 Vectors.

§ 211.207-1 Requirement.

Conditions shall be maintained that are unfavorable for the harboring, feeding, and breeding of vectors.

§ 211.207-2 Recommended procedures: Design.

Plans should include contingency programs for vector control, and the operator should be prepared at all times to implement those procedures.

§ 211.207-3 Recommended procedures: Operations.

Vector control contingency programs should be implemented when necessary to prevent or rectify vector problems.

§ 211.208 Esthetics.

§ 211.208-1 Requirement.

The land disposal site shall be designed and operated at all times in an esthetically acceptable manner.

§ 211.208-2 Recommended procedures: Design.

Plans should include an effective litter control program.

§ 241.208-3 Recommended procedures: Operations.

(a) Portable litter fences or other devices should be used in the immediate vicinity of the working face and at other appropriate locations to control blowing litter. At the end of each operating day, or more often as required, litter should be removed from the fences and incorporated into the cell being used. Alternatively, the litter may be containerized for disposal on the next operating day.

(b) Wastes that are easily moved by wind should be covered, as necessary, to prevent their becoming airborne and scattered.

(c) On-site vegetation should be cleared only as necessary. Natural windbreaks, such as green belts, should be maintained where they will improve the appearance and operation of the land disposal site.

(d) Salvage operations should be conducted in such a manner as to not detract from the appearance of the land disposal site. Salvaged material should be removed from the land disposal site frequently enough to maintain aesthetic acceptability.

§ 241.209 Cover material.**§ 241.209-1 Requirement.**

Cover material shall be applied as necessary to minimize fire hazards, infiltration of precipitation, odors, and blow litter; control gas venting and vectors; discourage scavenging; and provide a pleasing appearance.

§ 241.209-2 Recommended procedures: Design.

Plans should specify:

(a) Cover material sources and soil classifications (Unified Soil Classification System or U.S. Department of Agriculture Classification System).

(b) Surface grades and side slopes needed to promote maximum runoff, without excessive erosion, to minimize infiltration.

(c) Procedures to promote vegetative growth as promptly as possible to combat erosion and improve appearance of idle and completed areas.

(d) Procedures to maintain cover material integrity, e.g., regrading and re-covering.

§ 241.209-3 Recommended procedures: Operations.

(a) Daily cover should be applied regardless of weather; sources of cover material should, therefore, be accessible on all operating days. The thickness of the compacted daily cover should not be less than 6 inches.

(a) Intermediate cover should be applied on areas where additional cells are not to be constructed for extended periods of time. The thickness of the compacted intermediate cover should not be less than 1 foot.

(c) Final cover should be applied on each area as it is completed. The thickness of the compacted final cover should not be less than 2 feet.

§ 241.210 Compaction.**§ 241.210-1 Requirement.**

In order to conserve land disposal site capacity, thereby preserving land resources, and to minimize moisture infiltration and settlement, municipal solid waste and cover material shall be compacted to the smallest practicable volume.

§ 241.210-2 Recommended procedures: Design.

(a) Arrangements should be made and indicated in the plans whereby substitute equipment will be available to provide uninterrupted service during routine maintenance periods or equipment breakdowns.

(b) An equipment maintenance facility should be provided onsite or appropriate contract arrangements should be made to receive such service.

(c) Equipment manuals, catalogs, and space parts lists should be compiled and readily available onsite.

§ 241.210-3 Recommended procedures: Operations.

(a) Municipal solid waste handling equipment should, on any operating day, be capable of performing the following functions on a slope not flatter than one (vertical) to three (horizontal):

(1) Spread the solid wastes accepted in layers no more than 2 feet thick while confining it to the smallest practicable area;

(2) Compact the spread solid wastes to the smallest practicable volume; and

(3) Place, spread, and compact the cover material.

(b) A preventive maintenance program should be employed to maintain equipment in operating order.

(c) An operating manual describing the various tasks that must be performed during a typical shift should be available to employees for reference.

§ 241.211 Safety.**§ 241.211-1 Requirement.**

The land disposal site shall be designed, constructed, and operated in such a manner as to protect the health and safety of personnel associated with the operation. Pertinent provisions of the Occupational Safety and Health Act of 1970 (Public Law 91-596) and regulations promulgated thereunder shall apply.

§ 241.211-2 Recommended procedures: Design.

A manual describing safety precautions and procedures to be employed should be developed.

§ 241.211-3 Recommended procedures: Operations.

(a) A safety manual should be available for use by employees, and they should be instructed in application of its procedures.

(b) Safety devices, including but not limited to, rollover protective structures, seatbelts, audible reverse warning devices, and fire extinguishers should be provided on all solid waste handling equipment.

(c) Provision should be made to extinguish any fires in wastes being delivered to the site or which occur at the working face or within equipment or personnel facilities.

(d) Communications equipment should be available on site for emergency situations.

(e) Scavenging should be prohibited at all times to avoid injury and to prevent interference with site operations.

(f) Access to the site should be controlled and should be by established roadways only. The site should be accessible only when operating personnel are on duty. Large containers may be placed at the site entrance so that users can conveniently deposit waste after hours. The containers and the areas around them should be maintained in a sanitary and litter-free condition.

(g) Traffic signs or markers should be provided to promote an orderly traffic pattern to and from the discharge area and, if necessary, to restrict access to hazardous areas or to maintain efficient operating conditions. Drivers of manually discharging vehicles should not hinder operation of mechanically discharging vehicles. Vehicles should not be left unattended at the working face or along traffic routes. If a regular user persistently poses a safety hazard, he should be barred from the site and reported to the responsible agency.

§ 241.212 Records.**§ 241.212-1 Requirement.**

The owner/operator of the land disposal site shall maintain records and monitoring data to be provided, as required, to the responsible agency.

§ 241.212-2 Recommended procedures: Design.

Where necessary, plans should prescribe methods to be used in maintaining records and monitoring the environmental impact of the land disposal site. Information on recording and monitoring requirements should be obtained from the responsible agency.

§ 241.212-3 Recommended procedures: Operations.

(a) Records should be maintained covering at least the following:

(1) Major operational problems, complaints, or difficulties.

(2) Qualitative and quantitative evaluation of the environmental impact of the land disposal site with regard to the effectiveness of gas and leachate control, including results of: (i) Leachate sampling and analyses; (ii) gas sampling and analyses; (iii) ground and surface water quality sampling and analyses upstream and downstream of the site.

(3) Vector control efforts.

(4) Dust and litter control efforts.

(5) Quantitative measurements of the solid wastes handled. This should be accomplished through routine or periodic utilization of scales and topographic surveys.

(6) Description of solid waste materials received, identified by source of material.

(b) Upon completion of the site, a detailed description, including a plat, should be recorded with the area's land recording authority. The description should include general types and locations of wastes, depth of fill, and other information of interest to potential landowners.

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