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Municipal Solid Waste Landfills, Volume 1:

Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills

FINAL

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ABSTRACT

This volume is one of several documents designed to assist States, EPA regional offices, and municipal solid waste (MSW) landfill owners and operators in implementing the New Source Performance Standards (NSPS) and Emission Guidelines (EG) for MSW landfills. Full references to all related documents are provided. Landfills that commenced construction, modification, or reconstruction after May 30, 1991 are subject to the Federal NSPS (40 CFR 60 Subpart WWW). The EG (40 CFR Part 60 Subpart Cc) apply to existing landfills that commenced construction, modification, or reconstruction before May 30, 1991, and that have accepted waste at any time since November 8, 1987, or have additional capacity for future waste deposition. The requirements of the NSPS and EG are similar. Enclosed is a summary of the NSPS and EG and the control, monitoring, recordkeeping and reporting requirements. Explanations are included to help implementing agencies determine applicability, ensure compliance, collect and review reports, and conduct inspections. The appendices include tools for ensuring compliance, such as test methods, checklists, and calculation procedures.

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Municipal Solid Waste Landfills, Volume 1
Summary of the Requirements for the New
Source Performance Standards and Emission Guidelines
for Municipal Solid Waste Landfills
(EPA-453R/96-004)

Available at:

(1) U.S. Environmental Protection Agency
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Phone: 202-260-7548
Docket Number: A-88-09
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The file is located under:

Actions Sorted by CAA Title
Title III

TABLE OF CONTENTS

Section | Page

1.0 INTRODUCTION 1-1
- 1.1 PURPOSE OF THIS DOCUMENT 1-1
- 1.2 REGULATORY BACKGROUND 1-2
- 1.3 BACKGROUND ON LANDFILL GAS 1-2
- 1.4 RELATED DOCUMENTS 1-4
- 1.5 ORGANIZATION OF THIS DOCUMENT 1-5

2.0 OVERVIEW OF THE STANDARDS AND GUIDELINES 2-1
- 2.1 NEW SOURCE PERFORMANCE STANDARDS (40 CFR 60, SUBPART WWW) 2-1
  - 2.1.1 Applicability Determinations 2-1
  - 2.1.2 Regulatory Standards 2-7
  - 2.1.3 Demonstrating Compliance 2-18
- 2.2 EMISSION GUIDELINES (40 CFR PART 60, SUBPART Cc) 2-42
  - 2.2.1 Applicability Criteria for "Existing" Landfills 2-43
  - 2.2.2 Flexibility in Establishing Control Requirements for State-Implemented Emission Standards 2-43
  - 2.2.3 State Plan Development for Implementing the Requirements of the EG 2-43
  - 2.2.4 Compliance Schedule for a State-Implemented Emission Standard 2-44

3.0 IMPLEMENTATION AND COMPLIANCE 3-1
- 3.1 IMPLEMENTATION OF THE NEW SOURCE PERFORMANCE STANDARDS 3-1
- 3.2 STATE PLAN DEVELOPMENT FOR EG AND ACTIVITIES TO IMPLEMENT THEIR PLAN 3-18

4.0 INSPECTION PROCEDURES 4-1
- 4.1 PREPARING FOR THE INSPECTION 4-1
- 4.2 INSPECTION OF RECORDS AND EQUIPMENT 4-3

LIST OF TABLES

Table		Page
1-1	Contents of the Appendices	1-6
2-1	Overview Topics for the MSW Landfill NSPS	2-2
2-2	Organization of the NSPS, EG, and Test Methods	2-3
2-3	Summary of Monitoring Requirements for MSW Landfills	2-20
2-4	Summary of Recordkeeping Requirements for MSW Landfills	2-27
2-5	Summary of Compliance Reporting Requirements for MSW Landfills	2-34
3-1	Applicability of the NSPS and EG to MSW Landfills	3-7
3-2	Schedule for MSW Landfill Compliance with the Emission Guidelines	3-21

LIST OF FIGURES

Figure — Page

2-1 Landfill NSPS and EG Applicability Based on Size and Construction and Modification History 2-5

2-2 Flow Chart for Determining Control Requirements 2-10

2-3 General Milestones for the Compliance and Schedule for an Example Landfill 2-17

2-4 Flow Chart of Surface Monitoring Requirements 2-22

2-5 Example Traverses for Monitoring Methane Concentrations 2-24

3-1 NSPS Reporting Sequence for an Example Landfill 3-5

3-2 Example Initial NMOC Emission Rate Report 3-9

3-3 Sample Letter to Report Landfill Closure 3-11

3-4 Sample Letter to Report Control Equipment Removal 3-12

3-5 Landfill Report Tracking Log 3-15

3-6 Example Tracking Spreadsheet 3-16

APPENDICES

Appendix		Page
A	EG (Subpart Cc), NSPS (Subpart WWW), Amendments to Subparts Cc and WWW, and Appendix A-Reference Methods (Method 2E, Method 3C, Method 25C)	A-1
B	Applicable Test Method not Attached to the Regulations (Method 21)	B-1
C	Part 60, Subpart A (General Provisions)	C-1
D	MSW Landfill Contacts	D-1
E	Collection System Design Plans	E-1
F	Report Checklist	F-1
G	On-Site Inspection Checklists	G-1
H	Example Report Forms	H-1
I	Tier Calculation Details and Equations	I-1
J	Computer Model for Landfill Air Emissions Estimation	J-1
K	Landfill Report Log	K-1

LIST OF ACRONYMS AND ABBREVIATIONS

Act	Clean Air Act (of 1990)
AFS	Aerometric Emissions Information Retrieval System Facility Subsystem
BDT	Best Demonstrated Technology
BID	Background Information Document
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
FID	Flame Ionization Detector
LFG	Landfill Gas
m^3	Cubic meters
Mg	Megagram (2204 lb)
MSW	Municipal Solid Waste
MWC	Municipal Waste Combustor
NAAQS	National Ambient Air Quality Standards
NMOC	Non-methane Organic Compounds
NSPS	New Source Performance Standard
NSR	New Source Review
OVA	Organic vapor analyzer
PCP	Pollution Control Project
RCRA	Resource Conservation and Recovery Act
SIP	State Implementation Plan
TTN Web	EPA Technology Transfer Network Website

1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this document is to provide guidance to the implementing agency on the steps necessary to implement the Emission Guidelines (EG) and New Source Performance Standards (NSPS) for municipal solid waste landfills. This is the first of two guidance documents designed to assist States, EPA regional offices, and Municipal Solid Waste (MSW) landfill owners and operators in implementing the EG and NSPS. The NSPS regulate emissions from new landfills and the EG regulate emissions from existing landfills. This enabling document supplements the EG and NSPS, explains landfills control, monitoring, recordkeeping and reporting requirements, and assists States in determining compliance. Included are discussions on activities to implement the NSPS and EG, how to identify new landfills, ensure compliance, and collect and review reports. This document also includes a discussion on the procedures to prepare for and conduct on-site inspections to ensure compliance. The appendices contain tools for determining compliance with the rules.

States must develop State Plans as part of the implementation process for the EG. The required content of State Plans and the adoption and submittal schedule are discussed in detail in "Municipal Solid Waste Landfills, Volume 2: Summary of the Requirements for Section 111(d) State Plans for Implementing the Municipal Solid Waste Landfill Emission Guidelines," (EPA-456/R-96-005) (MSW Landfills, Volume 2). The description and location of MSW Landfills, Volume 2 and other helpful documents is provided in Section 1.4, Related Documents.

1.2 REGULATORY BACKGROUND

The NSPS implement section 111(b) of the Clean Air Act (Act) is the basis for regulations issued for categories of new emission sources which "... cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare." The responsibility of implementing the NSPS lies with the U.S. Environmental Protection Agency (EPA). However, the EPA has the ability to delegate authority to the State. The EG implement section 111(d) of the Act. The EG require a State to submit a plan that establishes emission standards for existing sources when NSPS have been promulgated for a designated pollutant, such as landfill gas (LFG). The EPA publishes EG to establish minimum requirements that States can use in establishing their emission standards. States have responsibility for implementing the EG and are required to submit an implementation plan to the EPA.

The NSPS and EG were proposed in the Federal Register on May 30, 1991 (58 FR 24468). On June 21, 1993, EPA published a notice in the Federal Register (58 FR 33791) providing information on additional data used in developing the final NSPS and EG for MSW landfills. The final standards and guidelines were published in the Federal Register on March 12, 1996 (61 FR 9905). Amendments to the final standards and guidelines appeared as a direct final notice in the Federal Register on June 16, 1998, (63 FR 32743). The final rule, including the direct final amendments, is contained in Appendix A. The amendments correct errors and clarify regulatory text regarding primarily applicability and design capacity. The direct final is effective as of August 17, 1998.

1.3 BACKGROUND ON LANDFILL GAS

How Is Landfill Gas Formed?

Landfill gas is generated by bacterial decomposition of organic materials in solid waste. General practice for landfills is to provide a daily cover of soil over the refuse. Therefore, refuse is insulated from the atmosphere and decomposition occurs anaerobically (without oxygen). However, air is always present initially and, in some circumstances, may never be fully expelled by anaerobic gases.

What Is Contained in Landfill Gas and How Does it Affect the Public?

The composition of LFG is approximately 50 percent methane, 50 percent carbon dioxide, and less than 1 percent of many different "nonmethane" organic gases, described as NMOC. The NMOC originate from organic chemicals present in municipal waste that has been placed in a landfill and from products of refuse decomposition. Municipal wastes may include waste items such as paints, solvents, pesticides, and adhesives which contain numerous organic compounds. These organic compounds are stripped from the refuse by the generation of methane and carbon dioxide from decomposing refuse.

Evidence from EPA and State studies indicates that LFG has adverse effects on both public health and welfare. These adverse effects include:

(1) groundlevel ozone formation,
(2) cancer and noncancer health effects,
(3) odor nuisance,
(4) methane migration (fire hazard) potential, and
(5) global warming from methane emissions.

How Are Landfills Different From Other Stationary Sources?

The primary difference between an MSW landfill and a typical stationary source is that a landfill may continue to generate and emit a significant quantity of emissions for more than 10 years after the facility has closed or has ceased to accept waste. A typical stationary source (e.g., a utility boiler) generates emissions only while it is in operation.

What Are Current Methods for Controlling Landfill Gas?

Control of LFG emissions requires both an effective gas collection system and a control device. Landfill gas collection systems can be categorized as one of two basic types: active and passive gas collection systems. Active systems use mechanical blowers or compressors to create a vacuum that draws LFG through deposited refuse and into gas collection wells. Passive systems rely on the natural LFG pressure within the landfill that creates a positive pressure gradient so LFG flows from the landfill into the gas collection wells. The rule provides minimum criteria for an active gas collection system. The rule includes provisions for using alternative designs for a gas collection system (active or passive), as long as the alternative designs are demonstrated to be equivalent.

Once LFG enters a collection well, via either an active or passive collection system, the gas is directed to a control device through a network of piping. Landfill gas may be controlled by recovering the gas as a fuel source or by destroying the organic content of the gas. Since methane comprises nearly 50 percent of LFG, the gas can be processed and sold as a fuel. Generally, the goal is to process LFG to a purity level equivalent to that of pipeline natural gas.

Control methods that destroy the organic content of LFG include flares, gas turbines, internal combustion engines, and boilers. The rule requires injecting LFG into the combustion zone of these combustion devices to ensure the complete destruction of the organic content. Gas turbines, internal combustion engines, and boilers provide the opportunity for energy recovery, while flares do not. Energy recovery often provides an economic incentive since steam or power generated by these devices can be used on site or sold.

1.4 RELATED DOCUMENTS

A number of related documents and resources are available that may prove useful to States, EPA regional offices, and landfill owners and operators. Documents posted on the TTN Web may be accessed by computer as described on page iv. The user can download an electronic copy from the EPA Technology Transfer Network Website (TTN Web). Otherwise, printed copies of the documents are available as indicated.

- "Municipal Solid Waste Landfills, Volume 2: Summary of the Requirements for Section 111(d) State Plans for Implementing the Municipal Solid Waste Landfill Emission Guidelines," EPA-456R/96-005 (MSW Landfills, Volume 2) has been posted on the TTN Web, and explains the State Plan development and approval process. MSW Landfills, Volume 2 outlines and explains the required content of State Plans, outlines the timeline and responsibilities for developing and submitting State Plans, and answers general questions about how to prepare State Plans. The document is also available in the docket (see address on page iv).

- "Municipal Solid Waste Landfill New Source Performance Standards and Emission Guidelines—Issues and Answers," is posted on the TTN Web and contains a periodically updated summary of answers to questions EPA has recently been asked about the MSW Landfills NSPS and Emission Guidelines.

- "Air Emissions from Municipal Solid Waste Landfills — Background Information for Final Standards and Guidelines," EPA-453/R-94-021 contains summaries of public comments received on the landfills NSPS and Emission Guidelines, EPA's responses, and the estimated impacts of these regulations. This document may be obtained from the TTN Web, the U.S. EPA Library (MD-33), Research Triangle Park, NC 27711, telephone (919) 541-2777, or from the docket (see addresses on page iv).

- EPA's Landfill Methane Outreach Program (LMOP). To cost-effectively reduce methane emissions from landfills, the EPA encourages the development of environmentally and economically beneficial landfill gas-to-energy projects through the LMOP. The LMOP works with States, utilities, and the landfill gas-to-energy industry to facilitate the development of successful projects. One of the key ways the LMOP does this is by publishing technical information on how to develop a gas-to-energy project including current technology, cost, and financing options, and regulatory considerations. Appendix D includes information on how to contact LMOP.

- "Landfill Gas Emissions Model" Version 2.0 , and User's Manual, February 1998. The computer model can be used to calculate annual emission rates as to determine applicability of the NSPS or Emission Guidelines or for State emission inventory or other purposes. The user's guide and electronic files can be purchased from the National Technical Information Services, 5285 Port Royal Road, Springfield, VA 22161, telephone: (703) 487-4650, or accessed on the TTN Web at http://www.epa.gov/ttn/catc/products.html#software.

1.5 ORGANIZATION OF THIS DOCUMENT

This document is organized into four sections and eleven appendices. Section 2 presents a brief overview of the regulations to provide the implementing agency with a basic understanding of the requirements of the EG and NSPS. Section 3 provides guidance on activities to implement and ensure compliance with the EG and NSPS. Section 4 provides a discussion on procedures to prepare for and conduct on-site inspections to ensure compliance. The appendices include copies of the applicable regulations and tools for determining compliance. Table 1-1 summarizes the contents of these appendices.

TABLE 1-1. CONTENTS OF THE APPENDICES

Appendix	Contents
A	Subparts Cc, WWW, and amendments, and accompanying reference methods promulgated with the rule
B	One additional test method referred to by the regulations
C	40 CFR Part 60, Subpart A (General Provisions), which applies to all NSPS
D	MSW Landfill Contacts
E	Collection system design plans
F	Reporting checklists for use by the implementing agency to determine whether all applicable data is reported by the landfill
G	On-site inspection checklist for use by the implementing agency to determine compliance
H	Blank reporting forms that fulfill the reporting requirements and that can be submitted by the landfills
I	Tiered NMOC emission calculation procedures
J	Information on an EPA computer model that can be used to estimate landfill emissions
K	Spreadsheet to track reports from landfills

2.0 OVERVIEW OF THE STANDARDS AND GUIDELINES

This section provides an overview of requirements for the NSPS and EG for MSW landfills. Requirements for the NSPS are discussed in section 2.1. Requirements for the EG are discussed in section 2.2. The requirements of these two standards are parallel so the majority of items discussed for the NSPS are generally applicable to the EG, except where noted.

2.1 NEW SOURCE PERFORMANCE STANDARDS (40 CFR 60, SUBPART WWW)

The requirements for these NSPS are summarized under a series of topics as shown in Table 2-1. These topics organize the requirements in a linear and progressive order, thereby providing more clarity and reduced repetition. The summary also includes references for locating each requirement in the published rule. The published rule is organized by headings similar to those shown in Table 2-2.

2.1.1 Applicability Determinations

How Is a "New" Landfill Defined?

The NSPS applies to "new" landfills. A "new" landfill is defined as a landfill that commenced construction, modification, or reconstruction on or after May 30, 1991. The implementing agency will determine whether changes to a landfill's design or operation meet the definitions of modification or reconstruction discussed below. The EG applies to "existing" landfills. An "existing" landfill is a landfill that is not a "new" landfill.

TABLE 2-1. OVERVIEW TOPICS FOR THE MSW LANDFILL NSPS

2.1.1 APPLICABILITY DETERMINATIONS

How Is a "New" Landfill Defined?

What Is Landfill Size Exemption?

How Is the Design Capacity Determined?

What Portions of a Landfill Are Subject to the Rule?

Will Remedial Actions Affect Applicability?

How Does New Source Review Affect Landfills?

2.1.2 REGULATORY STANDARDS

How Is the Need to Control Landfills Determined?

How Are NMOC Emissions Calculated?

What Is the Required Gas Collection Technology?

What Are the Operational Requirements for the Gas Collection System?

What Is the Required Gas Control Technology?

What Is the Compliance Schedule for Installing Controls?

When Can Gas Collection and Control Systems Be Removed?

2.1.3 DEMONSTRATING COMPLIANCE

What Must Be Monitored?

What Recordkeeping Must Be Kept?

What Must Be Reported?

TABLE 2-2. ORGANIZATION OF THE NSPS, EG, AND TEST METHODS

Part 60, Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills	
§ 60.750	Applicability, Designation of Affected Facility, and Delegation of Authority
§ 60.751	Definitions
§ 60.752	Standards for Air Emissions from Municipal Solid Waste Landfills
§ 60.753	Operational Standards for Collection and Control Systems
§ 60.754	Test Methods and Procedures
§ 60.755	Compliance Provisions
§ 60.756	Monitoring of Operations
§ 60.757	Reporting Requirements
§ 60.758	Recordkeeping Requirements
§ 60.759	Specifications for Active Collection Systems
Part 60, Subpart Cc - Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills	
§ 60.30c	Scope
§ 60.31c	Definitions
§ 60.32c	Designated Facilities
§ 60.33c	Emission Guidelines for Municipal Solid Waste Landfill Emissions
§ 60.34c	Test Methods and Procedures
§ 60.35c	Reporting and Recordkeeping Guidelines
§ 60.36c	Compliance Times
Part 60, Appendix A - Reference Methods (the following methods have been added)	
Method 2E	Determination of Landfill Gas Production Flow Rate
Method 3C	Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources
Method 25C	Determination of Nonmethane Organic Compounds (NMOC) in Landfill Gases

An existing landfill that commenced construction before May 30, 1991, but began accepting waste after May 1991 would be subject to the EG rather than the NSPS. Figure 2-1 illustrates whether a landfill is subject to the EG or NSPS based on its construction and modification history.

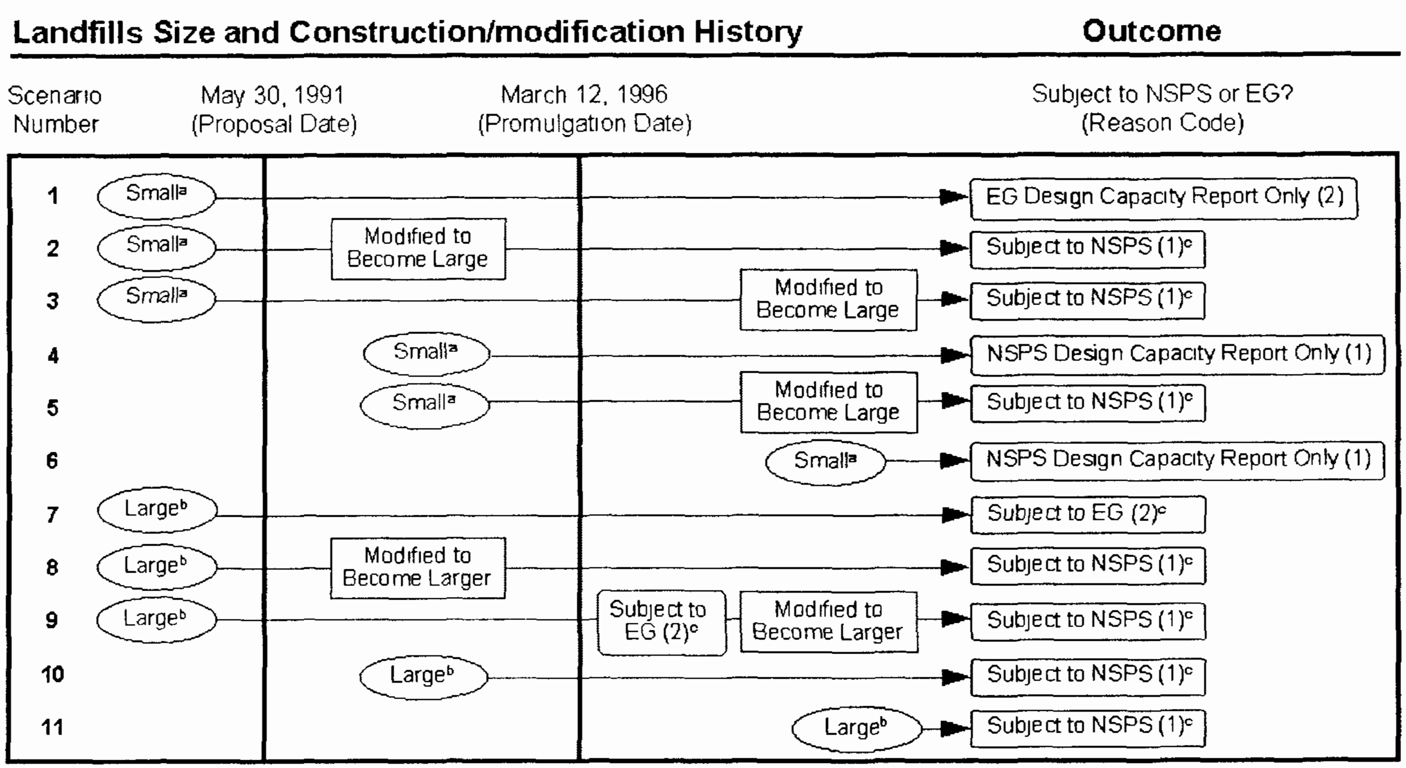
If an existing landfill has been or is "modified" on or after May 30, 1991, it will be subject to the provisions of the NSPS. The definition of "modification" specific to landfills is included in the landfill NSPS (§ 60.751) and is based on the landfill's design capacity. A modification is an increase in the permitted design capacity caused by an increase in the horizontal or vertical dimensions of the landfill. Such a modification makes the landfill subject to the NSPS. Modification does not occur until the owner or operator commences construction on the horizontal or vertical expansion. Existing landfills that make an operational change (for example, increasing the moisture content of the waste, increasing the physical compaction on the surface, changing the cover material or thickness of daily cover, and changing bailing or compaction practices), but do not increase the horizontal or vertical dimensions of the landfill continue to be subject to the EG rather than the NSPS.

Reconstructions are unlikely for landfills. As specified in the NSPS General Provisions (§ 60.15), reconstructions are "the replacement of components of an existing facility [landfill] to such and extent that: the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost of a comparable entirely new facility [landfill]..." The Agency knows of no situation where this would occur at a landfill.

What Is the Landfill Size Exemption?

Each new landfill with a design capacity below 2.5 million megagrams (Mg) or 2.5 million cubic meters (m^3) is exempt from most of the requirements in this rule. A small landfill with a capacity below the exemption level is required only to submit an Initial Design Capacity Report to the implementing agency [§ 60.752(a)]. The report documents the current design capacity of the landfill (see section 2.1.3 Demonstrating Compliance, Initial Design Capacity Report).

If the design capacity of a small landfill is ever increased to a revised capacity equal to or greater than 2.5 million Mg and 2.5 million m^3, the landfill is no longer exempt from the compliance requirements of the rule. The EG and the NSPS require the landfill to report



Code for Reason Landfill is Subject to NSPS
(1) Commenced construction, modification, or reconstruction on or after May 30, 1991

Code for Reason Landfill is Subject to Emission Guidelines
(2) *Landfills that commenced construction, modification, or reconstruction before May 30, 1991, are subject to the EG*

[a]Small means design capacity < 2.5 million Mg or 2.5 million m³
[b]Large means design capacity ≥ 2.5 million Mg and 2.5 million m³
[c]"Subject to" means the landfill must submit annual emission reports and must install controls if emissions are ≥ 50 Mg/yr

Figure 2-1 Landfill NSPS or EG Applicability Based on Size and Construction and Modification History any increase in design capacity that results in a capacity above the design capacity cutoff (see section 2.1.3 Demonstrating Compliance, amended Design Capacity Report).

How Is the Design Capacity Determined?

The Initial Design Capacity Report is used to determine the design capacity of the landfill. Most landfills have permits from a State, local, or tribal agency that indicate the design capacity of the landfill. If there are multiple permits, the most recent permit is used to determine design capacity. A permit may express design capacity on a volumetric basis or a mass basis. The owner or operator may choose to convert the design capacity from volume to mass or from mass to volume, using a site-specific density, in order to demonstrate that the design capacity is less than the 2.5 million Mg or 2.5 million m^3 design capacity cutoff level. If the density changes, the design capacity changes. Therefore, the site-specific density must be recalculated annually. If a landfill does not have a permit specifying design capacity, the design capacity must be calculated. The various calculations and the contents of an Initial Design Capacity Report are discussed in section 2.1.3 Demonstrating Compliance.

What Portions of a Landfill Are Subject to the Rule?

When the rule applies to a landfill, it applies to the "entire landfill." An entire landfill is defined as the total landfill property designated for solid waste disposal irrespective of subdividing geographical landmarks such as access roads or disposal cell boundaries, and under common ownership or control. The total landfill property includes all areas actively receiving refuse, all closed disposal cells, and all areas that may be designated to receive refuse in the future.

Will Remedial Actions Affect Applicability?

Remedial actions generally will not trigger NSPS for a landfill. Specifically, CERCLA remedial actions, RCRA correction actions, and State remedial actions are not considered construction, modification, or reconstruction and would not subject a landfill to the NSPS.

How Does New Source Review Affect Landfills?

In addition to the NSPS, landfills may be subject to the New Source Review (NSR) requirements of the Act. The NSR program requires the preconstruction review of major new sources and major modifications. The review includes a control technology review and an analysis of the air quality impacts of the new or modified source. New landfills that are major sources and existing landfills that make modifications that result in significant emissions increases are subject to major NSR requirements. For example, a landfill may install a combustion device to control NMOC, but simultaneously increase secondary emissions. However, there is an exemption of NSR that may be available to an existing landfill that would otherwise trigger NSR. This Pollution Control Project (PCP) exclusion was established to allow States to exempt from major NSR PCPs that are, on balance, "environmentally beneficial." Landfills that apply controls to comply with the EG may qualify for the PCP exclusion. EPA has issued guidance on whether such projects as adding combustion controls at a landfill qualify for the PCP exclusion. On a case-by-case basis, States may use the EPA guidance to determine whether projects such as the addition of combustion controls at landfills qualify for the PCP exemption. NSR and the PCP exclusion are discussed in detail in MSW Landfills, Volume 2.

2.1.2 Regulatory Standards

The provisions of the NSPS apply to all "new" landfills with a maximum design capacity equal to or greater than 2.5 million Mg and 2.5 million m^3. The provisions include criteria for determining landfill control requirements, design and operating specifications for control equipment, compliance schedules, and criteria for removal of controls. The provisions also include a series of monitoring, recordkeeping, and reporting requirements, which are discussed in section 2.1.3.

How Is the Need to Control Landfills Determined?

Control requirements for a landfill are determined by calculating the NMOC emission rate from the landfill. The NMOC emission rate has been selected as a surrogate for LFG emissions. Each landfill that is at least 2.5 million Mg and 2.5 million m^3 in design capacity must perform an initial NMOC emissions rate calculation until the landfill has installed a gas collection and control system according to specifications in the rule.

If the landfill NMOC emission rate is determined to be equal to or greater than 50 Mg/yr, the landfill owner or operator is required to install a gas collection and control device to reduce the landfill NMOC emissions [§ 60.752(b)(2)]. If the landfill NMOC emission rate is determined to be less than 50 Mg/yr, then the landfill only needs to calculate and report its NMOC emission rate periodically. An NMOC Emission Rate Report is submitted each year until such time as the recalculated NMOC emission rate is equal to or greater than 50 Mg/yr or the landfill ceases to accept waste [§ 60.752(b)(1)].

The NMOC emission rate is calculated periodically because landfill emissions change over time. These factors are described in greater detail in the background information document (BID) published at proposal and entitled "Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Guidelines" (EPA-450/3-90-011a).

How Are NMOC Emissions Calculated?

The rule includes detailed procedures for calculating NMOC emissions from landfills (§ 60.754). The procedure consists of a three-tiered approach, with Tier 1 being the simplest. All "tier" calculations provide an estimate of NMOC emissions, as a function of site-specific information such as age of landfill and waste acceptance rate and three variables:

- Methane generation rate constant, (k);
- Refuse methane generation potential, (L_O); and
- NMOC concentration in LFG (C_{NMOC}).

Tier 1 calculations use default values for k, L_O, and C_{NMOC}, and they tend to overstate NMOC emission rates. An alternative default methane generation rate constant (k) of 0.02 per year is provided for Tier 1 calculations for landfills in geographical areas with an annual average precipitation of less than 25 inches. The average annual precipitation must be measured by the nearest representative meteorological site. (Landfills located in geographical areas with low precipitation experience slower decomposition of their waste than landfills located in geographical areas with moderate to high rainfall.) For details on tier equations and calculation procedures, see appendix I.

If Tier 1 calculations indicate emissions equal to or greater than 50 Mg/yr, a landfill owner or operator has two compliance options. The first option requires the landfill owner or operator to initiate control of NMOC emissions from the landfill by submitting a design plan for a gas collection and control system. The second option requires the landfill owner or operator to recalculate the NMOC emission rate using Tier 2 or Tier 3 procedures. These additional tier procedures determine site-specific data through testing. However, a landfill owner or operator may elect to skip any or all of the additional tier procedures and install landfill controls at any time after the NMOC emission rate has been calculated to exceed the emission limit.

Tier 2 calculations are based on site-specific measured NMOC concentrations and yield a more accurate estimate of the NMOC emission rate. The NMOC concentrations are determined by performing EPA Method 25C or Method 18. Tier 2 measurements require the waste to be 2 years old. If the first waste deposited is not 2 years old at the time Tier 2 calculations are required to be done, the landfill owner or operator may wait until the waste is 2 years old. If Tier 2 calculations result in NMOC emissions equal to or greater than 50 Mg/yr, then Tier 3 calculations may be performed.

Tier 3 calculations are based on both site-specific NMOC concentrations and a site-specific methane generation rate constant (k). Tier 3 calculations yield the most accurate determination of NMOC emission rate. The NMOC concentrations are determined by following the Tier 2 procedures. The methane generation rate (k) is determined by performing EPA Method 2E.

It is unlikely that a site-specific Tier 3 evaluation will lower the annual NMOC emission estimate below the 50 Mg/yr threshold unless the Tier 2 calculation is only slightly higher than the threshold. Dry, arid regions may show a more significant lowering of emissions at Tier 3 than wet regions.

Figure 2-2 presents a flow chart showing the steps for determining NMOC emissions from a landfill, and for determining whether the landfill must be controlled. Additional information on tier equations and calculation procedures is included in appendix I.

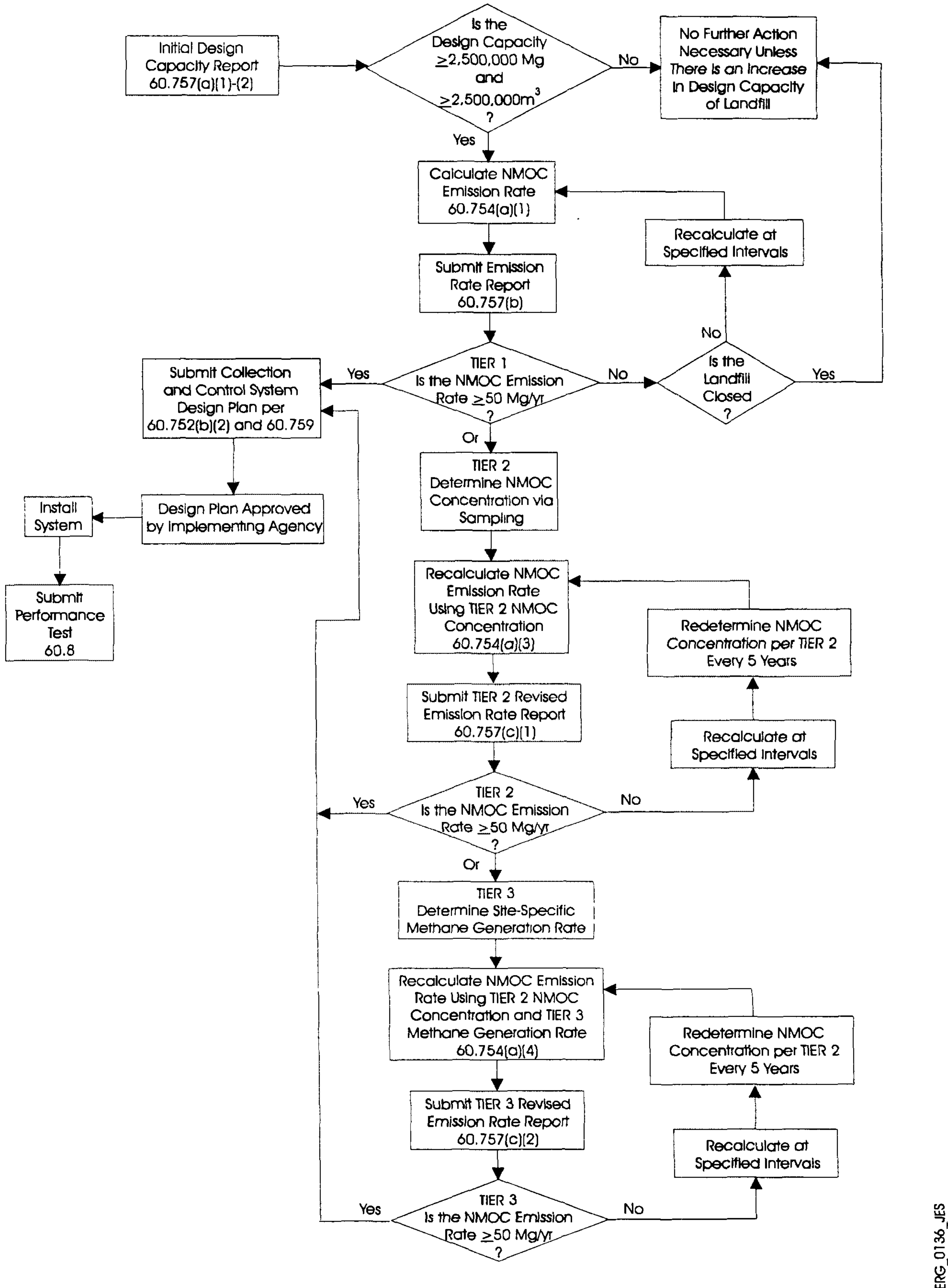


Figure 2-2. Flow Chart for Determining Control Requirements

What Is the Required Gas Collection Technology?

The rule requires collection and control of landfill emissions to the level deemed "best demonstrated technology" (BDT). The BDT for collecting landfill emissions consists of a well-designed and well-operated gas collection system to be installed in a landfill to collect LFG effectively from all disposal areas requiring control. The disposal areas requiring control can be active, closed, or at final grade with no further waste to be deposited. Active areas requiring control are areas where the first refuse deposited is five years or older. These areas must be controlled with the installation of a gas collection system, even though waste is still being actively deposited. After the initial installation of the collection system, owners and operators may need to expand the collection system as active areas in which the first waste deposited reaches the age of five years. Closed areas or areas that are at final grade must be controlled with the installation of a gas collection system if the first refuse deposited there is two years old or older [60.752(b)(2)(ii)(A)(2)].

Gas collection systems may rely on active or passive techniques for extracting LFG from landfill areas requiring control [§ 60.752(b)(2)(ii)(A) or (B)]. Active gas collectors (e.g., active extraction wells) depend on mechanical blowers or compressors to create a negative pressure gradient in the landfill. The negative pressure causes LFG to be drawn into the gas collection system. Passive gas collectors rely on the natural LFG pressure within the landfill which creates a positive pressure gradient so LFG flows from the landfill into the gas collection system.

The regulation allows use of a wide variety of collection systems. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. System designs could include vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only; leachate collection systems; and passive systems.

The rule requires a site-specific Collection and Control System Design Plan to be prepared by a professional engineer and submitted to the regulatory agency for approval. For an active system, the plan must show that the collection system is designed to:

(1) Handle the maximum expected gas flow rate over the expected lifespan of collection system equipment,

(2) Collect gas from each area or cell in which solid waste has been placed for 5 years if the cell is active and 2 years if it is closed or at final grade,

(3) Collect gas at a sufficient extraction rate (A sufficient extraction rate is a rate adequate to maintain a negative pressure at all wellheads in the collection system without causing air infiltration.), and

(4) Minimize off-site migration of subsurface gas.

Passive systems must satisfy criteria (1), (2), and (4) above and must have liners on the bottom and all sides of the areas in which gas is collected [§ 60.752(b)(2)(ii)(B)(2)]. Gas collected by either an active or a passive system must be routed to a control device.

To aid in selecting a design that will meet the above BDT control requirements, the rule provides design criteria for installing active collection systems (§ 60.759). These design criteria are presented in appendix E. The design plan must either show that the collection system conforms to the design criteria in § 60.759 or include a demonstration that an alternative design is sufficient.

Alternative designs could include alternative vertical collection systems, horizontal trench active collection systems, or passive collection systems. Section 4.1 of the proposal BID (EPA-450/3-90-011a) provides a discussion on collection systems including active vertical and horizontal collection systems and passive collection systems. Appendix E also provides examples of alternative collection system designs that were installed and operating prior to the regulations.

States reviewing design plans may approve or disapprove the plans, or ask the landfill owner or operator to provide additional information.

What Are the Operational Requirements for the Gas Collection System?

The rule provides operational standards for collection and control systems; test procedures; compliance provisions; and monitoring, recordkeeping, and reporting provisions for landfill gas collection and control systems in § 60.753 through § 60.758. However, the design plan required in § 60.752(b)(2) may include alternatives to any of these provisions. In cases where an alternative design is used in place of the active collection system specifications in

§ 60.759, it may be appropriate to use alternative operating and compliance provisions that are consistent with the site-specific design.

This section briefly describes the operational requirements that are used to ensure that the collection system is performing in accordance with its design and that the four design criteria listed in the previous section are met on a continuing basis. Additional details on monitoring and compliance determination provisions are provided in section 2.1.3.

To ensure that the collection system is designed to handle the maximum expected gas generation rate, § 60.755(a) provides procedures for calculating the gas generation flow rate.

Landfill gas is effectively collected from the landfill when gas collectors are operated at a sufficient gas extraction rate. To demonstrate that the gas extraction rate for an active gas collection system is sufficient, a negative pressure must be maintained at each wellhead [§ 60.753(b) and § 60.755(a)(3)] except as noted in § 60.753(b). Gas collection systems that operate at a sufficient gas extraction rate minimize the potential of off-site, migration of subsurface LFG [§ 60.752(b)(2)(ii)].

An excessive gas extraction rate may cause air infiltration into the landfill through its surface and sides. Under the rule, the nitrogen gas concentration in the collected LFG must be maintained below 20 percent (or the oxygen concentration maintained below 5 percent) and the temperature of the collected LFG must be below 55 ^{o}C (131 ^{o}F) to prevent excess air infiltration [§ 60.753(c) and § 60.755(a)(5)]. For a specific site, the owner or operator may establish a higher temperature, or a higher nitrogen or oxygen level for particular wells, with approval from the State.

An inadequate gas extraction rate may cause LFG to escape through the landfill surface. Under the rule, the gas extraction rate is considered adequate when the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, surface testing is conducted around the perimeter of the collection area, along a pattern that traverses the landfill at 30 meter intervals, and where visual observations indicate elevated concentrations of landfill gas (e.g., distressed vegetation, cracks or seeps in the cover). The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage [§ 60.753(d) and § 60.755(c)].

Collection system parameters (pressure, nitrogen concentration, oxygen concentration, temperature, surface methane concentration) must be monitored periodically to ensure that the system is effectively extracting LFG from the landfill. If the monitoring results indicate problems, the gas collection system must be adjusted, as necessary, to maintain peak performance [§ 60.755(a)(3), (a)(5), and (d)(4)]. In some cases, upgrades to the collection system or installation of additional collection devices may be required to correct the problem.

Again, it should be noted that a Collection and Control System Design Plan can request alternatives to the pressure, temperature, nitrogen concentration, oxygen concentration, or surface methane monitoring and compliance provisions for landfill gas collection systems. The plan must provide a justification for the alternatives, and the State agency may approve or disapprove the proposed alternatives.

Collected LFG is vented through a network of piping to a BDT control device [§ 60.752(b)(2)(iii)]. The control device is operated at all times when collected LFG is routed into the control system [§ 60.753(f)] except during times of startup, shut down, or malfunction. This exception is allowed as long as the operational disruption for the collection system is 5 days or less [§ 60.755(e)]. In the event the collection system or control device becomes inoperable, the gas mover system must be shut down. All valves leading to atmospheric venting of LFG in the gas collection and control system must also be closed [§ 60.753(e)].

What Is the Required Gas Control Technology?

The BDT for controlling landfill emissions is routing collected LFG to a control device capable of reducing NMOC emissions by 98 weight-percent or reducing emissions to 20 parts per million by volume dry (ppmvd) as hexane. The efficiency or emission reduction achieved by the control technology must be demonstrated. Acceptable control devices for landfill emissions are open flares and enclosed combustion devices.

The emission reduction performance of an open flare can be demonstrated by using a flare that meets certain design and operating parameters [§ 60.752(b)(2)(iii)(A)]. These design and operating parameters have been specified in 40 CFR § 60.18 to ensure open flares achieve at least 98 percent destruction efficiency. Measurement of percent reduction or outlet concentration is not feasible for open flares. Flares meeting the specifications in § 60.18 are presumed to achieve 98 percent control, and a performance test is not required. However, § 60.18 does require a visible emission determination.

For enclosed combustion devices or other control devices, the landfill owner or operator must demonstrate either the 98 weight-percent reduction or reduction of the outlet NMOC concentration to 20 ppmvd as hexane at 3 percent oxygen by performance testing [§ 60.752(b)(2)(iii)(B)]. The performance test must be in accordance with Method 25C or Method 18 of appendix A [§ 60.754(d)]. Examples of enclosed combustion devices that have the potential to meet the 98 percent destruction efficiency or 20 ppmvd level include energy recovery systems (internal combustion [IC] engines, gas turbines, steam generating boilers), enclosed flares, and thermal incinerators.

Enclosed combustion devices, including IC engines, gas turbines, and steam generating boilers, provide the opportunity for energy recovery. Therefore, these enclosed combustion devices may offer economic incentives since the energy or power generated by these devices may be used on-site or sold.

Another control option is to collect and process LFG for subsequent sale or use as a fuel source [§ 60.752(b)(2)(iii)(C)]. Generally, contaminates such as carbon dioxide and water are removed from LFG in sufficient quantities to achieve a purity level equal to that of pipeline gas. However, any emissions occurring from atmospheric vents on a gas collection and processing system must be routed to a BDT control device.

The control device is operated at all times when collected LFG is routed into the control system [§ 60.753(f)] except during times of startup, shut down, or malfunction. This exception is allowed as long as the operational disruption for the control device is 1 hour or less [§ 60.755(e)]. In the event that the collection or control system becomes inoperable, the gas mover system is shut down. All valves leading to atmospheric venting of LFG in the gas collection and control system must also be closed [§ 60.753(e)].

The rule [§ 60.752(b)(2)] includes provisions that allow an owner or operator to use alternative designs for a gas control system. However, the owner or operator must be able to demonstrate that an alternative system is able to achieve an equivalent level of control and emission reduction. The owner or operator may also request approval to use alternatives to the control system monitoring, test methods and procedures, and compliance provisions in §§ 60.753, 60.754, and 60.755, respectively.

What Is the Compliance Schedule for Installing Controls?

Within 30 months after a landfill's NMOC emission rate is first reported to be equal to or greater than 50 Mg/yr, the provisions of this rule require installation and startup of a gas collection and control system at the landfill. This interval allows sufficient time for a landfill owner or operator to submit plans for a control system design and install the control system. Within 180 days after startup of a gas collection and control system, the landfill owner or operator must conduct performance testing on the control system to document compliance with the rule. General milestones for the compliance schedule are presented in Figure 2-3 for an example landfill. Construction of this example landfill commenced on March 12, 1993. Therefore, it is defined as a new landfill since construction commenced after the proposal date. Also, it is assumed that the example landfill capacity is greater than the minimum size limit and that the emission rate is greater than the emission rate cutoff.

Within 1 year after a landfill's NMOC emission rate is calculated to be equal to or greater than 50 Mg/yr, the landfill owner or operator must submit a Collection and Control System Design Plan prepared by a professional engineer. This design plan must meet the design requirements specified in § 60.752(b)(2)(ii) and include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring provisions, or recordkeeping and reporting provisions. The landfill may install an active collection and control system design as specified by the rule (§ 60.759) or elect to install a collection and control system of alternative but equivalent design.

Within 30 months after submitting an NMOC emission rate report showing that emissions equal or exceed 50 Mg/yr NMOC, the gas collection and control system must be ready for start-up operations. If a design plan is submitted by 1 year after the annual report showing emissions greater than or equal to 50 Mg/yr, this leaves 18 months for approval of the design plan and installation of collection and control systems. The implementing agency is responsible for approving design plans. Approval time for a system design plan is estimated at 6 months. For example, the implementing agency conducts a preliminary review of the system design and submits its comments to the landfill in approximately 2 months. The landfill owner or operator responds to the comments from the preliminary review within 2 months. The implementing agency completes its final review of landfill responses to the agency's preliminary review

Milestone	Example Achievement Date	Compliance Schedule[a]
Design Capacity Report	June 10, 1996[b]	Within 90 days after promulgation[b]
NMOC Emission Rate Report	June 10, 1996[b]	Within 90 days after promulgation[b], and then annually
Collection and Control System Design Plan	June 10, 1997	Within 1 year after reporting NMOC emissions $\geq$ 50 Mg/yr
Installation of Collection and Control System Completed (up and running, i.e., on-line)	December 10, 1998	Within 30 months after reporting NMOC emissions $\geq$ 50 Mg/yr
Initial Performance Test of Collection and Control System to Document Compliance	June 28, 1999	Within 180 days after the initial startup of the control system

[a]Promulgation date is March 12, 1996. The time frames specified in this example are based on the dates in § 60.757 of Subpart WWW.

[b] Ninety (90) days after promulgation is the due date for landfills constructed, reconstructed, or modified on or after May 30, 1991, but before March 12, 1996. For landfills constructed on or after March 12, 1996, the due date is 90 days after construction, reconstruction, or modification.

Figure 2-3. General Milestones for the NSPS Compliance Schedule for an Example Landfill

comments within another 2 months. Therefore, approximately 12 months remain for installing the control system at the landfill.

Within 180 days of the gas collection and control system start-up, the initial performance test of the control system must be conducted and the results must be submitted to the implementing agency. The performance test results document the control system's compliance with the rule.

When Can Gas Collection and Control Systems Be Removed?

The standards allow capping or removal of gas collection and control devices only when all of the following conditions are satisfied:

(1) The landfill is closed as defined in § 60.751.

(2) The landfill owner or operator notifies the implementing agency by submitting a Landfill Closure Report [§ 60.752(b)(2)(v)(A)]. A Landfill Closure Report is described later in section 2.1.3.

(3) The gas collection and control system has been operating continuously for at least 15 years [§ 60.752(b)(2)(v)(B)].

(4) The landfill NMOC emission rate has been calculated to be less than 50 Mg/yr on three successive test dates. The test dates should be no closer than 90 days apart and no farther than 180 days apart [§ 60.752(b)(2)(v)(C)].

2.1.3 Demonstrating Compliance

What Must Be Monitored?

Several operating parameters of a controlled landfill must be monitored to ensure compliance with the standards. These monitoring parameters verify the performance status of the gas collection system and control device or gas treatment system. Table 2-3 presents a summary of monitoring requirements for the gas collection and control system. As previously noted, the owner or operator can request approval, in the Collection and Control System Design Plan, to monitor alternative parameters.

Monitoring Gas Collection Systems

For an active gas collection system that meets design criteria published in § 60.759, the gauge pressure, nitrogen or oxygen concentration, and temperature of LFG within each extraction wellhead must be monitored once a month. Methane concentrations at the landfill surface must be monitored quarterly. These parameters indicate whether the gas extraction rates for the extraction wells are adequate. When the methane surface concentration monitoring for a closed landfill shows no exceedances for three consecutive quarters, then the landfill owner or operator may "skip" to annual monitoring. If an exceedance is detected, monitoring resumes on a quarterly schedule until no exceedances are observed for three consecutive quarters. Also, surface methane monitoring must be performed during typical meteorological conditions, so monitoring may need to be postponed to allow for typical conditions to be present. Figure 2-4 provides a flow chart of the surface monitoring requirements.

If an exceedance is detected, corrective action must be taken by performing cover maintenance or adjusting the collection system operating parameters. The location of the exceedance(s) must be rechecked for surface methane concentration within 10 days. If there are three exceedances at a location within a quarterly period then a new well or collection device must be installed within 120 days of the initial exceedance. An alternate remedy and timeline may be proposed to the Administrator. It should be noted that an exceedance of the 500 ppm surface methane concentration level is <u>not</u> a violation of the rule as long as the proper correction procedures, as depicted in Figure 2-4, are carried out.

Each extraction well installed in an active collection system must include a sampling port and a temperature measuring device or access port for temperature measurements. The sampling port allows easy access for gauge pressure and nitrogen concentration measurements. An extraction well with an adequate gas extraction rate will maintain a negative gauge pressure in the wellhead. A negative pressure indicates that a negative pressure gradient exists within the landfill and LFG is being extracted.

TABLE 2-3. SUMMARY OF MONITORING REQUIREMENTS FOR MSW LANDFILLS

Equipment	Monitoring Action	Schedule	Reference
Gas Collection System	Monitor gauge pressure within each gas extraction well. A negative value indicates a well is operating with a sufficient gas extraction rate.	Monthly	§60.756(a)(1)
	Monitor nitrogen concentration using Method 3C or oxygen concentration using Method 3A. Nitrogen concentration values <20 percent or oxygen concentration values < 5 percent indicate well extraction rates are not causing excessive air infiltration into the landfill.	Monthly	§60.756(a)(2)
	Monitor LFG temperature in extraction well; should be <55°C (131°F), unless otherwise demonstrated that a higher temperature is appropriate. An elevated LFG temperature is an indicator of subsurface fires and aerobic conditions within the landfill.	Monthly	§60.756(a)(3)
	Monitor methane concentration at the landfill surface. Values <500 ppm above background indicate well extraction rates are sufficient to minimize the amount of LFG seeping out of the landfill.	Quarterly OR Skip Method[a]	§60.755(c) and §60.756(f)
	For an alternative gas collection system design, the owner or operator must submit appropriate monitoring requirements to the implementing agency for approval.	To Be Determined	§60.756(e)
Gas Control System	Record gas flow from collection system to the enclosed combustion device (unless bypass line valves are secured in a closed position with car-seal or lock-and-key type configuration). This requirement identifies periods when gas flow has been diverted from the control device.	At least once every 15 minutes OR Monthly inspections of bypass line seals	§60.756(b)(2)

TABLE 2-3. SUMMARY OF MONITORING REQUIREMENTS FOR MSW LANDFILLS (CONTINUED)

Equipment	Monitoring Action	Schedule	Reference
Gas Control System (Continued)	Record gas flow from collection system to open flare (unless bypass line valves are secured in a closed position with car-seal or lock-and-key type configuration). This requirement identifies periods when gas flow has been diverted from the control device.	At least once every 15 minutes OR Monthly inspections of bypass line seals	§60.756(c)(2)
	Monitor combustion temperature of the enclosed combustion device with a temperature monitoring device equipped with a continuous recorder. (Temperature monitoring is not required for a boiler or process heater >44 megawatts) This requirement identifies operational and performance status of control device.	Continuous	§60.756(b)(1)
	Monitor the continuous presence of a pilot flame or the flare flame for an open flare. This requirement confirms operational status of control device.	Continuous	§60.756(c)(1)
	For an alternative control device, the owner or operator must submit appropriate monitoring requirements to the implementing agency for approval.	To Be Determined	§60.756(d)

[a]When monitoring of methane concentration for a closed landfill shows no exceedances for three consecutive quarterly monitoring periods, then monitoring can be "skipped" to annual monitoring. Any exceedance of the 500 ppm methane level returns the landfill to quarterly monitoring.

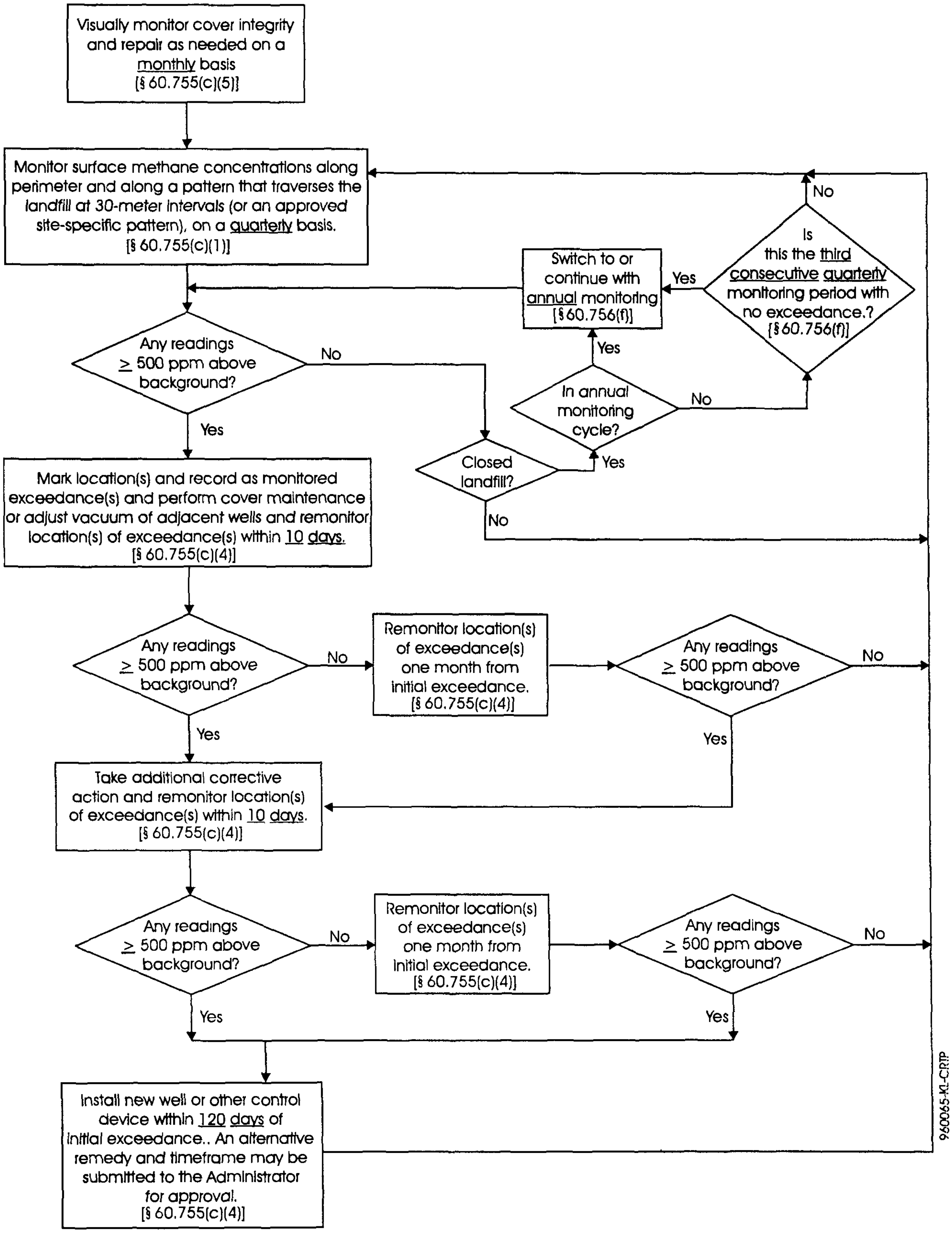


Figure 2-4. Flow Chart of Surface Monitoring Requirements [§60.755(c) and §60.756(f)]

If a positive pressure is measured, the owner or operator must initiate corrective action within 5 calendar days. If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection must be expanded to correct the exceedance within 120 days. An alternative timeline for correcting the exceedance may be submitted to the Administrator for approval. Exceptions to the negative pressure requirement are listed in § 60.753(b).

Collected LFG must have a nitrogen concentration less than 20 percent or an oxygen level less than 5 percent, and a maximum temperature of 55°C (131°F). Nitrogen concentration levels are measured following the procedures in EPA Method 3C. Oxygen concentration levels are measured following the procedures in EPA Method 3A. Nitrogen concentration rates < 20 percent or oxygen concentration values < 5 percent indicate well extraction rates are not causing ambient air infiltration into a landfill through its surface and sides. Increased LFG temperatures indicate that subsurface fires or aerobic conditions exist within the landfill. The maximum allowable LFG temperature is 55°C (131°F), unless a landfill owner or operator can demonstrate adequately that a higher temperature is appropriate and does not hinder the anaerobic decomposition process. If a well exceeds the temperature, nitrogen concentration, or oxygen concentration, the owner or operator must initiate corrective action within 5 calendar days. If the exceedance cannot be corrected within 15 calendar days of the first measurement, the gas collection system must be expanded to correct the exceedance within 120 calendar days. An alternative timeline for correcting the exceedance may be submitted to the Administrator for approval.

After the installation of extraction wells, the landfill surface must be monitored for methane concentrations less than 500 ppm above background levels. Methane concentrations are measured within 5 to 10 cm (2 to 4 in) of the landfill surface using a portable organic vapor analyzer (OVA), flame ionization detector (FID), or other similar monitoring device [§ 60.755(d)]. Methane concentrations are measured following the procedures in EPA Method 21, except that "methane" replaces all references to "volatile organic compounds" (VOC) and the calibration gas is 500 ppm methane in air [§ 60.755(d)]. Methane surface concentrations are monitored around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals (see Figure 2-5) and where visual observations indicate elevated concentrations of landfill gas (e.g., distressed vegetation, cracks or seeps in the cover). The

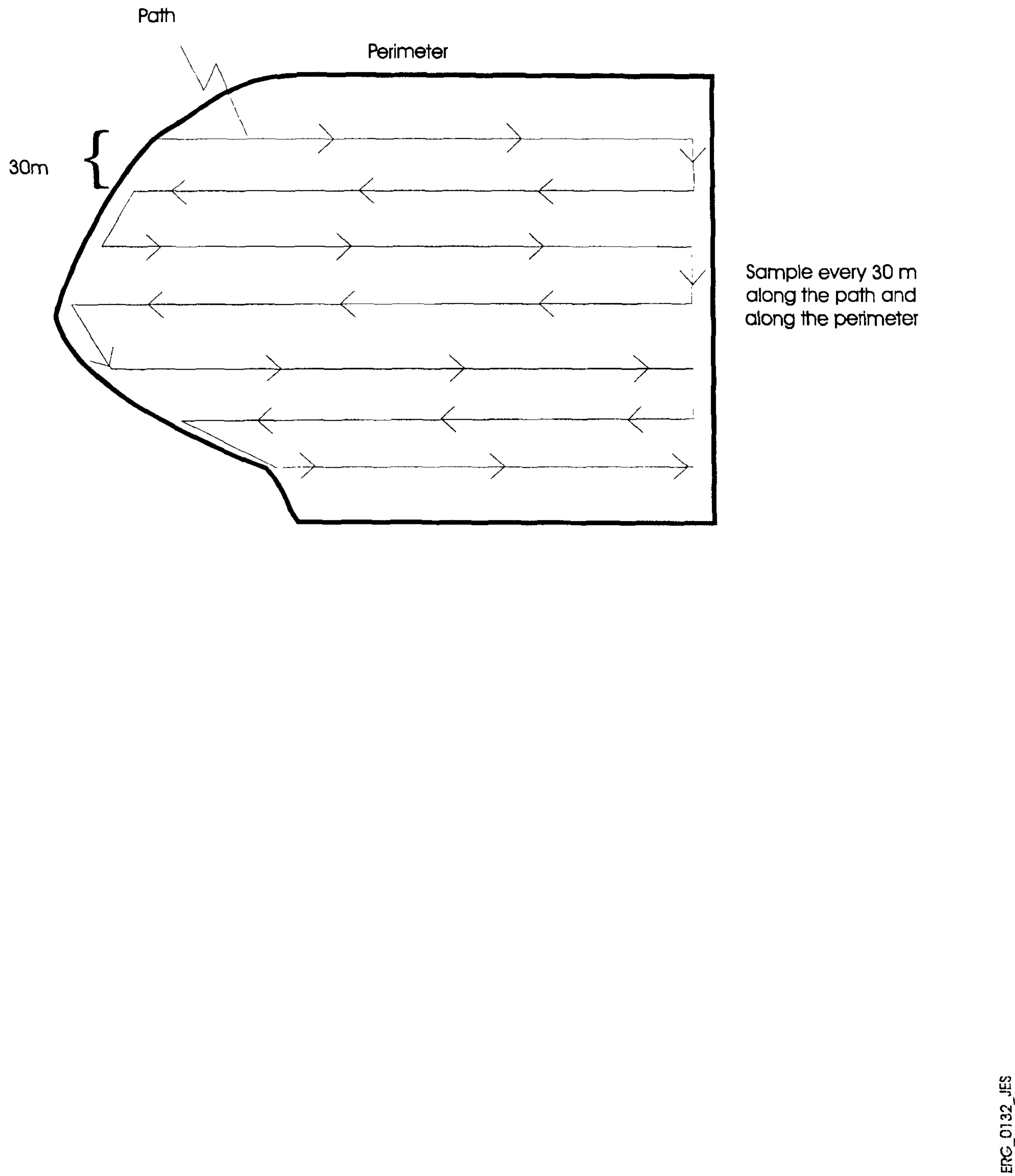


Figure 2-5. Example Traverses for Monitoring Methane Concentrations

owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. Methane surface concentrations indicate whether gas extraction rates are sufficient to minimize the amount of LFG escaping through the landfill cover.

Monitoring Gas Control Systems

For gas control systems using an open flare or an enclosed combustion device, a device that records flow to or bypass of the control device is required. The presence of gas flow to the control device from the collection system is recorded at least once every 15 minutes or the bypass lines must be secured in the closed position using a car-seal or lock-and-key type configuration. This recording frequency is needed to identify periods when the gas flow has been diverted from the control device or periods of no flow from the collection system [§ 60.756(b)(2) and § 60.756(c)(2)].

Combustion device operating parameters must be monitored continuously. For open flares, a heat sensing device such as an ultraviolet beam sensor or thermocouple, located at the flare pilot light or flare flame, is used to indicate the continuous presence of a flame [§ 60.756(c)(1)]. For enclosed combustion devices, a temperature measuring device equipped with a continuous recorder is used to monitor the combustion temperature so that an adequate temperature is maintained [§ 60.756(b)(1)]. Note that § 60.756(b)(1) excludes boilers ≥ 44 Megawatts from being required to install a temperature monitor and recorder.

Gas collection and control systems based on design criteria other than those specified in the rule are allowed. For alternative systems, the landfill owner or operator must provide information describing the system design, the operation of the system, operating parameters that would indicate proper performance, and appropriate monitoring procedures [§ 60.756(d) and (e)]. The implementing agency will review the submitted information and decide whether to approve it, request additional information, or specify additional monitoring procedures [§ 60.756(d) and (e)].

What Recordkeeping Must Be Kept?

The landfill owner or operator must keep up-to-date, readily accessible records to document that controlled landfill operations comply with the requirements of this standard. These records must be maintained in electronic or hard-copy format for at least 5 years, unless otherwise specified. This subsection describes the recordkeeping requirements of this rule. Table 2-4 is a summary of these requirements.

Records must be maintained to document three major operations at a controlled landfill. These operations include:

(1) Design of the landfill and control system;

(2) Gas collection and control system monitoring data; and

(3) Performance test data of the gas collection and control system.

A discussion of the recordkeeping requirements for each of these operations is provided below. As previously noted, a Collection and Control System Design Plan may request alternatives to the recordkeeping and reporting requirements. If alternative collection system designs are used, it may be necessary to specify alternative monitoring, recordkeeping, and reporting procedures that are more appropriate for the site-specific design.

A landfill owner or operator has the option of calculating design capacity on either a mass or volume basis. If the design capacity is converted from mass to volume or from volume to mass to demonstrate that design capacity is < 2.5 million Mg or 2.5 million m^3, then the landfill owner or operator must keep readily accessible records of the annual recalculation on site. The records must include the annual recalculation of site-specific density, design capacity, and the supporting documentation.

Landfill and Control System Design Records

A number of records must be kept to document the general design and operation of the landfill. These records include current landfill design capacity, current amount of refuse-in-place, and year-by-year waste acceptance rates [§ 60.758(a)]. Records must be available to

TABLE 2-4. SUMMARY OF RECORDKEEPING REQUIREMENTS FOR MSW LANDFILLS

Operation	Recordkeeping Item	Reference
Landfill Design Capacity	If design capacity was converted from mass to volume or volume to mass to demonstrate that design capacity is < 2.5 million Mg or 2.5 million m^3, records of annual recalculation of site-specific density, design capacity, and supporting documentation	§60.758(f)
Landfill and Control System Design	If ≥ 2.5 million Mg and 2.5 million m^3, current maximum design capacity, current amount of refuse-in-place, and year-by-year refuse accumulation rates.	§60.758(a)
	Plot map showing each existing and planned well in the gas collection system. Provide unique identifying labels for each well.	§60.758(d)
	Installation date and location of all newly installed wells per §60.755(b).	§60.758(d)(1)
	Description, location, amount, and placement date of all nondegradable refuse including asbestos and demolition refuse placed in landfill areas which are excluded from LFG collection and control.	§60.758(d)(2)
Monitored Operating Parameters for Gas Collection and Control Systems	(1) Gauge pressure in each extraction well.	§60.756(a)(1)
	(2) Nitrogen or oxygen concentration in extracted LFG.	§60.756(a)(2)
	(3) Temperature of extracted LFG.	§60.756(a)(3)
	(4) Methane concentrations along landfill surface.	§60.756(f)
	(5) Gas flow from collection system to the BDT control device (or seal bypass lines and inspect seals).	§60.756(b)(2)(i) and (ii)
	(6) Combustion temperature of an enclosed combustion device or the continuous presence of a pilot flame for an open flare.	§60.756(c)
	(7) Operating parameters for alternative collection and control system designs, which are specified by the landfill and approved by the implementing agency.	§60.756(e)

TABLE 2-4. SUMMARY OF RECORDKEEPING REQUIREMENTS FOR MSW LANDFILLS (CONTINUED)

Operation	Recordkeeping Item	Reference
Collection and Control System Design and Measurements From Initial Performance Test	Maximum expected gas generation flow rate	§60.758(b)(1)(i)
	Density of wells, horizontal collectors, surface collectors, or other gas extraction devices.	§60.758(b)(1)(ii)
	For enclosed combustion devices (except for boilers or process heaters with a heat input ≥44 Megawatts [150 million British thermal units per hour]):	
	(1) Average combustion temperature measured at least every 15 minutes and averaged over the performance test duration.	§60.758(b)(2)(i)
	(2) Percent reduction of NMOCs by the control device.	§60.758(b)(2)(ii)
	For boilers/process heaters (of any size):	
	Describe location where LFG is introduced into the boiler flame zone.	§60.758(b)(3)
	For open flares: (1) Type of flare (steam-, air-, or non-assisted), (2) All visible emission readings, (3) Heat content determination, (4) Gas flow rate or bypass measurements, (5) Exit velocity determinations, (6) Continuous pilot flame or flare flame monitoring, and (7) All periods when pilot flame or flare flame is absent.	§60.758(b)(4)

TABLE 2-4. SUMMARY OF RECORDKEEPING REQUIREMENTS FOR MSW LANDFILLS (CONTINUED)

Operation	Recordkeeping Item	Reference
Gas Control System: Periods When Operating Parameters Exceeded Limits Set by Most Recent Performance Test	For enclosed combustion devices (except for boilers/process heaters with a heat input $\geq$44 Megawatts [150 million British themal units per hour]): Records of all 3-hour periods in which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature measured during the most recent performance test.	§60.758(c)(1)(i)
	For boilers/process heaters with a heat input $\geq$44 Megawatts (150 million British themal units per): Document all periods of operation by recording parameters, such as steam use, fuel use, or other specified parameters required by other regulatory agencies.	§60.758(c)(3)
	For boilers/process heaters: Document any changes to the location where collected LFG is introduced in the boiler flame zone.	§60.758(c)(1)(ii)
	For an open flare:	
	Record all pilot flame or flare flame monitoring data and all periods when pilot flame or flare flame was absent.	§60.758(c)(4)
Gas Control System: Periods When Operating Parameters Exceeded Limits Set by Most Recent Performance Test (Continued)	Records of continuous flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines.	§60.758(c)(2)

TABLE 2-4. SUMMARY OF RECORDKEEPING REQUIREMENTS FOR MSW LANDFILLS (CONTINUED)

Operation	Recordkeeping Item	Reference
Gas Collection and Control System: Exceedances of operational standards	Record all values which exceed the operational standards specified in §60.753. Also include the operating value from the next monitoring period and the location of each exceedance: (1) New well installation, (2) Pressure in each extraction well, (3) Nitrogen concentration or oxygen concentration in extracted LFG, (4) Temperature of extracted LFG, (5) Methane concentrations along landfill surface, (6) Collected LFG is routed to control device at all times, note periods when the collection system and/or control device were not operational. Keep up-to-date, readily accessible records of these exceedences for at least 5 years.	§60.758(e)

support any area exclusions. All areas storing nondegradable refuse such as asbestos and demolition refuse that are excluded from collection must be identified on a location map [§ 60.758(d)(2)]. In addition, a description of the nondegradable refuse must be recorded along with the amount and date of placement in the landfill [§ 60.758(d)(2)].

A landfill owner or operator has the option of calculating design capacity on either a mass or volume basis. If the design capacity is converted from mass to volume or from volume to mass to demonstrate that design capacity is < 2.5 million Mg or 2.5 million m^3, the landfill owner or operator must keep readily accessible records of the annual recalculation on site. The records must include the annual recalculation of site-specific density, design capacity, and the supporting documentation [§ 60.758(f)].

A plot map is needed to document that LFG is being collected from all gas-producing areas in a landfill. This map must show each existing and planned extraction well in the gas collection system and must provide a unique identifying label for each well [§ 60.758(d)]. In addition, the installation date and location of all newly installed wells per § 60.755(b) must be indicated and documented [§ 60.758(d)(1)].

Gas Collection and Control System Monitoring Data Records

All monitoring data gathered during the operation of a gas collection and control system, as per § 60.756, must be recorded [§ 60.758(c)]. These data include:

(1) Gauge pressure, nitrogen concentration or oxygen concentration, and temperature of LFG within each wellhead;

(2) Methane surface concentrations;

(3) Gas flow to or bypass of the control device (or monthly inspections of seals on bypass lines);

(4) Adequate combustion conditions (e.g., combustion temperature, presence of flare flame or pilot flame) for the control device; and

(5) Any other data specified by the implementing agency.

Records must also be kept of periods when the monitored control device operating parameter (e.g., temperature) exceeds the established boundaries (see Table 2-4 for details).

If any of the monitored readings for gauge pressure, nitrogen or oxygen concentration, temperature of LFG in wellheads, or methane concentration exceed the operational standards established in § 60.753, then the location and value of the reading must be documented as such an occurrence [§ 60.758(e)]. For each exceedance, the reading from the subsequent monitoring period must also be recorded regardless of whether the subsequent value is an exceedance [§ 60.758(e)].

Initial Performance Test Records

Measurements gathered during the initial performance test of the gas collection and control system must be maintained by the landfill owner or operator for the life of the control equipment [§ 60.758(b)]. Further, measurements gathered during tests or monitoring must be kept for a minimum of 5 years. Measurements recorded from the gas collection system during the initial performance test include the maximum expected gas generation flow rate and the density of wells, horizontal collectors, surface collectors, or other gas extraction devices [§ 60.758(b)(1)].

Measurements recorded from the gas control system during the initial performance test depend on the type of control device used. For enclosed combustion devices, the average combustion temperature must be recorded at least every 15 minutes and averaged over the performance test duration [§ 60.758(b)(2)(i)]. The percent reduction of NMOC's achieved by the control device must also be recorded [§ 60.758(b)(2)(ii)]. Temperature monitoring is not required for boilers and process heaters with design heat input capacities greater than 44 Megawatts (150 million British thermal units per hour). For boilers and process heaters (of any size), a description of the location where LFG is introduced into the boiler flame zone must be recorded [§ 60.758(b)(3)]. For open flares, operating parameters that must be recorded are listed in Table 2-4 [§ 60.758(b)(4)]. If any of the monitored control device readings exceed limits set by the most recent performance test, then the period when these readings were observed must be documented. These periods are described in Table 2-4.

What Must Be Reported?

The landfill owner or operator must submit a series of reports to the implementing agency to demonstrate compliance with this standard. These reports are based on information maintained by the landfill's recordkeeping efforts. The reporting sequence begins with the Initial Design Capacity Report and concludes with the Landfill Closure and Control Equipment Removal Reports. This subsection identifies and describes each report that is required by this rule and the schedule for each report submittal. The required reports and submittal schedules are listed in Table 2-5.

Initial Design Capacity Report

Each landfill owner or operator must submit a report that documents the landfill maximum design capacity. This report establishes whether a landfill is subject to the control requirements of this standard or is excluded because of the landfill design capacity exemption. The Initial Design Capacity Report will also fulfill the requirements of the notification of the date construction is commenced as required by the NSPS General Provisions [§ 60.7(a)(1)]. The report must be submitted no later than:

(1) June 10, 1996, for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991 but before March 12, 1996, or

(2) 90 days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996.

An Initial Design Capacity Report must include:

(1) A map or plot of the landfill that provides the location and size of the landfill, and identifies all areas where solid waste may be landfilled according to the permit issued by the State, local, or Tribal agency responsible for regulating the landfill; and

(2) The maximum design capacity of the landfill.

TABLE 2-5. SUMMARY OF COMPLIANCE REPORTING REQUIREMENTS FOR MSW LANDFILLS

Report or Action	Schedule	Reference
Initial Design Capacity Report	Submit report no later than: (1) June 10, 1996 for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996 or (2) 90 days after the date the landfill commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996.	§60.757(a)(1) §60.757(a)(2)
Amended Design Capacity Report	If design capacity is increased to a value that equals or exceeds 2.5 million Mg, the landfill must submit an Amended Design Capacity Report. Submit report within 90 days of an increase in the maximum design capacity of the landfill to or above the 2.5 million Mg and 2.5 million m^3 size exemption.	§60.757(a)(3)
Annual <u>OR</u> Five-Year[a] NMOC Emission Rate Report (Tier 1)	Submit initial report no later than: (1) June 10, 1996 for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996 or (2) 90 days after the date the landfill commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996. May submit with Initial Design Capacity Report. Repeat either once a year <u>OR</u> once every 5 years.	§60.757(b)
Revised NMOC Emission Rate Report (Tier 2)	If Tier 1 analysis results in NMOC emissions $\geq$50 Mg/yr, a revised NMOC emission rate report using data gathered from Tier 2 analysis can be submitted within 180 days of the initial calculated exceedance.	§60.757(c)(1)

TABLE 2-5. SUMMARY OF COMPLIANCE REPORTING REQUIREMENTS FOR MSW LANDFILLS (CONTINUED)

Report or Action	Schedule	Reference
Revised NMOC Emission Rate Report (Tier 3)	If Tier 2 analysis results in NMOC emissions ≥50 Mg/yr, a revised NMOC Emission Rate Report using data gathered from Tier 3 analysis can be submitted within 1 year of the initial calculated exceedance.	§60.757(c)(2)
Collection and Control System Design Plan	Within 1 year after submitting NMOC Emission Rate Report with a value ≥50 Mg/yr. Plans must gain Agency approval prior to installation.	§60.757(c)
Emission Control System Start-up	Control system based on approved design will startup within 30 months after submitting NMOC Emission Rate Report with a value ≥50 Mg/yr.	§60.752(b)(2)(ii)
Initial Control System Performance Test Report	Submit report within 180 days of emission collection and control system start-up per §60.8. Results can be included in the initial Annual Report.	§60.757(g)
Annual Compliance Report	Submit initial report within 180 days of emission collection and control system start-up. Report once every 12 months.	§60.757(f)
Landfill Closure Report	When landfill is no longer accepting refuse and the landfill is considered closed. Submit report within 30 days of refuse acceptance cessation.	§60.757(d)
Control Equipment Removal Report	Submit report within 30 days prior to removal or cessation of control system operations. Controls can be removed after meeting all of these criteria: (1) Landfill Closure Report has been submitted, (2) Control system was operated for at least 15 years, and (3) Three consecutive NMOC Emission Rate Reports with values <50 Mg/yr achieved.	§60.757(e)

[a] The owner or operator may elect to submit an estimate of the NMOC emission rate for the next 5 years in lieu of the annual report if the estimated NMOC emission rate is <50 Mg/yr in each of the 5 years.

If the maximum design capacity of the landfill is documented in a State or local construction or RCRA permit, a copy of the permit specifying the maximum design capacity may be submitted as part of this report [§ 60.757(a)(2)(ii)]. The design capacity is determined by the most recent permit issued by the State, local, or tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the landfill design capacity is not specified in a permit, then the capacity must be calculated using good engineering practices. All calculations, assumptions, and relevant parameters used in estimating the landfill design capacity must be included in the report for review by the implementing agency. The maximum design capacity of a landfill can be determined from the total area available for refuse disposal. Alternative information that could be used to determine design capacity includes operating parameters such as depth of refuse placement, refuse acceptance rates, and refuse compaction practices.

In order to demonstrate that the landfill design capacity is less than the 2.5 million Mg or 2.5 million m^3 design capacity cutoff, a landfill with a volumetric permit may choose to calculate design capacity on a mass basis (or vise versa) based on a site-specific density. The initial design capacity report must provide supporting documentation. If such a conversion is made, records must also be kept of the annual recalculation of the site-specific density and design capacity with supporting documentation.

For example, a landfill may have a permitted design capacity greater than 2.5 million m^3 by volume; but the landfill may have documented calculations showing that, based on the actual waste density, the design capacity is less than 2.5 million Mg by weight. Because the design capacity is less than 2.5 million Mg, the landfill is below the design capacity cutoff. If such a landfill changes it compaction practices such that the density of the waste placed in the landfill increases, the design capacity could become greater than 2.5 million Mg, and the landfill would then need to submit an Amended Design Capacity Report.

Amended Design Capacity

The NSPS requires the landfill to report any increase in design capacity that results in a capacity above the design capacity cutoff [§ 60.757(a)(3)]. For example, if a landfill changes its compaction practices such that the density of the waste placed in the landfill increases, the design capacity could become equal to or greater than 2.5 million Mg, and the landfill would then need to submit an Amended Design Capacity Report. As another example, if the permitted volume (vertical and/or horizontal dimensions of the landfill) increased such that the design capacity becomes ≥ 2.5 million Mg, an Amended Design Capacity Report would be needed.

The Amended Design Capacity Report must adequately describe the nature of the landfill design capacity increase. The Amended Design Capacity Report must be submitted to the implementing agency within 90 days of an increase in the maximum design capacity of the landfill equal to or above the size exemption of 2.5 million Mg and 2.5 million m^3. If the revised design capacity is equal to or over the size exemption, the landfill must estimate emissions and must install controls if emissions are greater than or equal to 50 Mg/yr.

NMOC Emission Rate Report

Landfills with a maximum design capacity equal to or greater than 2.5 million Mg and 2.5 million m^3 of refuse must submit annual calculations of the NMOC emission rate [§ 60.757(b)]. The report must include an annual estimate of NMOC emissions from the landfill using the tier equations and calculation procedures from § 60.754. These equations and calculation procedures are included in appendix I. An example NMOC Emission Rate Report is included in appendix H.

If the estimated NMOC emissions from a landfill are less than 50 Mg/yr (55 tons/yr) in each of 5 consecutive years, the landfill owner or operator may elect to submit a 5-year estimate of NMOC emissions from the landfill instead of an Annual Report [§ 60.757(b)(1)(ii)]. For each of the next 5 years, the landfill NMOC emission rate is estimated following the same procedures used for the annual estimates. A 5-year NMOC Emission Rate Report is based on the current amount of refuse in the landfill and the estimated waste acceptance rate for each of the 5 years covered by the report. If an actual waste acceptance rate exceeds the estimated waste acceptance rate used in a 5-year report, a revised 5-year report must be submitted to the implementing agency. The revised 5-year estimate must begin with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate. All data, calculations, and measurements used to prepare the 5-year report must be submitted for review by the implementing agency.

The initial Annual NMOC Emission Rate Report must be submitted: (1) by June 10, 1996 for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996; or (2) within 90 days after the date the landfill commenced construction, modification, or reconstruction for landfills that commence these activities on or after March 12, 1996. Subsequent NMOC Emission Rate Reports must be submitted annually or until criteria are met to allow a 5-year NMOC Emission Rate Report. The Initial NMOC Emission Rate Report may be submitted with the Initial Design Capacity Report.

Collection and Control System Design Plan

Each landfill owner or operator that reports an NMOC emission rate equal to or greater than 50 Mg/yr must take one of the following actions:

(1) Submit a design plan for a gas collection and control system; or

(2) Recalculate the NMOC emission rate estimate using Tier 2 and Tier 3 calculating procedures.

If a landfill owner or operator elects to submit a design plan, the plan must be submitted to the implementing agency within 1 year after a landfill first reports an NMOC emission rate equal to or greater than 50 Mg/yr (55 tons/yr). A landfill owner or operator can install either a gas collection and control system that meets the design criteria in § 60.759 of the standard, or an alternative design.

Each landfill owner or operator is required to submit design plans to the implementing agency for approval. The gas collection and control system must be installed and ready for startup within 30 months after a landfill's NMOC emission rate is first reported to be equal or greater than 50 Mg/yr.

The implementing agency must approve the design of a gas collection and control system prior to installation. The review and comment interval for approving a design plan is expected to take approximately 6 months from the date the plan is submitted, leaving approximately 12 months for installing the alternative gas collection and control system.

The second option for a landfill with a Tier 1 NMOC emission rate equal to or greater than 50 Mg/yr (55 tons/yr) is to recalculate the NMOC emission rate. This calculation is made after determining site-specific landfill characteristics through Tier 2 and Tier 3 sampling and analysis. If a landfill owner or operator recalculates an NMOC emission rate less than 50 Mg/yr (55 tons/yr) using a site-specific NMOC concentration determined from the Tier 2 procedures, the annual reporting of the NMOC emission rate resumes using the site-specific NMOC concentrations. The recalculated Tier 2 NMOC Emission Rate Report must be submitted to the implementing agency within 180 days after calculating the initial NMOC emission rate exceedance [§ 60.757(c)(1)]. Subsequent annual reports must be submitted on the anniversary of the original Tier 1 Annual NMOC Emission Rate Report. The site-specific NMOC concentration is reverified through testing once every 5 years. Subsequent reports using the site-specific NMOC concentration continue until the NMOC emission rate cut-off is exceeded.

A landfill owner or operator may also elect to recalculate the NMOC emission rate after determining a site-specific methane gas generation rate through Tier 3 sampling and analysis. If a landfill owner or operator recalculates an NMOC emission rate less than 50 Mg/yr (55 tons/yr) using a methane gas generation rate determined from Tier 3 procedures, then the annual reporting of the NMOC emission rate resumes using the site-specific value. The recalculated NMOC Emission Rate Report, based on the Tier 3 sampling and analysis, must be submitted to the implementing agency within 1 year after calculating the initial NMOC emission rate exceedance [§ 60.757(c)(2)]. Subsequent reports using the site-specific NMOC concentration continue until the NMOC emission rate cut-off is exceeded. If using site-specific factors results in a landfill recalculating its NMOC emission rate as being equal to or greater than 50 Mg/yr, a notification of intent to install a collection system and control device or a Collection and Control System Design Plan Report must be submitted to the implementing agency within 1 year after first reporting an NMOC emission rate exceeding the cut-off.

Closure Report

The owner or operator of a controlled landfill that is preparing to permanently close the landfill must submit a closure report to the implementing agency within 30 days of waste acceptance cessation [§ 60.757(d)]. The report acknowledges that the landfill will no longer accept or dispose of refuse in the landfill unless a notification of modification is filed according to the procedures in § 60.7(a)(4). The implementing agency may request additional information to verify permanent closure of the landfill has taken place. An example of a Closure Report is included in appendix H.

Equipment Removal Report

An equipment removal report must be submitted to the implementing agency within 30 days prior to the removal or cessation of operation of a gas collection and control system [(§ 60.757(e)]. The report must include the following:

(1) A copy of the Landfill Closure Report;

(2) A copy of the Initial Performance Test Report, to demonstrate that the gas collection and control system has controlled emissions from the landfill for at least 15 years; and

(3) Copies of three successive NMOC Emission Rate Reports which document the NMOC emission rate (prior to the control device) as less than 50 Mg/yr. The test dates should be no closer than 90 days apart and no farther than 180 days apart.

Annual Compliance Report

The initial Annual Report for a gas collection and control system must be submitted to the implementing agency within 180 days after installation and start-up of the system [§ 60.757(f) and (g)]. The initial report is required to include the Initial Performance Test Report for the gas control system and the following information:

(1) Value and length of time for exceedances of monitored parameters under § 60.756. This would include reporting of monthly measurements of nitrogen or oxygen concentration and temperature within a well that exceed 20 percent nitrogen or 5 percent oxygen or 55 ^{o}C (131 ^{o}F), and methane concentrations in excess of 500 ppm above background. Reportable exceedances for control device operating parameters include 3-hour periods when combustor temperatures are outside the ranges established in the most recent performance tests, and periods when the pilot flame to a flare or the flare flame is absent;

(2) Description and duration of all periods when the gas stream from the collection system was diverted from the control device through a bypass line or had no flow;

(3) Description and duration of all periods when the gas control device was not operational for more than 1 hour and length of time the control device was not operational;

(4) All periods when the gas collection system was not operational in excess of 5 days;

(5) Each location where the landfill surface exceeded a methane concentration of 500 ppm, and the methane concentration measured at each location for which an exceedance was recorded in the previous month; and

(6) Date and location of all newly installed wells or collection system expansions.

Initial Performance Test Report

The landfill owner or operator is required to submit a performance test report (as specified in § 60.8) for the gas collection and control system. This report must be submitted to the implementing agency within 180 days after installation and start-up of the control system. The report must include the following information:

(1) A diagram of gas collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices; landfill areas excluded from control; and proposed sites for future collection system expansion.

(2) Data upon which the sufficient density of gas extraction devices and gas mover sizing are based.

(3) Documentation on the presence of asbestos or nondegradable material in areas where extraction wells have been excluded.

(4) Calculations and the sum of LFG gas generation rates for areas where extraction wells have been excluded.

(5) Provisions for increasing gas mover capacity if future gas generation rates exceed current equipment limits.

(6) Documentation to demonstrate the control of off-site gas migration.

2.2 EMISSION GUIDELINES (40 CFR PART 60, SUBPART Cc)

This section summarizes the EG applicability, regulatory requirements, and compliance schedule. The requirements of the EG parallel the requirements of the NSPS. The similarities between the EG and the NSPS are as follows:

(1) The same design capacity ($\geq$ 2.5 million Mg and 2.5 million m^3) and NMOC emission rate ($\geq$ 50 Mg/yr) levels are used to determine control requirements.

(2) The same emission controls (installing a gas collection and control system that achieves a 98 percent reduction of NMOC emissions) are required.

(3) The same operating limits exist for the landfill and emission control system.

(4) The same monitoring, recordkeeping, and reporting requirements exist.

(5) The same time intervals are allowed for completing compliance requirements.

(6) The same testing and calculating procedures (tier calculating procedures, Method 2E, Method 3C or 3A, and Method 25C or 18) are used.

Since the majority of requirements specified in the EG are identical to those requirements specified by the NSPS, only the differences in EG requirements are discussed in this section. The main differences between the EG and the NSPS are as follows:

(1) Applicability criteria are for "existing" landfills;

(2) There is flexibility in establishing the control requirements for a State-implemented emission standard;

(3) States need to develop a plan to implement the requirements of the EG; and

(4) There are different landfill compliance schedules for a State-implemented emission standard.

Each of these differences are discussed below.

2.2.1 Applicability Criteria for "Existing" Landfills

The EG apply to all MSW landfills that satisfy the two conditions listed below:

(1) The construction, modification, or reconstruction of the landfill began before the proposal date of May 30, 1991, and

(2) The landfill received waste on or after November 8, 1987 or has additional design capacity that may be filled in the future.

These landfills are defined as existing landfills. The EG do not apply to landfills that closed prior to November 8, 1987. (See Section 2.1.1 for a discussion of modification and Figure 2-1 for an illustration of whether a landfill is subject to the NSPS or EG based on its construction and modification history.)

2.2.2 Flexibility in Establishing Control Requirements for State-Implemented Emission Standards

State emission standards and compliance times must generally be as stringent as the EG. However, the EG offer some flexibility in that States may develop more stringent standards to address State and local concerns. In certain case-by-case situations, less stringent control is allowed. Flexibility in establishing a State emission standard is discussed further in MSW Landfills, Volume 2.

2.2.3 State Plan Development for Implementing the Requirements of the EG

State agencies must develop a plan for implementing the EG. The procedure for developing and submitting implementation plans for EG was established in 40 CFR Subpart B, Adoption and Submittal of State Plans for Designated Facilities.

The State Plan for controlling landfill emissions must be submitted to the EPA Administrator for review within 9 months after the promulgation date of the EG for MSW landfills [§ 60.23(a)]. The Administrator will approve or disapprove each State Plan (or portion thereof) within 4 months after the receipt date of the plan. If an adequate State Plan has not been submitted or approved by the Administrator within 6 months after the receipt date of the plan, the Administrator is authorized to promulgate a Federal Plan for the State [§ 60.27(d)]. The requirements for developing a State Plan to implement EG are discussed in detail in MSW Landfills, Volume 2.

2.2.4 Compliance Schedule for a State-Implemented Emission Standard

The compliance schedule and reporting requirements for the EG are similar to the NSPS except for the date to begin reporting. The State Plan will specify the date rather than beginning 90 days from the EG promulgation date. State Plans are required to include the same types of reporting and compliance steps as the NSPS. For example, a State Plan will include a specific date for the Initial Design Capacity Report and the NMOC Emission Rate Report. To be consistent with the EG, the date for the Design Capacity Report and the initial Annual NMOC Emission Rate Report should be within 90 days after the effective date of State Plan approval. If the report shows $\geq$ 50 Mg/yr NMOC, the landfill must comply within 30 months, the same interval as the NSPS. See section 3.2 of this document and MSW Landfills, Volume 2.

3.0 IMPLEMENTATION AND COMPLIANCE

Three required actions will be triggered by promulgation of the MSW landfill rule:

(1) Delegated authorities, which in most cases are the States, must implement and ensure compliance with the NSPS;

(2) States must develop a plan for implementing requirements of the EG; and

(3) States must implement and ensure compliance with requirements of the EG.

This section provides a discussion of these actions.

3.1 IMPLEMENTATION OF THE NEW SOURCE PERFORMANCE STANDARDS

New landfills are subject to the NSPS proposed under the authority of section 111(b) of the Act. The responsibility for implementing the NSPS lies with the EPA, but States may become the delegated authority. Under section 111(c)(1) of the Act, States may develop and submit to the Administrator a procedure for implementing and enforcing standards of performance for new sources. If the Administrator finds the State procedure to be adequate, the State is delegated the authority to implement and enforce the standards.

Implementing the NSPS

States can obtain the authority to implement NSPS by requesting delegation from the Administrator and writing an implementation and enforcement plan per section 111(c) of the Act. States that have been delegated authority are listed in 40 CFR § 60.4. As of 1995, 49 States, the District of Columbia, and three territories have received delegated authority to implement some or all NSPS.

The first activity for States with delegated authority is submission of an implementation and enforcement plan. Guidance on preparing NSPS implementation and enforcement plans is not provided in this document since this procedure is a familiar process for States.

How to Identify New MSW Landfills

A new landfill is a landfill that commenced construction, reconstruction, or modification on or after May 30, 1991 (see section 2.1.1 for how to make applicability determinations). States will need to develop and implement a strategy for identifying new landfills. Since State air agencies typically do not have an inventory of MSW landfills, it will be important to communicate with the State agency responsible for solid waste regulation.

States should have information on landfills located in their jurisdiction due to requirements of two federal statutes. States were required to develop solid waste management implementation plans under 40 CFR 256. Also, MSW landfill criteria were established under RCRA in 40 CFR 258. These criteria are applicable to all landfills that have received waste since October 9, 1991, except for those landfills that stopped receiving waste before October 9, 1993. In addition, solid waste agencies are required by RCRA to collect landfill design and construction information. Arrangements should be made to review State RCRA files on MSW landfills. From a review of these files, it should be possible to identify all of the new landfills.

The State air agency also needs to institute a mechanism for being notified when a new landfill is being planned. Since the need for a solid waste disposal permit is more obvious to landfill owners or operators, coordination with State personnel responsible for RCRA permitting of MSW landfills may be the most effective mechanism.

NSPS Title V Permitting

Title V of the Act requires sources affected by NSPS and/or EG to obtain a Title V operating permit under Part 70 and 71, unless the Administrator exempts a source category or part of a source category from permit requirements. (In States with approved Part 70 operating permit programs, sources will apply to the State for Part 70 permits; in States without Part 70 operating permit programs, EPA will implement the Federal operating permits program under Part 71.) Landfills that have design capacities greater than the design capacity cutoff (≥ 2.5 million Mg and 2.5 million m^3) are required to obtain Title V permits.

Landfills below the design capacity cutoff are not subject to the requirement to obtain a Part 70 or 71 (Title V) operating permit, unless the landfill is a major source or is subject for some other reason. "Major source" is defined in Part 70 and is based on emissions. In general, if a landfill emits more than 100 tons per year of any regulated criteria pollutant (e.g., VOC, NO_X) or more than 25 tons per year total hazardous air pollutants, it is a major source. If a landfill is located in a nonattainment area, the major source thresholds for criteria pollutants (e.g., VOC, NO_X) are lower. Landfills would also be subject to operating permit requirements if they are subject to another NSPS or NESHAP. If landfills below the design capacity cutoff are major sources or are subject for some other reason, they must obtain a permit under the same deadlines and requirements that apply to any other major source. If a landfill's design capacity is modified to be equal to or greater than the design capacity cutoff, the landfill will become subject to Title V, regardless of whether the landfill is a major source or not.

Landfills must apply for a Title V permit within 1 year of becoming subject to Title V. If a landfill was already subject to Title V prior to the NSPS or EG (e.g., because it was a major source), an application would already have been submitted. For landfills with design capacities ≥ 2.5 million Mg and 2.5 million m^3 that become subject to Title V permitting as a result of the NSPS or EG, the direct-final amendment notice (63 FR 32743, June 16, 1998) clarifies the date they become subject. Existing landfills become subject 90 days after the effective date of EPA's approval of the State plan. New landfills become subject 90 days after promulgation of the NSPS or 90 days after the date they commenced construction, modification, or reconstruction. By these dates the Design Capacity Report would be submitted and it would be clear whether or not the landfill exceeds the design capacity criteria. The permit application would be due within 1 year of these dates.

When a landfill is closed, and either never needed a control system to comply with the NSPS or EG, or meets the conditions for control system removal specified in the NSPS, a Part 70 or 71 operating permit is no longer required by the NSPS or EG if the landfill is not otherwise subject to the requirements of either Part 70 or 71. However, the landfill may still be subject to Part 70 or 71 for some other reason and, thereby, be required to have an operating permit.

Ensuring Compliance with the NSPS

Reports are the primary method for ensuring compliance with the NSPS. These reports begin with the Initial Design Capacity Report and conclude with the Landfill Closure and Control Equipment Removal Reports. This section provides a discussion on techniques States can use to do the following:

(1) ensure the proper reports are received;

(2) track receipt of the incoming reports; and

(3) ensure that each report includes accurate and complete information.

The reporting requirements and submittal schedules are detailed in section 2. Figure 3-1 illustrates the reporting sequence for an example landfill. This example landfill is defined as "new" because construction commenced on March 12, 1993. Landfills constructed or modified on or after the proposal date (May 30, 1991) and prior to March 12, 1996 must submit a Design Capacity Report by June 10, 1996. In this example, the design capacity is greater than the minimum size exemption limit of 2.5 million Mg and 2.5 million m^3 and the NMOC emission rate is equal to or greater than the emission rate cutoff of 50 Mg/yr. The example landfill stopped accepting waste on December 1, 2005.

Collecting Reports

The State may want to consider establishing an outreach program to facilitate receipt of the Initial Design Capacity Reports from each landfill. One objective of the outreach program would be to send example report forms for the landfills to complete and return. This

Report	Latest Submittal Date	Compliance Schedule
Design Capacity Report	June 10, 1996	Within 90 days after promulgation[a]
NMOC Emission Rate Report Based on TIER 1 Estimate (NMOC = 50 Mg/yr)	June 10, 1996	Within 90 days after promulgation[a]
Revised Emission Rate Report Based on TIER 2 Estimate (NMOC = 50 Mg/yr)	December 7, 1996	Within 180 days year after landfill estimates of NMOC emissions ≥ 50 Mg/yr
Design Plan for Collection and Control System	June 10, 1997	Within 1 year after estimating NMOC emissions ≥ 50 Mg/yr
Installation of Collection and Control System Completed	December 10, 1998	Within 30 months after reporting NMOC emissions ≥ 50 Mg/yr
Annual Report (and Control System Initial Performance Test Report)	June 8, 1999	Within every 180 days after installing control system
Landfill Closure Report	December 31, 2005	Within 30 days after the landfill stops accepting MSW
Control Equipment Removal Report	December 10, 2013	30 days prior to shutting down and removing, and at least 15 years after installing controls

[a]Promulgation date is March 12, 1996.

Figure 3-1. NSPS Reporting Sequence for an Example Landfill

would facilitate receiving the required information in a standard format. Example forms that could be used are included in appendix H.

The first report required by the NSPS is the Design Capacity Report. All landfills subject to the NSPS are required to submit this report. An example Design Capacity Report which includes all of these requirements is included in appendix H. Landfills with a design capacity below the minimum size exemption of 2.5 million Mg or 2.5 million m^3 are not subject to any other requirements of the regulations. (Except, if the landfill converted design capacity from mass to volume or from volume to mass to demonstrate that capacity is below 2.5 million Mg or 2.5 million m^3, they are required to recalculate site-specific density and design capacity annually, as explained in section 2.1.3.) Also, if the design capacity is changed such that it is $\geq$ 2.5 million Mg and 2.5 million m^3 (e.g., resulting from an increase in volume or a change in density), an Amended Design Capacity Report must be filed. Landfills with design capacities equal to or greater than 2.5 million Mg and 2.5 million m^3 must comply with the requirements of the NSPS. Table 3-1 shows the applicability of the NSPS and EG to MSW landfills. Figure 2-1 also illustrates applicability.

TABLE 3-1. APPLICABILITY OF THE NSPS AND EG TO MSW LANDFILLS

Landfill Maximum Design Capacity	Constructed, reconstructed, or modified after 5/30/91	Constructed, reconstructed, or modified before 5/30/91. Accepted waste after 11/8/87 or has additional capacity
< 2.5 million Mg or <2.5 million m^3	Must report design capacity. No further requirements.*	Must report design capacity. No further requirements.*
≥ 2.5 million Mg and ≥ 2.5 million m^3	Must comply with the requirements of the NSPS.	Must comply with the requirements of the EG.

*Except, if the landfill converted design capacity from mass to volume or from volume to mass to demonstrate that capacity is below 2.5 million Mg or 2.5 million m^3, they are required to recalculate site-specific density and design capacity annually, as explained in section 2.1.3.

The NMOC Emission Rate Report is due within the same time period as the Initial Design Capacity Report. An example letter that could serve as an Initial NMOC Emission Rate Report is shown in Figure 3-2. Landfills must estimate annual emissions according to the Tier method discussed in section 2. After submitting the initial NMOC Emission Rate Report, annual reporting is generally required. However, the NMOC emission rate may be reported on a 5-year basis if the estimated NMOC emissions are less than 50 Mg/yr in each of five consecutive years.

If the landfill's NMOC emission rate is 50 Mg/yr or more, the landfill must submit a Collection and Control System Design Plan prepared by a professional engineer. The design plan should either: (1) show that the planned collection and control system conforms to the criteria in § 60.759 for active collection systems, or (2) demonstrate that an alternative design is sufficient and addresses the criteria in § 60.752(b)(2). Appendix E provides guidance in reviewing both Collection and Control System Design Plans that conform to § 60.759 and alternative design plans. Also included are several case studies of collection systems.

State Air Agency Director
State Air Agency
Air Agency Address
Air Agency's Town, State, and Zip Code

RE: Initial NMOC Emission Rate Report as required by the MSW Landfill NSPS

Dear State Air Agency Director:

Facility A is currently regulated according to the MSW Landfill NSPS. Under the requirements of the regulations, Landfill A must submit an estimate of the NMOC emissions. The estimated NMOC emission rate is ___ Mg/yr. This estimate was calculated based on the Tier 1 procedures in the regulations. A copy of the calculations is enclosed

Sincerely,

Landfill A Owner or operator
enclosure

Figure 3-2. Example Initial NMOC Emission Rate Report

One of the last reports a landfill is required to submit is the Landfill Closure Report. The purpose of this report is to inform the State that the landfill has stopped accepting MSW. Figure 3-3 shows a sample letter that could serve as a Landfill Closure Report. The most important element of the letter is a statement that the landfill stopped accepting MSW on a certain day. Other information that may be helpful to the State is a reiteration of the design capacity, the initial date of waste acceptance, and the mass or volume of MSW in the landfill. The landfill should note whether there is remaining capacity. A sample Control Equipment Removal Report is provided in Figure 3-4. This report applies only to controlled landfills and will be the last report the State receives from a controlled landfill. This sample report form includes a statement that the landfill intends to remove, or cease operation of, the collection and control system. The regulations list three criteria that must be met before the landfill may stop operating the controls and remove them. Submittal of the Closure Report satisfies the first criteria. The letter should include statements certifying that the remaining criteria have been met. These criteria include:

(1) the control system has been in operation for at least 15 years; and

(2) three consecutive NMOC Emission Rate Test Reports with values less than 50 Mg/yr (prior to the control device) have been submitted.

As discussed in section 2, Annual Reports are also required for controlled landfills. Because the context of these reports will vary depending on the type of control and whether there have been monitoring parameter exceedances during the time period, a sample report form has not been provided.

Tracking Reports

As discussed above, providing standard report forms to landfill owners/operators can facilitate receiving the proper information in a consistent format. Another responsibility of the State is tracking receipt of reports so the status of each landfill can be readily determined. The State needs to be able to determine which reports have been received and what reports are expected.

State Air Agency Director
State Air Agency
Air Agency Address
Air Agency's Town, State, and Zip Code

RE: Landfill Closure Report as required by the MSW Landfill NSPS

Dear State Air Agency Director:

Facility A is currently regulated according to the MSW Landfill NSPS. Under the requirements of the regulations, Landfill A must submit a Landfill Closure Report within 30 days of ceasing to accept MSW. The last day of waste acceptance was March 20, 2009 and the landfill was closed on April 5, 2009. The closure is intended to be permanent.

The design capacity of the landfill is 2,750,000 Mg. The estimated quantity of refuse-in-place is 2,750,000 Mg. Therefore, there is no additional capacity.

Also note that Landfill A is not being controlled.

Sincerely,

Landfill A Owner or operator

Figure 3-3. Sample Letter to Report Landfill Closure

State Air Agency Director
State Air Agency
Air Agency Address
Air Agency's Town, State, and Zip Code

RE: Control Equipment Removal Report as required by the MSW Landfill NSPS

Dear State Air Agency Director:

Facility A is currently regulated according to the MSW Landfill NSPS. Under the requirements of the regulations, Landfill A must submit a Control Equipment Removal Report 30 days prior to ceasing to operate and removal of landfill gas collection and control equipment. Operation of the collection and control system is scheduled to cease on November 30, 2015.

The control system has been in operation since August 12, 1999. Therefore the minimum 15 year operating requirement has been fulfilled. As required by 60.757(e), a dated copy of the initial performance test report is enclosed to document the date of initial installation of the system. Also enclosed per 60.757(e), are dated copies of the three most recent NMOC Emission Rate Reports demonstrating that the landfill is no longer emitting more than 50 Mg/yr of NMOC.

Note that a Landfill Closure Report was submitted on August 20, 2013. The last day of waste acceptance was July 20, 2013 and the landfill was closed July 21, 2013

Sincerely,

Landfill A Owner or operator
enclosures

Figure 3-4. Sample Letter to Report Control Equipment Removal

Numerous reports may be required from each landfill. Therefore, it would be convenient to create separate files for each landfill. A suggested tool for tracking the incoming reports is to maintain a landfill report tracking log in each landfill's file. As reports are received, they could be noted in this log. This log would provide a summary of the reports received from each landfill. Therefore, any authorized person could immediately determine the status of a landfill by reviewing the log instead of searching through the entire file. For example, an inspector could prepare for a site visit using the log. This would eliminate the need for time-consuming file searches.

An example log is included in appendix K. An illustration of this log is also provided in Figure 3-5. This log provides a means of tracking incoming reports from landfills and indicating the next report expected from the landfill.

One of the first steps in using this log is to indicate the date the landfill becomes affected by the NSPS. This date should be indicated in the space noted as the "Trigger-Date." Once the trigger date has been established, the regulator can compute the due date for the next required reports. The log in appendix K provides a summary of the specified submittal times. When a report is received, the regulator should note the postmark date since it is the recognized date of receipt in the rule. In the example log, the "Due Date" and "Date Postmarked" are side-by-side so that it is clearly evident whether the report was received on time.

The example log also includes a column to note whether the report is acceptable. The report must include all of the information required by the NSPS. If the report is not acceptable, the regulator needs to inform the landfill of the inadequate report and make arrangements for the report to be resubmitted.

The last column in the example log provides space to indicate the next report expected from the landfill. This column provides the criteria for determining the nature of the next report. This allows the regulator to enter the due date for the next expected report. In some cases, the landfill may have an option, such as whether to install controls or refine the emission estimate. In such a case, the regulator may "pencil-in" the due date for possible reports.

Figure 3-5 does not include all possible reports since some reports must be submitted annually. The complete example report log included in appendix K has two attachments. Attachment A is used for tracking the NMOC Emission Rate Reports. These reports must be submitted annually, except when projected emissions are less than 50 Mg in each of five consecutive years. In this case, the Emission Rate Report may be submitted once every 5 years. Attachment B is used for tracking the Annual Reports. These reports must be submitted every 12 months after a collection and control system is installed. All landfills with capacities greater than 2.5 million Mg and 2.5 million m^3 must submit either the NMOC Emission Rate Reports or the Annual Reports.

The State should also consider maintaining a report tracking database or spreadsheet to track all of the incoming reports. There may be as many as 100 or more landfills in any State. All of the landfills that are subject to either the NSPS or the EG must submit an Initial Design Capacity Report. However, a relatively small percentage of these landfills will have design capacities of 2.5 million Mg and 2.5 million m^3 or more and will therefore be required to submit additional reports. Depending on the number of landfills in a State and the size of the landfills, the State may incur a significant administrative burden in processing the numerous reports from these landfills.

A suggested method of tracking the reports received from all landfills is to create a database or spreadsheet containing all the affected landfills and the due dates of expected reports. This would provide a summary of the reports expected from all of the landfills in the State's jurisdiction. An illustrative example of such a tracking spreadsheet is shown in Figure 3-6.

The first priority in tracking reports is to determine if all reports due by a certain date have been submitted. Therefore, the first column of the tracking spreadsheet is the report due date. The other columns include the date postmarked, report name, facility name, contact person, and contact phone number. Using a database or spreadsheet format allows the information to be sorted by any of the column headings, such as the report due date, report name, or facility.

The first step in creating such a spreadsheet is to enter the facility name, contact person, and contact phone number in the appropriate columns for all of the new landfills. This information could be obtained from the individual landfill files. Therefore, the first step is to enter "Initial Design Capacity Report" in the "Report" column, since all landfills must submit this report.

LANDFILL REPORT LOG

Trigger Date

___/___/___

FACILITY NAME: ____________________

CONTACT PERSON: ____________________

TELEPHONE NUMBER: ____________________

#	Report	Due Date	Date Postmarked	Acceptable (yes or no)	Comments	Actions if Report is Acceptable
1	Initial Design Capacity Report					If capacity is $\geq$ 2.5 million Mg and 2.5 million m^3, go to #2. If capacity is < 2.5 million Mg or 2.5 million m^3, no further action is required unless capacity is increased.
2	Initial NMOC Emission Rate Report					If NMOC emission rate is $\geq$ 50 Mg, go to #3 or #4. If NMOC emission rate is < 50 Mg, go to Attachment A (NMOC Emission Rate Report tracking form).
3	Collection and Control System Design Plan					Go to Attachment B (Annual Report tracking form).
4	Revised NMOC Emission Rate Report (Tier 2)					If NMOC emission rate is $\geq$ 50 Mg, go to #3 or #5. If NMOC emission rate is < 50 Mg, go to Attachment A (NMOC Emission Rate Report tracking form).
5	Revised NMOC Emission Rate Report (Tier 3)					If NMOC emission rate is $\geq$ 50 Mg, go to #3. If NMOC emission rate is < 50 Mg, go to Attachment A (NMOC Emission Rate Report tracking form).
6	Landfill Closure Report					
7	Control Equipment Removal Report					
8	Amended Design Capacity Report					If the amended design capacity is $\geq$ 2.5 million Mg and 2.5 million m^3 resulting from an increase in volume or a change in density, go to #2. If capacity is < 2.5 million Mg or 2.5 million m^3, this report is not required. No further action is required unless capacity is increased.

Figure 3-5. Landfill Report Tracking Log

REPORT TRACKING SPREADSHEET[a]

Date Report Expected	Date Postmarked	Report	Facility	Facility Contact Person	Contact Phone Number
1/27/99		Initial Control System Performance Test and Annual Report	Landfill A	J.A. Owner	(999) 444-2222
1/27/99		Annual Report	Landfill B	R.Q. Operator	(222) 999-3333
1/28/99		Revised Emission Rate Report (Tier 3)	Landfill C	B.J. Valadez	(444) 111-1111
1/28/99		Initial Design Capacity Report	Landfill D	J.R. Smith	(333) 666-2121
1/29/99		Collection and Control System Design Plan	Landfill E	L.M. Austin	(888) 454-3131
1/29/99		Emission Rate Report (Tier 1)	Landfill F	S.T. Barnes	(777) 123-0123

[a]This table shows all of the reports due from landfills during the period of January 27 through January 29, 1999.

Figure 3-6. Example Tracking Spreadsheet

The next compliance action can be obtained from the individual landfill report log. After determining the next required report, a new row must be created to indicate the report name and due date.

A convenient method for using the tracking spreadsheet would be to print a list of all the expected reports due that week. This could be accomplished by sorting the spreadsheet by the "Date Report Expected" column and printing all of the spreadsheet records for that week. As the reports are received, the regulator could note receipt by filling in the "Date Postmarked" column. At the end of the week, the regulator could then determine if any reports were not received. The example spreadsheet contains the contact person and telephone number for each landfill. This will facilitate follow-up on any delinquent or insufficient reports.

Reviewing Reports

After reports are received, the regulator needs to determine whether each report contains all the required information. Appendix F includes checklists for each report required by the NSPS. These reports include:

(1) Initial Design Capacity;
(2) Amended Design Capacity;
(3) Annual or 5-year NMOC Emission Rate;
(4) Revised NMOC Emission Rate (Tier 2);
(5) Revised NMOC Emission Rate (Tier 3);
(6) Collection and Control System Design Plan;
(7) Initial Control System Performance Test;
(8) Annual Reports;
(9) Landfill Closure; and
(10) Control Equipment Removal.

The regulator should complete the appropriate checklist for each report as the reports are received. The checklists provide a standard means of ensuring that all requirements of each report are met. In general, the questions in the checklists begin by asking whether the report was submitted within the required timeframe. The questions then follow the requirements in the regulations.

It is likely that some landfills will submit emission estimates or other calculations which do not adhere to those prescribed in the regulations. In such cases, it is the responsibility of the regulator to verify whether the procedures used by the landfill are acceptable. Because the rule specifies that NMOC emissions must be estimated using the Tier methodology, it is not acceptable for owners or operators to deviate from this methodology. The rule is not as specific regarding design capacity calculations, so the regulator will need to determine whether the landfill procedures are acceptable based on sound engineering practices.

3.2 STATE PLAN DEVELOPMENT FOR EG AND ACTIVITIES TO IMPLEMENT THEIR PLAN

Each State with existing landfills is required to submit a plan to the Administrator for implementing and enforcing the EG. State Plan development is discussed in detail in MSW Landfills, Volume 2. Volume 2 outlines how to develop a State Plan and describes the contents of State Plans. In addition, Volume 2 discusses the submittal and approval process and schedule, the flexibility allowed in State Plans, the relationship of State Plans to SIPs, compliance times, provisions for requirements other than those in the EG, and progress reports in plan enforcement. Volume 2 can be found on the EPA TTN Web as described on page iv of this volume.

This section provides an overview of the actions States must take to implement their plan and ensure that affected landfills are in compliance. For the purposes of this document, it is assumed that States will adopt the requirements of the EG completely. Compliance of a landfill with a State's plan includes determining which landfills are affected and ensuring that monitoring, reporting, and recordkeeping requirements are fulfilled. Compliance with the monitoring and recordkeeping requirements are determined through on-site inspections. Inspections are discussed in section 4.0. The primary means for States to determine whether landfills are complying with the EG is collection and review of reports. The reporting requirements for EG are the same as the NSPS except for the reporting schedule times.

Activities to Implement the EG

Implementing EG is similar to implementing the NSPS; States will first need to identify landfills subject to EG. Only landfills defined as "existing" are affected. Air agencies may be able to obtain information on these landfills from their solid waste counterparts since air agencies typically have limited, if any, information on MSW landfills.

The 1984 Hazardous and Solid Waste Amendments to RCRA required States to establish a permit program or other system of prior approval to ensure that facilities receiving household hazardous waste or small quantity generator hazardous waste are in compliance with 40 CFR Part 257. This permit program was to be established by November 8, 1987. This permit program is one available resource for States to use in locating landfills that are subject to the EG. Another source of information may be county and municipal governments.

One special consideration for identifying all of the existing landfills is that some may be closed. Identifying and locating owners or operators of closed landfills may be difficult; only landfills that have accepted MSW since November 8, 1987 are subject to the EG. Therefore, these landfills may have RCRA permits. Once a closed landfill has been identified, the State will need to identify and locate the owner or operator or responsible party.

After all the landfills subject to the EG are identified, the State must determine which will be affected by the EG. An Initial Design Capacity Report is required of all affected landfills. Landfills with design capacities less than the exemption level of 2.5 million Mg or 2.5 million m^3 have no further requirements unless the design capacity is increased above the exemption level. Table 3-1 in section 3.1 of this document illustrates applicability of the EG to MSW landfills. As shown in this table, existing landfills with design capacities above the minimum size exemption must comply with the requirements of the EG. The requirements of the EG are the same as for the NSPS. Therefore, the flow chart of the compliance actions presented in Figure 2-2 for the NSPS is also applicable to the requirements of the EG, except that the actions would be initiated on the date of State Plan approval or on a date specified by the State instead of on the promulgation date of the NSPS.

EG Title V Permitting

The Title V permitting requirements for landfills subject to the EG are the same as the Title V requirements for the NSPS. These requirements are discussed in section 3.1, NSPS Title V Permitting.

Ensuring Compliance with the EG

Receipt of the required reports is one method of ensuring compliance with the EG. Owners and operators of landfills must submit several different reports, according to the requirements in the EG. Table 3-2 shows the schedule for an example landfill. It is assumed that the capacity is greater than the minimum size limit and the emission rate cutoff. The table illustrates the sequence of reports the State should receive from the landfill.

The compliance reporting schedule for existing landfills generally follows the reporting requirements of the NSPS, except that rather than beginning reporting (Design Capacity Report and the Initial NMOC emission rate report) 90 days after the NSPS promulgation date, reporting begins with a set date in the State Plan. For consistency with Subparts Cc and WWW, these first two reports could be due 90 days after the effective date of the State standard or other enforceable mechanism. The same information required by the NSPS is required by the EG.

The same methods for ensuring compliance with the NSPS can be used for the EG. The following paragraphs provide a discussion on methods of facilitating the submittal and tracking of reports. These are the same methods previously discussed for ensuring compliance with the NSPS. Refer to the section on ensuring compliance with the NSPS for a more detailed discussion on these methods.

Providing standard reports for the landfills will facilitate receiving reports. The outreach program discussed in section 3.1 to assist in ensuring compliance with the NSPS can be used for all landfills affected by the NSPS and the EG. This outreach program would consist of providing standard report forms that the landfill owner or operator could complete and return to the State. Example report forms are provided in appendix H. These forms can be used by either existing landfills complying with the requirements of the EG and State Plan or new landfills complying with the NSPS.

A convenient method of tracking reports for each landfill is to maintain a log in the individual landfill files. An example of this type of form, referred to in section 3.1 as a Landfill Report Log, is included in appendix K. This log provides a means of noting each report, indicating the next expected report, and noting whether the report was acceptable. Refer to the section on ensuring compliance with the NSPS section for a detailed discussion on using this log.

Table 3-2. Schedule for MSW Landfill Compliance with the Emission Guidelines

Report	Compliance Schedule
Design Capacity Report	A set date in State Plan. For consistency with Subparts Cc and WWW, 90 days after the effective date of the state emission standard or other enforceable mechanism
Initial NMOC Emission Rate Report	A set date in State Plan. For consistency with Subparts Cc and WWW, 90 days after the effective date of the state emission standard or other enforceable mechanism
Collection and Control System Design Plan	A set date in State Plan. For consistency with Subparts Cc and WWW, the collection and control system design plan must be submitted within 1 year after the date of the landfill's submittal of the first Annual Emission Rate Report that shows that NMOC emissions first equal or exceed 50 Mg/yr of NMOC
Complete construction and installation of gas collection and control system	A set date in State Plan. For consistency with Subpart Cc, installation of a collection and control system capable of achieving compliance with the Emission Guidelines must be accomplished within 30 months after a landfill's emission rate first equals or exceeds 50 Mg/yr of NMOC.[1]
First Annual Compliance Report and initial performance test for MSW landfill control system	As scheduled in State Plan and for consistency with the NSPS general provisions, no later than 180 days after installation of the collection and control system

[1]On a case-by-case basis, the state may provide for a longer compliance schedule only if the state demonstrates in the Section 111(d) State Plan that the criteria in § 60.24(f) of Subpart B are met, and the EPA approves the compliance schedule.

The State should also consider using a database or spreadsheet in order to track reports received from all of the landfills in its jurisdiction. This tracking spreadsheet would enable the regulator to determine whether any landfills were delinquent in meeting the reporting requirements. The spreadsheet format discussed in the section 3.1 on ensuring compliance with the NSPS can also be used to track reports from landfills affected by EG. This spreadsheet can be used to indicate which reports have been received and which are expected by sorting the spreadsheet entries by the report due date. An illustration of this type of spreadsheet, referred to earlier as a Report Tracking Spreadsheet, was provided in Figure 3-6.

A convenient method for using this spreadsheet would be to print all of the reports due each week. This could be accomplished by sorting the spreadsheet by report due date and printing a hard copy of the reports due for a given week. This method would allow the regulator to post the hard copy and note each report as it is received. At the end of the period, the updated information could be entered and the next action expected by the landfill determined.

Reviewing Reports

The reports submitted under the requirements of the EG should be reviewed in the same manner as those submitted under the NSPS. Appendix F includes checklists to assist in reviewing the reports. These checklists provide a standard means for ensuring that all of the required information is included in the reports. In addition, some landfills may estimate emissions or perform calculations using procedures other than those prescribed in the regulations. In cases where the rule specifies a calculation methodology (i.e., the tier method for calculating NMOC emissions), it is not acceptable for landfill owners/operators to deviate from the rule. In cases where the rule is not specific (i.e., design capacity calculations), the regulator needs to verify that the procedures are acceptable based on sound engineering practices.

4.0 INSPECTION PROCEDURES

Inspections are an important part of the overall regulatory compliance program. Through inspections; regulatory authorities are able to verify compliance with the required monitoring and recordkeeping procedures and visually inspect control systems. This section provides guidance on how to prepare for and conduct inspections at MSW landfills affected by the NSPS and EG.

Since the requirements of the NSPS and EG are the same except for compliance schedules, the same procedures can be used for inspecting landfills affected by the NSPS or the EG. The guidance presented in this section applies to landfills affected by either regulation. Therefore, this section does not distinguish between landfills affected by the NSPS or EG.

This section presents guidelines for conducting an on-site compliance inspection. Section 4.1 provides guidance on how to prepare for the inspection. Section 4.2 presents the steps for conducting a compliance inspection, and references the corresponding on-site inspection checklists located in appendix G.

4.1 PREPARING FOR THE INSPECTION

Preparing for the inspection includes (1) the search and review of relevant files, (2) notification of landfill management concerning the upcoming inspection, and (3) obtaining necessary equipment and materials for the inspection. These preparation activities are discussed below.

Search and Review Files

Prior to conducting an inspection, the inspector should become familiar with the regulations; search the EPA, State, or local agency files; and review all relevant information related to the landfill targeted for inspection. The regulations require that landfills submit reports to the States, or the implementing agency. These reports should indicate whether the landfill is subject to the regulations. The required reports begin with the Design Capacity and NMOC Emission Rate Reports. Familiarity with the most recent compliance history of the landfill is useful in planning the inspection. Example report forms are included in appendix H.

These required reports should provide a compliance history for the subject landfill. From the reports, the inspector can determine what type of records must be kept by the landfill and what type of collection and control systems are required. It may also be helpful for the inspector to review the on-site checklists (provided in appendix G) in order to systematically review the file. If prior inspections of the landfill have been made, a review of the files will help the inspector prioritize areas of concern for the upcoming inspection.

Notify the Landfill

Since the primary means of determining compliance is the review of landfill records, the inspector should notify the landfill management prior to the inspection. This will allow landfill personnel time to gather and organize all relevant records and have them available for review. Landfill management should also provide a map and/or diagrams of the landfill to the inspector for use in planning spot checks of equipment and verifying the records.

Inspector's Materials and Equipment

The inspector needs to have suitable materials and equipment to perform an inspection. Materials such as pens, pencils, and writing tablets are obvious since results of the inspection need to be recorded. The primary means of recording an inspection is by completing previously prepared checklists. Checklists provide a standard approach and format for conducting and recording an inspection. Checklists for recording, monitoring, and control equipment are included in appendix G. Copies of these checklists should be made for each inspection.

In addition, the inspector may want to monitor surface methane concentrations during the inspection. In this case, an organic vapor analyzer (OVA), flame ionization detector (FID), or other portable monitor meeting the specifications provided in § 60.755(d) will be needed to monitor the methane emissions.

Also, the inspector may request permission from the landfill owner or operator to take photographs. Photographs can provide a large amount of information concerning the physical layout of the landfill and equipment. In addition, details of the equipment may be difficult to represent adequately in the checklists, but will be clear in photographs.

4.2 INSPECTION OF RECORDS AND EQUIPMENT

The inspection consists of three components: (1) review of landfill records, (2) visual inspection of the collection and control equipment, and (3) visual inspection of the monitoring equipment. All three of these components are discussed below.

Reviewing Records

During the visit, inspectors should verify that all records are maintained by the landfill and are accurate. The compliance recordkeeping checklist provided in appendix G is designed to assist in ensuring that all necessary records are kept on site and are up-to-date. This checklist is appropriate for landfills that are required to install collection and control systems (i.e., those with an emission rate at or above 50 Mg/yr). It is expected that agencies will target these landfills for inspections rather than those landfills that are below the emission rate cutoff.

The recordkeeping checklist is organized into six sections. The first section notes the general requirements for maintaining records. For example, records must be kept for at least 5 years and the records must be on site and accessible. The second section concerns the control equipment compliance determination. The landfill is required to demonstrate that the control equipment is in compliance. Records of compliance tests or other approved methods of demonstrating control equipment compliance must be maintained. The equipment operating parameters and exceedances are covered in the third section. This section assists the inspector in determining whether records of the operating parameters are maintained. The fourth section assists the inspector in verifying that records of the location and identification of the collection system wells are maintained. The checklist in the fifth section assists the inspector in verifying that, if the collection system does not collect LFG from areas that do not warrant controls or from areas that contain asbestos, appropriate records are maintained. Collection and control exceedances are noted in the sixth section.

Inspecting Collection and Control Equipment

Visual inspections enable the inspector to assess the condition of the collection and control equipment. Inspectors should note if there are discrepancies between the landfill records and visual inspections. Collection and control equipment should be checked for obvious leaks and lack of maintenance. A collection and control checklist is provided in appendix G to assist the inspector in determining whether the criteria for active collection systems in § 60.759 are being met. A site-specific collection system design plan must be approved. Visual observations of the collection system may be compared to the design plan in addition to or instead of the checklist.

During the visual inspection of the landfill equipment, the inspector may also choose to conduct monitoring to verify compliance. Surface methane emissions may be monitored to provide an indication of the performance; monitoring may be conducted in a manner similar to that described in the regulations or randomly as a spot check. The regulations state that methane emission monitoring shall be conducted along the perimeter of the collection area and along a path that traverses the landfill at 30-meter intervals, and where visual observations indicate elevated concentrations of landfill gas (e.g., distressed vegetation, cracks or seeps in the cover). Measurements are to be made in accordance with section 4.3.1 of Reference Method 21. When monitoring methane emissions, it is important that the probe inlet be placed within 5-10 centimeters of the ground. A complete description of Method 21 is given in appendix B. An OVA, FID, or other portable monitor meeting the specifications provided in § 60.755(d) will be needed to conduct the Method 21 procedures. Any reading of 500 parts per million or more above background levels at any location is considered an exceedance of the operational standards, and corrective action is required. However, an exceedance of 500 parts per million is not a violation if required corrective actions are taken. As required by the regulations, monitoring shall be performed during typical meteorological conditions.

Inspecting Monitoring Equipment

The inspector should verify that required monitoring equipment is installed on the collection and control equipment. A monitoring checklist is provided in appendix G to assist inspectors in determining whether the monitoring requirements in § 60.756 are being met.

APPENDIX A

EMISSION GUIDELINES (SUBPART Cc) AND NEW SOURCE PERFORMANCE STANDARDS (SUBPART WWW), AMENDMENTS TO SUBPARTS Cc AND WWW AND APPENDIX A - REFERENCE METHODS (METHOD 2E, METHOD 3C, AND METHOD 25C)

A1 Subparts Cc and WWW of 40 CFR Part 60 can be found as published in the Federal Register on March 12, 1996 (61 FR 9905) or on the internet at http://www.epa.gov/docs/fedrgstr/EPA-AIR/1996/March

A2 Amendments to Subparts Cc and WWW appeared as a direct final notice in the Federal Register on June 16, 1998 (63 FR 32743) and can also be found on the internet at http://www.epa.gov/docs/fedrgstr/EPA-AIR/1998/June

APPENDIX A1

Subparts Cc and WWW of 40 CFR Part 60 can be found as published in the Federal Register on March 12, 1996 (61 FR 9905) or on the internet at http://www.epa.gov/docs/fedrgstr/EPA-AIR/1996/March

§ 706.2 Certifications of the Secretary of the Navy under Executive Order 11964 and 33 U.S.C. 1605.

* * * * *

TABLE FIVE

Vessel	No.	Masthead lights not over all other lights and obstructions. annex I, sec. 2(f)	Forward masthead light not in forward quarter of ship. annex I, sec. 3(a)	After masthead light less than ½ ship's length aft of forward masthead light. annex I, sec. 3(a)	Percentage horizontal separation attained
* * * * *			*		*
USS PAUL HAMILTON	DDG 60	X	X	X	20.4
* * * * *			*		*

Dated: February 25, 1996

R. R. Pixa,

Captain, JAGC, U.S. Navy, Deputy Assistant Judge Advocate General (Admiralty).

[FR Doc. 96-5837 Filed 3-11-96; 8:45 am]

BILLING CODE 3810-FF-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 51, 52, and 60

[AD-FRL-5437-8]

RIN 2060-AC42

Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources: Municipal Solid Waste Landfills

AGENCY: Environmental Protection Agency (EPA)

ACTION: Final rule and guideline

SUMMARY: This action adds subparts WWW and Cc to 40 CFR part 60 by promulgating standards of performance for new municipal solid waste landfills and emission guidelines for existing municipal solid waste landfills. This action also adds the source category "municipal solid waste landfills" to the priority list in 40 CFR Part 60, § 60.16, for regulation under section 111 of the Clean Air Act These standards and emission guidelines implement section 111 of the Clean Air Act and are based on the Administrator's determination that municipal solid waste landfills cause, or contribute significantly to, air pollution that may reasonably be anticipated to endanger public health or welfare. The emissions of concern are non-methane organic compounds (NMOC) and methane. NMOC include volatile organic compounds (VOC), hazardous air pollutants (HAPs), and odorous compounds. VOC emissions contribute to ozone formation which can result in adverse effects to human health and vegetation. Ozone can penetrate into different regions of the respiratory tract and be absorbed through the respiratory system. The health effects of exposure to HAPs can include cancer, respiratory irritation, and damage to the nervous system. Methane emissions contribute to global climate change and can result in fires or explosions when they accumulate in structures on or off the landfill site. The intended effect of the standards and guidelines is to require certain municipal solid waste landfills to control emissions to the level achievable by the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

EFFECTIVE DATE: Effective on March 12, 1996.

ADDRESSES: Background Information Document The background information document for the promulgated standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Air Emissions from Municipal Solid Waste Landfills—Background Information for Final Standards and Emission Guidelines," EPA-453/R-94-021 The Background Information Document contains: (1) A summary of all the public comments made on the proposed standards and the Notice of Data Availability as well as the Administrator's response to these comments, (2) a summary of the changes made to the standards since proposal, and (3) the final Environmental Impact Statement, which summarizes the impacts of the standards.

Docket. Docket No. A-88-09, containing supporting information used in developing the promulgated standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, except for Federal holidays at the following address: U.S. Environmental Protection Agency, Air and Radiation Docket and Information Center (MC-6102), 401 M Street SW., Washington, DC 20460 [phone: (202) 260-7548] The docket is located at the above address in Room M-1500, Waterside Mall (ground floor). A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: For information on the regulation of municipal solid waste landfills, contact Ms. Martha Smith, Waste and Chemical Processes Group, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-2421

SUPPLEMENTARY INFORMATION:

Judicial Review

Under section 307(b)(1) of the Clean Air Act, judicial review of the actions taken by this notice is available *only* by the filing of a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by the EPA to enforce these requirements.

The following outline is provided to aid in locating information in the introductory text (preamble) to the final standards.

I. Acronyms, Abbreviations, and Measurement Units
  A. Acronyms
  B. Abbreviations and Measurement Units
  C. Conversion Factors and Commonly Used Units
II. Background
III. Summary of Considerations in Developing the Standards and Emission Guidelines
  A. Purpose of the Regulation
  B. Technical Basis of the Regulation
  C. Stakeholders and Public Involvement
IV. Summary of the Standards, Emission Guidelines, and Methods
V Impacts of the Standards and Emission Guidelines
  A. Environmental Impacts
  B. Cost and Economic Impacts
VI Significant Changes to the Proposed Standards and Emission Guidelines
  A. Design Capacity Exemption
  B. Emission Rate Cutoff
  C. Collection System Design Specifications
  D. Timing for Well Placement
  E. Operational Standards
  F. Surface Emission Monitoring
  G Model Default Values
VII. Permitting
  A New Source Review Permits
  B Operating Permits
VIII. Administrative Requirements
  A Docket
  B Paperwork Reduction Act
  C. Executive Order 12866
  D. Executive Order 12875
  E Unfunded Mandate Reform Act
  F Regulatory Flexibility Act
  G Miscellaneous

I. Acronyms, Abbreviations, and Measurement Units

The following definitions, acronyms, and measurement units are provided to clarify the preamble to the final rule.

A. Acronyms

BDT—best demonstrated technology
BID—background information document
CAA—Clean Air Act
CERCLA—Comprehensive Environmental Response, Compensation, and Liability Act
EG—emission guideline(s)
EPA—Environmental Protection Agency
FR—Federal Register
HAP—hazardous air pollutant
LFG—landfill gas
MSW—municipal solid waste
NMOC—nonmethane organic compounds
NPV—net present value
NSPS—new source performance standards
NSR—new source review
OMB—Office of Management and Budget
PSD—prevention of significant deterioration
RCRA—Resource Conservation and Recovery Act
VOC—volatile organic compound(s)

B. Abbreviations and Measurement Units

J/scm—joules per standard cubic meter
m—meter
Mg—megagram
mm—millimeter
ppm—parts per million
ppmv—parts per million by volume
tpy—tons per year
yr—year

C. Conversion Factors and Commonly Used Units

1 meter = 3.2808 feet
1 megagram ≈ 1.1023 tons = 2204.6 pounds
1 cubic meter = 35.288 cubic feet = 1.3069 cubic yards
1 cubic meter = 0.0008101 acre-feet
Degrees Celsius = (degrees Fahrenheit − 32)/1.8

II. Background

The United States Environmental Protection Agency (EPA) originally considered regulating MSW landfill emissions under a RCRA subtitle D rulemaking. However, the Administrator decided to regulate MSW landfill emissions under the authority of the CAA, and announced the decision in the Federal Register on August 30, 1988 (53 FR 33314). The EPA decided to propose regulation of new MSW landfills under section 111(b) of the CAA and to propose EG for existing MSW landfills under section 111(d).

The EPA published a proposal of this NSPS and EG in the Federal Register on May 30, 1991 (56 FR 24468)

Following the receipt of new data and changes in the modeling techniques, the EPA published a Notice of Data Availability in the Federal Register on June 21, 1993 (56 FR 33790).

Under the authority of section 111(b)(1)(A) of the CAA, today's notice adds the source category MSW landfills to the priority list in 40 CFR 60.16 because, in the judgement of the Administrator, it contributes significantly to air pollution which may reasonably be anticipated to endanger public health and welfare. Further rationale for this finding is contained in section 1.1.1 of the promulgation BID (EPA-453/R-94-021).

Today's notice promulgates the final NSPS and EG for MSW landfills. The promulgation BID "Air Emissions from Municipal Solid Waste Landfills—Background Information for Final Standards and Guidelines" (EPA 453/R-94-021) summarizes all public comments on the proposed NSPS and EG and the EPA responses. For further discussion of stakeholder and public involvement in the development of the rules see section III.C. of this preamble.

Recent information suggests that mercury might be emitted from landfills. The EPA is still looking at the possibility and will take action as appropriate in the future under the landfill national emission standards for hazardous air pollutants.

III. Summary of Considerations in Developing the Standards and Emission Guidelines

A. Purpose of the Regulation

Landfill gas emissions contain methane, carbon dioxide, and more than 100 different NMOC, such as vinyl chloride, toluene, and benzene. Studies indicate that MSW landfill gas emissions can at certain levels have adverse effects on both public health and welfare. The EPA presented concerns with the health and welfare effects of landfill gases in the preamble to the proposed regulations (56 FR 24468).

Briefly, specific health and welfare effects from LFG emissions are as follows: NMOC contribute to ozone formation; some NMOC are known or suspected carcinogens, or cause other noncancer health effects; NMOC can cause an odor nuisance; methane emissions present a well-documented danger of fire and explosion on-site and off-site, and contribute to global climate change as a major greenhouse gas. Today s rules will serve to significantly reduce these potential problems associated with LFG emissions.

B. Technical Basis of the Regulation

Today's regulations are based on extensive data analysis and consideration of several alternatives Prior to proposal, the EPA developed an extensive data base, using survey information from approximately 1,200 landfills, along with emissions information from literature, State and local agencies, and industry test reports. The preamble to the proposed regulations presented a detailed discussion of the data used to develop the rule and the regulatory alternatives considered (56 FR 24476).

After proposal, the EPA continued to gather new information and received new data through public comments. The EPA published this new information in a Notice of Data Availability on June 21, 1993 (56 FR 33790). In addition to public comments, the EPA held consultations with industry under the authority of Executive Order 12875 (See section VIII of this document for a detailed discussion of the Executive Order).

Based on the new information, the EPA re-assessed the impacts of the alternatives and made changes to the final regulation. The most significant changes to the regulation are summarized in section VI of this preamble. Detailed rationales for these changes as well as more minor changes are provided in the final BID (EPA 453/R-94-021).

In keeping with the EPA's common sense initiative, several of the changes were made to streamline the rule and to provide flexibility. Examples of this streamlining and increased flexibility include focusing control on the largest landfills, removing the gas collection system prescriptive design specifications, and more reasonable timing for the installation of collection wells. All of these changes are discussed further in section VI of this preamble.

C. Stakeholders and Public Involvement

Prior to proposal, in accordance with section 117 of the CAA, the EPA had consultations with appropriate advisory committees, independent experts, Federal departments and agencies. In addition, numerous discussions were held with industry representatives and trade associations.

After proposal, the EPA provided interested persons the opportunity to comment at a public hearing and through a written comment period. Comment letters were received from 60 commenters including industry representatives, governmental entities, environmental groups, and private citizens. A public hearing was held in Research Triangle Park, North Carolina, on July 2, 1991. This hearing was open to the public and five persons presented oral testimony on the proposed NSPS and EG.

On June 21, 1993, a supplemental notice of data availability to the May 30, 1991 proposal appeared in the Federal Register (58 FR 33790) The notice announced the availability of additional data and information on changes in the EPA's modelling methodology being used in the development of the final NSPS and EG for MSW landfills. Public comments were requested on the new data and comment letters were received from seven commenters.

Since the Notice of Data Availability, the EPA has held several consultations with State, local, and industry representatives in accordance with the October 26, 1993 Executive Order 12875 on *Enhancing the Intergovernmental Partnership*.

Major concerns expressed by participants in the consultations were identified by the EPA. These concerns included: the design capacity exemption level, collection system design and monitoring flexibility, and timing of well placement. These concerns and others raised at proposal and clarified in the consultations were addressed by revising the rule as described in section VI of this preamble.

IV. Summary of the Standards, Emission Guidelines, and Methods

The affected facility under the NSPS is each new MSW landfill. MSW landfills are also subject to the requirements of RCRA (40 CFR 257 and 258). A new MSW landfill is a landfill for which construction, modification, or reconstruction commences on or after the proposal date of May 30, 1991 or that began accepting waste on or after that date.

The EG require control for certain existing MSW landfills. An existing MSW landfill is a landfill for which construction commenced prior to May 30, 1991. An existing MSW landfill may be active, i.e., currently accepting waste, or have additional capacity available to accept waste, or may be closed, i.e., no longer accepting waste nor having available capacity for future waste deposition. The designated facility under the EG is each existing MSW landfill that has accepted waste since November 8, 1987.

The final rules (both the NSPS and EG) require affected and designated MSW landfills having design capacities below 2.5 million Mg or 2.5 million cubic meters to file a design capacity report. Affected and designated MSW landfills having design capacities greater than or equal to 2 5 million Mg or 2.5 million cubic meters are subject to the additional provisions of the standards or EG

The final standards and EG for MSW landfill emissions require the periodic calculation of the annual NMOC emission rate at each affected or designated facility with a maximum design capacity greater than or equal to 2.5 million Mg or 2.5 million cubic meters. Those that emit more than 50 Mg/yr are required to install controls.

The final rules provide a tier system for calculating whether the NMOC emission rate is less than or greater than 50 Mg/yr, using a first order decomposition rate equation. The tier system does not need to be used to model the emission rate if an owner or operator has or intends to install controls that would achieve compliance Chapter 1 of the promulgation BID (EPA 453/R-94-021) presents a complete discussion of the components of the tier system.

The BDT for both the NSPS and the EG requires the reduction of MSW landfill emissions from new and existing MSW landfills emitting 50 Mg/yr of NMOC or more with: (1) A well-designed and well-operated gas collection system and (2) a control device capable of reducing NMOC in the collected gas by 98 weight-percent.

A well-designed and well-operated collection system would, at a minimum: (1) Be capable of handling the maximum expected gas generation rate; (2) have a design capable of monitoring and adjusting the operation of the system; and (3) be able to collect gas effectively from all areas of the landfill that warrant control. Over time, new areas of the landfill will require control, so collection systems should be designed to allow expansion by the addition of further collection system components to collect gas, or separate collections systems will need to be installed as the new areas require control.

The BDT control device is a combustion device capable of reducing NMOC emissions by 98 weight-percent. While energy recovery is strongly recommended, the cost analysis is based on open flares because they are applicable to all affected and designated facilities regulated by the standards and EG. If an owner or operator uses an enclosed combustor, the device must demonstrate either 98-percent NMOC reduction or an outlet NMOC concentration of 20 ppmv or less. Alternatively, the collected gas may be treated for subsequent sale or use, provided that all emissions from any atmospheric vent from the treatment system are routed to a control device meeting either specification above.

The standards and EG require that three conditions be met prior to capping or removal of the collection and control system. (1) The landfill must be permanently closed under the requirements of 40 CFR 258.60; (2) the collection and control system must have been in continuous operation a minimum of 15 years; and (3) the annual NMOC emission rate routed to the control device must be less than the emission rate cutoff on three successive dates, between 90 and 180 days apart, based upon the site-specific landfill gas flow rate and average NMOC concentration

Section VI.E. of this preamble describes a new section of the NSPS, § 60.753, "Operational Standards for Collection and Control Systems." The EG also refer to this section. The provisions in this section include: (1) Collection of gas from each area, cell or group of cells in which non-asbestos degradable solid waste has been placed for a period of 5 years or more for active areas or 2 years or more for closed areas; (2) operation of the collection system with each wellhead under negative pressure, with a nitrogen level less than or equal to 20 percent (revised from 1 percent in the proposal, based on public comments) or an oxygen level less than or equal to 5 percent (a new provision); (3) operation with a landfill gas temperature less than 55 °C (a new provision) at each well transporting the collected gases to a treatment or control device designed and operated in compliance with § 60.752(b)(2)(iii) of the NSPS and operated at all times when the collected gas is vented to it; and (4) a requirement that the collection system be operated to limit the surface methane concentration to 500 ppm or less over the landfill as determined according to a specified monitoring pattern.

Owners and operators must determine compliance with the standards for the collection systems and control devices according to § 60.755. Changes made to the final compliance determination and monitoring procedures as a result of comments are discussed in detail in the BID (EPA 453/R-94-021). The §§ 60.757 and 60.758 of the NSPS and § 60.35(c) of the EG contain recordkeeping and reporting requirements. Changes have been made to the recordkeeping and reporting requirements to allow for consistency with the final compliance requirements.

V. Impacts of the Standards and Emission Guidelines

A. Environmental Impacts of Promulgated Action

The estimated environmental impacts have changed somewhat from those presented in the preamble to the proposed regulations as a result of changes in the final rules and changes in the estimation methodology. These changes were made in response to public comments. Additional data were also incorporated and are described in the supplemental Notice of Data Availability (56 FR 33790). The analysis of environmental impacts presented in this document, along with the proposal and promulgation BID's, and memoranda in the docket constitute the Environmental Impact Statement for the final standards and guidelines.

For most NSPS, emission reductions and costs are expressed in annual terms. In the case of the NSPS and EG for landfills, the final regulations require controls at a given landfill only after the increasing NMOC emission rate reaches the level of the regulatory cutoff. The controls are applied when the emissions exceed the threshold, and they must remain in place until the emissions drop below the cutoff. However, this process could take as long as 50 to 100 hundred years for some landfills. During the control period, costs and emission reductions will vary from year to year. Therefore, the annualized numbers for any impact will change from year to year. Because of the variability of emission reductions and costs of the final standards and EG over time, the EPA judged that the NPV of an impact is a more valuable tool in the decision process for landfills and has used NPV in the development of both the proposal and final nationwide impacts. The NPV is computed by discounting the capital and operating costs and emission reductions that will be incurred throughout the control periods to arrive at a measure of their current value. In this way, the NPV accounts for the unique emission patterns of landfills when evaluating nationwide costs and benefits over different discrete time periods for individual sources. Thus, the impacts presented include both annualized estimates and estimates expressed in terms of NPV in 1992.

1. Air Emissions

The methodology for estimating the impacts of the NSPS and EG is discussed in the proposal BID and in memoranda in the docket. The analysis of impacts for the NSPS is based on new landfills (beginning construction after May 30, 1991) that are projected to begin accepting waste over the first 5 years of the standards. The NPV of the emission reduction achieved by the final standards is estimated to be 79,300 Mg, which reflects a 50 percent reduction from the NPV of the baseline emissions of 160,000 Mg. Substantial reduction of methane emissions is also achieved. Table 1 presents the emission reductions of the final NSPS in annualized values as well as NPV.

TABLE 1.—SUMMARY OF EMISSION REDUCTION AND COST IMPACTS FOR THE NSPS

	NPV	Annualized
Baseline NMOC Emissions [a] (Mg)	160,000	13,400
NMOC Emission Reductions (Mg)	79,300	4,860
% NMOC Emission Reduction	50%	36%
Baseline Methane Emissions [a] (Mg)	10,600,000	899,000
Methane Emission Reduction [b] (Mg)	3,890,000	193,000
% Methane Emission Reduction	37%	21%
Cost (Million $)	97	4

[a] In the absence of an NSPS. This does not include landfills closed prior to November 8, 1987.
[b] This does not enclude landfills expected to undertake profitable energy recovery.

For existing landfills, the NPV of the NMOC emission reduction achieved by the final EG is estimated to be 1.1 million Mg, or a 53 percent reduction from a baseline of 2.07 million Mg (NPV). The NPV of the methane reduction is estimated to be 47 million Mg. Table 2 presents the emission reductions of the final EG in annualized values as well as NPV. Note that the baseline methane emissions do not include landfills closed prior to November 8, 1987, and that methane reductions shown in Tables 1 and 2 do not include landfills expected to undertake profitable energy recovery. Total methane reductions are anticipated to be on the order of 7 million megagrams in the year 2000.

TABLE 2.—SUMMARY OF EMISSION REDUCTION AND COST IMPACTS FOR THE EMISSION GUIDELINES

	NPV	Annualized
Baseline NMOC Emissions[a] (Mg)	2,070,000	145,000
NMOC Emission Reductions (Mg)	1,100,000	77,600
% NMOC Emission Reduction	53%	54%
Baseline Methane Emissions[b] (Mg)	120,000,000	8,440,000
Methane Emission Reduction (Mg)	47,000,000	3,370,000
% Methane Emission Reduction	39%	40%
Cost (Million $)	1,278	90

[a] In the absence of EG. This does not include landfills closed prior to November 8, 1987.
[b] This does not enclude landfills expected to undertake profitable energy recovery.

As existing landfills are filled, closed, and replaced by new landfills, the actual annual emissions reductions achieved by the guidelines will decrease, while the reductions achieved by the standards will increase.

Certain by-product emissions, such as NO_X, CO, SO_X, and particulates, may be generated by the combustion devices used to reduce air emissions from MSW landfills. The types and quantities of these by-product emissions vary depending on the control device However, by-product emissions are very low compared to the achievable NMOC and methane emission reductions Chapters 4 and 6 of the proposal BID (EPA-450/3-90-011a) present additional information about the magnitude of potential secondary air impacts.

2 Water

Landfill leachate is the primary potential source of water pollution from a landfill. Although there is no data on the effect of gas collection on leachate composition. the amount of water pollution present as NMOC in the leachate may be reduced under these standards and guidelines

When LFG is collected organics and water are condensed inside the header pipes of the gas collection system This waste also contains NMOC and various toxic substances present in the LFG The pH of this condensate is normally adjusted by adding caustic at the landfill and then routing it to a public treatment works where it would be treated and discharged. At this time, there is insufficient data available to quantify the effects of the rule on leachate.

3. Solid Waste

The final NSPS and EG will likely have little impact on the quantity of solid waste generated nationwide. Aside from the disposal of the collection and control system equipment once it can be removed from the landfill no other solid wastes are expected to be generated by the required controls The increased cost of landfill operation resulting from the control requirements may cause greater use of waste recycling and other alternatives to landfill disposal, leading to a decrease in landfill use. However, quantification of such an impact is not possible at this time.

4. Superfund Sites

Municipal solid waste landfill sites comprise approximately 20 percent of the sites placed by the EPA on the national priorities list. Often, remedial actions selected at these sites include venting methane and volatile organic contaminants, which would be controlled as necessary to protect human health and the environment.

The final NSPS and EG may affect remedial actions under Superfund for MSW landfills. Section 121(d)(2) of CERCLA requires compliance with the substantive standards of applicable or relevant and appropriate requirements (ARAR) of certain provisions in other environmental laws when selecting and implementing on-site remedial actions. "Applicable" requirements specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a Superfund site "Relevant and appropriate" requirements are not legally applicable, but may address problems or situations sufficiently similar to those encountered so that their use is well suited to a particular site. See 40 CFR 300.5 (55 FR 8814, 8817. March 8, 1990)

These air emission rules will apply to new MSW landfills, as well as to those facilities that have accepted waste since November 8, 1987, or that have capacity available for future use. For CERCLA municipal landfill remediations, these requirements would be potential ARAR for all Records of Decision signed after the date of promulgation. These NSPS and EG will be applicable for those MSW landfill sites on the national priorities list that accepted waste on or after November 8, 1987, or that are operating and have capacity for future use. These standards may also be determined relevant and appropriate for sites that accepted wastes prior to November 8, 1987. The determination of relevance and appropriateness is made on a site-specific basis pursuant to 40 CFR 300.400(g) (55 FR 8841, March 8, 1990). Because the NSPS and EG apply only to landfills with design capacities greater than or equal to 2.5 million Mg or 2.5 million cubic meters, the collection and control requirements may not be relevant and appropriate for smaller landfills.

Given the significant public policy benefits that result from the collection and processing of landfill gas, Congress, as part of the 1986 SARA Amendments, enacted CERCLA Section 124 to provide broad liability protection for companies engaged in landfill gas recovery or processing. Landfill gas emissions, in addition to being a significant source of air pollution, can leach underground and cause explosions in nearby residences. If recovered, landfill gas could supply as much as 1 percent of the U.S. energy requirements.

CERCLA Section 124 states that owners or operators of equipment installed "for the recovery or processing (including recirculation of condensate) of methane" shall not be liable as a CERCLA "owner or operator" under CERCLA Section 101 (20) nor shall they be deemed "to have arranged for disposal or treatment of any hazardous substance* * *" pursuant to CERCLA Section 107. Exceptions are provided (1) where a release is primarily caused by activities of the landfill gas owner/operator or (2) where such owner/operator would be otherwise liable due to activities unrelated to methane recovery.

Since passage of CERCLA section 124, methane emissions have been targeted by the EPA as a large contributor to global warming (18 percent) and landfills are one of the largest source of methane emissions (36 percent). Because of this, the EPA's Atmospheric Pollution Prevention Division has initiated the Landfill Methane Outreach Program to promote landfill gas collection projects at the 750 landfills where methane could profitably be recovered. Methane recovery, as compared with collection and flaring of landfill gas without recovery, results in significantly less emissions. It also can greatly reduce the financial burden on local governments (as well as taxpayers) since the energy recovered can be sold to utilities or other consumers and thereby create a revenue stream that may cover the costs of collection and recovery.

The EPA is aware that the standards and guidelines promulgated today for control of emissions at municipal solid waste landfills may change the focus of the landfill gas collection and processing for methane recovery. The landfill gas owner/operator will now need to consider how the collection and recovery of methane will impact on controlling the MSW landfill emissions. It is also likely that the landfill gas owner/operator will be asked to advise and in some cases help implement the MSW landfill's compliance obligations. These related objectives, the control of emissions at municipal solid waste landfills in order to comply with the Clean Air Act Amendments and the reduction of methane emissions in order to mitigate global warming, will need to be coordinated in carrying out common activities such as laying a system of collection piping at a given landfill.

In promulgating today's standards and guidelines, the EPA wants to promote the policy incorporated in CERCLA Section 124. Recognizing the chilling effect that potential CERCLA liability might otherwise have on landfill gas collection or processing activities, the EPA interprets CERCLA Section 124 in a manner that will encourage the beneficial recovery of methane. Specifically, EPA believes that Congress intended Section 124 to provide liability protection to owners and operators of equipment for the recovery or processing of methane with respect to all phases involved in landfill gas collection and methane processing. This includes any assistance (related to recovery or processing of methane) provided by the landfill gas equipment owner or operator to the landfill owner/operator for achieving compliance with the emission standards promulgated today or similar Federal, State, or local controls on landfill emissions. In general, Section 124 will be interpreted in a manner to provide owners and operators of equipment for the recovery or processing of methane with comprehensive protection from CERCLA liability, unless the release or threatened release was primarily caused by activities of the owners and operators of the equipment, or unless such owners or operators would be otherwise liable under CERCLA.

B. Energy and Economic Impacts of Promulgated Action

The energy and economic impacts are summarized in chapter 1 and fully discussed in chapter 3 and appendix A of the promulgation BID (EPA-453/R-94-021). The estimated impacts have changed somewhat as a result of changes in the final rules and changes in the impacts estimation methodology made in response to public comments.

1. Energy Impacts

Affected and designated landfills with NMOC emission rates of 50 Mg/yr or more are required to install a gas collection system and control device. The gas collection system would require a relatively small amount of energy to run the blowers and the pumps. If a flare is used for control, auxiliary fuel should not be necessary because of the high heat content of LFG, commonly 1.86×10^7 J/scm or more. If a recovery device such as an internal combustion (I.C.) engine or a gas turbine is used, an energy savings would result.

The EPA evaluated the overall energy impacts resulting from the use of flares, I.C. engines, or gas turbines for control of collected emissions at all affected landfills The least cost control option was identified by taking the NPV costs of the three control options (flares, I.C. engines, and turbines), including any cost savings from the use of recovered landfill gas, and determining the option that costs the least. If landfills use the least cost control device, it is estimated that the NSPS will produce $170 million of energy revenue as NPV in 1992 The EG are estimated to generated $1 5 billion of energy revenue as NPV in 1992, if the least cost control device is used.

2. Control Costs and Economic Impacts

Nationwide annualized costs for collection and control of air emissions from new MSW landfills are estimated to be $4 million. The nationwide cost of the EG would be approximately $90 million. These values are annualized costs. Tables 1 and 2 present costs in both annualized and NPV values. In comparison to other solid waste-related rules, the nationwide costs of the recently promulgated RCRA Subtitle D (40 CFR 257 and 258) rule are estimated to be $300 million per year and the estimated nationwide costs of the MWC rules promulgated in 1991 are estimated to be $170 million per year for new combustors and $302 million per year for existing combustors (56 FR 5488 and 5514).

The incremental costs and benefits of the different options are presented in tables 3, 4, 5, and 6 in section VIII.E. For NMOC, the average cost effectiveness is approximately $1,200/Mg for both the NSPS and the EG. Preliminary economic analysis indicates that the annual cost of waste disposal may increase by an average of approximately $0.60 per Mg for the NSPS and $1.30 per Mg for the EG. Costs per household would increase approximately $2.50 to $5.00 per year, when the household is served by a new or existing landfill, respectively. Additionally, less than 10 percent of the households would face annual increases of $15 or more per household as a result of the final EG. However, the EPA anticipates that many landfills will elect to use energy recovery systems, and costs per household for those areas would be less. The EPA has concluded that households would not incur severe economic impacts. For additional information, please refer to the regulatory impact analysis (Docket No. A-88-09, Item No. IV-A-7) and chapter 3 of the promulgation BID (EPA-453/R-94-021).

VI. Significant Changes to the Proposed Standards and Emission Guidelines

All of the significant public comments received on the proposed standards and EG and the Notice of Data Availability are addressed in the promulgation BID (EPA-453/R-94-021). This section of the preamble reviews the major changes to the standards and EG resulting from public comments. A more detailed rationale for these changes is provided in chapters 1 and 2 of the promulgation BID (EPA-453/R-94-021).

A. Design Capacity Exemption

A design capacity exemption of 100,000 Mg was included in the proposed NSPS and EG to relieve owners and operators of small landfills that the EPA considered unlikely to emit NMOC above the emission rate cutoff requiring control from undue recordkeeping and reporting responsibilities. Commenters indicated that the exemption level was too low, and would still impact many small businesses and municipalities. In response to these comments and as a result of changes to the nationwide impacts analysis, the design capacity exemption in the final NSPS was revised to 2.5 million Mg. The 2.5 million Mg exemption level would exempt 90 percent of the existing landfills while only losing 15 percent of the total NMOC emission reduction. Most of the exempt landfills are owned by municipalities. The 2.5 million Mg level was chosen to relieve as many small businesses and municipalities as possible from the regulatory requirements while still maintaining significant emission reduction.

This cutoff excludes those landfills who would be least able to afford the costs of a landfill gas collection and control system and are less likely to have successful energy recovery projects. However, depending on site-specific factors including landfill gas characteristics and local markets, some landfills smaller than the design capacity exemption level may be able to make a profit by installing collection and control systems that recover energy. While the rule does not require control of landfills smaller than 2.5 million Mg, the EPA encourages energy recovery in cases where it is profitable. The EPA has developed a Landfill Methane Outreach Program to encourage more widespread utilization of landfill gas as an energy source. Information can be obtained by calling the Landfill Methane Outreach Program Hotline at (202) 233-9042. Available publications are identified in section 1.2.1 of the promulgation BID.

Since some landfills record waste by volume and have their design capacities calculated in volume, the EPA also established an equivalent design capacity exemption of 2.5 million m^3 of waste. The density of solid waste within different landfills varies depending on several factors, including the compaction practices. Any landfill that reports waste by volume and wishes to establish a mass design capacity must document the basis for their density calculation

B. Emission Rate Cutoff

Some commenters asserted that the proposed emission rate cutoff of 150 Mg/yr should be made more stringent, while others favored the proposal cutoff or higher The commenters favoring the more stringent level indicated that the EPA's data on NMOC concentration, the benefits of energy recovery and reduced global warming, and the reduced health risks all supported an increased stringency level.

The Climate Change Action Plan, signed by the President in October, 1993 calls for EPA to promulgate a "tough" landfill gas rule as soon as possible. This initiative also supports a more stringent emission rate cutoff that will achieve greater emission reduction.

Due to the small-size exemption, only landfills with design capacities greater than 2 5 million Mg of waste or 2.5 million cubic meters of waste will be affected by this rule. It is estimated that a landfill of 2.5 million Mg design capacity corresponds to cities greater than about 125,000 people. On the whole, large landfills service areas with large population. A reasonable assumption is that many of these large landfills are in the 400 counties that have been designated as urban ozone nonattainment areas and are developing plans to address ozone nonattainment.

Finally, the new data and modeling methodologies, which were published in the Notice of Data Availability on June 21, 1993, significantly reduced the emission reduction and corresponding effectiveness of the rule. Therefore, a more stringent emission rate cutoff would achieve similar emission reductions at similar cost effectiveness to the proposed rule.

Based on all of these reasons, the EPA reevaluated the stringency level and chose an emission rate cutoff of 50 Mg/yr of NMOC for the final rules. This revision would affect more landfills than the proposal value of 150 Mg/yr of NMOC; however, the 50 Mg/yr of NMOC will only affect less than 5 percent of all landfills and is estimated to reduce NMOC emissions by approximately 53 percent and methane emissions by 39 percent. The 150 Mg/yr emission rate cutoff would have reduced NMOC emissions by 45 percent and methane emissions by 24 percent. The incremental cost effectiveness of control of going from a 150 Mg/yr cutoff level to a 50 Mg/yr cutoff level is $2,900/Mg NMOC reduction for new landfills and $3,300/Mg for existing landfills.

The values for NMOC cost effectiveness do not include any credit for the benefits for toxics, odor, explosion control, or the indirect benefit of methane control. A revised cost effectiveness could be calculated with an assumed credit value for one or more of the other benefits. As an example, assuming a $30/Mg credit for the methane emission reduction, the incremental cost effectiveness from the proposal cutoff of 150 Mg/yr to the final cutoff of 50 Mg/yr would be reduced to $660/Mg NMOC.

C. Collection System Design Specifications

Commenters indicated that the proposed design specifications for the collection system were overly prescriptive, discouraged innovation, and did not prevent off-site migration of LFG. In the new § 60.759 for design specifications, certain criteria still require proper landfill gas collection; however, the proposed design specifications for the LFG collection system were removed from the final regulations Instead, the final rule allows sources to design their own collection systems. Design plans must meet certain requirements and be signed by a registered professional engineer, and are subject to agency approval. These changes were made to provide flexibility and encourage technological innovation.

D. Timing for Well Placement

The proposed regulations required the installation of collection wells at applicable landfills within 2 years of initial waste placement. Commenters indicated that the installation of wells within 2 years was not practiced at many landfills, because many cells were still active (receiving waste) 2 years after initial placement Collection wells installed at these cells would have to be covered over, which would decrease the operational life of the well and be costly and inefficient.

The proposed timing for the placement of collection wells has been revised to reduce costs and better coincide with common operational practices at MSW landfills. The final regulation allows for well installation up to 5 years from initial waste placement for active cells. An area that reaches final grade or closure must install collection wells within 2 years of initial waste placement.

E. Operational Standards

In response to commenters concerns about the operation of collection systems, the final NSPS contains a new section, § 60.753, "Operational Standards for Collection and Control Equipment." Various operational provisions that had previously been located throughout the proposed rule have been organized under this one section, and new provisions on collection and control systems have been added The new section addresses the following areas. (1) Collection of gas from active areas containing solid waste older than 5 years (changed from 2 years at proposal); (2) operation of the collection system with negative pressure at each wellhead (except as noted in the rule); (3) operation of the collection system with a landfill temperature less than 55°C (or a higher established temperature) and either an N_2 level less than or equal to 20 percent or an O_2 level less than or equal to 5 percent; (4) operation of the collection system with a surface concentration less than 500 ppm methane; (5) venting all collected gases to a treatment or control device; and (6) operation of the treatment or control device at all times when the collected gas is routed to the control device. The numerical requirements (for the N_2 or O_2 levels, landfill temperature, and surface concentration) are new requirements that will verify that the system is being adequately operated and maintained. In conjunction with the new operational provisions, the compliance, testing and monitoring sections were revised to reference and support these new or relocated provisions.

F. Surface Emission Monitoring

Numerous commenters asserted that the proposed rules did not address surface methane emissions resulting from insufficient well spacing or from breaks in the cover material. The commenters recommended that monitoring of surface emissions be required to ensure the proper operation of collection system equipment. Upon further analysis, the EPA decided to require surface emission monitoring and the maintenance of negative pressure at all wells, except under specified conditions, to ensure proper collection system design and operation. Based on information submitted by commenters, a maximum surface concentration of 500 ppm methane should be demonstrated to indicate proper operation of the collection system. Monitoring is to be done quarterly, with provisions for increasing monitoring and corrective procedures if readings above 500 ppm are detected. Instrumentation specifications, monitoring frequencies, and monitoring patterns have been structured to provide clear and straightforward procedures that are the minimum necessary to assure compliance.

G Model Default Values

The EPA received additional data after proposal on the model defaults that were included in the tier system calculations These default values are used to calculate whether the NMOC concentration is above the cutoff level for control requirements of 50 Mg/yr. The new information received lead the EPA to revise the default values for the site-specific methane generation rate constant (k), the methane generation potential (L_0), and the NMOC concentration (C_{NMOC}). In the absence of site-specific data, the landfill owner or operator would use the default values for k, L_0, and C_{NMOC} in order to estimate the annual NMOC emission rate More information on the model defaults may be found in the final BID (EPA-453/R-94-021) and the memorandum "Documentation of Small-Size Exemption Cutoff Level and Tier 1 Default Values (Revised)," October 21, 1993, (Docket No A-88-09, Item No. IV-B-5).

The Tier 1 default values of k, Lo, and C_{NMOC} tend to overstate NMOC emission rates for most landfills, and are intended to be used to indicate the need to install a collection and control system or perform a more detailed Tier 2 analysis. It is recommended that these default values not be used for estimating landfill emissions for purposes other than the NSPS and EG. The EPA document "Compilation of Air Pollution Emission Factors" (AP-42) provides emission estimation procedures and default values that can be used for emissions inventories and other purposes.

VII. Permitting

A. New Source Review Permits

Today's rulemaking under section 111(b) establishes a new classification of pollutants subject to regulation under the CAA: "MSW landfill emissions." Therefore, PSD rules now apply to all subject stationary sources which have increases in landfill gas above the significance level, 50 tpy or more of NMOC. Landfills below the 2.5 million Mg design capacity exemption, which are not required by the regulations to install controls, may exceed this significance level. In this case, the State will need to determine if controls should be installed for purposes of PSD or NSR compliance.

The proposed significance level for MSW landfill emissions of 40 tpy of NMOC was changed to 50 tpy after consideration of public comments. The PSD significance level for VOC emissions is 40 tpy. At proposal, the landfill gas emission level was set at 40 tpy of NMOC to be consistent with the 40 tpy level for VOC. However, NMOC contains organic compounds that are not VOC An NMOC emission rate of roughly 50 tpy corresponds to a VOC emission rate of 40 tpy.

The components of MSW landfill emissions that are regulated as pollutants or precursors of an air pollutant listed under section 108 of the CAA are also regulated by other provisions of CAA as applicable For example, the components of MSW landfill emissions that are emitted as photochemically reactive VOCs are regulated, as applicable, under the nonattainment provisions for ozone contained in part D of title I of the CAA.

B. Operating Permits

Section 502 of the CAA and § 70.3(a) require any source subject to standards or regulations under section 111 of the CAA to obtain part 70 operating permits. However, landfills below 2.5 million Mg design capacity are not subject to standards under section 111 because they are not required to put on controls and are not subject to emission limits These landfills are subject to a reporting requirement under the section 111 rule; however, this requirement determines applicability of the standard and does not make them "subject" for the purposes of part 70. Consequently, landfills below 2.5 million Mg design capacity are not subject to part 70, provided they are not major sources; and this is stated in § 60.752(a) of the rule. If landfills below 2.5 million Mg design capacity are major sources, they must obtain a part 70 permit under the same deadlines and requirements that apply to any other major source. States may request additional information to verify whether landfills have the potential to emit at major source levels.

For landfills above the 2.5 million Mg design capacity exemption, part 70 operating permits are required. These landfills are subject to emission limits and will most often be major sources. Since landfill emissions increase over time, a landfill over 2.5 million Mg may not be major in the beginning; however, as the landfill progresses to capacity, it may become major. Many of the landfills above the 2.5 million Mg exemption will be required to collect and control the gas under the regulation. The issuance of a permit will also help enforce and implement the standard. Therefore, the EPA has decided to require permits for all landfills with design capacities above 2.5 million Mg, whether or not the landfill will be required to install a collection and control system.

The regulation also provides for termination of operating permits. Landfill emissions, unlike emissions from other source categories, decrease over time after the landfill is closed. If a landfill has closed and a control system was never required or the conditions for control system removal specified in the regulation have been met, an operating permit is no longer necessary.

VIII. Administrative Requirements

A. Docket

The docket (Docket No. A-88-09) is an organized and complete file of all the information considered by the EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and promulgated standards and the EPA responses to significant comments, the contents of the docket, except for interagency review materials, will serve as the record in case of judicial review [section 307(d)(7)(A)].

B. Paperwork Reduction Act

The information collection requirements in this rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. An Information Collection Request (ICR) document has been prepared by the EPA (ICR No 1557.03) and a copy may be obtained from Sandy Farmer, OPPE Regulatory Information Division, U.S. Environmental Protection Agency (2137), 401 M St., S W.; Washington, DC 20460, or by calling (202) 260-2740. The information requirements are not effective until OMB approves them.

The information required to be collected by this rule is necessary to identify the regulated entities who are subject to the rule and to ensure their compliance with the rule. The recordkeeping and reporting requirements are mandatory and are being established under authority of section 114 of the Act. All information submitted as part of a report to the Agency for which a claim of confidentiality is made will be safeguarded according to the Agency policies set forth in title 40, chapter 1, part 2, subpart B—Confidentiality of Business Information (see 40 CFR 2; 41 FR 36902, September 1, 1976, amended by 43 FR 39999, September 28, 1978, 43 FR 42251, September 28, 1978, 44 FR 17674, March 23, 1979)

The total annual reporting and recordkeeping burden for this collection, averaged over the first 3 years of the NSPS applicability to new MSW landfills, is estimated to be 3,379 person hours per year. This is the estimated burden for 299 respondents (e.g., MSW landfill owners/operators) per year, at an estimated annual reporting and recordkeeping burden averaging 11.3 hours per respondent The rule requires an initial one-time notification of landfill design capacity If the landfill is larger than the design capacity cutoff, annual reports are required. The capital cost to purchase required monitoring equipment is $8,100 per monitor. The total annualized capital and startup costs for purchase of monitoring equipment are $80,250. The total national annual cost burden including all labor costs and annualized capital costs for recordkeeping and reporting is $188,850.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

C. Executive Order 12866

Under Executive Order 12866, (58 FR 51735 (October 4, 1993)) the EPA must determine whether the regulatory action is "significant" and therefore subject to OMB review and the requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may: (1) Have an annual effect on the economy of $100 million or more or adversely effect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles met forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, this action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations are documented in the public record

D. Executive Order 12875

To reduce the burden of Federal regulations on States and small governments, the President issued E.O. 12875 on October 26, 1993. Under E.O. 12875, the EPA is required to consult with representatives of affected State, local, and tribal governments. Because this regulatory action imposes costs to the private sector and government entities in excess of $100 million per year, the EPA pursued the preparation of an unfunded mandates statement, consultations, and other requirements of the Unfunded Mandates Reform Act. The requirements are met as presented under the following unfunded mandates section (section VIII.E of this notice).

E. Unfunded Mandate Reform Act

Under section 202 of the Unfunded Mandates Reform Act of 1995 ("Unfunded Mandates Act"), signed into law on March 22, 1995, the EPA must prepare a statement to accompany any rule where the estimated costs to State, local, or tribal governments, or to the private sector, will be $100 million or more per year. Section 203 requires the Agency to establish a plan for informing and advising any small governments that may be significantly or uniquely affected by the rule. Section 204 requires that the Agency "to the extent permitted in law, develop an effective process to permit elected officers of State, local, and tribal governments * * * to provide meaningful and timely input in the development of regulatory proposals containing significant Federal intergovernmental mandates". Under section 205(a), the EPA must select the "least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule" and is consistent with statutory requirements.

The unfunded mandates statement under section 202 must include: (1) A citation of the statutory authority under which the rule is proposed, (2) an assessment of the costs and benefits of the rule including the effect of the mandate on health, safety and the environment, and the Federal resources available to defray the costs, (3) where feasible, estimates of future compliance costs and disproportionate impacts upon particular geographic or social segments of the nation or industry, (4) where relevant, an estimate of the effect on the national economy, and (5) a description of the EPA's consultation with State, local, and tribal officials.

Because this rule is estimated to impose costs to the private sector and governments entities in excess of $100 million per year (based on tenth or fifteenth year annualized values), it is considered a significant regulatory action.

The EPA has thus prepared the following statement with respect to sections 202 through 205 of the Unfunded Mandates Act.

1. Statutory Authority

As discussed in section II of this preamble, the statutory authority for this rulemaking is section 111 of the CAA. The rule establishes emission guidelines for existing MSW landfills and standards of performance for new MSW landfills. Section 111(a)(1) of the requires that standards of performance for new sources reflect the—

* * * degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

Section 111(d) requires emission guidelines for existing sources to reflect a similar degree of emission reduction.

These systems are referred to as BDT for new and existing sources.

Properly operated gas collection and control systems achieving 98 percent emission reduction have been demonstrated on landfills of the size affected by the standards and EG, and represent BDT Control technologies and their performance are discussed in the preamble to the proposed rules (56 FR 24476, May 30, 1991)

In selecting BDT, the EPA also considered which landfills should be required to apply collection and control systems. A range of landfill design capacity and emission rate cutoffs were evaluated, as described below in section 2.b "Regulatory Alternatives Considered." The promulgated standards contain a design capacity exemption of 2.5 million Mg or 2.5 million cubic meters and an emission rate cutoff of 50 Mg NMOC/yr.

The EPA considered emission reduction, costs, and energy requirements, as required by the statutory language of section 111 of the CAA, in selecting the promulgated standards and EG. The promulgated standards represent BDT They achieve significant reductions in landfill gas emissions—a 53 percent reduction in NMOC emissions, and a 39 percent reduction in methane reduction emissions nationwide. The cost impacts of the standards are presented in section V.B and in section VII.E.2 (below). The public entities and affected industries who were consulted, as required by the Unfunded Mandates Reform Act, understand the cost impacts and support the final rules (see Section 4, "Consultation with Government Officials" below). The energy impacts are discussed in section V.B of this notice. To the extent energy recovery devices are used to comply with the rules, the rules will result in a net energy savings (production of energy).

Compliance with section 205(a): Regarding the EPA's compliance with section 205(a), the EPA did identify and consider a reasonable number of alternatives, and presents a summary of these below. The EPA has chosen to adopt the alternative with a size cutoff of 2.5 million Mg capacity, and 50 Mg/yr emissions. The incremental cost effectiveness of this 50 Mg/yr option is $6,250 per ton of NMOC reduced (versus the less stringent 75 Mg/yr option). This cost effectiveness is much higher than is typical for NMOC (or VOC) controls in NSPSs. However, the EPA also considers the reductions in methane achieved by this 50 Mg/yr option as necessary to "achieve the objectives" of section 111. The additional methane reductions achieved by this option are also an important part of the total carbon reductions identified under the Administration's 1993 Climate Change Action Plan. The EPA thus concludes that the chosen alternative is the most cost-effective to achieve the objectives of section 111, as called for in section 205(a).

2. Social Costs and Benefits

This assessment of the cost and benefits to State, local, and tribal governments of the guidelines is based on EPA s "Economic Impact Analysis for Proposed Emission Standards and Guidelines for Municipal Solid Waste Landfills" and updates to the analysis contained in "Air Emissions from Municipal Solid Waste Landfills—Background Information for Final Standards and Guidelines" (EPA-453/R-94-021) Measuring the social costs of the guidelines requires identification of the affected entities by ownership (public or private), consideration of regulatory alternatives, calculation of the regulatory compliance costs for each affected entity, and assessment of the market implications of the additional pollution control costs. Considering the social benefits of the guidelines requires estimating the anticipated reductions in emissions at MSW landfills due to regulation and identifying the harmful effects of exposure to MSW landfill emissions. Quantitative valuation of the expected benefits to society was not done for this rule.

a. *Affected Entities.* The standards of performance for new sources will require control of approximately 43 new landfills constructed in the first 5 years the standards are in effect. The EG will require control of approximately 312 existing landfills. This represents less than 5 percent of the total number of landfills in the U.S.

Of the landfills required to install controls, about 30 percent of the existing landfills and 20 percent of the new landfills are privately owned. The remainder are publicly owned. (These percentages are taken from section 3.2.1 of the promulgation BID (EPA-453/R-94-021). While that analysis used a design capacity exemption level of 1 million Mg rather than the 2.5 million Mg exemption level contained in the final rule, the percentage of private versus publicly owned landfills would be similar.

b. *Regulatory Alternatives Considered.* Under section 205 of the Unfunded Mandates Act, the Agency must identify and consider a reasonable number of regulatory alternatives before promulgating a rule for which a budgetary impact statement must be prepared. The Agency must select from those alternatives the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule, unless the Agency explains why this alternative is not selected or the selection of this alternative is inconsistent with the law.

A number of alternatives were considered. These included design capacity exemption levels of 1, 2.5, and 3 million Mg and emission rate cutoffs of 50, 75, 100, and 150 Mg/year Table 3 presents the impacts of alternative design capacity exemption levels for existing landfills. Table 4 presents the impacts of alternative emission rate cutoffs for existing landfills. Tables 5 and 6 present alternative design capacity exemption levels and emission rate cutoffs for new landfills.

TABLE 3.—ALTERNATIVE DESIGN CAPACITY EXEMPTION LEVEL OPTIONS FOR THE EMISSION GUIDELINES [a,b]

Small size cutoff (millions Mg)	Number landfills affected	Annual [c] NMOC emission reduction (Mg/yr)	Annual [d] methane emission reduction (Mg/yr)	Annual cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC Incremental cost eff ($/Mg)
Baseline [e]						
3,000,000	273	73,356	3,220,000	84	1,145	1,145

TABLE 3.—ALTERNATIVE DESIGN CAPACITY EXEMPTION LEVEL OPTIONS FOR THE EMISSION GUIDELINES [a,b]—Continued

Small size cutoff (millions Mg)	Number landfills affected	Annual [c] NMOC emission reduction (Mg/yr)	Annual [d] methane emission reduction (Mg/yr)	Annual cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC incremental cost eff. ($/Mg)
2,500,000	312	77,600	3,370,000	89	1,147	1,178
1,000,000	572	97,600	3,990,000	119	1,219	1,500
No cutoff [f]	7,299	142,000	8,270,000	719	5,063	13,514

[a] Emission rate cutoff level of 50 Mg NMOC/yr.
[b] All values are fifth year annualized
[c] NMOC emission reductions are from a baseline of 145,000 Mg NMOC/yr.
[d] Methane emission reductions are from a baseline of 8,400,000 Mg methane/yr.
[e] In the absence of an emission guidelines.
[f] No emission rate cutoff and no design capacity exemption level.

TABLE 4.—ALTERNATIVE NMOC EMISSION RATE STRINGENCY LEVEL OPTIONS FOR THE EMISSION GUIDELINES [a,b]

Emission rate cutoff (Mg NMOC/yr)	Number landfills affected	Annual [c] NMOC emission reduction (Mg/yr)	Annual [d] methane emission reduction (Mg/yr)	Annual cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC incremental cost eff. ($/Mg)
Baseline [e].						
150	142	66,600	2,210,000	51	766	766
100	201	72,700	2,720,000	66	908	2,459
75	250	76,000	3,080,000	79	1,039	3,939
50	312	77,600	3,370,000	89	1,147	6,250
No cutoff [f]	7,299	142,000	8,270,000	719	5,063	9,783

[a] Design capacity exemption level of 2,500,000 Mg of refuse.
[b] All values are fifth year annualized
[c] NMOC emission reductions are from a baseline of 145,000 Mg NMOC/yr.
[d] Methane emission reductions are from a baseline of 8,400,000 Mg methane/yr.
[e] In the absence of an emission guidelines
[f] No emission rate cutoff and no design capacity exemption level

TABLE 5.—ALTERNATIVE DESIGN CAPACITY EXEMPTION LEVEL OPTIONS FOR THE NEW SOURCE PERFORMANCE STANDARDS [a,b]

Small size cutoff (millions Mgr)	Number landfills affected	Annual [c] NMOC emission reduction (Mg/yr)	Annual [d] methane emission reduction (Mg/yr)	Annual [e] cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC [f] incremental cost eff ($/Mg)
Baseline [g]						
3 000,000	41	4,900	193,000	4	816	N/A
2 500,000	43	4,900	193,000	4	816	N/A
1,000,000	89	4,900	193,000	4	816	N/A
No cutoff [h]	872	13,115	881,000	81	6,176	N/A

[a] Emission rate cutoff level of 50 Mg NMOC/yr
[b] All values are fifth year annualized
[c] NMOC emission reductions are from a baseline of 13,400 Mg NMOC/yr.
[d] Methane emission reductions are from a baseline of 899,000 Mg methane/yr.
[e] Due to rounding off to the nearest million dollar, cost values do not appear to change for each option However, actual costs are slightly less for a less stringent option
[f] Because the annual cost does not change enough to show a different cost from one option to the next, incremental cost effectiveness values are not applicable
[g] In the absence of a standard
[h] No emission rate cutoff and no design capacity exemption level

TABLE 6.—ALTERNATIVE NMOC EMISSION RATE STRINGENCY LEVEL OPTIONS FOR THE NEW SOURCE PERFORMANCE STANDARDS [a,b]

Emission rate cutoff (Mg NMOC/yr)	Number landfills affected	Annual [c,d] NMOC emission reduction (Mg/yr)	Annual [c,e] methane emission reduction (Mg/yr)	Annual [f] cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC [g] incremental cost eff. ($/Mg)
Baseline [h].						
150	14	5,200	187,000	4	769	NA
100	25	5,100	203,000	4	784	NA
75	33	5,000	194,000	4	800	NA

TABLE 6.—ALTERNATIVE NMOC EMISSION RATE STRINGENCY LEVEL OPTIONS FOR THE NEW SOURCE PERFORMANCE STANDARDS [a,b]—Continued

Emission rate cutoff (Mg NMOC/yr)	Number landfills affected	Annual [c,d] NMOC emission reduction (Mg/yr)	Annual [c,e] methane emission reduction (Mg/yr)	Annual [f] cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC [g] Incremental cost eff. ($/Mg)
50	43	4,900	193,000	4	816	NA
No Cutoff [i]	872	13,115	881,000	81	6,176	NA

[a] Design capacity exemption level of 2,500,000 Mg of refuse
[b] All values are fifth year annualized.
[c] Because of the small number of landfills and the longer time period of control for a given landfill at a more stringent option, the average annual emission reduction appears to decrease for a more stringent option. However, the emission reduction for a given year increase for more stringent options.
[d] NMOC emission reductions are from a baseline of 13,400 Mg NMOC/yr.
[e] Methane emission reductions are from a baseline of 899,000 Mg NMOC/yr.
[f] Due to rounding off to the nearest million dollar, cost values do not appear to change for each option. However, actual costs are slightly less for a less stringent option
[g] Because the annual cost does not change enough to show a different cost from one option to the next, incremental cost effectiveness values are not applicable.
[h] In the absence of a standard
[i] No emission rate cutoff and no design capacity exemption level

The design capacity cutoff of 2.5 million Mg or 2.5 million cubic meters was chosen as a result of changes to the nationwide impacts analysis and to relieve as many small businesses and municipalities as possible from the regulatory requirements while still maintaining significant emission reduction The 2.5 million Mg cutoff level exempts landfills that serve populations of less than about 125,000 people from periodic reporting and control requirements. This cutoff excludes those landfills who would be least able to afford the costs of a landfill gas collection and control system A less stringent design capacity exemption level (e.g., 3 million Mg) was not selected because it would result in less emissions reductions. A more stringent design capacity exemption level (e.g., 1 million Mg) was not selected because it would increase the number of landfills required to apply control by over 80 percent (572 vs 312 existing landfills) while only achieving an additional 25 percent NMOC emission reduction (see table 3) It would also increase national costs and subject smaller government entities to the regulatory requirements, since smaller governments typically operate smaller landfills.

The emission rate cutoff of 50 Mg/yr of NMOC was chosen because, in conjunction with the 2.5 million Mg design capacity cutoff, it will require control of less than 5 percent of all landfills, yet is estimated to reduce NMOC emissions by approximately 53 percent and methane emissions by 39 percent. The Climate Change Action Plan, signed by the President in October 1993, calls for the EPA to promulgate a "tough" landfill gas rule as soon as possible.

The average cost effectiveness is about $1,150/Mg NMOC (see table 4). While the incremental cost effectiveness for NMOC control of going from a cutoff of 75 Mg/yr to a 50 Mg/yr cutoff is high ($6,250/Mg NMOC), this value does not include any credit for the benefits of toxics, odor, explosion control, or the indirect benefit of methane control. The economic analysis indicated that the final rule (including the 50 Mg/yr cutoff level) would cause a relatively small increase in waste disposal costs compared to the current costs and would not result in severe economic impacts on households (see section C. "Social Costs" below).

A more stringent option (e.g , no cutoff) was not chosen because the average and incremental cost and cost effectiveness was not reasonable (see table 4). Less stringent emission rate cutoff levels were not chosen because they result in less NMOC and methane reduction, and would not be consistent with the section 111 statutory requirement to base emission standards on BDT.

The public entities with whom the EPA consulted understood the EPA's concerns regarding the loss of emission reductions by changing the proposed capacity exemption level from 100,000 Mg to 5 million Mg and agreed that 2.5 million relieved 90 percent of the landfills from the burden of regulation and was reasonable.

c. *Social Costs.* The regulatory compliance costs of reducing air emissions from MSW landfills include the total and annualized capital costs; operating and maintenance costs, monitoring, inspection, recordkeeping, and reporting costs; and total annual costs. The annualized capital cost is calculated using a 7 percent discount rate. The total annual cost is calculated as the sum of the annualized capital cost; operating and maintenance costs; and the monitoring, inspection, recordkeeping, and reporting costs.

The total nationwide annualized cost for collection and control of air emissions from new MSW landfills are estimated to be $4 million. The nationwide costs of the EG for existing landfills is estimated to be about $90 million. The annual cost of waste disposal is estimated to increase by an average of $0.60/Mg for the NSPS and $1.30/Mg for the EG. Costs per household would increase by approximately $2.50 to $5.00 per year for households served by a new or existing landfill, respectively, that is required to install a collection and control system. Because the rule requires control of only about 5 percent of the landfills in the U S many households would experience no increase in disposal costs. Furthermore, if affected landfills choose to use energy recovery systems, the cost per household in those areas would be less. The EPA has concluded that households would not incur severe economic impacts. For additional information, please refer to the regulatory impacts analysis (Docket No. A-88-09, Item IV-A-7) and chapter 3 of the promulgation BID (EPA-453/R-94-021). There are no Federal funds available to assist State and local governments in meeting these costs.

d. *Social Benefits.* Society will benefit from the NSPS and EG through the reduction of landfill gas emissions, including NMOC and methane reductions The total nationwide annualized emission reduction of the EG is estimated to be 77,600 Mg/yr of NMOC and 3,370,000 Mg/yr of methane.

The total nationwide annualized emission reduction for the NSPS is about 4,900 Mg/yr of NMOC and 881,000 Mg/yr of methane.

The NMOC's present several hazards to human health. The NMOC's participate in chemical reactions leading to the formation of ozone, which causes health effects. Also, certain NMOC's have cancer risks and cause noncancer health effects.

Ozone is created by sunlight acting on NO_X and NMOC's in ambient air. Ozone leads to alterations in pulmonary function, aggravation of pre-existing respiratory disease, damage to lung structure, and adverse effects on blood enzymes, the central nervous system, and endocrine systems Ozone also warrants control due to its welfare effects, specifically, reduced plant growth, decreased crop yield, necrosis of plant tissue, and deterioration of certain synthetic materials such as rubber (Docket No. A–88–09, Item Nos. II-A-26, II-I-16, etc).

There is also concern about cancer risks from landfill NMOC emissions. In reviewing limited emissions data from MSW landfills, EPA identified both known and suspected carcinogens such as benzene, carbon tetrachloride, chloroform, ethylene dichloride, methylene dichloride, perchloroethylene, trichloroethylene, vinyl chloride, and vinylidene chloride. Prior to proposal, the EPA attempted to apply statistical methods to the limited data to generate the average annual increased cancer incidence and the maximum individual risk (MIR). In evaluating the result of the calculations for annual incidence and MIR, the EPA could not determine reasonable estimates of either an annual incidence or the MIR The EPA concluded, at proposal, that the uncertainties in the database are too great to calculate credible estimates of the cancer risks associated with MSW landfills

Another benefit of the NSPS and EG is reduced fire explosion hazard through reduction of methane emissions. The EPA has documented many cases of acute injury and death caused by explosions and fires related to municipal landfill gas emissions. In addition to these health effects, the associated property damage is a welfare effect. Furthermore, when the migration of methane and the ensuring hazard are identified, adjacent property values can be adversely affected (Docket No. A–88–09, Item Nos. II–I–6, II–I–7, etc.)

Another aspect of MSW landfill emissions is the offensive odor associated with landfills. While the nature of the wastes themselves contribute to the problem of odor, the gaseous decomposition products are often characteristically malodorous and unpleasant. Various welfare effects may be associated with odors, but due to the subjective nature of the impact and perception of odor, it is difficult to quantify these effects. Studies indicate that unpleasant odors can discourage capital investment and lower the socioeconomic status of an area. Odors have been shown to interfere with daily activities, discourage facility use, and lead to a decline in property values, tax revenues, and payroll (Docket No. A–88–09, Item Nos. II–I–6, II–I–7, etc.)

An ancillary benefit from regulating air emissions from MSW landfills is a reduction in the contribution of MSW landfill emissions to global emissions of methane. Methane is a major greenhouse gas, and is 20 to 30 times more potent than CO_2 on a molecule-per-molecule basis. This is due to the radiative characteristics of methane and other effects methane has on atmospheric chemistry. There is a general concern within the scientific community that the increasing emissions of greenhouse gases could lead to climate change, although the rate and magnitude of these changes are uncertain.

In conclusion, while the social benefits of the rule have not been quantified, significant health and welfare benefits are expected to result from the reduction in landfill gas emissions caused by the rule.

3. Effects on the National Economy

The Unfunded Mandates Act requires that the EPA estimate "the effect" of this rule—

"on the national economy, such as the effect on productivity economic growth, full employment creation of productive jobs and international competitiveness of the U S goods and services, if and to the extent that the EPA in its sole discretion determines that accurate estimates are reasonably feasible and that such effect is relevant and material."

As stated in the Unfunded Mandates Act, such macroeconomic effects tend to be measurable, in nationwide econometric models, only if the economic impact of the regulation reaches 0.25 to 0.5 percent of gross domestic product (in the range of $1.5 billion to $3 billion). A regulation with a smaller aggregate effect is highly unlikely to have any measurable impact in macroeconomic terms unless it is highly focused on a particular geographic region or economic sector. For this reason, no estimate of this rule's effect on the national economy has been conducted

4. Consultation with Government Officials

The Unfunded Mandates Act requires that the EPA describe the extent of the EPA's consultation with affected State, local, and tribal officials, summarize the officials' comments or concerns, and summarize the EPA's response to those comments or concerns. These goals were addressed through meetings held with a number of public entities over the course of six months. Those entities included the US Conference of Mayors, the National League of Cities, the National Governor's Association, the National Association of Counties, and the Solid Waste Association of North America (SWANA). Through these meetings, these entities were informed of the rule, educated about it, and advised as to whether or not they would be impacted by it. These initial education and information sharing meetings were followed by meetings in which consultations and analysis of various alternatives took place. Documentation of all meetings and public comments can be found in Docket A–88–09.

Various concerns were discussed during the meetings. These concerns included: (1) The design capacity cutoff; (2) collection wells, their costing and installation requirements; (3) design specifications for collection systems; (4) well head nitrogen measurement of 20 percent; and (5) the surface monitoring requirements.

As a result of these consultations, the EPA decided to modify the final regulatory package to address these concerns. In the final regulatory package promulgated today: (1) The design capacity cutoff has been raised from the proposed level of 100,000 to 2.5 million Mg; (2) Changes were made to the way the costing algorithm calculates the number of vertical collection wells. The rule was also changed to require active areas to install wells 5 years from initial waste placement instead of 2 years. Closed areas or areas at final grade must install a collection system within 2 years; (3) Prescriptive design specifications have been removed from the rule and replaced with general criteria. The EPA is developing an Enabling Document to assist State and local permitting agencies in their review of designs; (4) Well head pressure monitoring can meet either 20 percent nitrogen or 5 percent oxygen; (5) Surface monitoring is to be done quarterly instead of monthly, not to exceed 500 ppm methane above background.

These changes were made in response to consultations held regarding burden of the regulation and as a result of new data presented by the entities with whom the EPA met. A letter from the Solid Waste Management of North America and SWAC to the EPA demonstrates their support of this decision. Detailed summaries of the meetings and the letter can be obtained from the Docket A-88-09.

Documentation of the EPA's consideration of comments on the proposed standards and guidelines is provided in the BID's for the proposed and final standards and guidelines. Refer to the **ADDRESSES** section of this preamble for information on how to acquire copies of these documents.

The final rule reflects a minimization of burden on small landfills and does not create an unreasonable burden for large public entities. The EPA has considered the purpose and intent of the Unfunded Mandate Act and has determined the landfill NSPS and EG are needed.

F. Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) requires the EPA to give special consideration to the impact of regulation on small businesses, small organizations, and small governmental units. The Regulatory Flexibility Act specifies that EPA must prepare an initial regulatory flexibility analysis if a regulation will have a significant economic impact on a substantial number of small entities.

Pursuant to section 605(b) of the Regulatory Flexibility Act, 5 U.S.C. 605(b), the Administrator certifies that this rule will not have a significant economic impact on a substantial number of small entities.

The final NSPS and Eg exempt small landfills that have a design capacity below 2.5 million Mg of MSW. This design capacity exemption will exempt landfills that serve communities of 125,000 people or less, assuming the typical waste generation rate of 5 lb of waste per person per day and an average landfill age of 20 years. Section 601 of the Regulatory Flexibility Act defines a "small governmental jurisdiction" as governments of cities, counties, towns, or other districts with a population less than 50,000 The design capacity exemption will exempt landfills that serve small governmental jurisdictions. Therefore, the landfills NSPS and EG will have no impact on small entities.

The NSPS and EG will require periodic emissions calculations or control of emissions from only the largest 10 percent of landfills in the U.S. By controlling these large landfills, the rules will significantly reduce landfill gas emissions, which have adverse effects on human health and welfare, contribute to global warming, and can create odors and explosion hazards. In consideration of the potential regulatory burden on small entities and in response to public comment, the landfill design capacity in the proposed rule was raised to 2.5 million Mg/yr, thereby exempting small entities.

G. Miscellaneous

The effective date of this regulation is March 12, 1996. Section 111(b)(1)(B) of the CAA provides that standards of performance or revisions thereof become effective upon promulgation and apply to affected facilities of which the construction or modification was commenced after the date of proposal, May 31, 1991.

As prescribed by section 111, the promulgation of these standards was preceded by the Administrator's determination that MSW landfills contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare. In accordance with section 117 of the CAA, publication of these promulgated standards was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies.

This regulation will be reviewed 4 years from the date of promulgation as required by the CAA. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements.

Section 317 of the CAA requires the Administrator to prepare an economic impact assessment for any NSPS promulgated under section 111(b) of the CAA An economic impact assessment was prepared for this regulation and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the standards to ensure that cost was carefully considered in determining the BDT. The economic impact assessment is included in the BID for the proposed standards and in Chapter 3 of the promulgation BID

List of Subjects

40 CFR Part 51

Environmental protection, Air pollution control.

40 CFR Part 52

Air pollution control

40 CFR Part 60

Environmental protection, Air pollution control, Intergovernmental relations, reporting and recordkeeping requirements, Municipal solid waste landfills, Municipal solid waste.

Dated: March 1, 1996.

Carol M. Browner,

Administrator.

For the reasons set out in the preamble, title 40, chapter 1, parts 51, 52 and 60 of the Code of Federal Regulations are amended as follows:

PART 51—REQUIREMENTS FOR PREPARATION, ADOPTION AND SUBMITTAL OF IMPLEMENTATION PLANS

1. The authority citation for part 51 continues to read as follows:

Authority: 7401-7671q

2. Section 51.166(b)(23)(i) is amended by adding an entry to the end of the *Pollutant and Emission Rate* list to read as follows:

§ 51.166 Prevention of significant deterioration of air quality.

* * * * *

(b) * * *

(23) * * *

(i) * * * Municipal solid waste landfill emissions (measured as nonmethane organic compounds): 45 megagrams per year (50 tons per year)

* * * * *

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

3. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S C 7401-7671q

4. Section 52.21(b)(23)(i) is amended by adding an entry to the end of the *Pollutant and Emission Rate* list to read as follows:

§ 52.21 Prevention of significant deterioration of air quality.

* * * * *

(b) * * *

(23) * * *

(i) * * * Municipal solid waste landfills emissions (measured as nonmethane organic compounds): 45 megagrams per year (50 tons per year)

* * * * *

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

5. The authority citation for part 60 continues to read as follows:

Authority: 42 U S C. 7401, 7411, 7414, 7416, and 7601.

6. Section 60.16 of subpart A is amended by adding an entry to the end to read under *Other Source Categories* as follows:

§ 60.16 Priority list.

* * * * *

Other Source Categories

* * * * *

Municipal solid waste landfills.[4]

* * * * *

7. Section 60.30 is amended by adding a new paragraph (c) to read as follows:

§ 60.30 Scope.

* * * * *

(c) Subpart Cc—Municipal Solid Waste Landfills.

8. Part 60 is further amended by adding the Subpart Cc to read as follows:

Subpart Cc—Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills

Sec.
60.30c Scope
60.31c Definitions.
60 32c Designated facilities
60.33c Emission guidelines for municipal solid waste landfill emissions.
60 34c Test methods and procedures.
60 35c Reporting and recordkeeping guidelines
60.36c Compliance times

Subpart Cc—Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills

§ 60.30c Scope.

This subpart contains emission guidelines and compliance times for the control of certain designated pollutants from certain designated municipal solid waste landfills in accordance with section 111(d) of the Act and subpart B

§ 60.31c Definitions.

Terms used but not defined in this subpart have the meaning given them in the Act and in subparts A, B, and WWW of this part.

Municipal solid waste landfill or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill or a lateral expansion

[4] Not prioritized since an NSPS for this major source category has already been promulgated

§ 60.32c Designated facilities.

(a) The designated facility to which the guidelines apply is each existing MSW landfill for which construction, reconstruction or modification was commenced before May 30, 1991.

(b) Physical or operational changes made to an existing MSW landfill solely to comply with an emission guideline are not considered a modification or reconstruction and would not subject an existing MSW landfill to the requirements of subpart WWW [see § 60.750 of Subpart WWW].

§ 60.33c Emission guidelines for municipal solid waste landfill emissions.

(a) For approval, a State plan shall include control of MSW landfill emissions at each MSW landfill meeting the following three conditions:

(1) The landfill has accepted waste at any time since November 8, 1987, or has additional design capacity available for future waste deposition;

(2) The landfill has a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters. The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions shall be documented and submitted with the report; and

(3) The landfill has a nonmethane organic compound emission rate of 50 megagrams per year or more.

(b) For approval, a State plan shall include the installation of a collection and control system meeting the conditions provided in § 60.752(b)(2)(ii) of this part at each MSW landfill meeting the conditions in paragraph (a) of this section. The State plan shall include a process for State review and approval of the site-specific design plans for the gas collection and control system(s)

(c) For approval, a State plan shall include provisions for the control of collected MSW landfill emissions through the use of control devices meeting the requirements of paragraph (c)(1), (2), or (3) of this section, except as provided in § 60.24.

(1) An open flare designed and operated in accordance with the parameters established in § 60.18; or

(2) A control system designed and operated to reduce NMOC by 98 weight percent; or

(3) An enclosed combustor designed and operated to reduce the outlet NMOC concentration to 20 parts per million as hexane by volume, dry basis at 3 percent oxygen, or less.

§ 60.34c Test methods and procedures.

For approval, a State plan shall include provisions for: the calculation of the landfill NMOC emission rate listed in § 60.754, as applicable, to determine whether the landfill meets the condition in § 60.33c(a)(3); the operational standards in § 60.753; the compliance provisions in § 60.755; and the monitoring provisions in § 60.756.

§ 60.35c Reporting and recordkeeping guidelines.

For approval, a State plan shall include the recordkeeping and reporting provisions listed in §§ 60.757 and 60.758, as applicable, except as provided under § 60.24.

§ 60.36c Compliance times.

(a) Except as provided for under paragraph (b) of this section, planning, awarding of contracts, and installation of MSW landfill air emission collection and control equipment capable of meeting the emission guidelines established under § 60.33c shall be accomplished within 30 months after the effective date of a State emission standard for MSW landfills.

(b) For each existing MSW landfill meeting the conditions in § 60.33c(a)(1) and § 60.33c(a)(2) whose NMOC emission rate is less than 50 megagrams per year on the effective date of the State emission standard, installation of collection and control systems capable of meeting emission guidelines in § 60.33c shall be accomplished within 30 months of the date when the condition in § 60.33c(a)(3) is met (i.e., the date of the first annual nonmethane organic compounds emission rate which equals or exceeds 50 megagrams per year)

9. Part 60 is amended by adding a new subpart WWW to read as follows:

Subpart WWW—Standards of Performance for Municipal Solid Waste Landfills

Sec.
60 750 Applicability, designation of affected facility, and delegation of authority.
60 751 Definitions
60 752 Standards for air emissions from municipal solid waste landfills
60.753 Operational standards for collection and control systems
60.754 Test methods and procedures
60.755 Compliance provisions
60 756 Monitoring of operations.
60.757 Reporting requirements
60.758 Recordkeeping requirements
60.759 Specifications for active collection systems

Subpart WWW—Standards of Performance for Municipal Solid Waste Landfills

§ 60.750 Applicability, designation of affected facility, and delegation of authority.

(a) The provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction or modification or began accepting waste on or after May 30, 1991. Physical or operational changes made to an existing MSW landfill solely to comply with Subpart Cc of this part are not considered construction, reconstruction, or modification for the purposes of this section.

(b) The following authorities shall be retained by the Administrator and not transferred to the State: None.

§ 60.751 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act or in subpart A of this part.

Active collection system means a gas collection system that uses gas mover equipment.

Active landfill means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

Closed landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under § 60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed. A landfill is considered closed after meeting the criteria of § 258.60 of this title.

Closure means that point in time when a landfill becomes a closed landfill.

Commercial solid waste means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate The landfill is considered controlled at the time either

(1) A notification of intent to install a collection and control system or

(2) A collection and control system design plan is submitted in compliance with § 60.752(b)(2)(i).

Design capacity means the maximum amount of solid waste a landfill can accept, as specified in the construction or operating permit issued by the State, local, or Tribal agency responsible for regulating the landfill

Disposal facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

Emission rate cutoff means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

Enclosed combustor means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

Flare means an open combustor without enclosure or shroud.

Gas mover equipment means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.

Household waste means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

Industrial solid waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, parts 264 and 265 of this title. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries, organic chemicals, plastics and resins manufacturing; pulp and paper industry, rubber and miscellaneous plastic products, stone, glass, clay, and concrete products; textile manufacturing, transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Interior well means any well or similar collection component located inside the perimeter of the landfill. A perimeter well located outside the landfilled waste is not an interior well.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under § 257.2 of this title.

Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

Municipal solid waste landfill or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§ 257.2 of this title) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

Municipal solid waste landfill emissions or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

NMOC means nonmethane organic compounds, as measured according to the provisions of § 60.754.

Nondegradable waste means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

Passive collection system means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

Sludge means any solid, semisolid or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

Solid waste means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).

Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

Sufficient extraction rate means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

§ 60.752 Standards for air emissions from municipal solid waste landfills.

(a) Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume shall submit an initial design capacity report to the Administrator as provided in § 60.757(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values Any density conversions shall be documented and submitted with the report. For purposes of part 70 permitting, a landfill with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters does not require an operating permit under part 70 of this chapter. Submittal of the initial design capacity report shall fulfill the requirements of this subpart except as provided for in paragraphs (a)(1) and (a)(2) of this section

(1) The owner or operator shall submit to the Administrator an amended design capacity report, as provided for in § 60.757(a)(3), when there is any increase in the design capacity of a landfill subject to the provisions of this subpart whether the increase results from an increase in the area or depth of the landfill, a change in the operating procedures of the landfill, or any other means.

(2) If any increase in the maximum design capacity of a landfill exempted from the provisions of § 60.752(b) through § 60 759 of this subpart on the basis of the design capacity exemption in paragraph (a) of this section results in a revised maximum design capacity equal to or greater than 2.5 million megagrams or 2 5 million cubic meters, the owner or operator shall comply with the provision of paragraph (b) of this section.

(b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams or 2.5 million cubic meters, shall either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in § 60.754. The NMOC emission rate shall be recalculated annually, except as provided in § 60.757(b)(1)(ii) of this subpart. The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters is subject to part 70 permitting requirements. When a landfill is closed, and either never needed control or meets the conditions for control system removal specified in § 60.752(b)(2)(v) of this subpart, a part 70 operating permit is no longer required.

(1) If the calculated NMOC emission rate is less than 50 megagrams per year, the owner or operator shall:

(i) Submit an annual emission report to the Administrator, except as provided for in § 60.757(b)(1)(ii); and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in § 60.754(a)(1) until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the landfill is closed.

(A) If the NMOC emission rate, upon recalculation required in paragraph (b)(1)(ii) of this section, is equal to or greater than 50 megagrams per year, the owner or operator shall install a collection and control system in compliance with paragraph (b)(2) of this section

(B) If the landfill is permanently closed, a closure notification shall be submitted to the Administrator as provided for in § 60.757(d).

(2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall

(i) Submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year:

(A) The collection and control system as described in the plan shall meet the design requirements of paragraph (b)(2)(ii) of this section

(B) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§ 60 753 through 60 758 proposed by the owner or operator.

(C) The collection and control system design plan shall either conform with specifications for active collection systems in § 60.759 or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to § 60.759.

(D) The Administrator shall review the information submitted under paragraphs (b)(2)(i) (A),(B) and (C) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.

(ii) Install a collection and control system within 18 months of the submittal of the design plan under paragraph (b)(2)(i) of this section that effectively captures the gas generated within the landfill.

(A) An active collection system shall:

(*1*) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;

(*2*) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:

(*i*) 5 years or more if active; or

(*ii*) 2 years or more if closed or at final grade;

(*3*) Collect gas at a sufficient extraction rate;

(*4*) Be designed to minimize off-site migration of subsurface gas.

(B) A passive collection system shall:

(*1*) Comply with the provisions specified in paragraphs (b)(2)(ii), (A) (*1*), (*2*), and (*4*) of this section

(*2*) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners shall be installed as required under § 258.40 of this title.

(iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii) (A), (B) or (C) of this section.

(A) An open flare designed and operated in accordance with § 60.18;

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test, required under § 60.8 using the test methods specified in § 60.754(d).

(*1*) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.

(*2*) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in § 60.756;

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii) (A) or (B) of this section.

(iv) Operate the collection and control device installed to comply with this subpart in accordance with the provisions of § § 60.753, 60.755 and 60.756.

(v) The collection and control system may be capped or removed provided that all the conditions of paragraphs (b)(2)(v) (A), (B), and (C) of this section are met:

(A) The landfill shall be no longer accepting solid waste and be permanently closed under the requirements of § 258.60 of this title. A closure report shall be submitted to the Administrator as provided in § 60.757(d).

(B) The collection and control system shall have been in operation a minimum of 15 years; and

(C) Following the procedures specified in § 60.754(b) of this subpart, the calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

§ 60.753 Operational standards for collection and control systems.

Each owner or operator of an MSW landfill gas collection and control system used to comply with the provisions of § 60.752(b)(2)(ii) of this subpart shall:

(a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade.

(b) Operate the collection system with negative pressure at each wellhead except under the following conditions:

(1) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in § 60.757(f)(1).

(2) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;

(3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Administrator;

(c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

(1) The nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart.

(2) Unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A except that

(i) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span,

(ii) A data recorder is not required;

(iii) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;

(iv) A calibration error check is not required;

(v) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

(d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with § 60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour; and

(f) Operate the control or treatment system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirement in paragraphs (b), (c), or (d) of this section are not met, corrective action shall be taken as specified in § 60.752(a) (3) through (5) or § 60.755(c) of this subpart. If corrective actions are taken as specified in § 60.755, the monitored exceedance is not a violation of the operational requirements in this section

§ 60.754 Test methods and procedures.

(a)(1) The landfill owner or operator shall calculate the NMOC emission rate using either the equation provided in paragraph (a)(1)(i) of this section or the equation provided in paragraph (a)(1)(ii) of this section. The values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for Lo, and 4,000 parts per million by volume as hexane for the C_{NMOC}

(i) The following equation shall be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{NMOC} = \sum_{i=1}^{n} 2\,k\,L_o M_i \left(e^{-kt_i}\right)\left(C_{NM}OC\right)\left(3.6 \times 10^{-9}\right)$$

where,

M_{NMOC}=Total NMOC emission rate from the landfill, megagrams per year
k=methane generation rate constant, year^{-1}
L_o=methane generation potential, cubic meters per megagram solid waste
M_i=mass of solid waste in the ith section, megagrams
t_i=age of the ith section, years
C_{NMOC}=concentration of NMOC, parts per million by volume as hexane
3.6×10^{-9}=conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if the documentation provisions of § 60.758(d)(2) are followed.

(ii) The following equation shall be used if the actual year-to-year solid waste acceptance rate is unknown.

$$M_{NMOC}=2L_o\,R\,(e^{-kc} - e^{-kt})\,(C_{NMOC})\,(3.6 \times 10^{-9})$$

where,

M_{NMOC}=mass emission rate of NMOC, megagrams per year
L_o=methane generation potential, cubic meters per megagram solid waste
R=average annual acceptance rate, megagrams per year
k=methane generation rate constant, year^{-1}
t=age of landfill, years
C_{NMOC}=concentration of NMOC, parts per million by volume as hexane
c=time since closure, years. For active landfill c = O and $e^{-kc}=1$
3.6×10^{-9}=conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R, if the documentation provisions of § 60.758(d)(2) are followed

(2) *Tier 1.* The owner or operator shall compare the calculated NMOC mass emission rate to the standard of 50 megagrams per year

(i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 50 megagrams per year, then the landfill owner shall submit an emission rate report as provided in § 60.757(b)(1), and shall recalculate the NMOC mass emission rate annually as required under § 60.752(b)(1)

(ii) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, then the landfill owner shall either comply with § 60.752(b)(2), or determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in paragraph (a)(3) of this section.

(3) *Tier 2.* The landfill owner or operator shall determine the NMOC concentration using the following sampling procedure. The landfill owner or operator shall install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25C of appendix A of this part or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42). If composite sampling is used, equal volumes shall be taken from each sample probe. If more than the required number of samples are taken, all samples shall be used in the analysis. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(i) The landfill owner or operator shall recalculate the NMOC mass emission rate using the equations provided in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using the average NMOC concentration from the collected samples instead of the default value in the equation provided in paragraph (a)(1) of this section.

(ii) If the resulting mass emission rate calculated using the site-specific NMOC concentration is equal to or greater than 50 megagrams per year, then the landfill owner or operator shall either comply with § 60.752(b)(2), or determine the site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the procedure specified in paragraph (a)(4) of this section

(iii) If the resulting NMOC mass emission rate is less than 50 megagrams per year, the owner or operator shall submit a periodic estimate of the emission rate report as provided in § 60.757(b)(1) and retest the site-specific NMOC concentration every 5 years using the methods specified in this section

(4) *Tier 3* The site-specific methane generation rate constant shall be determined using the procedures provided in Method 2E of appendix A of this part. The landfill owner or operator shall estimate the NMOC mass emission rate using equations in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using a site-specific methane generation rate constant k, and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator shall compare the resulting NMOC mass emission rate to the standard of 50 megagrams per year.

(i) If the NMOC mass emission rate as calculated using the site-specific methane generation rate and concentration of NMOC is equal to or greater than 50 megagrams per year, the owner or operator shall comply with § 60.752(b)(2).

(ii) If the NMOC mass emission rate is less than 50 megagrams per year, then the owner or operator shall submit a periodic emission rate report as provided in § 60.757(b)(1) and shall recalculate the NMOC mass emission rate annually, as provided in § 60.757(b)(1) using the equations in paragraph (a)(1) of this section and using the site-specific methane generation rate constant and NMOC concentration obtained in paragraph (a)(3) of this section. The calculation of the methane generation rate constant is performed only once, and the value obtained is used in all subsequent annual NMOC emission rate calculations.

(5) The owner or operator may use other methods to determine the NMOC concentration or a site-specific k as an alternative to the methods required in paragraphs (a)(3) and (a)(4) of this section if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).

(b) After the installation of a collection and control system in compliance with § 60.755, the owner or operator shall calculate the NMOC emission rate for purposes of determining when the system can be removed as provided in § 60.752(b)(2)(v), using the following equation.

$$M_{NMOC} = 1.89 \times 10^{-3}\, Q_{LFG}\, C_{NMOC}$$

where,

M_{NMOC} = mass emission rate of NMOC, megagrams per year
Q_{LFG} = flow rate of landfill gas, cubic meters per minute
C_{NMOC} = NMOC concentration, parts per million by volume as hexane

(1) The flow rate of landfill gas, Q_{LFG}, shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of section 4 of Method 2E of appendix A of this part

(2) The average NMOC concentration, C_{NMOC}, shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate

removal equipment using the procedures in Method 25C or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).

(c) The owner or operator of each MSW landfill subject to the provisions of this subpart shall estimate the NMOC emission rate for comparison to the PSD major source and significance levels in §§ 51.166 or 52.21 of this chapter using AP–42 or other approved measurement procedures. If a collection system, which complies with the provisions in § 60.752(b)(2) is already installed, the owner or operator shall estimate the NMOC emission rate using the procedures provided in paragraph (b) of this section.

(d) For the performance test required in § 60.752(b)(2)(iii)(B), Method 25 or Method 18 of appendix A of this part shall be used to determine compliance with 98 weight-percent efficiency or the 20 ppmv outlet concentration level, unless another method to demonstrate compliance has been approved by the Administrator as provided by § 60 752(b)(2)(i)(B) If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42) The following equation shall be used to calculate efficiency:

$$\text{Control Efficiency} = (NMOC_{in} - NMOC_{out})/(NMOC_{in})$$

where,

$NMOC_{in}$ = mass of NMOC entering control device

$NMOC_{out}$ = mass of NMOC exiting control device

§ 60.755 Compliance provisions.

(a) Except as provided in § 60 752(b)(2)(i)(B), the specified methods in paragraphs (a)(*1*) through (a)(6) of this section shall be used to determine whether the gas collection system is in compliance with § 60.752(b)(2)(ii).

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with § 60.752(b)(2)(ii)(A)(*1*), one of the following equations shall be used. The k and L_o kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42) or other site specific values demonstrated to be appropriate and approved by the Administrator. If k has been determined as specified in § 60.754(a)(4), the value of k determined from the test shall be used. A value of no more than 15 years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

(i) For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_o R\,(e^{-kc} - e^{-kt})$$

where,

Q_m = maximum expected gas generation flow rate, cubic meters per year

L_o = methane generation potential, cubic meters per megagram solid waste

R = average annual acceptance rate, megagrams per year

k = methane generation rate constant, year^{-1}

t = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years

c = time since closure, years (for an active landfill c = O and e^{-kc} = 1)

(ii) For sites with known year-to-year solid waste acceptance rate.

$$Q_M = \sum_{i=1}^{n} 2\,k\,L_o\,M_i\left(e^{-kt_i}\right)$$

where

Q_M=maximum expected gas generation flow rate, cubic meters per year

k=methane generation rate constant, year^{-1}

L_o=methane generation potential, cubic meters per megagram solid waste

M_i=mass of solid waste in the ith section, megagrams

t_i=age of the ith section, years

(iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations in paragraphs (a)(1) (i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in paragraphs (a)(1) (i) or (ii) or other methods shall be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

(2) For the purposes of determining sufficient density of gas collectors for compliance with § 60.752(b)(2)(ii)(A)(*2*), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

(3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 60.752(b)(2)(ii)(A)(*3*), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under § 60.753(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.

(4) Owners or operators are not required to install additional wells as required in paragraph (a)(3) of this section during the first 180 days after gas collection system start-up.

(5) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in § 60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.

(6) An owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(ii)(A)(*4*) through the use of a collection system not conforming to the specifications provided in § 60.759 shall provide information satisfactory to the Administrator as specified in § 60.752(b)(2)(i)(C) demonstrating that off-site migration is being controlled.

(b) For purposes of compliance with § 60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in § 60.752(b)(2)(i). Each well shall be installed within 60 days of the date in which the initial solid waste has been in place for a period of:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade.

(c) The following procedures shall be used for compliance with the surface methane operational standard as provided in § 60.753(d).

(1) After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a serpentine pattern spaced 30 meters apart (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.

(2) The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A of this part, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions

(4) Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4) (i) through (v) of this section shall be taken As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 60.753(d)

(i) The location of each monitored exceedance shall be marked and the location recorded.

(ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance.

(iii) If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (c)(4)(v) of this section shall be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) has been taken.

(iv) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (c)(4) (ii) or (iii) of this section shall be re-monitored 1 month from the initial exceedance. If the 1-month remonitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the actions specified in paragraph (c)(4) (iii) or (v) shall be taken.

(v) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval.

(5) The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(1) The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of appendix A of this part, except that "methane" shall replace all references to VOC.

(2) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.

(3) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part shall be used.

(4) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part shall be followed immediately before commencing a surface monitoring survey.

(e) The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices.

§ 60.756 Monitoring of operations.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator seeking to comply with § 60.752(b)(2)(ii)(A) for an active gas collection system shall install a sampling port and a thermometer or other temperature measuring device at each wellhead and:

(1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 60.755(a)(3); and

(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in § 60.755(a)(5); and

(3) Monitor temperature of the landfill gas on a monthly basis as provided in § 60.755(a)(5).

(b) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an enclosed combustor shall calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment.

(1) A temperature monitoring device equipped with a continuous recorder and having an accuracy of ±1 percent of the temperature being measured expressed in degrees Celsius or ±0.5 °C, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity greater than 44 megawatts.

(2) A gas flow rate measuring device that provides a measurement of gas flow to or bypass of the control device The owner or operator shall either

(i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(c) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an open flare shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment

(1) A heat sensing device, such as an ultraviolet beam sensor or

thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.

(2) A device that records flow to or bypass of the flare. The owner or operator shall either:

(i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(d) Each owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(iii) using a device other than an open flare or an enclosed combustor shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator shall review the information and either approve it, or request that additional information be submitted. The Administrator may specify additional appropriate monitoring procedures.

(e) Each owner or operator seeking to install a collection system that does not meet the specifications in § 60.759 or seeking to monitor alternative parameters to those required by § 60.753 through § 60.756 shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i) (B) and (C) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator may specify additional appropriate monitoring procedures.

(f) Each owner or operator seeking to demonstrate compliance with § 60.755(c), shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in § 60.755(d). Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

§ 60.757 Reporting requirements.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator subject to the requirements of this subpart shall submit an initial design capacity report to the Administrator.

(1) The initial design capacity report shall fulfill the requirements of the notification of the date construction is commenced as required under § 60.7(a)(1) and shall be submitted no later than the earliest day from the following:

(i) 90 days of the issuance of the State, Local, Tribal, or RCRA construction or operating permit; or

(ii) 30 days of the date of construction or reconstruction as defined under § 60.15; or

(iii) 30 days of the initial acceptance of solid waste.

(2) The initial design capacity report shall contain the following information:

(i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the provisions of the State, local, Tribal, or RCRA construction or operating permit;

(ii) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the State or local construction or RCRA permit, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity shall be calculated using good engineering practices. The calculations shall be provided, along with such parameters as depth of solid waste solid waste acceptance rate, and compaction practices as part of the report The State, Tribal, local agency or Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(3) An amended design capacity report shall be submitted to the Administrator providing notification of any increase in the design capacity of the landfill, whether the increase results from an increase in the permitted area or depth of the landfill, a change in the operating procedures, or any other means which results in an increase in the maximum design capacity of the landfill above 2.5 million megagrams or 2.5 million cubic meters. The amended design capacity report shall be submitted within 90 days of the issuance of an amended construction or operating permit, or the placement of waste in additional land, or the change in operating procedures which will result in an increase in maximum design capacity, whichever occurs first.

(b) Each owner or operator subject to the requirements of this subpart shall submit an NMOC emission rate report to the Administrator initially and annually thereafter, except as provided for in paragraphs (b)(1)(ii) or (b)(3) of this section. The Administrator may request such additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report shall contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in § 60.754(a) or (b), as applicable.

(i) The initial NMOC emission rate report shall be submitted within 90 days of the date waste acceptance commences and may be combined with the initial design capacity report required in paragraph (a) of this section. Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in paragraphs (b)(1)(ii) and (b)(3) of this section.

(ii) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 50 megagrams per year in each of the next 5 consecutive years, the owner or operator may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated All data and calculations upon which this estimate is based shall be provided to the Administrator. This estimate shall be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate shall be submitted to the Administrator. The revised estimate shall cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(2) The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.

(3) Each owner or operator subject to the requirements of this subpart is exempted from the requirements of paragraphs (b)(1) and (2) of this section, after the installation of a collection and control system in compliance with § 60.752(b)(2), during such time as the collection and control system is in

operation and in compliance with §§ 60.753 and 60.755.

(c) Each owner or operator subject to the provisions of § 60.752(b)(2)(i) shall submit a collection and control system design plan to the Administrator within 1 year of the first report, required under paragraph (b) of this section, in which the emission rate exceeds 50 megagrams per year, except as follows:

(1) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in § 60.754(a)(3) and the resulting rate is less than 50 megagrams per year, annual periodic reporting shall be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than 50 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, shall be submitted within 180 days of the first calculated exceedance of 50 megagrams per year.

(2) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate constant (k), as provided in Tier 3 in § 60.754(a)(4), and the resulting NMOC emission rate is less than 50 Mg/yr, annual periodic reporting shall be resumed. The resulting site-specific methane generation rate constant (k) shall be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of § 60.754(a)(4) and the resulting site-specific methane generation rate constant (k) shall be submitted to the Administrator within 1 year of the first calculated emission rate exceeding 50 megagrams per year.

(d) Each owner or operator of a controlled landfill shall submit a closure report to the Administrator within 30 days of waste acceptance cessation. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 60.7(a)(4).

(e) Each owner or operator of a controlled landfill shall submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment.

(1) The equipment removal report shall contain all of the following items:

(i) A copy of the closure report submitted in accordance with paragraph (d) of this section;

(ii) A copy of the initial performance test report demonstrating that the 15 year minimum control period has expired; and

(iii) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.

(2) The Administrator may request such additional information as may be necessary to verify that all of the conditions for removal in § 60.752(b)(2)(v) have been met.

(f) Each owner or operator of a landfill seeking to comply with § 60.752(b)(2) using an active collection system designed in accordance with § 60.752(b)(2)(ii) shall submit to the Administrator annual reports of the recorded information in (f)(1) through (f)(6) of this paragraph. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under § 60.8. For enclosed combustion devices and flares, reportable exceedances are defined under § 60.758(c).

(1) Value and length of time for exceedance of applicable parameters monitored under § 60.756(a), (b), (c), and (d).

(2) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified under § 60.756.

(3) Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the control device was not operating.

(4) All periods when the collection system was not operating in excess of 5 days.

(5) The location of each exceedance of the 500 parts per million methane concentration as provided in § 60.753(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month.

(6) The date of installation and the location of each well or collection system expansion added pursuant to paragraphs (a)(3), (b), and (c)(4) of § 60.755.

(g) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall include the following information with the initial performance test report required under § 60.8:

(1) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;

(2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;

(3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;

(4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area; and

(5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and

(6) The provisions for the control of off-site migration.

§ 60.758 Recordkeeping requirements.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator of an MSW landfill subject to the provisions of § 60.752(b) shall keep for at least 5 years up-to-date, readily accessible, on-site records of the maximum design capacity, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in paragraphs (b)(1) through (b)(4) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.

(1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(ii):

(i) The maximum expected gas generation flow rate as calculated in § 60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator.

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 60.759(a)(1).

(2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity greater than 44 megawatts:

(i) The average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test

(ii) The percent reduction of NMOC determined as specified in § 60.752(b)(2)(iii)(B) achieved by the control device.

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(B)(*1*) through use of a boiler or process heater of any size: a description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(A) through use of an open flare, the flare type (i e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 60.18, continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent

(c) Each owner or operator of a controlled landfill subject to the provisions of this subpart shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.756 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

(1) The following constitute exceedances that shall be recorded and reported under § 60.757(f):

(i) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal unit per hour) or greater, all 3-hour periods of operation during which the average combustion temperature was more than 28 oC below the average combustion temperature during the most recent performance test at which compliance with § 60.752(b)(2)(iii) was determined.

(ii) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (b)(3)(i) of this section.

(2) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under § 60.756.

(3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with § 60.752(b)(2)(iii) shall keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other State, local, Tribal, or Federal regulatory requirements.)

(4) Each owner or operator seeking to comply with the provisions of this subpart by use of an open flare shall keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under § 60 756(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent

(d) Each owner or operator subject to the provisions of this subpart shall keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector

(1) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 60.755(b).

(2) Each owner or operator subject to the provisions of this subpart shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 60.759(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 60.759(a)(3)(ii).

(e) Each owner or operator subject to the provisions of this subpart shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in § 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

§ 60.759 Specifications for active collection systems.

(a) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Administrator as provided in § 60.752(b)(2)(i)(C) and (D):

(1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandibility, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.

(2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior

(3) The placement of gas collection devices determined in paragraph (a)(1) of this section shall control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (a)(3)(ii) of this section.

(i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under § 60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and shall be provided to the Administrator upon request.

(ii) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. Emissions from each section shall be computed using the following equation:

$$Q_i = 2\,k\,L_o\,M_i\,(e^{-kt_i})\,(C_{NMOC})\,(3.6 \times 10^{-9})$$

where,

Q_i = NMOC emission rate from the i^{th} section, megagrams per year
k = methane generation rate constant, year^{-1}
L_o = methane generation potential, cubic meters per megagram solid waste
M_i = mass of the degradable solid waste in the i^{th} section, megagram
t_i = age of the solid waste in the i^{th} section, years
C_{NMOC} = concentration of nonmethane organic compounds, parts per million by volume
3.6×10^{-9} = conversion factor

(iii) The values for k, L_o, and C_{NMOC} determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence. If field testing has not been performed, the default values for k, L_o and C_{NMOC} provided in § 60.754(a)(1) shall be used The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

(b) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall construct the gas collection devices using the following equipment or procedures:

(1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration.

(2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(c) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with § 60 752(b)(2)(iii) through the collection header pipe(s) The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

(1) For existing collection systems, the flow data shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (c)(2) of this section shall be used.

(2) For new collection systems, the maximum flow rate shall be in accordance with § 60.755(a)(1).

10. Part 60 is further amended by adding Methods 2E, 3C and 25C to appendix A as follows:

Appendix A—Reference Methods

* * * * *

Method 2E—Determination of Landfill Gas; Gas Production Flow Rate

1. Applicability and Principle

1.1 Applicability. This method applies to the measurement of landfill gas (LFG) production flow rate from municipal solid waste (MSW) landfills and is used to calculate the flow rate of nonmethane organic compounds (NMOC) from landfills. This method also applies to calculating a site-specific k value as provided in § 60.754(a)(4). It is unlikely that a site-specific k value obtained through Method 2E testing will lower the annual emission estimate below 50 Mg/yr NMOC unless the Tier 2 emission estimate is only slightly higher than 50 Mg/yr NMOC. Dry, arid regions may show a more significant difference between the default and calculated k values than wet regions

1 2 Principle Extraction wells are installed either in a cluster of three or at five locations dispersed throughout the landfill. A blower is used to extract LFG from the landfill LFG composition, landfill pressures near the extraction well, and volumetric flow rate of LFG extracted from the wells are measured and the landfill gas production flow rate is calculated.

2. Apparatus

2.1 Well Drilling Rig. Capable of boring a 0.6 meters diameter hole into the landfill to a minimum of 75 percent of the landfill depth The depth of the well shall not exceed the bottom of the landfill or the liquid level

2.2 Gravel. No fines. Gravel diameter should be appreciably larger than perforations stated in sections 2 10 and 3.2 of this method

2 3 Bentonite

2 4 Backfill Material. Clay, soil, and sandy loam have been found to be acceptable

2 5 Extraction Well Pipe Polyvinyl chloride (PVC), high density polyethylene (HDPE) fiberglass, stainless steel, or other suitable nonporous material capable of transporting landfill gas with a minimum diameter of 0 075 meters and suitable wall-thickness.

2 6 Wellhead Assembly. Valve capable of adjusting gas flow at the wellhead and outlet, and a flow measuring device, such as an in-line orifice meter or pitot tube. A schematic of the wellhead assembly is shown in figure 1.

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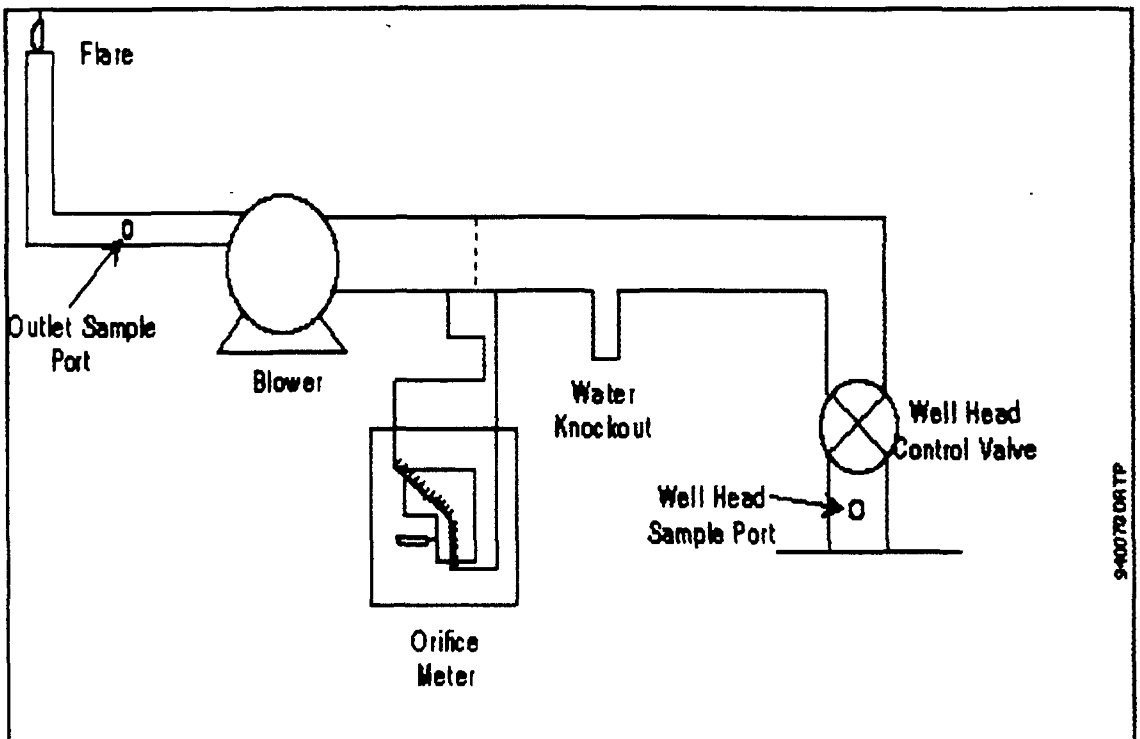

Figure 1. Schematic of above ground well head assembly.

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2 7 Cap. PVC, HDPE, fiberglass, stainless steel, or other suitable nonporous material capable of transporting landfill gas with a suitable wall-thickness

2.8 Header Piping PVC, HDPE, fiberglass, stainless steel, or other suitable nonporous material capable of transporting landfill gas with a suitable wall-thickness.

2.9 Auger Capable of boring a 0.15 to 0.23 meters diameter hole to a depth equal to the top of the perforated section of the extraction well, for pressure probe installation.

2.10 Pressure Probe. PVC or stainless steel (316), 0.025 meters. Schedule 40 pipe Perforate the bottom two thirds. A minimum requirement for perforations is slots or holes with an open area equivalent to four 6.0 millimeter diameter holes spaced 90° apart every 0.15 meters

2.11 Blower and Flare Assembly A water knockout, flare or incinerator, and an explosion-proof blower, capable of extracting LFG at a flow rate of at least 8.5 cubic meters per minute.

2.12 Standard Pitot Tube and Differential Pressure Gauge for Flow Rate Calibration with Standard Pitot Same as Method 2, sections 2.1 and 2 8

2.13 Gas flow measuring device Permanently mounted Type S pitot tube or an orifice meter.

2.14 Barometer. Same as Method 4, section 2 1 5

2 15 Differential Pressure Gauge. Water-filled U-tube manometer or equivalent, capable of measuring within 0.02 mm Hg, for measuring the pressure of the pressure probes.

3. Procedure

3.1 Placement of Extraction Wells. The landfill owner or operator shall either install a single cluster of three extraction wells in a test area or space five wells over the landfill. The cluster wells are recommended but may be used only if the composition, age of the solid waste, and the landfill depth of the test area can be determined. CAUTION. Since this method is complex, only experienced personnel should conduct the test. Landfill gas contains methane, therefore explosive mixtures may exist at or near the landfill. It is advisable to take appropriate safety precautions when testing landfills, such as installing explosion-proof equipment and refraining from smoking.

3 1.1 Cluster Wells. Consult landfill site records for the age of the solid waste, depth, and composition of various sections of the landfill. Select an area near the perimeter of the landfill with a depth equal to or greater than the average depth of the landfill and with the average age of the solid waste between 2 and 10 years old. Avoid areas known to contain nondecomposable materials, such as concrete and asbestos Locate wells as shown in figure 2.

Because the age of the solid waste in a test area will not be uniform, calculate a weighted average to determine the average age of the solid waste as follows.

$$A_{avg} = \sum_{i=1}^{n} f_i A_i$$

where,

A_{avg}=average age of the solid waste tested, year

f_i=fraction of the solid waste in the i^{th} section

A_i=age of the i^{th} fraction, year

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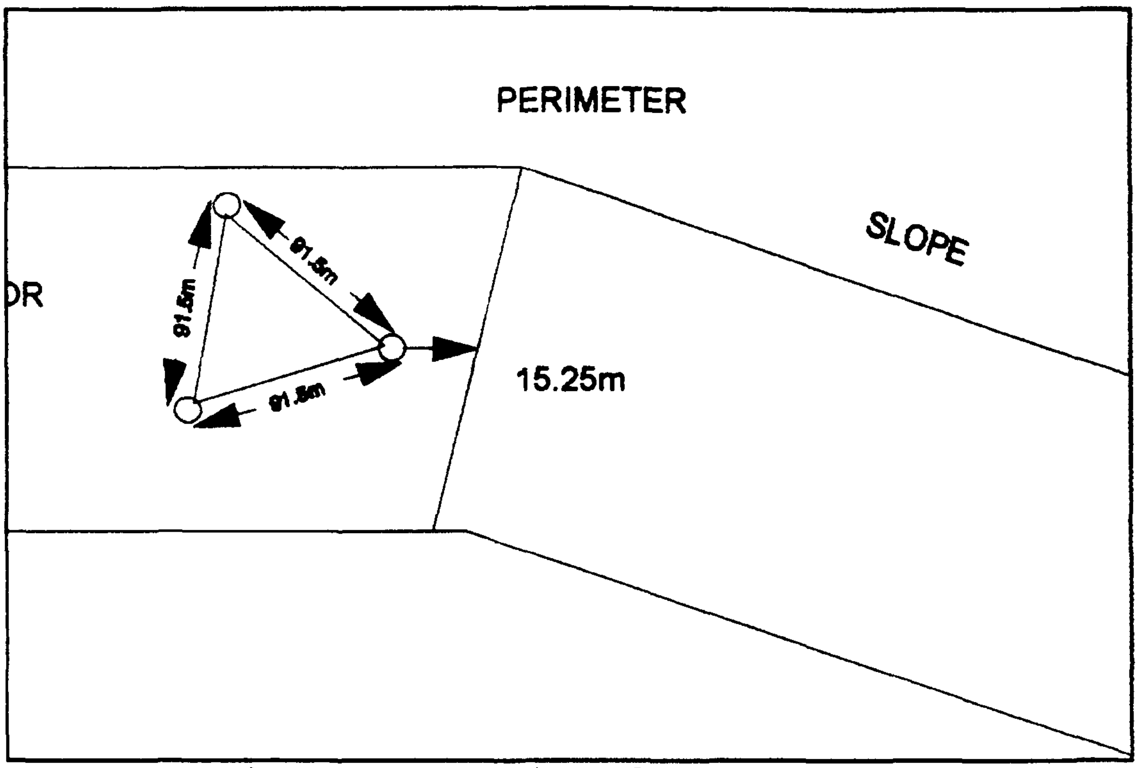

Figure 2. Location of Cluster Wells

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3.1.2 Equal Volume Wells. This procedure is used when the composition, age of solid waste, and landfill depth are not well known. Divide the portion of the landfill that has had waste for at least 2 years into five areas representing equal volumes. Locate an extraction well near the center of each area. Avoid areas known to contain nondecomposable materials, such as concrete and asbestos.

3.2 Installation of Extraction Wells. Use a well drilling rig to dig a 0.6 meters diameter hole in the landfill to a minimum of 75 percent of the landfill depth, not to exceed the bottom of the landfill or the water table. Perforate the bottom two thirds of the extraction well pipe. Perforations shall not be closer than 6 meters from the cover. Perforations shall be holes or slots with an open area equivalent to 1.0 centimeter diameter holes spaced 90 degrees apart every 0.1 to 0.2 meters. Place the extraction well in the center of the hole and backfill with 2.0 to 7.5 centimeters gravel to a level 0.3 meters above the perforated section Add a layer of backfill material 1.2 meters thick Add a layer of bentonite 1.0 meter thick, and backfill the remainder of the hole with cover material or material equal in permeability to the existing cover material The specifications for extraction well installation are shown in figure 3.

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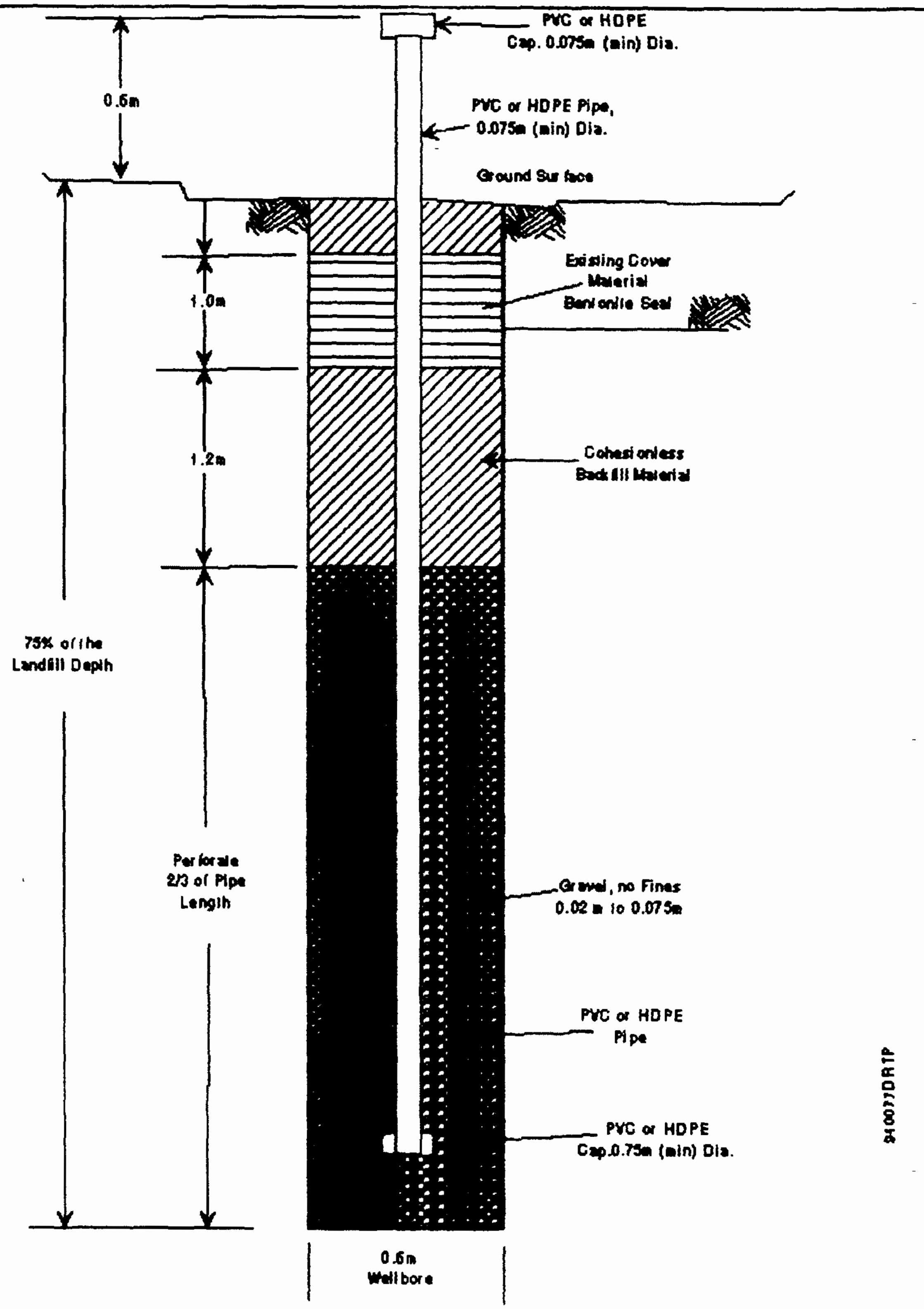

Figure 3. Gas extraction well.

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3.3 Pressure Probes. Shallow pressure probes are used in the check for infiltration of air into the landfill, and deep pressure probes are used to determine the radius of influence. Locate the deep pressure probes along three radial arms approximately 120 degrees apart at distances of 3, 15, 30, and 45 meters from the extraction well. The tester has the option of locating additional pressure probes at distances every 15 meters beyond 45 meters. Example placements of probes are shown in figure 4.

The probes located 15, 30, and 45 meters from each well, and any additional probes located along the three radial arms (deep probes), shall extend to a depth equal to the top of the perforated section of the extraction wells. Locate three shallow probes at a distance of 3 m from the extraction well. Shallow probes shall extend to a depth equal to half the depth of the deep probes.

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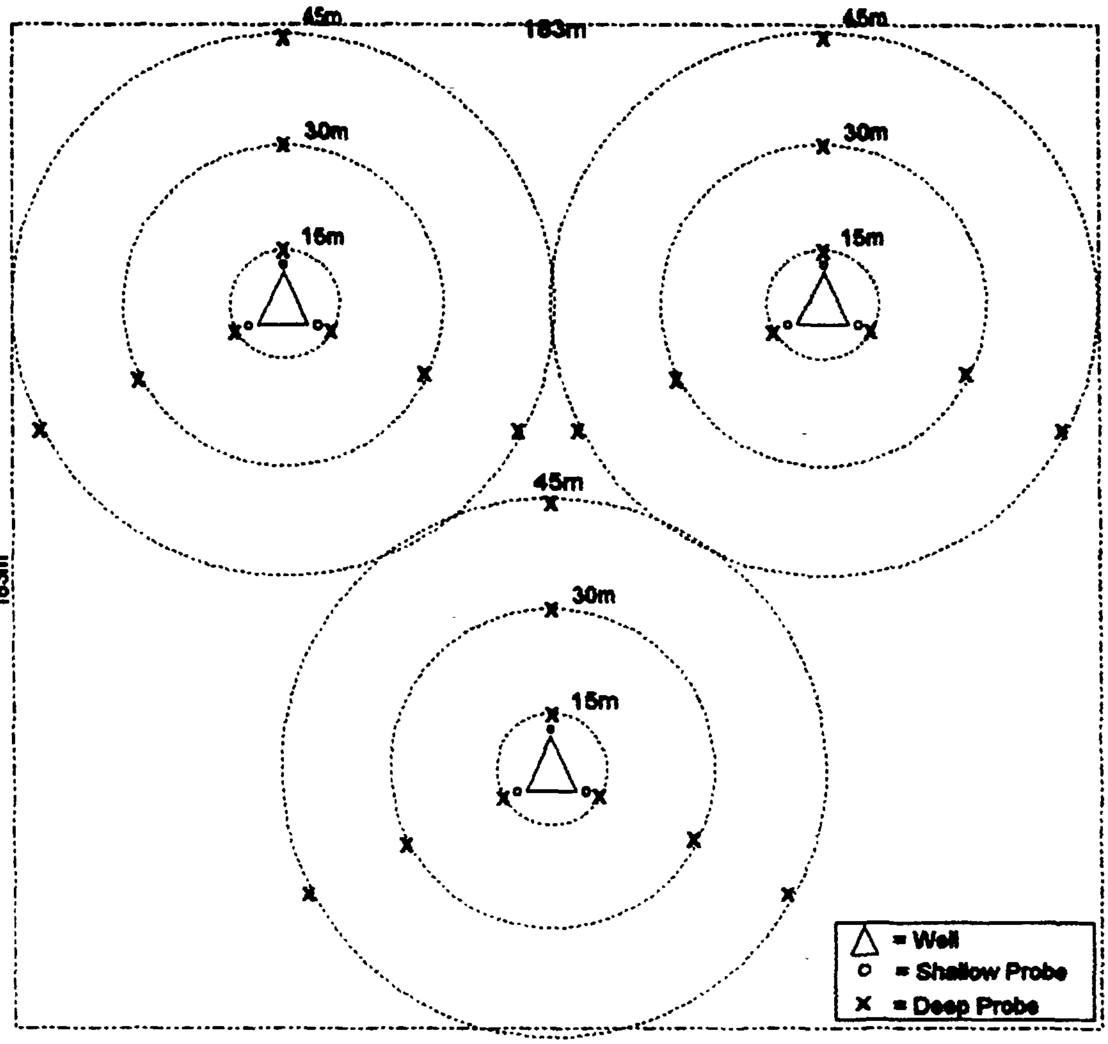

Figure 4. Cluster well configuration.

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Use an auger to dig a hole, approximately 0.15 to 0.23 meters in diameter, for each pressure probe. Perforate the bottom two thirds of the pressure probe. Perforations shall be holes or slots with an open area equivalent to four 6.0 millimeter diameter holes spaced 90 degrees apart every 0 15 meters. Place the pressure probe in the center of the hole and backfill with gravel to a level 0.30 meters above the perforated section. Add a layer of backfill material at least 1.2 meters thick. Add a layer of bentonite at least 0.3 meters thick, and backfill the remainder of the hole with cover material or material equal in permeability to the existing cover material. The specifications for pressure probe installation are shown in figure 5

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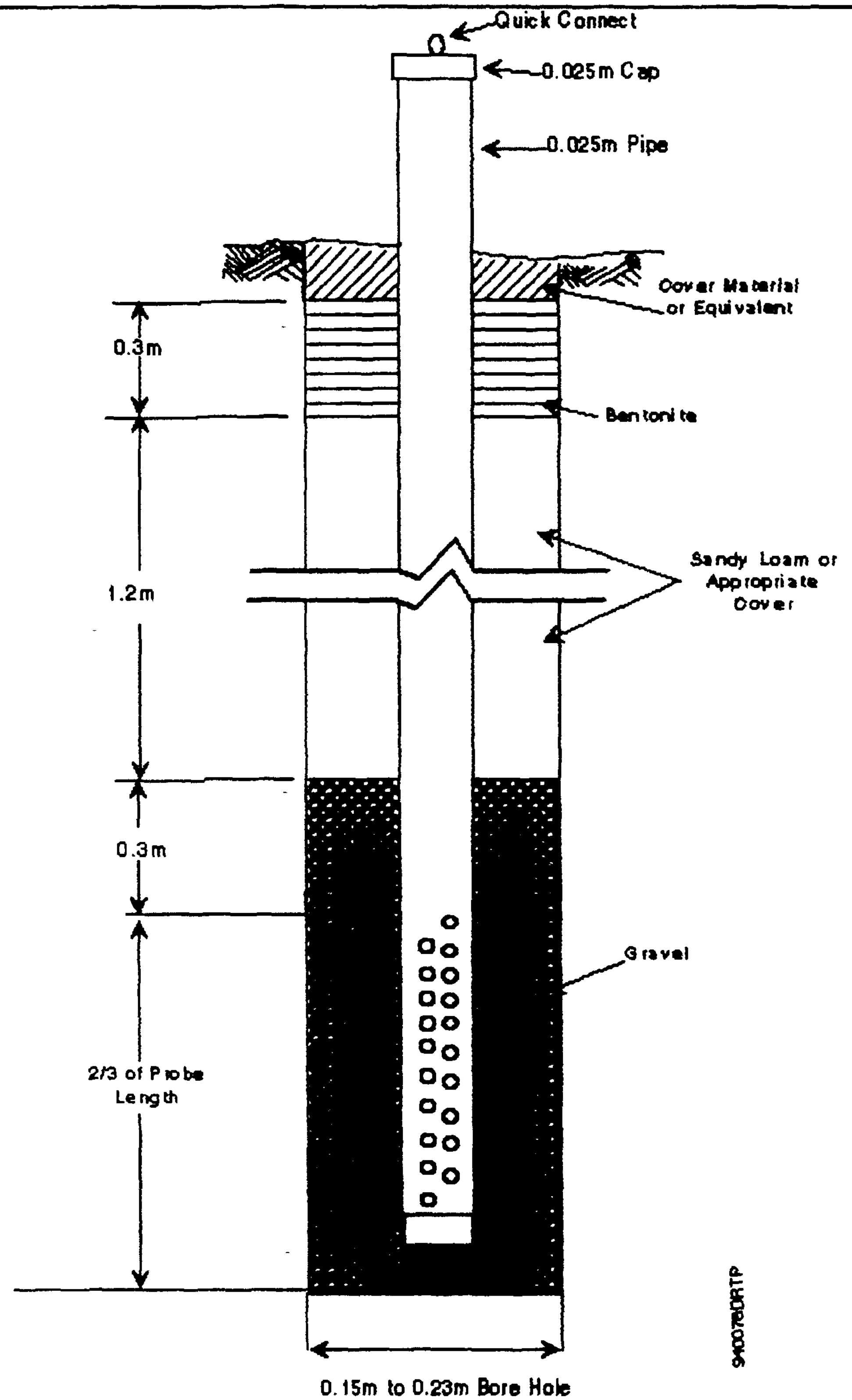

Figure 5. Pressure probe.

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3.4 LFG Flow Rate Measurement. Determine the flow rate of LFG from the test wells continuously during testing with an orifice meter. Alternative methods to measure the LFG flow rate may be used with approval of the Administrator. Locate the orifice meter as shown in figure 1. Attach the wells to the blower and flare assembly. The individual wells may be ducted to a common header so that a single blower and flare assembly and flow meter may be used Use the procedures in section 4.1 to calibrate the flow meter.

3.5 Leak Check. A leak check of the above ground system is required for accurate flow rate measurements and for safety. Sample LFG at the wellhead sample port and at a point downstream of the flow measuring device. Use Method 3C to determine nitrogen (N_2) concentrations. Determine the difference by using the formula below.

Difference=$C_o - C_w$

where,

C_o=concentration of N_2 at the outlet, ppmv

C_w=concentration of N_2 at the wellhead, ppmv

The system passes the leak check if the difference is less than 10,000 ppmv. If the system fails the leak check, make the appropriate adjustments to the above ground system and repeat the leak check.

3.6 Static Testing. The purpose of the static testing is to determine the initial conditions of the landfill. Close the control valves on the wells so that there is no flow of landfill gas from the well. Measure the gauge pressure (P_g) at each deep pressure probe and the barometric pressure (P_{bar}) every 8 hours for 3 days. Convert the gauge pressure of each deep pressure probe to absolute pressure by using the following equation. Record as P_i.

$P_i=P_{bar}+P_g$

where,

P_{bar}=Atmospheric pressure, mm Hg

P_g=Gauge pressure of the deep probes, mm Hg

P_i=Initial absolute pressure of the deep probes during static testing, mm Hg

3.6 1 For each probe. average all of the 8 hr deep pressure probe readings and record as P_{ia}. The P_{ia} is used in section 3.7 6 to determine the maximum radius of influence

3.6.2 Measure the LFG temperature and the static flow rate of each well once during static testing using a flow measurement device, such as a Type S pitot tube and measure the temperature of the landfill gas The flow measurements should be made either just before or just after the measurements of the probe pressures and are used in determining the initial flow from the extraction well during the short term testing The temperature measurement is used in the check for infiltration.

3.7 Short Term Testing. The purpose of short term testing is to determine the maximum vacuum that can be applied to the wells without infiltration of air into the landfill. The short term testing is done on one well at a time During the short term testing, burn LFG with a flare or incinerator.

3.7.1 Use the blower to extract LFG from a single well at a rate at least twice the static flow rate of the respective well measured in section 3.6.2. If using a single blower and flare assembly and a common header system, close the control valve on the wells not being measured. Allow 24 hours for the system to stabilize at this flow rate.

3.7.2 Check for infiltration of air into the landfill by measuring the temperature of the LFG at the wellhead, the gauge pressures of the shallow pressure probes, and the LFG N_2 concentration by using Method 3C. CAUTION: Increased vacuum at the wellhead may cause infiltration of air into the landfill, which increases the possibility of a landfill fire. Infiltration of air into the landfill may occur if any of the following conditions are met: the LFG N_2 concentration is more than 20 percent, any of the shallow probes have a negative gauge pressure, or the temperature has increased above 55°C or the maximum established temperature during static testing. If infiltration has not occurred, increase the blower vacuum by 4 mm Hg, wait 24 hours, and repeat the infiltration check. If at any time, the temperature change exceeds the limit, stop the test until it is safe to proceed. Continue the above steps of increasing blower vacuum by 4 mm Hg, waiting 24 hours, and checking for infiltration until the concentration of N_2 exceeds 20 percent or any of the shallow probes have a negative gauge pressure, at which time reduce the vacuum at the wellhead so that the N_2 concentration is less than 20 percent and the gauge pressures of the shallow probes are positive. This is the maximum vacuum at which infiltration does not occur.

3.7.3 At this maximum vacuum, measure P_{bar} every 8 hours for 24 hours and record the LFG flow rate as Q_s and the probe gauge pressures for all of the probes as P_f. Convert the gauge pressures of the deep probes to absolute pressures for each 8-hour reading at Q_s as follows:

$P=P_{bar}+P_f$

where,

P_{bar}=Atmospheric pressure, mm Hg

P_f=Final absolute pressure of the deep probes during short term testing, mm Hg

P=Pressure of the deep probes, mm Hg

3 7 4 For each probe. average the 8-hr deep pressure probe readings and record as P_{fa}

3 7 5 For each probe, compare the initial average pressure (P_{ia}) from section 3.6.1 to the final average pressure (P_{fa}). Determine the furthermost point from the wellhead along each radial arm where $P_{fa} \le P_{ia}$ This distance is the maximum radius of influence (ROI), which is the distance from the well affected by the vacuum. Average these values to determine the average maximum radius of influence (R_{ma})

The average R_{ma} may also be determined by plotting on semi-log paper the pressure differentials (P_{fa}-P_{ia}) on the y-axis (abscissa) versus the distances (3, 15, 30 and 45 meters) from the wellhead on the x-axis (ordinate). Use a linear regression analysis to determine the distance when the pressure differential is zero. Additional pressure probes may be used to obtain more points on the semi-long plot of pressure differentials versus distances

3.7.6 Calculate the depth (D_{st}) affected by the extraction well during the short term test as follows. If the computed value of D_{st} exceeds the depth of the landfill, set D_{st} equal to the landfill depth.

D_{st}=WD + $R_{ma}{}^2$

where,

D_{st}=depth, m

WD=well depth, m

R_{ma}=maximum radius of influence, m

3.7.7 Calculate the void volume for the extraction well (V) as follows.

$V=0.40\ \pi\ R_{ma}{}^2\ D_{st}$

where,

V=void volume of test well, m^3

R_{ma}=maximum radius of influence, m

D_{st}=depth, m

3.7.8 Repeat the procedures in section 3.7 for each well.

3.8 Calculate the total void volume of the test wells (V_v) by summing the void volumes (V) of each well.

3.9 Long Term Testing. The purpose of long term testing is to determine the methane generation rate constant, k. Use the blower to extract LFG from the wells. If a single blower and flare assembly and common header system are used, open all control valves and set the blower vacuum equal to the highest stabilized blower vacuum demonstrated by any individual well in section 3.7. Every 8 hours, sample the LFG from the wellhead sample port, measure the gauge pressures of the shallow pressure probes, the blower vacuum, the LFG flow rate, and use the criteria for infiltration in section 3.7.2 and Method 3C to check for infiltration. If infiltration is detected, do not reduce the blower vacuum, but reduce the LFG flow rate from the well by adjusting the control valve on the wellhead. Adjust each affected well individually. Continue until the equivalent of two total void volumes (V_v) have been extracted, or until V_t=2 V_v.

3.9.1 Calculate V_t, the total volume of LFG extracted from the wells, as follows

$$V_t = \sum_{i=1}^{n} 60\, Q_i\, t_{vi}$$

where,

V_t=total volume of LFG extracted from wells. m^3

Q_i=LFG flow rate measured at orifice meter at the i^{th} interval, cubic meters per minute

t_{vi}=time of the i^{th} interval, hour (usually 8)

3.9.2 Record the final stabilized flow rate as Q_f. If, during the long term testing, the flow rate does not stabilize, calculate Q_f by averaging the last 10 recorded flow rates.

3.9.3 For each deep probe, convert each gauge pressure to absolute pressure as in section 3.7 4 Average these values and record as P_{sa} For each probe, compare P_{ia} to P_{sa} Determine the furthermost point from the wellhead along each radial arm where $P_{sa} \le P_{ia}$. This distance is the stabilized radius of influence. Average these values to determine the average stabilized radius of influence (R_{sa})

3.10 Determine the NMOC mass emission rate using the procedures in section 5.

3.11 Deactivation of pressure probe holes. Upon completion of measurements, if pressure probes are removed, restore the integrity of the landfill cover by backfilling and sealing to prevent venting of LFG to the atmosphere or air infiltration.

4. Calibrations

Gas Flow Measuring Device Calibration Procedure. Locate a standard pitot tube in line with a gas flow measuring device. Use the procedures in Method 2D, section 4, to calibrate the orifice meter. Method 3C may be used to determine the dry molecular weight. It may be necessary to calibrate more than one gas flow measuring device to bracket the landfill gas flow rates. Construct a calibration curve by plotting the pressure drops across the gas flow measuring device for each flow rate versus the average dry gas volumetric flow rate in cubic meters per minute of the gas. Use this calibration curve to determine the volumetric flow from the wells during testing.

5. Calculations

5.1 Nomenclature.

A_{avg}=average age of the solid waste tested, year
A_i=age of solid waste in the ith fraction, year
A=age of landfill, year
A_r=acceptance rate, megagrams per year
C_{NMOC}=NMOC concentration, ppmv as hexane ($C_{NMOC}=C_t/6$)
C_t=NMOC concentration, ppmv (carbon equivalent) from Method 25C
D = depth affected by the test wells, m
D_{st}=depth affected by the test wells in the short term test, m
D_{LF}=landfill depth, m
f = fraction of decomposable solid waste in the landfill
f_i=fraction of the solid waste in the i^{th} section
k=methane generation rate constant, $year^{-1}$
L_o=methane generation potential, cubic meters per megagram
L_o'=revised methane generation potential to account for the amount of nondecomposable material in the landfill, cubic meters per megagram
M_i=mass of solid waste of the i^{th} section, megagrams
M_r=mass of decomposable solid waste affected by the test well, megagrams
M_w=number of wells
P_{bar}=atmospheric pressure, mm Hg
P_g=gauge pressure of the deep pressure probes, mm Hg
P_i=initial absolute pressure of the deep pressure probes during static testing, mm Hg
P_{ia}=average initial absolute pressure of the deep pressure probes during static testing, mm Hg
P_f=final absolute pressure of the deep pressure probes during short term testing, mm Hg
P_{fa}=average final absolute pressure of the deep pressure probes during short term testing, mm Hg
P_s=final absolute pressure of the deep pressure probes during long term testing, mm Hg
P_{sa}=average final absolute pressure of the deep pressure probes during long term testing, mm Hg
Q_B=required blow flow rate, cubic meters per minute
Q_f=final stabilized flow rate, cubic meters per minute
Q_i=LFG flow rate measured at orifice meter during the i^{th} interval, cubic meters per minute
Q_s=maximum LFG flow rate at each well determined by short term test, cubic meters per minute
Q_t=NMOC mass emission rate, cubic meters per minute
R_m=maximum radius of influence, m
R_{ma}=average maximum radius of influence, m
R_s=stabilized radius of influence for an individual well, m
R_{sa}=average stabilized radius of influence, m
t_i=age of section i, year
t_t=total time of long term testing, year
V=void volume of test well, m^3
V_r=volume of solid waste affected by the test well, m^3
V_t=total volume of solid waste affected by the long term testing, m^3
V_v=total void volume affected by test wells, m^3
WD=well depth, m
ρ=solid waste density, m^3 (Assume 0.64 megagrams per cubic meter if data are unavailable)

5.2 Use the following equation to calculate the depth affected by the test well. If using cluster wells, use the average depth of the wells for WD. If the value of D is greater than the depth of the landfill, set D equal to the landfill depth.

$D=WD+R_{sa}$

5.3 Use the following equation to calculate the volume of solid waste affected by the test well.

$V_r=R_{sa}^2\ \pi\ D$

5.4 Use the following equation to calculate the mass affected by the test well

$M_r=V_r\rho$

5 5 Modify L_o to account for the nondecomposable solid waste in the landfill

$L_o'=f\ L_o$

5.6 In the following equation, solve for k by iteration. A suggested procedure is to select a value for k, calculate the left side of the equation, and if not equal to zero, select another value for k. Continue this process until the left hand side of the equation equals zero, #0.001.

$$ke^{-k}A_{avg}-\left(5.256\times10^{5}\right)\frac{Q_f}{2\ L_o'\ M_r}=0$$

5.7 Use the following equation to determine landfill NMOC mass emission rate if the yearly acceptance rate of solid waste has been consistent (±10 percent) over the life of the landfill.

$Q_t = 2\ L_o'\ A_r\ (1 - e^{-k}A)\ C_{NMOC}\ /\ (5.256 \times 10^{11})$

5.8 Use the following equation to determine landfill NMOC mass emission rate if the acceptance rate has not been consistent over the life of the landfill.

$$Q_t=\frac{2\ kL_o'\ C_{NMOC}}{\left(5.256\times10^{11}\right)}\sum_{i=1}^{n}M_i e^{-kt_i}$$

6. Bibliography

1. Same as Method 2, appendix A, 40 CFR part 60.
2. Emcon Associates, Methane Generation and Recovery from Landfills. Ann Arbor Science, 1982.
3. The Johns Hopkins University, Brown Station Road Testing and Gas Recovery Projections. Laurel, Maryland: October 1982.
4. Mandeville and Associates, Procedure Manual for Landfill Gases Emission Testing.
5. Letter and attachments from Briggum, S., Waste Management of North America, to Thorneloe, S., EPA. Response to July 28, 1988 request for additional information. August 18, 1988.
6. Letter and attachments from Briggum, S., Waste Management of North America, to Wyatt, S., EPA. Response to December 7, 1988 request for additional information. January 16, 1989.

* * * * *

Method 3C—Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen From Stationary Sources

1. Applicability and Principle

1.1 Applicability. This method applies to the analysis of carbon dioxide (CO_2), methane (CH_4), nitrogen (N_2), and oxygen (O_2) in samples from municipal solid waste landfills and other sources when specified in an applicable subpart

1.2 Principle. A portion of the sample is injected into a gas chromatograph (GC) and the CO_2, CH_4, N_2, and O_2 concentrations are determined by using a thermal conductivity detector (TCD) and integrator

2. Range and Sensitivity

2.1 Range. The range of this method depends upon the concentration of samples. The analytical range of TCD's is generally between approximately 10 ppmv and the upper percent range.

2.2 Sensitivity The sensitivity limit for a compound is defined as the minimum detectable concentration of that compound, or the concentration that produces a signal-to-noise ratio of three to one. For CO_2, CH_4, N_2, and O_2, the sensitivity limit is in the low ppmv range

3. Interferences

Since the TCD exhibits universal response and detects all gas components except the carrier, interferences may occur. Choosing the appropriate GC or shifting the retention times by changing the column flow rate may help to eliminate resolution interferences.

To assure consistent detector response, helium is used to prepare calibration gases. Frequent exposure to samples or carrier gas containing oxygen may gradually destroy filaments

4. Apparatus

4.1 Gas Chromatograph. GC having at least the following components:

4.1.1 Separation Column. Appropriate column(s) to resolve CO_2, CH_4, N_2, O_2, and other gas components that may be present in the sample.

4.1.2 Sample Loop. Teflon or stainless steel tubing of the appropriate diameter.

Note: Mention of trade names or specific products does not constitute endorsement or recommendation by the U. S. Environmental Protection Agency.

4.1.3 Conditioning System. To maintain the column and sample loop at constant temperature.

4.1.4 Thermal Conductivity Detector.

4.2 Recorder Recorder with linear strip chart. Electronic integrator (optional) is recommended.

4.3 Teflon Tubing. Diameter and length determined by connection requirements of cylinder regulators and the GC.

4.4 Regulators. To control gas cylinder pressures and flow rates.

4.5 Adsorption Tubes. Applicable traps to remove any O_2 from the carrier gas.

5 Reagents

5.1 Calibration and Linearity Gases. Standard cylinder gas mixtures for each compound of interest with at least three concentration levels spanning the range of suspected sample concentrations. The calibration gases shall be prepared in helium.

5.2 Carrier Gas. Helium, high-purity.

6 Analysis

6.1 Sample Collection. Use the sample collection procedures described in Methods 3 or 25C to collect a sample of landfill gas (LFG).

6.2 Preparation of GC. Before putting the GC analyzer into routine operation, optimize the operational conditions according to the manufacturer's specifications to provide good resolution and minimum analysis time Establish the appropriate carrier gas flow and set the detector sample and reference cell flow rates at exactly the same levels. Adjust the column and detector temperatures to the recommended levels. Allow sufficient time for temperature stabilization. This may typically require 1 hour for each change in temperature.

6.3 Analyzer Linearity Check and Calibration. Perform this test before sample analysis. Using the gas mixtures in section 5.1, verify the detector linearity over the range of suspected sample concentrations with at least three points per compound of interest This initial check may also serve as the initial instrument calibration. All subsequent calibrations may be performed using a single-point standard gas provided the calibration point is within 20 percent of the sample component concentration. For each instrument calibration, record the carrier and detector flow rates, detector filament and block temperatures, attenuation factor, injection time, chart speed, sample loop volume, and component concentrations. Plot a linear regression of the standard concentrations versus area values to obtain the response factor of each compound Alternatively, response factors of uncorrected component concentrations (wet basis) may be generated using instrumental integration. Note: Peak height may be used instead of peak area throughout this method.

6.4 Sample Analysis. Purge the sample loop with sample, and allow to come to atmospheric pressure before each injection Analyze each sample in duplicate, and calculate the average sample area (A) The results are acceptable when the peak areas for two consecutive injections agree within 5 percent of their average. If they do not agree, run additional samples until consistent area data are obtained. Determine the tank sample concentrations according to section 7.2.

7 Calculations

Carry out calculations retaining at least one extra decimal figure beyond that of the acquired data. Round off results only after the final calculation.

7.1 Nomenclature.

A = average sample area

B_w = moisture content in the sample, fraction

C = component concentration in the sample, dry basis, ppmv

C_t = calculated NMOC concentration, ppmv C equivalent

C_{tm} = measured NMOC concentration, ppmv C equivalent

P_{bar} = barometric pressure, mm Hg

P_{ti} = gas sample tank pressure after evacuation, mm Hg absolute

P_t = gas sample tank pressure after sampling, but before pressurizing, mm Hg absolute

P_{tf} = final gas sample tank pressure after pressurizing, mm Hg absolute

P_w = vapor pressure of H_2O (from table 3C–1), mm Hg

T_{ti} = sample tank temperature before sampling, °K

T_t = sample tank temperature at completion of sampling, °K

T_{tf} = sample tank temperature after pressurizing, °K

r = total number of analyzer injections of sample tank during analysis (where j = injection number, 1 . . r)

R = Mean calibration response factor for specific sample component, area/ppmv

TABLE 3C–1.—MOISTURE CORRECTION

Temperature °C	Vapor Pressure of H_2O, mm Hg
4	6.1
6	7.0
8	8.0
10	9.2
12	10.5
14	12.0
16	13.6
18	15.5
20	17.5
22	19.8
24	22.4
26	25.2
28	28.3
30	31.8

7.2 Concentration of Sample Components. Calculate C for each compound using Equations 3C–1 and 3C–2. Use the temperature and barometric pressure at the sampling site to calculate Bw. If the sample was diluted with helium using the procedures in Method 25C, use Equation 3C–3 to calculate the concentration.

$$B_w = \frac{P_w}{P_{bar}} \qquad \text{3C-1}$$

$$C = \frac{A}{R(1-B_w)} \qquad \text{3C-2}$$

$$C = \frac{\dfrac{P_{tf}}{T_{tf}}}{\dfrac{P_t}{T_t} - \dfrac{P_{ti}}{T_{ti}}} \quad \frac{A}{R(1-B_w)} \qquad \text{3C-3}$$

8. Bibliography

1. McNair, H.M., and E.J. Bonnelli. Basic Gas Chromatography. Consolidated Printers, Berkeley, CA. 1969.

* * * * *

Method 25C—Determination of Nonmethane Organic Compounds (NMOC) in MSW Landfill Gases

1. Applicability and Principle

1.1 Applicability. This method is applicable to the sampling and measurement of nonmethane organic compounds (NMOC) as carbon in MSW landfill gases.

1.2 Principle. A sample probe that has been perforated at one end is driven or augered to a depth of 1.0 meter below the bottom of the landfill cover. A sample of the landfill gas is extracted with an evacuated cylinder. The NMOC content of the gas is determined by injecting a portion of the gas into a gas chromatographic column to separate the NMOC from carbon monoxide (CO), carbon dioxide (CO_2), and methane (CH_4); the NMOC are oxidized to CO_2, reduced to CH_4, and measured by a flame ionization detector (FID). In this manner, the variable response of the FID associated with different types of organics is eliminated.

2. Apparatus

2.1 Sample Probe. Stainless steel, with the bottom third perforated. The sample probe shall be capped at the bottom and shall have a threaded cap with a sampling attachment at the top. The sample probe shall be long enough to go through and extend no less than 1.0 meter below the landfill cover. If the sample probe is to be driven into the landfill, the bottom cap should be designed to facilitate driving the probe into the landfill.

2.2 Sampling Train

2.2.1 Rotameter with Flow Control Valve. Capable of measuring a sample flow rate of 500 ml/min or less (30.5±3.1 m³/min). The control valve shall be made of stainless steel.

2.2.2 Sampling Valve. Stainless steel.

2.2.3 Pressure Gauge U-tube mercury manometer, or equivalent, capable of measuring pressure to within 1 mm Hg in the range of 0 to 1,100 mm Hg.

2.2.4 Sample Tank. Stainless steel or aluminum cylinder, with a minimum volume of 4 liters and equipped with a stainless steel sample tank valve.

2.3 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg

2.4 Purging Pump. Portable, explosion proof, and suitable for sampling NMOC.

2.5 Pilot Probe Procedure. The following are needed only if the tester chooses to use the procedure described in section 4.2.1.

2.5.1 Pilot Probe. Tubing of sufficient strength to withstand being driven into the landfill by a post driver and an outside diameter of at least 6.0 millimeters smaller than the sample probe. The pilot probe shall be capped on both ends and long enough to go through the landfill cover and extend no less than 1.0 meter into the landfill.

2.5.2 Post Driver and Compressor. Capable of driving the pilot probe and the sampling probe into the landfill.

2.6 Auger Procedure. The following are needed only if the tester chooses to use the procedure described in section 4.2.2.

2.6.1 Auger. Capable of drilling through the landfill cover and to a depth of no less than 0.9 meters into the landfill.

2.6.2 Pea Gravel.

2.6.3 Bentonite.

2.7 NMOC Analyzer, Barometer, Thermometer, and Syringes. Same as in sections 2.3, 2.4.1, 2.4.2, 2.4.4, respectively, of Method 25.

3. Reagents

3.1 NMOC Analysis. Same as in Method 25, section 3.2.

3.2 Calibration. Same as in Method 25, section 3.4, except omit section 3.4.3.

4 Procedure

4 1 Sample Tank Evacuation and Leak Check. Conduct the sample tank evacuation and leak check either in the laboratory or the field. Connect the pressure gauge and sampling valve to the sample tank. Evacuate the sample tank to 10 mm Hg absolute pressure or less. Close the sampling valve, and allow the tank to sit for 60 minutes. The tank is acceptable if no change is noted. Include the results of the leak check in the test report.

4.2 Sample Probe Installation. The tester may use the procedure in sections 4.2.1 or 4.2.2. CAUTION: Since this method is complex, only experienced personnel should perform this test. LFG contains methane, therefore explosive mixtures may exist on or near the landfill. It is advisable to take appropriate safety precautions when testing landfills, such as refraining from smoking and installing explosion-proof equipment.

4.2.1 Pilot Probe Procedure. Use the post driver to drive the pilot probe at least 1.0 meter below the landfill cover. Alternative procedures to drive the probe into the landfill may be used subject to the approval of the Administrator.

Remove the pilot probe and drive the sample probe into the hole left by the pilot probe. The sample probe shall extend not less than 1.0 meter below the landfill cover and shall protrude about 0.3 meters above the landfill cover. Seal around the sampling probe with bentonite and cap the sampling probe with the sampling probe cap.

4.2.2 Auger Procedure. Use an auger to drill a hole through the landfill cover and to at least 1.0 meter below the landfill cover. Place the sample probe in the hole and backfill with pea gravel to a level 0.6 meters from the surface. The sample probe shall protrude at least 0.3 meters above the landfill cover. Seal the remaining area around the probe with bentonite. Allow 24 hours for the landfill gases to equilibrate inside the augered probe before sampling.

4.3 Sample Train Assembly. Prepare the sample by evacuating and filling the sample tank with helium three times. After the third evacuation, charge the sample tank with helium to a pressure of approximately 325 mm Hg. Record the pressure, the ambient temperature, and the barometric pressure. Assemble the sampling probe purging system as shown in figure 1.

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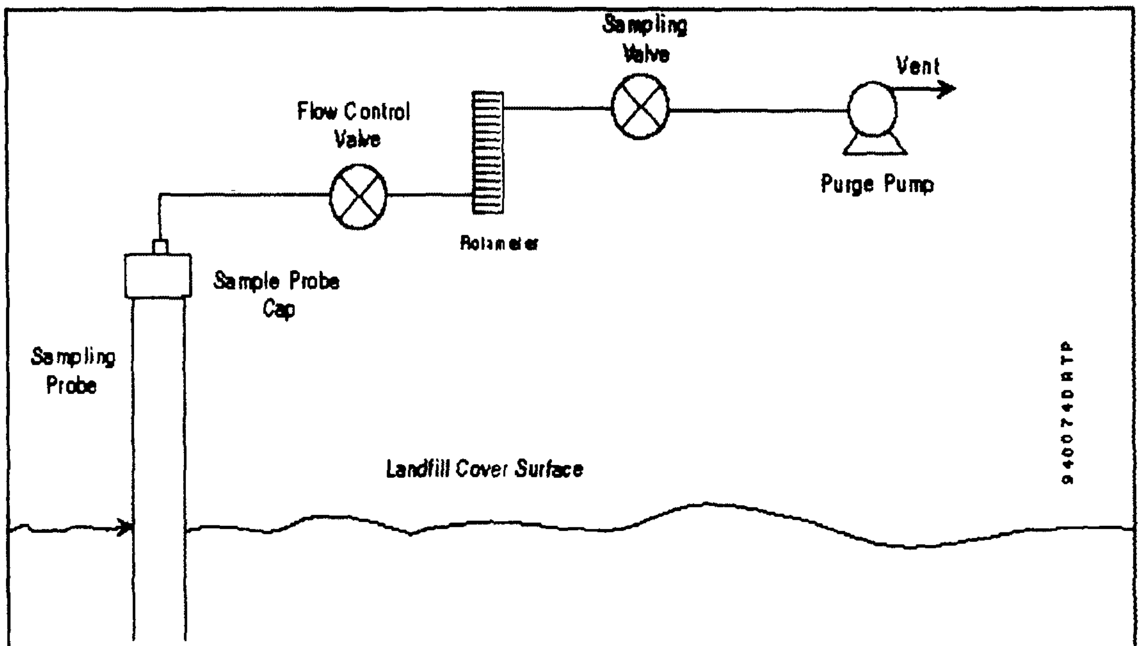

Figure 1. Schematic of sampling probe purging system.

4.4 Sampling Procedure. Open the sampling valve and use the purge pump and the flow control valve to evacuate at least two sample probe volumes from the system at a flow rate of 500 ml/min or less (30.5±3.1 m^3/min). Close the sampling valve and replace the purge pump with the sample tank apparatus as shown in figure 2. Open the sampling valve and the sample tank valves and, using the flow control valve, sample at a flow rate of 500 ml/min or less (30.5±3.1 m^3/min) until the sample tank gauge pressure is zero. Disconnect the sampling tank apparatus and use the carrier gas bypass valve to pressurize the sample cylinder to approximately 1,060 mm Hg absolute pressure with helium and record the final pressure. Alternatively, the sample tank may be pressurized in the lab. If not analyzing for N_2, the sample cylinder may be pressurized with zero air. Use Method 3C to determine the percent N_2 in the sample Presence of N_2 indicates infiltration of ambient air into the gas sample. The landfill sample is acceptable if the concentration of N_2 is less than 20 percent.

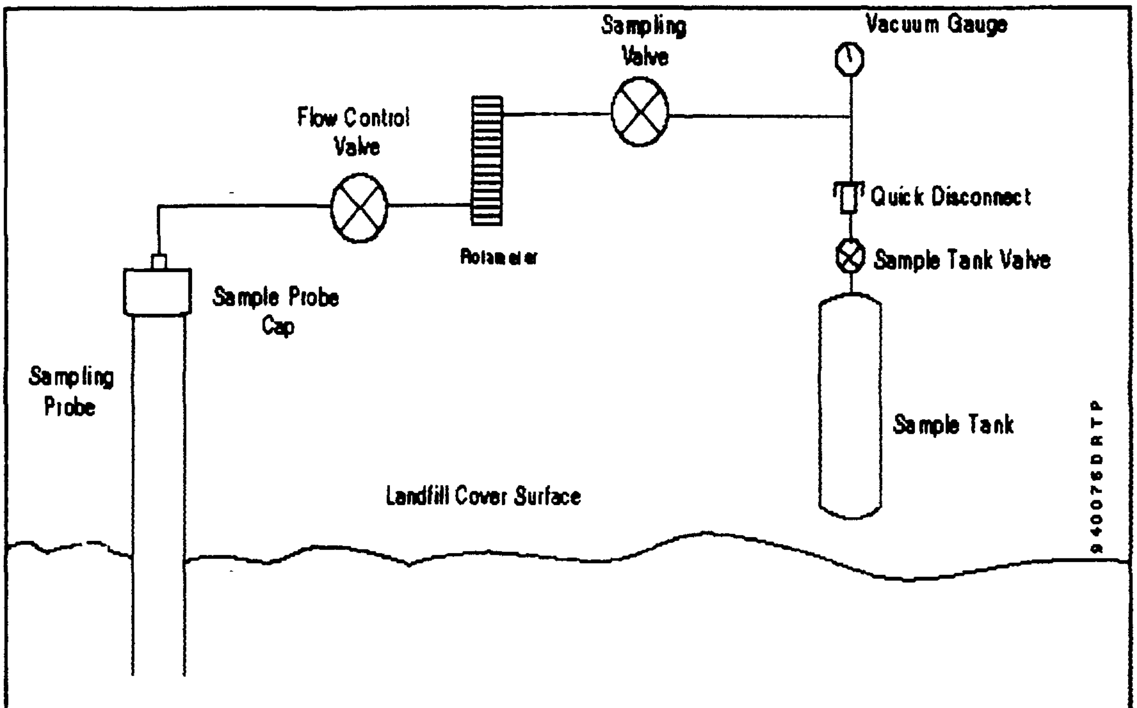

Figure 2. Schematic of sampling train.

4.5 Analysis. The oxidation, reduction, and measurement of NMOC is similar to Method 25. Before putting the NMOC analyzer into routine operation, conduct an initial performance test. Start the analyzer, and perform all the necessary functions to put the analyzer into proper working order. Conduct the performance test according to the procedures established in section 5.1. Once the performance test has been successfully completed and the NMOC calibration response factor has been determined, proceed with sample analysis as follows:

4.5.1 Daily Operations and Calibration Checks. Before and immediately after the analysis of each set of samples or on a daily basis (whichever occurs first), conduct a calibration test according to the procedures established in section 5.2. If the criteria of the daily calibration test cannot be met, repeat the NMOC analyzer performance test (section 5.1) before proceeding.

4.5.2 Operating Conditions. Same as in Method 25, section 4.4.2.

4.5.3 Analysis of Sample Tank. Purge the sample loop with sample, and then inject the sample. Under the specified operating conditions, the CO_2 in the sample will elute in approximately 100 seconds. As soon as the detector response returns to baseline following the CO_2 peak, switch the carrier gas flow to backflush, and raise the column oven temperature to 195 °C as rapidly as possible. A rate of 30 °C/min has been shown to be adequate. Record the value obtained for any measured NMOC. Return the column oven temperature to 85 °C in preparation for the next analysis. Analyze each sample in triplicate, and report the average as C_{tm}.

4.6 Audit Samples. Same as in Method 25, section 4.5.

4.7 Deactivation of Sample Probe Holes. Once sampling has taken place, either plug the sampling probes with a cap or remove the probes and refill the hole with cover material.

5 Calibration and Operational Checks

Maintain a record of performance of each item.

5.1 Initial NMOC Analyzer Performance Test. Same as in Method 25, section 5.2, except omit the linearity checks for CO_2 standards.

5.2 NMOC Analyzer Daily Calibration. NMOC response factors, same as in Method 25, section 5.3.2.

6. Calculations

All equations are written using absolute pressure; absolute pressures are determined by adding the measured barometric pressure to the measured gauge of manometer pressure.

6.1 Nomenclature.

B_w=moisture content in the sample, fraction
C_{N2}=measured N_2 concentration, fraction
C_t=calculated NMOC concentration, ppmv C equivalent
C_{tm}=measured NMOC concentration, ppmv C equivalent
P_b=barometric pressure, mm Hg
P_{ti}=gas sample tank pressure before sampling, mm Hg absolute
P_t=gas sample tank pressure at completion of sampling, but before pressurizing, mm Hg absolute
P_{tf}=final gas sample tank pressure after pressurizing, mm Hg absolute
P_w=vapor pressure of H_2O (from table 25C–1), mm Hg
T_{ti}=sample tank temperature before sampling, °K
T_t=sample tank temperature at completion of sampling, but before pressuring, °K
T_{tf}=sample tank temperature after pressurizing, °K
r=total number of analyzer injections of sample tank during analysis (where j=injection number, 1. . .r)

6.2 Water Correction. Use table 25C–1, the LFG temperature, and barometric pressure at the sampling site to calculate B_w.

$$B_w = \frac{P_w}{P_b}$$

TABLE 25C–1.—MOISTURE CORRECTION

Temperature, °C	Vapor Pressure of H_2O, mm Hg
4	6.1
6	7.0
8	8.0
1	9.2
12	10.5
14	12.0
16	13.6
18	15.5
20	17.5
22	19.8
24	22.4
26	25.2
28	28.3
30	31.8

6.3 NMOC Concentration. Use the following equation to calculate the concentration of NMOC for each sample tank.

$$C_t = \frac{\frac{P_{tf}}{T_{tf}}}{\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}}} \frac{1}{(1 - B_w - C_{N2}) r} \sum_{j=1}^{r} C_{tm}{}^{(j)}$$

7. Bibliography

1. Salon, Albert E., Samuel Witz, and Robert D. MacPhee. Determination of Solvent Vapor Concentrations by Total Combustion Analysis: A Comparison of Infrared with Flame Ionization Detectors. Paper No. 75-33.2. (Presented at the 68th Annual Meeting of the Air Pollution Control Association. Boston, Massachusetts. June 15-20, 1975.) p. 14.

2. Salon, Albert E., William L. Oaks, and Robert D. MacPhee. Measuring the Organic Carbon Content of Source Emissions for Air Pollution Control Paper No. 74-190. (Presented at the 67th Annual Meeting of the Air Pollution Control Association. Denver, Colorado. June 9-13, 1974) p. 25.

[FR Doc. 96-5529 Filed 3-11-96; 8:45 am]

BILLING CODE 6560-50-P

FEDERAL MARITIME COMMISSION

46 CFR Part 501

The Federal Maritime Commission—General

AGENCY: Federal Maritime Commission

ACTION: Final rule.

SUMMARY: The Federal Maritime Commission is revising its statement of delegations of authorities to include new authority delegated to the Director of the Bureau of Economics and Agreement Analysis to grant or deny applications for waivers of certain regulations.

EFFECTIVE DATE: March 12, 1996

FOR FURTHER INFORMATION CONTACT: Austin L. Schmitt. Director, Bureau of Economics and Agreement Analysis, Federal Maritime Commission, 800 North Capitol Street, NW., Washington, DC 20573-0001, (202) 523-5787.

SUPPLEMENTARY INFORMATION: In Docket No. 94-31, *Information Form and Post-Effective Reporting Requirements for Agreements Among Ocean Common Carriers Subject to the Shipping Act of 1984*, the Federal Maritime Commission ("Commission") has amended its regulations set forth in 46 CFR Part 572 governing the filing, processing and review of agreements among ocean common carriers subject to the Shipping Act of 1984. The amended regulations provide that, upon a showing of good cause, the Commission may waive any part of their requirements, and set forth procedures and standards governing applications for a waiver.

This rule amends the Commission's statement of delegations of authorities in 46 CFR Part 501 to include a new delegation to the Director of the Commission's Bureau of Economics and Agreement Analysis to grant or deny applications for waivers of the agreement regulations. Review of the Director's grant or denial of a waiver is available under the procedures already in effect pursuant to 46 CFR 501.21(f).

Notice and opportunity for public comment were not necessary prior to issuance of this rule and because it deals solely with matters of agency organization and procedure. 5 U.S.C. 553.

List of Subjects in 46 CFR Part 501

Administrative practice and procedure; authority delegations; organization and functions; seals and insignia.

Therefore, pursuant to 5 U.S.C. 551-557, 701-706, 2903 and 6304; 31 U.S.C. 3721; 41 U.S.C. 414 and 418; 44 U.S.C. 501-520 and 3501-3520; 46 U.S.C. app. 801-848, 876, 1111 and 1701-1720; Reorganization Plan No. 7 of 1961, 26 FR 7315, August 12, 1961; Pub. L. 89-56, 79 Stat. 195; and 5 CFR Part 2638, Part 501 of Title 46, Code of Federal Regulations, is amended to read as follows:

PART 501—THE FEDERAL MARITIME COMMISSION—GENERAL

1. The authority citation for Part 501 continues to read as follows:

Authority 5 U.S.C. 551-557, 701-706, 2903 and 6304; 31 U.S.C. 3721; 41 U.S C. 414 and 418, 44 U.S.C. 501-520 and 3501-3520, 46 U.S.C app 801-848, 876, 1111 and 1701-1720; Reorganization Plan No 7 of 1961, 26 FR 7315, August 12, 1961; Pub L 89-56, 79 Stat. 195, 5 CFR Part 2638

2. In section 501.26, paragraph (f) is amended by changing the reference to "572.404" to "572.406," and by changing the references to "572.501 and 572.502" to "572.404 and 572.405;" paragraphs (g) through (m) are redesignated (i) through (o); newly redesignated (i) (6) is removed; and new paragraphs (g) and (h) are added, as follows:

§ 501.26 Delegation to the Director, Bureau of Economics and Agreement Analysis.

* * * * *

(g) Authority to grant or deny applications filed under § 572.505 of this chapter for waiver of the information form requirements of §§ 572.503 and 572.504 of this chapter.

By the Commission

(h) Authority to grant or deny applications filed under § 572.709 of this chapter for waiver of the reporting and record retention requirements of §§ 572.701, 572.702, 572.703, 572.704, 572.705, 572.706, 572.707 and 572.708 of this chapter.

* * * * *

By the Commission.

Ronald D. Murphy,

Assistant Secretary.

[FR Doc. 96-5807 Filed 3-11-96; 8:45 am]

BILLING CODE 6730-01-M

FEDERAL COMMUNICATIONS COMMISSION

47 CFR PART 25

[CC Docket No. 92-166; FCC 96-54]

Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Band

AGENCY: Federal Communications Commission.

ACTION: Final rule: petition for reconsideration.

SUMMARY: The Commission has adopted, upon reconsideration, changes to the rules and policies establishing service and licensing rules for the Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Band. Specifically, we conclude that the "interim plan," designed to avoid interference between the Big LEO systems and the Russian Global Navigation Satellite System ("GLONASS"), is unnecessary at this time. We also clarify our views concerning position determination capabilities in Big LEO earth terminals, and modifications to feeder link proposals. In order to ensure that United States licensees do not engage in practices that are contrary to the goal of competitive markets world-wide, we also adopt a rule concerning exclusive arrangements for provision of Big LEO service. We also clarify our "two-tiered" processing scheme for financial qualifications. In addition, we make a number of minor editorial and clarifying changes to our technical rules.

EFFECTIVE DATE: April 11, 1996.

FOR FURTHER INFORMATION CONTACT: Karl Kensinger, International Bureau, Satellite and Radiocommunication Division, Satellite Policy Branch, (202) 418-0773.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Memorandum Opinion and Order* in CC Docket No. 92-166; FCC 96-54, adopted February 12, 1996 and released February 15, 1996. The complete text of this Memorandum Opinion and Order is

APPENDIX A2

Amendments to Subparts Cc and WWW appeared as a direct final notice in the Federal Register on June 16, 1998 (63 FR 32743) and can also be found on the internet at http://www.epa.gov/docs/fedrgstr/EPA-AIR/1998/June transiting the ICW once the last tall ship in the parade clears the Savannah River and Fields Cut junction.

(3) From 2 p.m. until 5 p.m. EDT on July 3, 1998, and from 8 a.m. until 11 a m EDT on July 6, 1998, all waters bounded by the south bank of the Savannah River to the center of the Savannah River Channel, from the Talmadge Bridge to position 32-04.45, 081-04.45W. During these times no vessel shall be allowed to enter these safety zones unless authorized by the Captain of the Port

(4) From 9 p.m. to 11 p.m. EDT on July 4, 1998, a 300 foot radius around a fireworks staging area in approximate position 32-05N, 081-05W. During this time no vessel shall be allowed to enter this safety zone unless authorized by the Captain of the Port.

(5) From 8 a.m. to 2 p.m. EDT on July 6 1998, the center 300 feet of the Savannah River channel from the Talmadge Bridge to the entrance of Bloody Point Range. Vessels that cannot safely navigate outside of this safety zone and desire to depart the port of Savannah on July 6, 1998, would be required to begin the outbound transit in sufficient time to clear the Savannah Riverfront area prior to 8 a m. Vessels that cannot safely navigate outside of this safety zone and desire to enter the port of Savannah on July 6, 1998. would be required to clear the Savannah Riverfront area prior to 8 a.m. If unable to clear the Savannah Riverfront area by 8 a m., these vessels would be required to start the inbound transit after 2 p m The Captain of the Port will allow vessel traffic to resume outbound transits utilizing the entire navigational channel when the last tall ship in the parade clears longitude 080-51W Vessels using the ICW will not be allowed to cross the Savannah River at the junction of the Fields Cut once the parade approaches within one (1) nautical mile of this area Vessels will be allowed to resume transiting the ICW once the last tall ship in the parade clears the Savannah River and Fields Cut junction.

(6) From 10 a.m to 2 p.m. EDT on July 6, 1998, an area bounded by 32-00.19N, 080-44 07W, 31-59.35N, 080-43.08W, 32-00.59N, 080-41.32W, and 32-01.43N, 080-42.28W. During this time no vessel shall be allowed to enter this safety zone unless authorized by the Captain of the Port.

Note: The regulations specified in paragraphs (a)(1) and (a)(6) apply only within the navigable waters of the United States In the waters within the offshore staging area and pre-race staging area that are outside the navigable waters of the United States. the following nonobligatory guidelines apply

(i) All unaffiliated Americas' Sail vessels should remain clear of the staging area and pre-race staging area and avoid interfering with any Americas' Sail participant or Coast Guard vessel. Interference with anchoring or race activities may constitute a safety hazard warranting cancellation or termination of all or part of the Americas' Sail activities by the Captain of the Port.

(ii) Any unauthorized entry into these zones by unaffiliated vessels constitutes a risk to the safety of marine traffic. Such entry will constitute a factor to be considered in determining whether a person has operated a vessel in a negligent manner in violation of 46 U S.C. 2302.

(b) *Regulations.* In accordance with the general regulations in § 165.23 of this part, entry into these safety zones is subject to the following requirements:

(1) These safety zones are closed to all non-participating vessels, except as may be permitted by the Captain of the Port or a representative of the Captain of the Port.

(2) The "representative of the Captain of the Port" is any Coast Guard commissioned, warrant or petty officer who has been designated by the Captain of the Port, Savannah, GA, to act on his behalf. The representative of the Captain of the Port will be aboard either a Coast Guard or Coast Guard Auxiliary vessel.

(3) Non-participating vessel operators desiring to enter or operate within the safety zone shall contact the Captain of the Port or his representative to obtain permission to do so. Vessel operators given permission to enter or operate in the safety zone shall comply with all directions given them by the Captain of the Port or his representative.

(4) The Captain of the Port may be contacted by telephone via the Command Duty Officer at (912) 652-4353. Vessels assisting in the enforcement of the safety zone may be contacted on VHF-FM channel 16. Vessel operators may determine the restrictions in effect for the safety zone by coming alongside a Coast Guard vessel patrolling the perimeter of the safety zone

(5) The Captain of the Port Savannah will issue a Marine Safety Information Broadcast Notice to Mariners to notify the maritime community of the safety zones and restrictions imposed.

(c) *Dates* This section becomes effective at 9 a.m , Eastern Daylight Time (EDT) on July 2, 1998, and terminates at 2 p m., EDT on July 6, 1998.

Dated June 3, 1998

R.E. Seebald,

Commander, U S Coast Guard, Captain of the Port, Savannah, Georgia

[FR Doc 98-15965 Filed 6-15-98, 8:45 am]

BILLING CODE 4910-15-M

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-6106-8]

Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources: Municipal Solid Waste Landfills

AGENCY: Environmental Protection Agency (EPA).

ACTION: Direct final rule.

SUMMARY: This action amends, corrects errors, and clarifies regulatory text of the "Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources: Municipal Solid Waste Landfills," which was issued as a final rule and guideline on March 12, 1996

EFFECTIVE DATE: This rule will become effective August 17, 1998 without further notice unless the Agency receives relevant adverse comment by July 16, 1998. Should the Agency receive such comments, it will publish a timely document withdrawing this rule.

ADDRESSES: Comments should be submitted (in duplicate if possible) to Air and Radiation Docket and Information Center (MC-6102), Attn. Docket No A-88-09/Category V-D, U.S. Environmental Protection Agency, 401 M Street, SW., Washington. DC 20460. The EPA request that a separate copy also be sent to the contact person listed below. Refer to **SUPPLEMENTARY INFORMATION** for information regarding electronic submittal of comments.

FOR FURTHER INFORMATION CONTACT: For information concerning this notice and analyses performed in developing this rule, contact Ms. Michele Laur, Waste and Chemical Processes Group, Emission Standards Division (MD-13), U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711, telephone number (919) 541-5256. For implementation issues, contact Mary Ann Warner, Program Review Group, Information Transfer and Program Integration Division (MD-12), U.S Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-1192 For information on the Landfill

Model, contact Susan Thorneloe through the internet at: thorneloe.susan@epamail.epa.gov. For information concerning applicability and rule determinations, contact the appropriate regional representative:

Region I

Greg Roscoe, Air Programs Compliance Branch Chief, U.S. EPA/ASO, Region I, JFK Federal Building, Boston, MA 02203, (617) 565-3221

Region II

Christine DeRosa, U.S. EPA, Region II, 290 Broadway, 25th Floor, New York, NY 10007-1866, (212) 637-4022

Region III

James Topsale, U.S. EPA/3AP22, Region III, 841 Chestnut Building, Philadelphia, PA 10107, (215) 566-2190

Region IV

R. Douglas Neeley, Chief, Air and Radiation Technology Branch, U.S. EPA, Region IV, 61 Forsyth St., SW., Atlanta, GA 30303, (404) 562-9105

Region V

George T. Czerniak, Jr., Air Enforcement Branch Chief, U.S. EPA/5AE-26, Region V, 77 West Jackson Street, Chicago, IL 60604, (312) 353-2088

Region VI

John R. Hepola, Air Enforcement Branch Chief, U.S. EPA, Region VI, 1445 Ross Avenue, Suite 1200, Dallas, TX 75202-2733, (214) 655-7220

Region VII

Ward Burns, U.S. EPA/RME, Region VII, 726 Minnesota Avenue/ARTDAPCO, Kansas City, KS 66101-2728, (913) 551-7960

Region VIII

Vicki Stamper, U.S. EPA, Region VIII, 999 18th Street, Suite 500, Denver, CO 80202-2466, (303) 312-6445

Region IX

Patricia Bowlin, U.S. EPA/RM HAN/17211, Region IX, 75 Hawthorne Street/AIR-4, San Francisco, CA, (415) 744-1188

Region X

Catherine Woo, U.S EPA, Region X, Office of Air Quality Planning and Standards-107, 1200 Sixth Avenue, Seattle, WA 98101, (206) 553-1814

SUPPLEMENTARY INFORMATION: A companion proposal to this final rule is being published in the proposed rules section of today's **Federal Register** and is identical to this direct final rule. Any comments on this direct final rule should address the companion proposal. The proposal provides information on addresses for submittal of comments. If relevant adverse comments are timely received, such comments will be addressed in a subsequent final rule based on the proposed rule. A document informing the public that the direct final rule did not take effect will be published. If no relevant adverse comments are timely filed on any provision of this direct final rule, then the entire direct final rule will become effective 60 days from today's **Federal Register** document and no further action will be taken on the companion proposal published today.

Background

On March 12, 1996 (60 FR 9918), the U.S. Environmental Protection Agency (EPA) promulgated in the **Federal Register** standards of performance for new sources (NSPS) for municipal solid waste landfills and emission guidelines for existing municipal solid waste landfills. These regulations and guidelines were promulgated as subparts WWW and Cc of 40 CFR part 60.

This document revises the wording of the applicability sections of subparts WWW and Cc and related definitions to clarify the intent regarding which landfills are subject to subpart WWW versus subpart Cc. This notice also corrects typographical and cross referencing errors. A few editorial modifications are also being made to clarify the intent of certain provisions and correct inconsistencies between different sections of subpart WWW. These changes do not significantly modify the requirements of the regulation.

I. Description of Changes

A. Definitions

The NSPS applies to landfills that commence construction, modification, or reconstruction on or after May 30, 1991. A definition of "modification" is being added. The definition is specific to landfills but is consistent with the intent of section 60.14 of the NSPS General Provisions. Application of the NSPS General Provisions to landfills is problematic due to the fact that a landfill is not a typical production or manufacturing facility for which the General Provisions originally were written. The following discussion demonstrates the considerations made to apply the NSPS General Provisions to landfills. This limited definition of modification is uniquely appropriate for landfills, and EPA does not believe at this time that such a rationale could be extended outside the landfill context.

As stated in 40 CFR 60.14(a), modifications are physical or operational changes to an existing facility that result in an increase in the emissions of any pollutant to which a standard applies. However, with respect to landfills, the concept of a physical or operational change leading to an increase in emissions is of limited application, since unlike more traditional sources of air pollution, increased emissions at landfills are based on the amount and character of waste placed in the landfill, rather than through physical or operational changes to equipment or production methods. Equipment at a landfill is essentially the landfill itself and while production can be roughly equated to the amount of waste placed in the landfill, total "production" for the entire life of the facility is controlled through the amount of design capacity specified in the permit. Although the amount and character of waste present at any given time may vary within the design capacity constraints set forth in the permit, emissions over the total life of the facility depend on the amount of waste a landfill can accept pursuant to its permitted design capacity. Accordingly, for landfills, it makes sense to consider only those physical or operational changes that increase the size of the landfill beyond its permitted capacity as modifications subjecting an existing facility to the NSPS. Therefore, if the design capacity of a landfill increases, a change leading to an increase in emissions is assumed to have occurred. For purposes of this NSPS, a landfill is considered modified and subject to the NSPS if its design capacity has been increased after May 30, 1991.

Operational changes at landfills, such as increasing the moisture content of the waste, increasing the physical compaction on the surface, changing the cover material or thickness of daily cover, and changing bailing or compaction practices, can typically be accomplished without a capital expenditure. Consequently, the landfill definition of modification does not include such operational changes. Existing landfills that make an operational change but do not increase the horizontal or vertical dimensions of the landfill continue to be subject to the emission guidelines rather than the NSPS. Therefore, for landfills, the only change which would constitute a modification is an increase in design capacity caused by an increase in the permitted horizontal or vertical dimensions of the landfill.

Reconstructions are unlikely for landfills. As specified in the NSPS General Provisions, reconstructions are "the replacement of components of an existing facility [landfill] to such an extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost of a comparable entirely new facility [landfill] * * *." The Agency knows of no situation where this would occur at a landfill.

The definition of "design capacity" is being amended to clarify that the design capacity is determined by the *most recent* permit issued by the State, local, or Tribal agency responsible for regulating the landfill plus any in-place waste not accounted for in that permit This clarification addresses cases where a landfill may have multiple permits. It makes sense to use the most recent permitted design capacity to determine whether a landfill exceeds the design capacity exemption level. The words "construction or operating" permit have also been deleted and substituted with the word "permit." The use of the term "operating permit" could be misinterpreted to mean a title V permit The permit intended was the State, local, or Tribal agency permit that establishes the design capacity.

The definition of design capacity is also being clarified to state that a permit may express design capacity on a volumetric or a mass basis. The revised definition also states that the owner or operator may choose to convert the design capacity from volume to mass or from mass to volume, using a site-specific density, in order to demonstrate that the design capacity is less than 2 5 million Mg or 2.5 million m^3. If the density changes, the design capacity changes. Therefore, an owner or operator who converts from volume to mass or mass to volume must annually calculate the site-specific density These revisions to the definition are clarifications that do not change the intent of the NSPS and emission guidelines as promulgated on March 12, 1996.

Under the NSPS and emission guidelines, design capacity is used to determine whether or not a landfill is below the design capacity cutoff. If the design capacity in the permit is below either 2.5 million megagrams (Mg) or 2.5 million cubic meters (m^3), the landfill is exempt (except for design capacity reporting requirements). A landfill with a volumetric permit may choose to calculate design capacity on a mass basis (or vice versa) based on a site-specific density The initial design capacity report must provide supporting documentation of this calculation. If such a conversion is made, records must also be kept of the annual recalculation of the site-specific density and design capacity with supporting documentation.

For example, a landfill may have a permitted design capacity greater than 2.5 million m^3 by volume; but the landfill may have documented calculations showing that, based on the actual waste density, the design capacity is less than 2.5 million Mg by mass. Because the design capacity is less than 2.5 million Mg, the landfill is below the design capacity cutoff. If such a landfill changes its compaction practices such that the density of the waste placed in the landfill increases, the calculated design capacity could become greater than 2.5 million Mg, and the landfill would then need to submit an amended design capacity report. If the revised design capacity is over 2.5 million m^3 and 2.5 million Mg, the landfill must estimate emissions and must install controls if emissions are greater than or equal to 50 Mg/yr.

If an existing landfill makes an operational change (such as a change in compaction practices), this is not a "modification" (see the previous discussion on the definition of "modification"). Such a landfill will continue to be subject to the emission guidelines rather than becoming subject to the NSPS. The emission guidelines require the landfill to report any increase in design capacity that results in a capacity equal to or greater than 2 5 million Mg and 2.5 million m^3. The control requirements of the emission guidelines will apply if the design capacity increases to over 2.5 million Mg and 2 5 million m^3 due to an operational change and not due to modification as defined by this rule

The definition of "closed landfill" and wording in section 60.752(b) are being revised to delete references to section 258.60. This reference is not appropriate for all landfills because some landfills closed prior to the October 1993 effective date of part 258 and are not subject to part 258. Section 60 752(b)(2)(v)(A) is being revised for clarification to refer to the definition of "closed landfill" in section 60.751 instead of the requirements of section 258 60.

The definition of "interior well" is being revised to clarify that an interior well is located inside the perimeter of the landfilled waste.

The definition of "radii of influence" is being added parenthetically in section 60.759(a)(3)(ii) for clarification. This definition makes it clear that the radii of influence is the distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero.

B. Designation of Affected Facility

Section 60.750(a) of subpart WWW is being revised slightly to clarify which landfills are subject to the NSPS. The promulgated rule stated that "the provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction, or modification or began accepting waste on or after May 30, 1991. The words "or began accepting waste" have been deleted. This change makes the applicability consistent with both the definition of "new source" in section 111 of the Clean Air Act (CAA) and the applicability of the emission guidelines in section 60.32c of subpart Cc. As stated in section 60.32c(a), the emission guidelines apply to landfills that commenced construction, modification, or reconstruction before May 30, 1991. A landfill that commenced construction before May 30, 1991, but began accepting waste after May 1991 should be subject to the emission guidelines rather than the NSPS. The change being made accomplishes this objective and is consistent with the CAA. The definitions of "commenced" and "construction" are contained in section 60.2 of the NSPS General Provisions (subpart A). A definition for "modification" is being added to subpart WWW, and "reconstruction" is described in section 60.15 of the NSPS General Provisions.

Section 60.750(b) of subpart WWW is being revised to clarify that authority for test methods are retained by the Administrator and shall *not* be transferred to the State This is consistent with EPA's historical position on test methods

Under applicability, we are also clarifying that activities conducted as part of CERCLA remedial actions or RCRA corrective actions are not considered construction, modification, or reconstruction and would not make a landfill subject to the NSPS. This is consistent with the provisions that changes made to an existing landfill solely to comply with the emission guidelines do not make the landfill subject to the NSPS It is also consistent with the exemption of facilities subject to a CERCLA remedial action from permitting requirements. This provision is being added to section 60.750 of subpart WWW as paragraph (c).

Regarding applicability and the design capacity exemption, the wording "or" in several places in section 60 752 has been changed to "and" to clarify that if a landfill design capacity is less than either 2.5 million Mg *or* 2.5 million m^3, the landfill is exempt from all provisions except the design capacity report; whereas if the capacity is equal to or greater than 2.5 million Mg *and* 2.5 million m^3, the additional requirements of the rule apply. As previously discussed under the definition of design capacity, a landfill may calculate design capacity on either a mass or volume basis to determine if it qualifies for the design capacity exemption.

C. Compliance Dates

The compliance time in section 60.752(b)(2)(ii) is being revised to make it clear that landfills have 30 months to install a collection and control system once the landfill becomes affected (i.e., the annual report shows NMOC emissions equal to or greater than 50 Mg/yr). Section 60.752(b)(2)(ii) stated that a landfill has 18 months to install a collection and control system after submitting a design plan to the Administrator. Section 60.752(b)(2)(i) requires landfills to submit a design plan within 1 year of the annual report showing NMOC emissions equal to or greater than 50 Mg/yr Therefore, the previous language in the rule would require landfills that submitted a design plan earlier than 1 year after becoming affected to install a collection and control system sooner than landfills that waited the full 1 year to submit the design plan The intent was to allow landfills 30 months after the first report showing NMOC emissions equal to or greater than 50 Mg/yr to install controls.

Similarly, in the emission guidelines, section 60.36c(a) is revised to specify that installation of collection and control systems shall be accomplished within 30 months of the initial report showing NMOC emissions equal or exceed 50 Mg/yr rather than within 30 months of the effective date of the State rule. This is consistent with the timing in the NSPS, which allows 90 days to submit an initial report, and 30 months to install controls if the report shows that emissions equal or exceed 50 Mg/yr.

Section 60.755(b) is being revised to clarify that an affected landfill must install each well no later than 60 days after the date on which the initial solid waste has been in place (1) for five years or more if the area is active or (2) two years or more if the area is closed or at final grade. The only change is to specify "no later than 60 days after" instead of "within 60 days "

D Clarification of Title V Permitting Requirements

The paragraphs on part 70 permitting requirements are being revised to refer to both part 70 and 71. In States with approved part 70 operating permit programs, sources will apply for part 70 permits; in States without approved part 70 permit programs, EPA will implement the federal operating permits program under part 71.

Section 502(a) of the Act requires title V operating permits for a number of sources, including, but not limited to, major sources and sources (including nonmajor sources) which are subject to standards or regulations under section 111 or 112. Section 502(a) also states that the Administrator may exempt source categories (in whole or in part) from permitting requirements if the Administrator determines that compliance with such requirements is impracticable, infeasible, or unnecessarily burdensome on such categories, but not major sources.

At promulgation of this NSPS and EG (61 FR 9905, March 12, 1996), landfills with a design capacity less than 2.5 million Mg in mass or 2.5 million m^3 in volume were exempted from part 70 operating permit requirements based on the above provisions. Although these landfills are required to submit a design capacity report under this NSPS and EG, no control is required for landfills of this size. As a result, EPA believes that it would be unnecessarily burdensome for landfills, which are not major sources and which have design capacities less than 2.5 million Mg or 2.5 million m^3, to apply for a title V permit when the NSPS or EG does not establish any emission limits or control requirements for such landfills.

If a MSW landfill is subject to title V permitting (40 CFR part 70 or part 71) as a result of this NSPS or EG standard (i e , a source which meets or exceeds the design capacity of 2.5 million Mg and 2 5 million m^3) it is not subject to the requirement to apply for a title V permit until 90 days after the earlier of the following dates: (1) the effective date of this NSPS (March 12, 1996), (2) the effective date of EPA's approval of a state's 111(d) plan, or (3) the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996, even if the design capacity report is submitted prior to the relevant deadline. Sentences have been added to section 60.752 and section 60.32c(c) to clarify the date the landfill becomes subject to title V. These dates for triggering title V applicability are consistent with the dates that NSPS sources are required to file design capacity reports. To maintain consistency between NSPS sources and EG sources, EG sources will not become subject to the requirement to apply for a title V permit until 90 days after the effective date of EPA's approval of a state's 111(d) plan.

The permit provisions originally included as sentences within paragraphs (a) and (b) of section 60.752 have been moved to separate paragraphs (c) and (d) so that the detailed permit provisions are in one location. The wording has also been revised to clarify that landfills smaller than 2.5 million Mg or 2.5 million m^3 do not require a part 70 or 71 operating permit unless they are subject to part 70 or 71 for some other reason. A landfill of this size *could* be a major source, and, if so, would need to apply for a permit. This situation was discussed in the preamble to the promulgated rule (61 FR 9912, March 12, 1996). Also, a landfill of this size could be subject to title V for some other reason, e.g., subject to another NSPS or NESHAP.

Sources subject to the title V permitting program under parts 70 or 71 are required to file applications within 12 months after becoming subject to the program. Landfills which are subject to the title V permitting program as a result of being subject to this NSPS or EG are required to file title V applications within 12 months following the deadline to submit a design capacity report (which indicates that the landfill in question is equal to, or greater than, 2.5 million Mg and 2.5 million m^3). In that the designation of size in the report triggers title V applicability. EPA believes that it is appropriate that the deadline for filing this report initiates the 12 month time frame for submitting a title V application As provided in section 503(c) of the Act, permitting authorities may establish earlier deadlines, prior to the 12 month deadline, for submitting title V applications. If more than one requirement causes a source to be subject to title V permitting, the time frame for filing a title V application will be triggered by the requirement which first caused the source to be subject to title V.

Section 60.752(d) (formerly the last sentence in section 60.752(b)) is being revised. This paragraph stated that after a landfill is closed and either never required a control system or has met the criteria for control system removal, a title V permit is no longer needed. The phrase "if the landfill is not otherwise subject to the requirements of either part 70 or 71" has been added. As previously discussed, if a landfill is a major source or is subject to title V for some other reason (e.g., subject to another NSPS or NESHAP), it will still require a permit. Other format changes to this paragraph are to improve clarity and do not change the intent.

Subpart Cc is being amended by adding paragraphs (c) and (d) to section 60 32c. These paragraphs, which cover when existing MSW landfills require part 70 or 71 operating permits, were excluded from the promulgated emission guidelines through an oversight. Part 70 permit provisions were included in the NSPS, but the Emission Guidelines inadvertently did not reference this section of the NSPS. The inclusion of these paragraphs makes subpart Cc consistent with subpart WWW with respect to part 70 or 71 operating permits. Specifically, paragraph (c) clarifies that an existing landfill smaller than 2.5 million Mg or 2.5 million m^3 does not require a part 70 or 71 operating permit unless it is subject to part 70 or 71 for some other reason. Paragraph (c) also clarifies that an existing landfill equal to or greater than 2.5 million Mg and 2.5 million m^3 is subject to part 70 or 71 permitting requirements whether it is a major source or not. In addition, paragraph (d) clarifies that closed landfills that are only required to have title V permits due to 40 CFR part 60, subparts WWW or Cc and are not required to have a control system or meet the conditions for control system removal are not required to have part 70 or 71 operating permits, if they are not otherwise subject to title V permitting requirements. As with 40 CFR part 60, subpart WWW, under 40 CFR part 60, subpart Cc, the deadline for submitting a design capacity report initiates the time frame for submitting a title V application. Permitting authorities may, however, establish earlier dates by which applications are required from these title V sources.

E. Equations

Section 60.754(a)(1) is being revised to clarify that *both* the equation in section 60 754(a)(1)(i) and the equation in section 60.754(a)(1)(ii) may be used when the actual year-to-year solid waste acceptance rate is known for only part of the life of the landfill. This is the technically correct way to calculate emissions and was the intent of the rule

Section 60.754(a)(1) is being amended by the addition of the methane generation rate constant (k) for geographical areas with low precipitation. A k value of 0.02 per year is provided for the tier 1 calculation for landfills located in geographical areas with a thirty year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorologic site. Landfills located in geographical areas with low precipitation experience slower decomposition of their waste than landfills located in geographical areas with moderate to high rainfall. Consequently, the gas production rate at landfills located in drier areas is reduced. Rather than burden these landfills with pursuing tier 3 Method 2E testing and analysis for a site-specific k value, it is reasonable to allow an alternative default k value. In reviewing the information used to estimate the impacts of the final rule (Docket A–88–09, Item IV–M–4), a k value of 0.02 per year for landfills that meet this description is a reasonably conservative value consistent with the intent of the tier 1 analysis.

Sections 60.754(a)(1)(i) and (ii) are also being revised to clarify that only documentation of the nature and amount of nondegradable waste needs to be maintained when subtracting the mass of nondegradable waste from the total mass of waste when calculating the NMOC emission rate. The previous language specified that the documentation provisions of section 60.758(d)(2) were to be followed; however, these provisions are related to segregated areas within the landfill excluded from collection pursuant to section 60 759(a)(3)(i) or (ii) because asbestos or other nondegradable wastes were disposed in those areas or because the area is nonproductive. For the purposes of estimating emissions, only documentation of the nature and amount of nondegradable waste needs to be maintained to justify the subtraction of the mass of nondegradable waste.

F Test Methods and Procedures

Section 60.754(a)(4)(ii) is revised to clarify that the site-specific methane generation rate constant is calculated only once and that this value is to be used in all subsequent annual NMOC emission rate calculations.

Section 60.752(b)(2)(iii)(B) is being revised to clarify that the initial performance test required under section 60 8 must be completed no later than 180 days after the initial startup of the approved control system. The promulgated regulation already required under section 60.757(f) that the initial performance test report must be submitted within 180 days of start-up of the collection system. This is being reiterated in section 60.752(b)(2)(iii)(B) for clarification.

Section 60.759(a)(3)(ii), which required the use of the values of k and CNMOC determined by field testing, if performed to determine the N_{MOC} emission rate or radii of influence, is being revised to also refer to alternative means for determining k or C_{NMOC} allowed by section 60.754(a)(5). The reference to using L_o values from testing is deleted because it was incorrect. The tier procedures do not include testing for L_o. As previously mentioned, the definition of radii of influence is being added parenthetically for clarity.

G. Prevention of Significant Deterioration Determination

Section 60.754(c) is being revised to clarify that the intent of this provision was to establish the *method* by which prevention of significant deterioration determinations should be made, not to require a PSD determination. The original wording could have been misinterpreted to require PSD-related actions. PSD is a separate permit program that applies to new and modified sources. The PSD regulations, not this NSPS, establish whether a PSD determination is needed. New sources may be subject to PSD review.

In a July 1, 1994 guidance memorandum issued by the EPA (available on the Technology Transfer Network; see "Pollution Control Projects (PCP) and New Source Review (NSR) Applicability" from John S. Seitz, Director, OAQPS to EPA Regional Air Division Directors), the EPA provided guidance for permitting authorities on the approvability of PCP exclusions for source categories other than electric utilities. In the guidance, the EPA indicated that add-on controls and fuel switches to less polluting fuels meet the definition of a PCP and, provided certain safeguards are met, may qualify for an exclusion from major NSR. To be eligible to be excluded from otherwise applicable major NSR requirements, a PCP must, on balance, be "environmentally beneficial," and the permitting authority must ensure that the project will not cause or contribute to a violation of a national ambient air quality standard (NAAQS) or PSD increment, or adversely affect visibility or other air quality related value (AQRV).

A potential exclusion available under PSD is discussed here for informational purposes. In the July 1, 1994 guidance memorandum, the EPA specifically identified the installation of controls pursuant to the NSPS and EG rules as an example of add-on controls that could be considered a PCP and an appropriate candidate for a case-by-case exclusion from major NSR. The EPA considers installation of controls pursuant to the NSPS and EG rules for the control of landfill gases a PCP because the controls are installed to comply with the NSPS and will reduce emissions of NMOC. The EPA also considers the reduction of these pollutants to represent an environmental benefit. However, EPA recognizes that the incidental formation of nitrogen oxides and carbon monoxide due to the destruction of landfill gas will occur. Consistent with the 1994 guidance, the permitting authority should confirm that in each case that the resultant increase in nitrogen oxides and carbon monoxide would not cause or contribute to a violation of the NAAQS and PSD increment or adversely affect an AQRV.

Finally, the 1994 guidance did not void or create an exclusion from any applicable minor source preconstruction review requirements in an approved State Implementation Plan (SIP). Any minor NSR permitting requirements in a SIP would continue to apply, regardless of any exclusion from major NSR that might be approved for a source under the PCP exclusion policy.

H. Monitoring

Section 60.756(a) is being revised to clarify that a temperature measuring device does not need to be permanently installed at each wellhead. It is common for wellheads to have an access port for temperature measurements so that a temperature measuring device can be shared across wellheads for the monthly temperature monitoring requirement. As long as the temperature is monitored monthly, the intent of the regulation is met

Section 60.756(b)(2) is also being revised to clarify that the device for monitoring gas flow need only record the flow or bypass, not necessarily measure the rate at which gas is flowing to the control device.

I. Compliance Provisions

Section 60.755(a)(3) is being revised to allow an alternative timeline to be proposed for correcting an exceedance in collection header pressure at each well. Consistent with section 60 755(c)(4)(v), a sentence is being added to sections 60.755(a)(3) and 60.755(a)(5) to allow an alternate timeline to be proposed to the Administrator for correcting an exceedance. This revision makes the sections consistent. Depending on the remedy selected to correct the problem, a different timeline may be needed, but any timeline extending more than 120 days must be approved by the regulatory agency.

Section 60.755(c)(1) is being revised slightly to indicate that surface monitoring of methane shall be performed along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30-meter intervals. This change makes the wording consistent with other sections of the rule (e.g., section 60.753(d)).

J. Recordkeeping and Reporting

Sections 60.757(a)(1) and (b)(1)(i) are being revised to clarify that subject landfills that commenced construction, modification, or reconstruction after May 30, 1991 (date of proposal) but before the date of promulgation had until June 10, 1996 (90 days from the promulgation date) to submit an initial design capacity report and an initial NMOC emission rate report to the Administrator. The previous language was not clear as to when landfills that commenced construction, modification, or reconstruction between proposal and promulgation would be required to submit an initial design capacity report or NMOC emission rate report. However, it is obvious that the reports could not be required prior to promulgation of the regulation. Therefore, instead of submitting the reports 90 days after commencing construction, landfills that were constructed before promulgation have 90 days after the promulgation date to submit the reports.

Also paragraphs (a)(1)(i) and (ii) in the promulgated rule were somewhat repetitive and contradictory. Paragraph (a)(1)(iii) reflected an unrealistic scenario in that this date would always occur later than the date in paragraphs (a)(1)(i) and (ii). For this reason, the previous paragraph (a)(1)(iii) was unnecessary and confusing. Therefore, that paragraph has been deleted, and paragraphs (a)(1)(i) and (ii) have been revised to state that the report is due on June 10, 1996 or within 90 days after the date of commencement of construction, modification, or reconstruction, depending on when the construction, modification, or reconstruction commenced.

The wording of section 60.757(a)(2)(ii) is being revised to require calculation of design capacity submitted as part of the design capacity report to include "relevant parameters" rather than the specific list of parameters in the promulgated rule. Some of the previously listed parameters (e.g., compaction practices) would not apply to landfills that calculate design capacity on a volumetric rather than mass basis. Other parameters that were not listed will be needed to perform the calculation in some cases.

The wording of section 60.757(a)(3), which requires amended design capacity reports, is being revised for clarity and consistency with the definitions of modification and design capacity discussed under I.A. It also clarifies that a report is required only if capacity increases above 2.5 million Mg and 2.5 million m^3. This was the original intent, but the original wording was confusing.

Several paragraphs in section 60.758 are being revised to clarify that the recordkeeping requirements in paragraphs (b), (c), (d), and (e) do not apply if an alternative to the operational standards, test methods, procedures, compliance measures, monitoring, or reporting provisions has been submitted with the design plan and approved by the Administrator.

II. Cross-Referencing and Typographical Errors

Errors in cross-referencing one section to another within subpart WWW are being corrected. Typographical errors are also being corrected

III. Corrections to Promulgation Preamble

Tables 3 and 5 in the promulgation preamble contained typographical errors. The units for the small size cutoff (column 1) are stated to be in millions of megagrams (millions Mg); however, the values presented are actually in megagrams These tables are corrected and provided below for clarification

TABLE 3.—ALTERNATIVE DESIGN CAPACITY EXEMPTION LEVEL OPTIONS FOR THE EMISSION GUIDELINES[a] [b]

Small size cutoff (mg)	Number landfills affected	Annual[c] NMOC emission reduction (Mg/yr)	Annual[d] methane emission reduction (Mg/yr)	Annual cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC incremental cost eff ($/Mg)
Baseline[e]						
3,000,000	273	73,356	3,220,000	84	1,145	1,145
2,500,000	312	77,600	3,370,000	89	1,147	1,178
1,000,000	572	97,600	3,990,000	119	1,219	1,500

TABLE 3.—ALTERNATIVE DESIGN CAPACITY EXEMPTION LEVEL OPTIONS FOR THE EMISSION GUIDELINES [a b]—Continued

Small size cutoff (mg)	Number landfills affected	Annual [c] NMOC emission reduction (Mg/yr)	Annual [d] methane emission reduction (Mg/yr)	Annual cost (million $/yr)	NMOC average cost eff. ($/Mg)	NMOC incremental cost eff. ($/Mg)
No cutoff [f]	7,299	142,000	8,270,000	719	5,063	13,514

[a] Emission rate cutoff level of 50 Mg NMOC/yr.
[b] All values are fifth year annualized.
[c] NMOC emission reductions are from a baseline of 145,000 Mg NMOC/yr.
[d] Methane emission reductions are from a baseline of 8,400,000 Mg methane/yr.
[e] In the absence of an emission guidelines.
[f] No emission rate cutoff and no design capacity exemption level

TABLE 5.—ALTERNATIVE DESIGN CAPACITY EXEMPTION LEVEL OPTIONS FOR THE NEW SOURCE PERFORMANCE STANDARDS [a b]

Small size cutoff (mg)	Number landfills affected	Annual [c] NMOC emission reduction (Mg/yr)	Annual [d] methane emission reduction (Mg/yr)	Annual [e] cost (million $/yr)	MNOC average cost eff. ($/Mg)	MNOC [f] incremental cost eff. ($/Mg)
Baseline [g]						
3,000,000	41	4,900	193,000	4	816	NA
2,500,000	43	4,900	193,000	4	816	NA
1,000,000	89	4,900	193,000	4	816	NA
No cutoff [h]	872	13,115	881,000	81	6,176	NA

[a] Emission rate cutoff level of 50 Mg NMOC/yr.
[b] All values are fifth year annualized.
[c] NMOC emission reductions are from a baseline of 13,400 Mg NMOC/yr.
[d] Methane emission reductions are from a baseline of 899,000 Mg methane/yr.
[e] Due to rounding off to the nearest million dollar, cost values do not appear to change for each option. However, actual costs are slightly less for a less stringent option.
Because the annual cost does not change enough to show a different cost from one option to the next, incremental cost effectiveness values are not applicable.
[g] In the absence of a standard.
[h] No emission rate cutoff and no design capacity exemption level.

IV. Judicial Review

Under section 307(b)(1) of the CAA, judicial review of the actions taken by this final rule is available only on the filing of a petition for review in the U.S Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this action. Under section 307(b)(2) of the CAA, the requirements that are subject to today's document may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements

V. Administrative

A Paperwork Reduction Act

The information collection requirements of the previously promulgated NSPS were submitted to and approved by the Office of Management and Budget (OMB). A copy of this Information Collection Request (ICR) document (OMB control number 1557.03) may be obtained from Sandy Farmer, OPPE Regulatory Information Division; U.S. Environmental Protection Agency (2137); 401 M Street, SW, Washington, DC 20460 or by calling (202) 260-2740.

Today's changes to the NSPS should have no impact on the information collection burden estimates made previously The changes consist of new definitions and clarifications of requirements; not additional requirements. Consequently, the ICR has not been revised.

B Executive Order 12866 Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether a regulatory action is "significant" and therefore subject to Office of Management and Budget (OMB) review and the requirements of this Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligation of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order

Pursuant to the terms of Executive Order 12866, it has been determined that this action is not "significant" because none of the listed criteria apply to this action. Consequently, this action was not submitted to OMB for review under Executive Order 12866.

C Regulatory Flexibility

EPA has determined that it is not necessary to prepare a regulatory flexibility analysis in connection with this direct final rule. EPA has also determined that this direct final rule amendment will not have a significant economic impact on a substantial number of small entities. Today's action clarifies the applicability of control requirements in the Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources. Municipal Solid Waste Landfills and does not include any provisions that create a burden for any of the regulated entities.

The changes in today's action do not increase the stringency of the rule or add additional control requirements. Nor is the scope of the rule changed so as to bring any entities not previously subject to the rule within its scope or coverage. Today's action does not alter control, monitoring, recordkeeping, or reporting requirements of the promulgated rule.

D. Submission to Congress

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. This rule is not a "major rule" as defined by 5 U.S.C. 804(2).

E Executive Order 12875 and Unfunded Mandates Reform Act

Under the executive order EPA must consult with representatives of affected State, local, and Tribal governments. Under the unfunded mandates reform act, EPA must prepare a statement to accompany any rule where the estimated costs to State, local, or Tribal governments, or to the private sector, will be $100 million or more per year The EPA held consultations and prepared such a statement at the time of promulgation of subpart Cc and WWW (61 FR 9913, March 12, 1996) Today's changes consist of new definitions and clarifications and do not impose costs on government entities or the private sector. Consequently, a new unfunded mandates statement has not been prepared.

F Children's Health Protection

This direct final rule is not subject to E.O. 13045, entitled "Protection of Children from Environmental Health Risks and Safety Risks" (62 FR 19885, April 23, 1997), because it does not involve decisions on environmental health risks or safety that may disproportionately affect children.

List of Subjects in 40 CFR Part 60

Environmental protection, Municipal solid waste landfills, Air pollution control

Dated May 28, 1998
Carol M. Browner,
Administrator

For the reasons set out in the preamble, title 40, chapter 1, part 60 of the Code of Federal Regulations is amended as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

1. The authority citation for part 60 continued to read as follows:

Authority: 42 U.S.C. 7401, 7411, 7414, 7416, 7429, and 7601.

Subpart Cc—[Amended]

2. Amend § 60.32c by adding paragraphs (c) and (d) to read as follows:

§ 60.32c Designated facilities.

* * * * *

(c) For purposes of obtaining an operating permit under title V of the Act, the owner or operator of a MSW landfill subject to this subpart with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters is not subject to the requirement to obtain an operating permit for the landfill under part 70 or 71 of this chapter, unless the landfill is otherwise subject to either part 70 or 71. For purposes of submitting a timely application for an operating permit under part 70 or 71, the owner or operator of a MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2 5 million cubic meters on the effective date of EPA approval of the State's program under section 111(d) of the Act, and not otherwise subject to either part 70 or 71, becomes subject to the requirements of §§ 70 5(a)(1)(i) or 71.5(a)(1)(i) of this chapter 90 days after the effective date of such 111(d) program approval, even if the design capacity report is submitted earlier.

(d) When a MSW landfill subject to this subpart is closed, the owner or operator is no longer subject to the requirement to maintain an operating permit under part 70 or 71 of this chapter for the landfill if the landfill is not otherwise subject to the requirements of either part 70 or 71 and if either of the following conditions are met

(1) The landfill was never subject to the requirement for a control system under § 60.33c(c) of this subpart; or

(2) The owner or operator meets the conditions for control system removal specified in § 60.752(b)(2)(v) of subpart WWW.

3. Amend § 60.33c by removing in paragraph (a)(2) the phrase "2.5 million megagrams or 2.5 million cubic meters" and adding, in its place "2.5 million megagrams and 2.5 million cubic meters."

4. Amend § 60.36c by revising paragraph (a) to read as follows:

§ 60.36c Compliance times.

(a) Except as provided for under paragraph (b) of this section, planning, awarding of contracts, and installation of MSW landfill air emission collection and control equipment capable of meeting the emission guidelines established under § 60.33c shall be accomplished within 30 months after the date the initial NMOC emission rate report shows NMOC emissions equal or exceed 50 megagrams per year.

* * * * *

Subpart WWW

5. Amend § 60.750 as follows:

a. In paragraph (a), remove the words "or began accepting waste".

b In paragraph (b), remove the word "None" and add, in its place "§ 60.754(a)(5)".

c. Add paragraph (c) to read as follows:

§ 60.750 Applicability, designation of affected facility, and delegation of authority.

* * * * *

(c) Activities required by or conducted pursuant to a CERCLA, RCRA, or State remedial action are not considered construction, reconstruction, or modification for purposes of this subpart

6. Amend § 60.751 as follows:

a. Remove the last sentence in the definition of "closed landfill."

b. Revise the definitions of "controlled landfill," "design capacity," and "interior well" and add a definition of "modification" to read as follows.

§ 60.751 Definitions.

* * * * *

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate. The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with § 60 752(b)(2)(i).

Design capacity means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the State, local, or Tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site specific density, which must be recalculated annually.

* * * * *

Interior well means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.

* * * * *

Modification means an increase in the permitted volume design capacity of the landfill by either horizontal or vertical expansion based on its permitted design capacity as of May 30, 1991.

7. Amend § 60.752 by revising paragraph (a), the introductory text of paragraph (b), paragraphs (b)(2)(ii), (b)(2)(iii)(B), and (b)(2)(v)(A), and adding paragraphs (c) and (d) to read as follows:

§ 60.752 Standards for air emissions from municipal solid waste landfills.

(a) Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume shall submit an initial design capacity report to the Administrator as provided in § 60.757(a) The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions shall be documented and submitted with the report. Submittal of the initial design capacity report shall fulfill the requirements of this subpart except as provided for in paragraphs (a)(1) and (a)(2) of this section

(1) The owner or operator shall submit to the Administrator an amended design capacity report, as provided for in § 60.757(a)(3).

(2) When an increase in the maximum design capacity of a landfill exempted from the provisions of § 60.752(b) through § 60 759 of this subpart on the basis of the design capacity exemption in paragraph (a) of this section results in a revised maximum design capacity equal to or greater than 2 5 million megagrams and 2.5 million cubic meters, the owner or operator shall comply with the provision of paragraph (b) of this section

(b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, shall either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in § 60 754. The NMOC emission rate shall be recalculated annually, except as provided in § 60.757(b)(1)(ii) of this subpart. The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters is subject to part 70 or 71 permitting requirements.

(1) * * *

(2) * * *

(ii) Install a collection and control system that captures the gas generated within the landfill as required by paragraphs (b)(2)(ii)(A) or (B) and (b)(2)(iii) of this section within 30 months after the first annual report in which the emission rate equals or exceeds 50 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the emission rate is less than 50 megagrams per year, as specified in § 60.757(c)(1) or (2).

* * * * *

(iii) * * *

(A) * * *

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in § 60.754(d)

* * * * *

(v) * * *

(A) The landfill shall be a closed landfill as defined in § 60.751 of this subpart. A closure report shall be submitted to the Administrator as provided in § 60.757(d);

* * * * *

(c) For purposes of obtaining an operating permit under title V of the Act, the owner or operator of a MSW landfill subject to this subpart with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters is not subject to the requirement to obtain an operating permit for the landfill under part 70 or 71 of this chapter, unless the landfill is otherwise subject to either part 70 or 71. For purposes of submitting a timely application for an operating permit under part 70 or 71, the owner or operator of a MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters, and not otherwise subject to either part 70 or 71, becomes subject to the requirements of §§ 70.5(a)(1)(i) or 71.5(a)(1)(i) of this chapter, regardless of when the design capacity report is actually submitted, no later than:

(1) June 10, 1996 for MSW landfills that commenced construction, modification, or reconstruction on or after May 30, 1991 but before March 12, 1996;

(2) Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commence construction, modification, or reconstruction on or after March 12, 1996.

(d) When a MSW landfill subject to this subpart is closed, the owner or operator is no longer subject to the requirement to maintain an operating permit under part 70 or 71 of this chapter for the landfill if the landfill is not otherwise subject to the requirements of either part 70 or 71 and if either of the following conditions are met:

(1) The landfill was never subject to the requirement for a control system under paragraph (b)(2) of this section; or

(2) The owner or operator meets the conditions for control system removal specified in paragraph (b)(2)(v) of this section.

8. Amend § 60.753 by revising the introductory text of § 60.753 and the second sentence of paragraph (d) and the first sentence of paragraph (g) to read as follows.

§ 60.753 Operational standards for collection and control systems.

Each owner or operator of an MSW landfill with a gas collection and control system used to comply with the provisions of § 60.752(b)(2)(ii) of this subpart shall. * * *

(d) * * * To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover * * *

* * * * *

(g) If monitoring demonstrates that the operational requirements in paragraphs (b), (c), or (d) of this section are not met, corrective action shall be taken as specified in § 60.755(a)(3) through (5) or § 60.755(c) of this subpart. * * *

9. Amend § 60.754 as follows:

a. In the last sentences of paragraph (a)(1)(i) and (a)(1)(ii) remove the phrase "if the documentation provisions of § 60 758(d)(2) are followed" and add, in its place, "if documentation of the nature and amount of such wastes is maintained";

b. In paragraph (a)(4)(ii) remove the last sentence and add in its place, "The calculation of the methane generation rate constant is performed only once, and the value obtained from this test shall be used in all subsequent annual NMOC emission rate calculations.";

c. In paragraphs (a)(5) and (b)(3) remove the phrase "as provided in § 60 752(b)(2)(i)(B)";

d. In paragraph (d), remove the words "Method 25" and add, in its place "Method 25C";

e. Revise the introductory text of paragraph (a)(1) and revise paragraph (c) to read as follows:

§ 60.754 Test methods and procedures.

(a)(1) The landfill owner or operator shall calculate the NMOC emission rate using either the equation provided in paragraph (a)(1)(i) of this section or the equation provided in paragraph (a)(1)(ii) of this section. Both equations may be used if the actual year-to-year solid waste acceptance rate is known, as specified in paragraph (a)(1)(i), for part of the life of the landfill and the actual year-to-year solid waste acceptance rate is unknown, as specified in paragraph (a)(1)(ii), for part of the life of the landfill. The values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for L_O, and 4,000 parts per million by volume as hexane for the C_{NMOC}. For landfills located in geographical areas with a thirty year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorologic site, the k value to be used is 0.02 per year.

* * * * *

(c) When calculating emissions for PSD purposes, the owner or operator of each MSW landfill subject to the provisions of this subpart shall estimate the NMOC emission rate for comparison to the PSD major source and significance levels in §§ 51.166 or 52.21 of this chapter using AP-42 or other approved measurement procedures.

* * * * *

10. Amend § 60.755 as follows:

a In paragraphs (a)(3) and (a)(5), add a sentence at the end of each paragraph reading "An alternative timeline for correcting the exceedance may be submitted to the Administrator for approval.".

b. Revise paragraph (a)(4) to read as follows:

§ 60.755 Compliance provisions.

(a) * * *

(4) Owners or operators are not required to expand the system as required in paragraph (a)(3) of this section during the first 180 days after gas collection system startup.

* * * * *

c. In paragraph (b) introductory text, in the last sentence, remove the phrase "within 60 days of the date in which" and add in its place, "no later than 60 days after the date on which";

d. In paragraph (c)(1), delete the phrase "and along a serpentine pattern spaced 30 meters apart (or a site-specific established spacing)" and add in its place, "and along a pattern that traverses the landfill at 30 meter intervals (or a site-specific established spacing)"

11. Amend § 60.756 as follows:

a. In paragraph (a) introductory text, remove the phrase "or other temperature measuring device" and add, in its place, "other temperature measuring device, or an access port for temperature measurements";

b. In paragraph (b)(1), remove the phrase "an accuracy of" and add in its place, "a minimum accuracy of";

c. In paragraph (b)(2), introductory text, remove the phrase "A gas flow rate measuring device that provides a measurement of gas flow" and add, in its place, "A device that records flow";

12. Amend § 60.757 by revising paragraphs (a)(1), (a)(2), (a)(3), (b)(1)(i) and (g) introductory text to read as follows:

§ 60.757 Reporting requirements.

* * * * *

(a) * * *

(1) The initial design capacity report shall fulfill the requirements of the notification of the date construction is commenced as required by § 60 7(a)(1) and shall be submitted no later than

(i) June 10, 1996, for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991 but before March 12, 1996 or

(ii) Ninety days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996.

(2) The initial design capacity report shall contain the following information:

(i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the permit issued by the State, local, or tribal agency responsible for regulating the landfill.

(ii) The maximum design capacity of the landfill Where the maximum design capacity is specified in the permit issued by the State, local, or tribal agency responsible for regulating the landfill, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity shall be calculated using good engineering practices. The calculations shall be provided, along with the relevant parameters as part of the report. The State, Tribal, local agency or Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(3) An amended design capacity report shall be submitted to the Administrator providing notification of an increase in the design capacity of the landfill, within 90 days of an increase in the maximum design capacity of the landfill to or above 2.5 million megagrams and 2.5 million cubic meters. This increase in design capacity may result from an increase in the permitted volume of the landfill or an increase in the density as documented in the annual recalculation required in § 60.758(f).

(b) * * *

(1) * * *

(i) The initial NMOC emission rate report may be combined with the initial design capacity report required in paragraph (a) of this section and shall be submitted no later than indicated in paragraphs (b)(1)(i)(A) and (B) of this section. Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in paragraphs (b)(1)(ii) and (b)(3) of this section.

(A) June 10, 1996, for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996, or

(B) Ninety days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996

* * * * *

(g) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) shall include the following information with the initial performance test report required under § 60.8:

* * * * *

13. Amend § 60.758 as follows:

a. Remove the introductory text;

b. At the beginning of paragraphs (a), (b) introductory text, (c) introductory text, (d) introductory text, and (e), add the phrase "Except as provided in § 60.752(b)(2)(i)(B),";

c. In paragraph (a), remove the phrase "on-site records of the maximum design capacity" and add, in its place "on-site records of the design capacity report which triggered § 60.752(b)";

d. Add paragraph (f) to read as follows:

§ 60.758 Recordkeeping Requirements.

* * * * *

(f) Landfill owners or operators who convert design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, as provided in the definition of "design capacity", shall keep readily accessible, on-site records of the annual recalculation of site-specific density, design capacity, and the supporting documentation Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

14. Amend § 60.759 as follows.

a. In paragraph (a)(3)(iii), remove the sentence "The values for k, L_O, and $C_{NM}OC$ determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence." and add, in its place, the sentence "The values for k and $C_{NM}OC$ determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence (the distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero)."

b. In paragraph (a)(3)(iii), remove the sentence "If field testing has not been performed, the default values for k, L_O, and $C_{NM}OC$ provided in § 60 754(a)(1) shall be used" and add, in its place, the sentence "If field testing has not been performed, the default values for k L_O and $C_{NM}OC$ provided in § 60 754(a)(1) or the alternative values from § 60.754(a)(5) shall be used.

[FR Doc 98-15007 Filed 6-15-98, 8 45 am]

BILLING CODE 6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 180, 185 and 186

[OPP-300663; FRL-5793-5]

RIN 2070-AB78

Quizalofop-p ethyl ester; Pesticide Tolerance

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This regulation establishes tolerances for combined residues of quizalofop-p ethyl ester [ethyl (*R*)-(2-[4-((6-chloroquinoxalin-2-yl)oxy)phenoxyl] propanoate), and its acid metabolite quizalofop-p [(*R*)-(2-[4-((6-chloroquinoxalin-2-yl)oxy)phenoxyl]propionate) and the *S* enantiomers of the ester and the acid, all expressed as quizalofop-p ethyl ester in or on canola seed, canola meal, peppermint tops and spearmint tops. DuPont Agricultural Products requested the tolerances for canola and the Interregional Research Project Number 4 (IR-4) requested the tolerances for peppermint and spearmint These tolerances were requested under the Federal Food, Drug, and Cosmetic Act, as amended by the Food Quality Protection Act of 1996 (Pub. L 104-170).

DATES: This regulation is effective June 16, 1998. Objections and requests for hearings must be received by EPA on or before August 17, 1998.

ADDRESSES: Written objections and hearing requests, identified by the docket control number, [OPP-300663], must be submitted to: Hearing Clerk (1900), Environmental Protection Agency, Rm. M3708, 401 M St., SW., Washington, DC 20460. Fees accompanying objections and hearing requests shall be labeled "Tolerance Petition Fees" and forwarded to: EPA Headquarters Accounting Operations Branch, OPP (Tolerance Fees), P.O Box 360277M. Pittsburgh, PA 15251 A copy of any objections and hearing requests filed with the Hearing Clerk identified by the docket control number, [OPP-300663], must also be submitted to: Public Information and Records Integrity Branch, Information Resources and Services Division (7502C), Office of Pesticide Programs, Environmental Protection Agency, 401 M St., SW., Washington, DC 20460 In person, bring a copy of objections and hearing requests to Rm. 119, CM #2, 1921 Jefferson Davis Hwy , Arlington, VA.

A copy of objections and hearing requests filed with the Hearing Clerk may also be submitted electronically by sending electronic mail (e-mail) to: opp-docket@epamail.epa.gov. Copies of objections and hearing requests must be submitted as an ASCII file avoiding the use of special characters and any form of encryption. Copies of objections and hearing requests will also be accepted on disks in WordPerfect 5.1/6.1 file format or ASCII file format. All copies of objections and hearing requests in electronic form must be identified by the docket control number [OPP-300663]. No Confidential Business Information (CBI) should be submitted through e-mail. Electronic copies of objections and hearing requests on this rule may be filed online at many Federal Depository Libraries.

FOR FURTHER INFORMATION CONTACT: By mail: Sidney Jackson, Registration Division (7505C), Office of Pesticide Programs, Environmental Protection Agency, 401 M St., SW., Washington, DC 20460. Office location, telephone number, and e-mail address: Crystal Mall #2, 1921 Jefferson Davis Hwy., Arlington, VA, (703) 305-7610; e-mail: jackson.sidney@epamail.epa.gov.

SUPPLEMENTARY INFORMATION: In the **Federal Register** published on October 29, 1997 (62 FR 56176 (mint)) (FRL-5749-7) and December 17, 1997, 62 FR 66080 (canola)) (FRL-5758-3), EPA, issued notices pursuant to section 408 of the Federal Food, Drug, and Cosmetic Act (FFDCA), 21 U.S.C 346a(e) announcing the filing of pesticide petitions (PP) 6E4652 and 5F4545 for tolerances by the IR-4 and DuPont Agricultural Products, Wilmington, Delaware. These notices included a summary of the petitions prepared by DuPont Agricultural Products, Wilmington, Delaware, the registrant. There were no comments received in response to these notices of filing.

The petitions requested that 40 CFR 180.441 be amended by establishing tolerances for combined residues of the herbicide quizalofop-p ethyl ester [ethyl (*R*)-(2-[4-((6-chloroquinoxalin-2-yl)oxy)phenoxyl] propanoate), and its acid metabolite quizalofop-p [(*R*)-(2-[4-((6-chloroquinoxalin-2-yl)oxy)phenoxyl] propionate) and the *S* enantiomers of the ester and the acid, all expressed as quizalofop-p ethyl ester, in or on canola seed at 1 0 part per million (ppm), canola meal at 1.5 ppm, and peppermint tops and spearmint tops at 2 0 ppm

I. Risk Assessment and Statutory Findings

New section 408(b)(2)(A)(i) of the FFDCA allows EPA to establish a tolerance (the legal limit for a pesticide chemical residue in or on a food) only if EPA determines that the tolerance is "safe." Section 408(b)(2)(A)(ii) defines "safe" to mean that "there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures for which there is reliable information " This includes exposure through drinking water and in residential settings, but does not include occupational exposure. Section 408(b)(2)(C) requires EPA to give special consideration to exposure of infants and

APPENDIX B

APPLICABLE TEST METHOD NOT ATTACHED TO THE REGULATIONS
METHOD 21

Method 21 is published in 40 CFR Part 60. Appendix A (test methods) of 40 CFR Part 60 can be found on the internet at http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-C/40P0060.

CONVERSION FACTORS FOR CONCENTRATION—Continued

From	To	Multiply by
ppm (NO_x)	lb/scf	1.194×10^{-7}

7.5.1 Calculation of Emission Rate Using Oxygen Correction Both the O_2 concentration and the pollutant concentration must be on a dry basis. Calculate the pollutant emission rate, as follows:

$$E=C_dF_d \frac{20.9}{20.9 \cdot \%O_2} \qquad \text{Eq 20–6}$$

where:

E=Mass emission rate of pollutant, ng/J (lb/10^6 Btu).

7.5.2 Calculation of Emission Rate Using Carbon Dioxide Correction The CO_2 concentration and the pollutant concentration may be on either a dry basis or a wet basis, but both concentrations must be on the same basis for the calculations. Calculate the pollutant emission rate using Equation 20–7 or 20–8:

$$E=C_dF_c \frac{100}{\%CO_2} \qquad \text{Eq. 20–7}$$

$$E=C_wF_c \frac{100}{\%CO_{2w}} \qquad \text{Eq 20–8}$$

where·

C_w=Pollutant concentration measured on a moist sample basis, ng/sm^3 (lb/scf).

$\%CO_{2w}$=Measured CO_2 concentration measured on a moist sample basis, percent.

8. *Bibliography*

1. Curtis, F A Method for Analyzing NO_x Cylinder Gases-Specific Ion Electrode Procedure, Monograph available from Emission Measurement Laboratory, ESED, Research Triangle Park, NC 27711, October 1978.

2. Sigsby, John E., F M. Black, T. A Bellar, and D L. Klosterman Chemiluminescent Method for Analysis of Nitrogen Compounds in Mobile Source Emissions (NO, NO_2, and NH_3) "Environmental Science and Technology," 7.51–54. January 1973.

3. Shigehara, R.T, R.M. Neulicht, and W S. Smith. Validating Orsat Analysis Data from Fossil Fuel-Fired Units. Emission Measurement Branch, Emission Standards and Engineering Division, Office of Air Quality Planning and Standards, U S. Environmental Protection Agency, Research Triangle Park, NC 27711. June 1975.

METHOD 21—DETERMINATION OF VOLATILE ORGANIC COMPOUNDS LEAKS

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of volatile organic compound (VOC) leaks from process equipment. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals.

1.2 Principle. A portable instrument is used to detect VOC leaks from individual sources. The instrument detector type is not specified, but it must meet the specifications and performance criteria contained in Section 3. A leak definition concentration based on a reference compound is specified in each applicable regulation. This procedure is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rates from individual sources.

2. *Definitions*

2.1 Leak Definition Concentration. The local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is present The leak definition is an instrument meter reading based on a reference compound.

2.2 Reference Compound. The VOC species selected as an instrument calibration basis for specification of the leak definition concentration. (For example· If a leak definition concentration is 10,000 ppmv as methane, then any source emission that results in a local concentration that yields a meter reading of 10,000 on an instrument calibrated with methane would be classified as a leak. In this example, the leak definition is 10,000 ppmv, and the reference compound is methane.)

2.3 Calibration Gas. The VOC compound used to adjust the instrument meter reading to a known value. The calibration gas is usually the reference compound at a concentration approximately equal to the leak definition concentration.

2.4 No Detectable Emission. Any VOC concentration at a potential leak source (adjusted for local VOC ambient concentration) that is less than a value corresponding to the instrument readability specification of section 3.1 1(c) indicates that a leak is not present.

2.5 Response Factor. The ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the application regulation

2.6 Calibration Precision. The degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

2.7 Response Time. The time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter.

3. *Apparatus*

3.1 Monitoring Instrument

3.1.1 Specifications.

a. The VOC instrument detector shall respond to the compounds being processed Detector types which may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

b. Both the linear response range and the measurable range of the instrument for each of the VOC to be measured, and for the VOC calibration gas that is used for calibration, shall encompass the leak definition concentration specified in the regulation. A dilution probe assembly may be used to bring the VOC concentration within both ranges; however, the specifications for instrument response time and sample probe diameter shall still be met.

c. The scale of the instrument meter shall be readable to ±2.5 percent of the specified leak definition concentration when performing a no detectable emission survey.

d. The instrument shall be equipped with an electrically driven pump to insure that a sample is provided to the detector at a constant flow rate The nominal sample flow rate, as measured at the sample probe tip, shall be 0.10 to 3.0 liters per minute when the probe is fitted with a glass wool plug or filter that may be used to prevent plugging of the instrument.

e. The instrument shall be intrinsically safe as defined by the applicable U.S.A. standards (e.g., National Electric Code by the National Fire Prevention Association) for operation in any explosive atmospheres that may be encountered in its use The instrument shall, at a minimum, be intrinsically safe for Class 1, Division 1 conditions, and Class 2, Division 1 conditions, as defined by the example Code The instrument shall not be operated with any safety device, such as an exhaust flame arrestor, removed.

f. The instrument shall be equipped with a probe or probe extension for sampling not to exceed ¼ in. in outside diameter, with a single end opening for admission of sample

3.1.2 Performance Criteria.

(a) The instrument response factors for each of the VOC to be measured shall be less than 10 When no instrument is available that meets this specification when calibrated with the reference VOC specified in the applicable regulation, the available instrument may be calibrated with one of the VOC to be measured, or any other VOC, so long as the instrument then has a response factor of less than 10 for each of the VOC to be measured.

(b) The instrument response time shall be equal to or less than 30 seconds. The instrument pump, dilution probe (if any), sample probe, and probe filter, that will be used during testing, shall all be in place during the response time determination

c. The calibration precision must be equal to or less than 10 percent of the calibration gas value.

d. The evaluation procedure for each parameter is given in Section 4.4

3.1.3 Performance Evaluation Requirements

a. A response factor must be determined for each compound that is to be measured, either by testing or from reference sources. The response factor tests are required before placing the analyzer into service, but do not have to be repeated at subsequent intervals

b. The calibration precision test must be completed prior to placing the analyzer into service, and at subsequent 3-month intervals or at the next use whichever is later.

c. The response time test is required prior to placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required prior to further use

3.2 Calibration Gases. The monitoring instrument is calibrated in terms of parts per million by volume (ppmv) of the reference compound specified in the applicable regulation. The calibration gases required for monitoring and instrument performance evaluation are a zero gas (air, less than 10 ppmv VOC) and a calibration gas in air mixture approximately equal to the leak definition specified in the regulation. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within ±2 percent accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life. Alternately, calibration gases may be prepared by the user according to any accepted gaseous standards preparation procedure that will yield a mixture accurate to within ±2 percent. Prepared standards must be replaced each day of use unless it can be demonstrated that degradation does not occur during storage.

Calibrations may be performed using a compound other than the reference compound if a conversion factor is determined for that alternative compound so that the resulting meter readings during source surveys can be converted to reference compound results.

4. *Procedures*

4.1 Pretest Preparations. Perform the instrument evaluation procedures given in Section 4.4 if the evaluation requirements of Section 3.1.3 have not been met.

4.2 Calibration Procedures. Assemble and start up the VOC analyzer according to the manufacturer's instructions. After the appropriate warmup period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

NOTE: If the meter readout cannot be adjusted to the proper value, a malfunction of the analyzer is indicated and corrective actions are necessary before use.

4.3 Individual Source Surveys.

4.3.1 Type I—Leak Definition Based on Concentration Place the probe inlet at the surface of the component interface where leakage could occur. Move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time. If the maximum observed meter reading is greater than the leak definition in the applicable regulation, record and report the results as specified in the regulation reporting requirements Examples of the application of this general technique to specific equipment types are:

a. Valves—The most common source of leaks from valves is at the seal between the stem and housing. Place the probe at the interface where the stem exits the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where a leak could occur

b. Flanges and Other Connections—For welded flanges, place the probe at the outer edge of the flange-gasket interface and sample the circumference of the flange. Sample other types of nonpermanent joints (such as threaded connections) with a similar traverse.

c. Pumps and Compressors—Conduct a circumferential traverse at the outer surface of the pump or compressor shaft and seal interface If the source is a rotating shaft, position the probe inlet within 1 cm of the shaft-seal interface for the survey If the housing configuration prevents a complete traverse of the shaft periphery, sample all accessible portions. Sample all other joints on the pump or compressor housing where leakage could occur.

d. Pressure Relief Devices—The configuration of most pressure relief devices prevents sampling at the sealing seat interface For those devices equipped with an enclosed extension, or horn, place the probe inlet at approximately the center of the exhaust area to the atmosphere.

e. Process Drains—For open drains, place the probe inlet at approximately the center of the area open to the atmosphere. For covered drains, place the probe at the surface of the cover interface and conduct a peripheral traverse.

f. Open-Ended Lines or Valves—Place the probe inlet at approximately the center of the opening to the atmosphere.

g. Seal System Degassing Vents and Accumulator Vents—Place the probe inlet at approximately the center of the opening to the atmosphere.

h. Access Door Seals—Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse

4 3 2 Type II—"No Detectable Emission".

Determine the local ambient concentration around the source by moving the probe inlet randomly upwind and downwind at a distance of one to two meters from the source If an interference exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the source, but in no case shall the distance be less than 25 centimeters. Then move the probe inlet to the surface of the source and determine the concentration described in 4.3.1. The difference between these concentrations determines whether there are no detectable emissions Record and report the results as specified by the regulation.

For those cases where the regulation requires a specific device installation, or that specified vents be ducted or piped to a control device, the existence of these conditions shall be visually confirmed. When the regulation also requires that no detectable emissions exist, visual observations and sampling surveys are required. Examples of this technique are:

(a) Pump or Compressor Seals—If applicable, determine the type of shaft seal. Preform a survey of the local area ambient VOC concentration and determine if detectable emissions exist as described above.

(b) Seal System Degassing Vents, Accumulator Vessel Vents, Pressure Relief Devices—If applicable, observe whether or not the applicable ducting or piping exists. Also, determine if any sources exist in the ducting or piping where emissions could occur prior to the control device If the required ducting or piping exists and there are no sources where the emissions could be vented to the atmosphere prior to the control device, then it is presumed that no detectable emissions are present. If there are sources in the ducting or piping where emissions could be vented or sources where leaks could occur, the sampling surveys described in this paragraph shall be used to determine if detectable emissions exist.

4.3.3 Alternative Screening Procedure A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have continuously moving parts, that do not have surface temperatures greater than the boiling point or less than the freezing point of the soap solution, that do not have open areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument techniques of 4.3.1 or 4.3 2

Spray a soap solution over all potential leak sources. The soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or a squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of 4.3.1 or 4.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

4.4 Instrument Evaluation Procedures. At the beginning of the instrument performance evaluation test, assemble and start up the instrument according to the manufacturer's instructions for recommended warmup period and preliminary adjustments.

4.4.1 Response Factor. Calibrate the instrument with the reference compound as specified in the applicable regulation For each organic species that is to be measured during individual source surveys, obtain or prepare a known standard in air at a concentration of approximately 80 percent of the applicable leak definition unless limited by volatility or explosivity In these cases, prepare a standard at 90 percent of the saturation concentration, or 70 percent of the lower explosive limit, respectively Introduce this mixture to the analyzer and record the observed meter reading Introduce zero air until a stable reading is obtained. Make a total of three measurements by alternating between the known mixture and zero air. Calculate the response factor for each repetition and the average response factor.

Alternatively, if response factors have been published for the compounds of interest for the instrument or detector type, the response factor determination is not required, and existing results may be referenced. Examples of published response factors for flame ionization and catalytic oxidation detectors are included in Bibliography.

4 4.2 Calibration Precision. Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and multiply by 100 to express the resulting calibration precision as a percentage

4 4.3 Response Time. Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the specified calibration gas. Measure the time from switching to when 90 percent of the final stable reading is attained. Perform this test sequence three times and record the results Calculate the average response time.

5. *Bibliography*

1. DuBose, D A., and G E Harris. Response Factors of VOC Analyzers at a Meter Reading of 10,000 ppmv for Selected Organic Compounds U S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-051. September 1981

2. Brown, G E., et al Response Factors of VOC Analyzers Calibrated with Methane for Selected Organic Compounds U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-022. May 1981.

3. DuBose, D.A., et al Response of Portable VOC Analyzers to Chemical Mixtures U S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-110 September 1981.

APPENDIX C

PART 60, SUBPART A
(GENERAL PROVISIONS)

The General Provisions of 40 CFR Part 60 can be found on the internet at
http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-C/40P0060.

Subpart A—General Provisions

§ 60.1 Applicability.

(a) Except as provided in subparts B and C, the provisions of this part apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of any standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

(b) Any new or revised standard of performance promulgated pursuant to section 111(b) of the Act shall apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of such new or revised standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

(c) In addition to complying with the provisions of this part, the owner or operator of an affected facility may be required to obtain an operating permit issued to stationary sources by an authorized State air pollution control agency or by the Administrator of the U.S. Environmental Protection Agency (EPA) pursuant to Title V of the Clean Air Act (Act) as amended November 15, 1990 (42 U.S.C. 7661). For more information about obtaining an operating permit see part 70 of this chapter.

[40 FR 53346, Nov. 17, 1975, as amended at 55 FR 51382, Dec. 13, 1990, 59 FR 12427, Mar 16, 1994]

§ 60.2 Definitions.

The terms used in this part are defined in the Act or in this section as follows:

Act means the Clean Air Act (42 U S C. 7401 *et seq.*)

Administrator means the Administrator of the Environmental Protection Agency or his authorized representative.

Affected facility means, with reference to a stationary source, any apparatus to which a standard is applicable.

Alternative method means any method of sampling and analyzing for an air pollutant which is not a reference or equivalent method but which has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for his determination of compliance.

Approved permit program means a State permit program approved by the Administrator as meeting the requirements of part 70 of this chapter or a Federal permit program established in this chapter pursuant to Title V of the Act (42 U.S.C. 7661).

Capital expenditure means an expenditure for a physical or operational change to an existing facility which exceeds the product of the applicable "annual asset guideline repair allowance percentage" specified in the latest edition of Internal Revenue Service (IRS) Publication 534 and the existing facility's basis, as defined by section 1012 of the Internal Revenue Code. However, the total expenditure for a physical or operational change to an existing facility must not be reduced by any "excluded additions" as defined in IRS Publication 534, as would be done for tax purposes.

Clean coal technology demonstration project means a project using funds appropriated under the heading 'Department of Energy-Clean Coal Technology', up to a total amount of $2,500,000,000 for commercial demonstrations of clean coal technology, or similar projects funded through appropriations for the Environmental Protection Agency.

Commenced means, with respect to the definition of *new source* in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

Construction means fabrication, erection, or installation of an affected facility.

Continuous monitoring system means the total equipment, required under the emission monitoring sections in applicable subparts, used to sample and condition (if applicable), to analyze, and to provide a permanent record of emissions or process parameters.

Electric utility steam generating unit means any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam supplied to a steam distribution system for the purpose of providing steam to a steam-electric generator that would produce electrical energy for sale is also considered in determining the electrical energy output capacity of the affected facility.

Equivalent method means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

Excess Emissions and Monitoring Systems Performance Report is a report that must be submitted periodically by a source in order to provide data on its compliance with stated emission limits and operating parameters, and on the performance of its monitoring systems.

Existing facility means, with reference to a stationary source, any apparatus of the type for which a standard is promulgated in this part, and the construction or modification of which was commenced before the date of proposal of that standard; or any apparatus which could be altered in such a way as to be of that type.

Isokinetic sampling means sampling in which the linear velocity of the gas entering the sampling nozzle is equal to that of the undisturbed gas stream at the sample point.

Issuance of a part 70 permit will occur, if the State is the permitting authority, in accordance with the requirements of part 70 of this chapter and the applicable, approved State permit program. When the EPA is the permitting authority, issuance of a Title V permit occurs immediately after the EPA takes final action on the final permit.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Modification means any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.

Monitoring device means the total equipment, required under the monitoring of operations sections in applicable subparts, used to measure and record (if applicable) process parameters.

Nitrogen oxides means all oxides of nitrogen except nitrous oxide, as measured by test methods set forth in this part.

One-hour period means any 60-minute period commencing on the hour.

Opacity means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

Owner or operator means any person who owns, leases, operates, controls, or supervises an affected facility or a stationary source of which an affected facility is a part.

Part 70 permit means any permit issued, renewed, or revised pursuant to part 70 of this chapter.

Particulate matter means any finely divided solid or liquid material, other than uncombined water, as measured by the reference methods specified under each applicable subpart, or an equivalent or alternative method.

Permit program means a comprehensive State operating permit system established pursuant to title V of the Act (42 U.S.C. 7661) and regulations codified in part 70 of this chapter and applicable State regulations, or a comprehensive Federal operating permit system established pursuant to title V of the Act and regulations codified in this chapter.

Permitting authority means:

(1) The State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to carry out a permit program under part 70 of this chapter; or

(2) The Administrator, in the case of EPA-implemented permit programs under title V of the Act (42 U.S.C. 7661).

Proportional sampling means sampling at a rate that produces a constant ratio of sampling rate to stack gas flow rate.

Reactivation of a very clean coal-fired electric utility steam generating unit means any physical change or change in the method of operation associated with the commencement of commercial operations by a coal-fired utility unit after a period of discontinued operation where the unit:

(1) Has not been in operation for the two-year period prior to the enactment of the Clean Air Act Amendments of 1990, and the emissions from such unit continue to be carried in the permitting authority's emissions inventory at the time of enactment;

(2) Was equipped prior to shut-down with a continuous system of emissions control that achieves a removal efficiency for sulfur dioxide of no less than 85 percent and a removal efficiency for particulates of no less than 98 percent;

(3) Is equipped with low-NO_x burners prior to the time of commencement of operations following reactivation; and

(4) Is otherwise in compliance with the requirements of the Clean Air Act.

Reference method means any method of sampling and analyzing for an air pollutant as specified in the applicable subpart.

Repowering means replacement of an existing coal-fired boiler with one of the following clean coal technologies: atmospheric or pressurized fluidized bed combustion, integrated gasification combined cycle, magnetohydrodynamics, direct and indirect coal-fired turbines, integrated gasification fuel cells, or as determined by the Administrator, in consultation with the Secretary of Energy, a derivative of one or more of these technologies, and any other technology capable of controlling multiple combustion emissions simultaneously with improved boiler or generation efficiency and with significantly greater waste reduction relative to the performance of technology in widespread commercial use as of November 15, 1990. Repowering shall also include any oil and/or gas-fired unit which has been awarded clean coal technology demonstration funding as of January 1, 1991, by the Department of Energy.

Run means the net period of time during which an emission sample is collected. Unless otherwise specified, a run may be either intermittent or continuous within the limits of good engineering practice.

Shutdown means the cessation of operation of an affected facility for any purpose.

Six-minute period means any one of the 10 equal parts of a one-hour period.

Standard means a standard of performance proposed or promulgated under this part.

Standard conditions means a temperature of 293 K (68•F) and a pressure of 101.3 kilopascals (29.92 in Hg).

Startup means the setting in operation of an affected facility for any purpose.

State means all non-Federal authorities, including local agencies, interstate associations, and State-wide programs, that have delegated authority to implement: (1) The provisions of this part; and/ or (2) the permit program established under part 70 of this chapter. The term State shall have its conventional meaning where clear from the context.

Stationary source means any building, structure, facility, or installation which emits or may emit any air pollutant.

Title V permit means any permit issued, renewed, or revised pursuant to Federal or State regulations established to implement title V of the Act (42 U.S.C. 7661). A title V permit issued by a State permitting authority is called a part 70 permit in this part.

Volatile Organic Compound means any organic compound which participates in atmospheric photochemical reactions; or which is measured by a reference method, an equivalent method, an alternative method, or which is determined by procedures specified under any subpart.

[44 FR 55173, Sept 25, 1979, as amended at 45 FR 5617, Jan 23, 1980; 45 FR 85415, Dec. 24, 1980, 54 FR 6662, Feb. 14, 1989; 55 FR 51382, Dec. 13, 1990; 57 FR 32338, July 21, 1992, 59 FR 12427, Mar 16, 1994]

§ 60.3 Units and abbreviations.

Used in this part are abbreviations and symbols of units of measure. These are defined as follows:

(a) System International (SI) units of measure:

A—ampere
g—gram
Hz—hertz
J—joule
K—degree Kelvin
kg—kilogram
m—meter
m^3—cubic meter
mg—milligram—10^{-3} gram
mm—millimeter—10^{-3} meter
Mg—megagram—10^6 gram
mol—mole
N—newton
ng—nanogram—10^{-9} gram
nm—nanometer—10^{-9} meter
Pa—pascal
s—second
V—volt
W—watt
Ω—ohm
μg—microgram—10^{-6} gram

(b) Other units of measure:

Btu—British thermal unit
°C—degree Celsius (centigrade)
cal—calorie
cfm—cubic feet per minute
cu ft—cubic feet
dcf—dry cubic feet
dcm—dry cubic meter
dscf—dry cubic feet at standard conditions
dscm—dry cubic meter at standard conditions
eq—equivalent
°F—degree Fahrenheit
ft—feet
gal—gallon
gr—grain
g-eq—gram equivalent
hr—hour
in—inch
k—1,000
l—liter
lpm—liter per minute
lb—pound
meq—milliequivalent
min—minute
ml—milliliter
mol. wt.—molecular weight
ppb—parts per billion
ppm—parts per million
psia—pounds per square inch absolute
psig—pounds per square inch gage
°R—degree Rankine
scf—cubic feet at standard conditions
scfh—cubic feet per hour at standard conditions
scm—cubic meter at standard conditions
sec—second
sq ft—square feet
std—at standard conditions

(c) Chemical nomenclature:

CdS—cadmium sulfide
CO—carbon monoxide
CO_2—carbon dioxide
HCl—hydrochloric acid
Hg—mercury
H_2O—water
H_2S—hydrogen sulfide
H_2SO_4—sulfuric acid
N_2—nitrogen
NO—nitric oxide
NO_2—nitrogen dioxide
NO_x—nitrogen oxides
O_2—oxygen
SO_2—sulfur dioxide
SO_3—sulfur trioxide
SO_x—sulfur oxides

(d) Miscellaneous:

A.S.T.M.—American Society for Testing and Materials

[42 FR 37000, July 19, 1977; 42 FR 38178, July 27, 1977]

§ 60.4 Address.

(a) All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate to the appropriate Regional Office of the U.S. Environmental Protection Agency to the attention of the Director of the Division indicated in the following list of EPA Regional Offices.

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), Director, Air Management Division, U S. Environmental Protection Agency, John F Kennedy Federal Building, Boston, MA 02203.

Region II (New Jersey, New York, Puerto Rico, Virgin Islands), Director, Air and Waste Management Division, U.S Environmental Protection Agency, Federal Office Building, 26 Federal Plaza (Foley Square), New York, NY 10278

Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia), Director, Air and Waste Management Division, U.S Environmental Protection Agency, Curtis Building, Sixth and Walnut Streets, Philadelphia, PA 19106.

Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), Director, Air and Waste Management Division, U S. Environmental Protection Agency, 345 Courtland Street, NE , Atlanta, GA 30365

Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Director, Air Management Division, U S. Environmental Protection Agency, 230 South Dearborn Street, Chicago, IL 60604.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas); Director; Air, Pesticides, and Toxics Division, U.S Environmental Protection Agency, 1445 Ross Avenue, Dallas, TX 75202.

Region VII (Iowa, Kansas, Missouri, Nebraska), Director, Air and Toxics Division, U S. Environmental Protection Agency, 726 Minnesota Avenue, Kansas City, KS 66101.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), Director, Air and Waste Management Division, U S. Environmental Protection Agency, 1860 Lincoln Street, Denver, CO 80295.

Region IX (American Samoa, Arizona, California, Guam, Hawaii, Nevada), Director, Air and Waste Management Division, U S Environmental Protection Agency, 215 Fremont Street, San Francisco, CA 94105.

Region X (Alaska, Oregon, Idaho, Washington), Director, Air and Waste Management Division, U.S. Environmental Protection Agency, 1200 Sixth Avenue, Seattle, WA 98101

(b) Section 111(c) directs the Administrator to delegate to each State, when appropriate, the authority to implement and enforce standards of performance for new stationary sources located in such State. All information required to be submitted to EPA under paragraph (a) of this section, must also be submitted to the appropriate State Agency of any State to which this authority has been delegated (provided, that each specific delegation may except sources from a certain Federal or State reporting requirement). The appropriate mailing address for those States whose delegation request has been approved is as follows:

(A) [Reserved]

(B) State of Alabama, Air Pollution Control Division, Air Pollution Control Commission, 645 S. McDonough Street, Montgomery, AL 36104.

(C) State of Alaska, Department of Environmental Conservation, Pouch O, Juneau, AK 99811

(D) Arizona:

Arizona Department of Health Services, 1740 West Adams Street, Phoenix, AZ 85007.

Maricopa County Department of Health Services, Bureau of Air Pollution Control, 1825 East Roosevelt Street, Phoenix, AZ 85006.

Pima County Health Department, Air Quality Control District, 151 West Congress, Tucson, AZ 85701

Pima County Air Pollution Control District, 151 West Congress Street, Tucson, AZ 85701.

(1) The following table lists the specific source and pollutant categories that have been delegated to the air pollution control agencies in Arizona. A star (*) is used to indicate each category that has been delegated.

E.GRAPHICS EC01JN92.000

E:GRAPHICS EC01JN92.001

(E) State of Arkansas: Chief, Division of Air Pollution Control, Arkansas Department of Pollution Control and Ecology, 8001 National Drive, P.O Box 9583, Little Rock, AR 72209.

(F) California.

Amador County Air Pollution Control District, P O Box 430, 810 Court Street, Jackson, CA 95642

Bay Area Air Pollution Control District, 939 Ellis Street, San Francisco, CA 94109.

Butte County Air Pollution Control District, P.O Box 1229, 316 Nelson Avenue, Oroville, CA 95965

Calaveras County Air Pollution Control District, Government Center, El Dorado Road, San Andreas, CA 95249

Colusa County Air Pollution Control District, 751 Fremont Street, Colusa, CA 95952

El Dorado Air Pollution Control District, 330 Fair Lane, Placerville, CA 95667

Fresno County Air Pollution Control District, 1221 Fulton Mall, Fresno, CA 93721

Glenn County Air Pollution Control District, P.O. Box 351, 720 North Colusa Street, Willows, CA 95988

Great Basin Unified Air Pollution Control District, 157 Short Street, Suite 6, Bishop, CA 93514

Imperial County Air Pollution Control District, County Services Building, 939 West Main Street, El Centro, CA 92243

Kern County Air Pollution Control District, 1601 H Street, Suite 250, Bakersfield, CA 93301

Kings County Air Pollution Control District, 330 Campus Drive, Hanford, CA 93230

Lake County Air Pollution Control District, 255 North Forbes Street, Lakeport, CA 95453

Lassen County Air Pollution Control District, 175 Russell Avenue, Susanville, CA 96130

Madera County Air Pollution Control District, 135 W Yosemite Avenue, Madera, CA 93637.

Mariposa County Air Pollution Control District, Box 5, Mariposa, CA 95338
Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482.
Merced County Air Pollution Control District, P.O. Box 471, 240 East 15th Street, Merced, CA 95340
Modoc County Air Pollution Control District, 202 West 4th Street, Alturas, CA 96101
Monterey Bay Unified Air Pollution Control, 1164 Monroe Street, Suite 10, Salinas, CA 93906
Nevada County Air Pollution Control District, H.E.W Complex, Nevada City, CA 95959
North Coast Unified Air Quality Management District, 5630 South Broadway, Eureka, CA 95501
Northern Sonoma County Air Pollution Control District, 134 "A" Avenue, Auburn, CA 95448
Placer County Air Pollution Control District, 11491 "B" Avenue, Auburn, CA 95603
Plumas County Air Pollution Control District, P.O. Box 480, Quincy, CA 95971
Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827.
San Bernardino County Air Pollution Control District, 15579–8th, Victorville, CA 92392
San Diego County Air Pollution Control District, 9150 Chesapeake Drive, San Diego, CA 92123.
San Joaquin County Air Pollution Control District, 1601 E. Hazelton Street (P.O. Box 2009) Stockton, CA 95201.
San Luis Obispo County Air Pollution Control District, P.O Box 637, San Luis Obispo, CA 93406
Santa Barbara County Air Pollution Control District, 315 Camino del Rimedio, Santa Barbara, CA 93110
Shasta County Air Pollution Control District, 2650 Hospital Lane, Redding, CA 96001
Sierra County Air Pollution Control District, P O Box 286, Downieville, CA 95936
Siskiyou County Air Pollution Control District, 525 South Foothill Drive, Yreka, CA 96097
South Coast Air Quality Management District, 9150 Flair Drive, El Monte, CA 91731
Stanislaus County Air Pollution Control District, 1030 Scenic Drive, Modesto, CA 95350
Sutter County Air Pollution Control District, Sutter County Office Building, 142 Garden Highway, Yuba City, CA 95991
Tehama County Air Pollution Control District, P O. Box 38, 1760 Walnut Street, Red Bluff, CA 96080
Tulare County Air Pollution Control District, County Civic Center, Visalia, CA 93277
Tuolumne County Air Pollution Control District, 9 North Washington Street, Sonora, CA 95370
Ventura County Air Pollution Control District, 800 South Victoria Avenue, Ventura, CA 93009
Yolo-Solano Air Pollution Control District, P O. Box 1006, 323 First Street, #5, Woodland, CA 95695

(1) The following table lists the specific source and pollutant categories that have been delegated to the air pollution control agencies in California. A star (*) is used to indicate each category that has been delegated.

E:GRAPHICS EC01JN92.002

E:GRAPHICS EC01JN92.003

(G) State of Colorado, Department of Health, Air Pollution Control Division, 4210 East 11th Avenue, Denver, CO 80220.

EDITORIAL NOTE: For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(H) State of Connecticut, Bureau of Air Management, Department of Environmental Protection, State Office Building, 165 Capitol Avenue, Hartford, CT 06106.

(I) State of Delaware, Delaware Department of Natural Resources and Environmental Control, 89 Kings Highway, P.O. Box 1401, Dover, DE 19901

(J) District of Columbia, Department of Consumer and Regulatory Affairs, 5000 Overlook Avenue SW., Washington DC 20032.

(K) Bureau of Air Quality Management, Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, FL 32301.

(L) State of Georgia, Environmental Protection Division, Department of Natural Resources, 270 Washington Street, SW., Atlanta, GA 30334

(M) Hawaii Department of Health, 1250 Punchbowl Street, Honolulu, HI 96813

Hawaii Department of Health (mailing address), Post Office Box 3378, Honolulu, HI 96801

(N) State of Idaho, Department of Health and Welfare, Statehouse, Boise, ID 83701

(O) [Reserved]

(P) State of Indiana, Indiana Department of Environmental Management, 105 South Meridian Street, P.O. Box 6015, Indianapolis, IN 46206

(Q) State of Iowa: Iowa Department of Natural Resources, Environmental Protection Division, Henry A. Wallace Building, 900 East Grand, Des Moines, IO 50319.

(R) State of Kansas: Kansas Department of Health and Environment, Bureau of Air Quality and Radiation Control, Forbes Field, Topeka, KS 66620

(S) Division of Air Pollution Control, Department for Natural Resources and Environmental Protection, U S. 127, Frankfort, KY 40601.

(T) State of Louisiana. Program Administrator, Air Quality Division, Louisiana Department of Environmental Quality, P.O. Box 44096, Baton Rouge, LA 70804

(U) State of Maine, Bureau of Air Quality Control, Department of Environmental Protection, State House, Station No. 17, Augusta, ME 04333.

(V) State of Maryland: Bureau of Air Quality and Noise Control, Maryland State Department of Health and Mental Hygiene, 201 West Preston Street, Baltimore, MD 21201.

(W) Commonwealth of Massachusetts, Division of Air Quality Control, Department of Environmental Protection, One Winter Street, 7th floor, Boston, MA 02108

(X) State of Michigan, Air Pollution Control Division, Michigan Department of Natural Resources, Stevens T. Mason Building, 8th Floor, Lansing, MI 48926.

(Y) Minnesota Pollution Control Agency, Division of Air Quality, 520 Lafayette Road, St. Paul, MN 55155

(Z) Bureau of Pollution Control, Department of Natural Resources, P O. Box 10385, Jackson, MS 39209.

(AA) State of Missouri: Missouri Department of Natural Resources, Division of Environmental Quality, P O. Box 176, Jefferson City, MO 65102

(BB) State of Montana, Department of Health and Environmental Services, Air Quality Bureau, Cogswell Building, Helena, MT 59601.

EDITORIAL NOTE: For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(CC) State of Nebraska, Nebraska Department of Environmental Control, P.O. Box 94877, State House Station, Lincoln, NE 68509.

Lincoln-Lancaster County Health Department, Division of Environmental Health, 2200 St. Marys Avenue, Lincoln, NE 68502

(DD) Nevada:

Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, 201 South Fall Street, Carson City, NV 89710.

Clark County County District Health Department, Air Pollution Control Division, 625 Shadow Lane, Las Vegas, NV 89106

Washoe County District Health Department, Division of Environmental Protection, 10 Kirman Avenue, Reno, NV 89502.

(1) The following table lists the specific source and pollutant categories that have been delegated to the air pollution control agencies in Nevada. A star (*) is used to indicate each category that has been delegated.

E:GRAPHICS EC01JN92.004

E:GRAPHICS EC01JN92.005

(EE) State of New Hampshire, Air Resources Division, Department of Environmental Services, 64 North Main Street, Caller Box 2033, Concord, NH 03302–2033.

(FF) State of New Jersey: New Jersey Department of Environmental Protection, Division of Environmental Quality, Enforcement Element, John Fitch Plaza, CN–027, Trenton, NJ 08625.

(1) The following table lists the specific source and pollutant categories that have been delegated to the states in Region II. The (X) symbol is used to indicate each category that has been delegated.

	Subpart	State			
		New Jersey	New York	Puerto Rico	Virgin Islands
D	Fossil-Fuel Fired Steam Generators for Which Construction Commenced After August 17, 1971 (Steam Generators and Lignite Fired Steam Generators)	X	X	X	X
Da	Electric Utility Steam Generating Units for Which Construction Commenced After September 18, 1978	X		X	
Db	Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X
E	Incinerators	X	X	X	X
F	Portland Cement Plants	X	X	X	X
G	Nitric Acid Plants	X	X	X	X
H	Sulfuric Acid Plants	X	X	X	X
I	Asphalt Concrete Plants	X	X	X	X
J	Petroleum Refineries—(All Categories)	X	X	X	X
K	Storage Vessels for Petroleum Liquids Constructed After June 11, 1973, and prior to May 19, 1978.	X	X	X	X
Ka	Storage Vessels for Petroleum Liquids Constructed After May 18, 1978	X	X	X	
L	Secondary Lead Smelters	X	X	X	X
M	Secondary Brass and Bronze Ingot Production Plants	X	X	X	X
N	Iron and Steel Plants	X	X	X	X
O	Sewage Treatment Plants	X	X	X	X
P	Primary Copper Smelters	X	X	X	X
Q	Primary Zinc Smelters	X	X	X	X
R	Primary Lead Smelters	X	X	X	X
S	Primary Aluminum Reduction Plants	X	X	X	X
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants.	X	X	X	X
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X	X	X	X
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X	X	X	X
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	X	X	X	X
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate	X	X	X	X
Y	Coal Preparation Plants	X	X	X	X
Z	Ferroally Production Facilities	X	X	X	X
AA	Steel Plants: Electric Arc Furnaces	X	X	X	X
AAa	Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels in Steel Plants	X	X	X	
BB	Kraft Pulp Mills	X	X	X	
CC	Glass Manufacturing Plants	X	X	X	
DD	Grain Elevators	X	X	X	
EE	Surface Coating of Metal Furniture	X	X	X	
GG	Stationary Gas Turbines	X	X	X	
HH	Lime Plants	X	X	X	
KK	Lead Acid Battery Manufacturing Plants	X	X		
LL	Metallic Mineral Processing Plants	X	X	X	
MM	Automobile and Light-Duty Truck Surface Coating Operations	X	X		
NN	Phosphate Rock Plants	X	X		

	Subpart	State			
		New Jersey	New York	Puerto Rico	Virgin Islands
PP	Ammonium Sulfate Manufacturing Plants	X	X		
QQ	Graphic Art Industry Publication Rotogravure Printing	X	X	X	X
RR	Pressure Sensitive Tape and Label Surface Coating Operations	X	X	X	
SS	Industrial Surface Coating: Large Appliances	X	X	X	
TT	Metal Coil Surface Coating	X	X	X	
UU	Asphalt Processing and Asphalt Roofing Manufacture	X	X	X	
VV	Equipment Leaks of Volatile Organic Compounds in Synthetic Organic Chemical Manufacturing Industry.	X		X	
WW	Beverage Can Surface Coating Industry	X	X	X	
XX	Bulk Gasoline Terminals	X	X	X	
FFF	Flexible Vinyl and Urethane Coating and Printing	X	X	X	
GGG	Equipment Leaks of VOC in Petroleum Refineries	X		X	
HHH	Synthetic Fiber Production Facilities	X		X	
JJJ	Petroleum Dry Cleaners	X	X	X	
KKK	Equipment Leaks of VOC from Onshore Natural Gas Processing Plants				
LLL	Onshore Natural Gas Processing Plants; SO_2 Emissions		X		
OOO	Nonmetallic Mineral Processing Plants		X	X	
PPP	Wool Fiberglass Insulation Manufacturing Plants		X	X	

(GG) State of New Mexico: Director, New Mexico Environmental Improvement Division, Health and Environment Department, 1190 St. Francis Drive, Santa Fe, NM 87503.

(i) The City of Albuquerque and Bernalillo County: Director, The Albuquerque Environmental Health Department, The City of Albuquerque, P.O. Box 1293, Albuquerque, NM 87103.

(HH) New York: New York State Department of Environmental Conservation, 50 Wolf Road Albany, New York 12233, attention: Division of Air Resources.

(II) North Carolina Environmental Management Commission, Department of Natural and Economic Resources, Division of Environmental Management, P.O. Box 27687, Raleigh, NC 27611. Attention: Air Quality Section.

(JJ) State of North Dakota, State Department of Health and Consolidated Laboratories, Division of Environmental Engineering. State Capitol, Bismarck, ND 58505.

EDITORIAL NOTE: For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(KK) State of Ohio.

(i) Medina, Summit and Portage Counties; Director, Akron Regional Air Quality Management District, 177 South Broadway, Akron, OH 44308.

(ii) Stark County, Director, Air Pollution Control Division, Canton City Health Department, City Hall Annex Second Floor, 218 Cleveland Avenue SW., Canton, OH 44702.

(iii) Butler, Clermont, Hamilton and Warren Counties: Director, Southwestern Ohio Air Pollution Control Agency, 2400 Beekman Street, Cincinnati, OH 45214

(iv) Cuyahoga County Commissioner, Division of Air Pollution Control Department of Public Health and Welfare, 2735 Broadway Avenue, Cleveland, OH 44115.

(v) Belmont, Carroll, Columbiana, Harrison, Jefferson, and Monroe Counties: Director, North Ohio Valley Air Authority (NOVAA), 814 Adams Street, Steubenville, OH 43952.

(vi) Clark, Darke, Greene, Miami, Montgomery, and Preble Counties: Supervisor, Regional Air Pollution Control Agency (RAPCA), Montgomery County Health Department, 451 West Third Street, Dayton, OH 45402.

(vii) Lucas County and the City of Rossford (in Wood County): Director, Toledo Environmental Services Agency, 26 Main Street, Toledo, OH 43605.

(viii) Adams, Brown, Lawrence, and Scioto Counties; Engineer-Director, Air Division, Portsmouth City Health Department, 740 Second Street, Portsmouth, OH 45662.

(ix) Allen, Ashland, Auglaize, Crawford, Defiance, Erie, Fulton, Hancock Hardin, Henry, Huron, Marion, Mercer, Ottawa, Paulding, Putnam, Richland, Sandusky, Seneca, Van Wert, Williams, Wood (except City of Rossford), and Wyandot Counties: Ohio Environmental Protection Agency, Northwest District Air Pollution Unit 1035 Dezlac Grove Drive, Bowling Green, OH 43402

(x) Ashtabula, Holmes, Lorain, and Wayne Counties: Ohio Environmental Protection Agency, Northeast District Office, Air Pollution Unit, 2110 East Aurora Road, Twinsburg, OH 44087.

(xi) Athens, Coshocton, Gallia, Guernsey, Hocking, Jackson, Meigs, Morgan, Muskingum, Noble, Perry, Pike, Ross, Tuscarawas, Vinton, and Washington Counties: Ohio Environmental Protection Agency, Southeast District Office, Air Pollution Unit, 2195 Front Street, Logan, OH 43138.

(xii) Champaign, Clinton, Highland, Logan, and Shelby Counties: Ohio Environmental Protection Agency, Southwest District Office, Air Pollution Unit, East Fourth Street, Dayton, OH 45402.

(xiii) Delaware, Fairfield, Fayette, Franklin, Knox, Licking, Madison, Morrow, Pickaway, and Union Counties: Ohio Environmental Protection Agency, Central District Office, Air Pollution Unit, P.O. Box 1049, Columbus, OH 43266–0149

(xiv) Geauga and Lake Counties: Lake County General Health District, Air Pollution Control, 105 Main Street, Painesville, OH 44077.

(xv) Mahoning and Trumbull Counties: Mahoning-Trumbull Air Pollution Control Agency, 9 West Front Street, Youngstown, OH 44503.

(LL) State of Oklahoma, Oklahoma State Department of Health, Air Quality Service, P.O. Box 53551, Oklahoma City, OK 73152.

(i) Oklahoma City and County: Director, Oklahoma City-County Health Department, 921 Northeast 23rd Street, Oklahoma City, OK 73105.

(ii) Tulsa County: Tulsa City-County Health Department, 4616 East Fifteenth Street, Tulsa, OK 74112.

(MM) State of Oregon, Department of Environmental Quality, Yeon Building, 522 S.W. Fifth, Portland, OR 97204

(i)—(viii) [Reserved]

(ix) Lane Regional Air Pollution Authority, 225 North Fifth, Suite 501, Springfield, OR 97477

(NN) (a) City of Philadelphia. Philadelphia Department of Public Health, Air Management Services, 500 S. Broad Street, Philadelphia, PA 19146

(b) Commonwealth of Pennsylvania. Department of Environmental Resources, Post Office Box 2063, Harrisburg, PA 17120.

(c) Allegheny County: Allegheny County Health Department, Bureau of Air Pollution Control, 301 Thirty-ninth Street, Pittsburgh, PA 15201.

(OO) State of Rhode Island, Division of Air and Hazardous Materials, Department of Environmental Management, 291 Promenade Street, Providence, RI 02908

(PP) State of South Carolina, Office of Environmental Quality Control, Department of Health and Environmental Control, 2600 Bull Street, Columbia, SC 29201.

(QQ) State of South Dakota, Department of Water and Natural Resources, Office of Air Quality and Solid Waste, Joe Foss Building, 523 East Capitol, Pierre, SD 57501—3181.

EDITORIAL NOTE: For a table listing Region VIII's NSPS delegation status, see paragragh (c) of this section.

(RR) Division of Air Pollution Control, Tennessee Department of Public Health, 256 Capitol Hill Building, Nashville, TN 37219

Knox County Department of Air Pollution, City/County Building, Room L222, 400 Main Avenue, Knoxville, TN 37902

Air Pollution Control Bureau, Metropolitan Health Department, 311 23rd Avenue North, Nashville, TN 37203.

(SS) State of Texas, Texas Air Control Board, 6330 Highway 290 East, Austin, TX 78723.

(TT) State of Utah, Department of Health, Bureau of Air Quality, 288 North 1460 West, P.O. Box 16690, Salt Lake City, UT 84113—0690

EDITORIAL NOTE: For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(UU) State of Vermont, Air Pollution Control Division, Agency of Natural Resources, Building 3 South, 103 South Main Street, Waterbury, VT 05676.

(VV) Commonwealth of Virginia, Virginia State Air Pollution Control Board, Room 1106, Ninth Street Office Building, Richmond, VA 23219.

(WW)(i) Washington: Washington Department of Ecology, Post Office Box 47600, Olympia, WA 98504.

(ii) Benton-Franklin Counties Clean Air Authority (BFCCAA), 650 George Washington Way, Richland, WA 99352.

(iii) Northwest Air Pollution Authority (NWAPA), 302 Pine Street, #207, Mt. Vernon, WA 98273-3852.

(iv) Olympic Air Pollution Control Authority (OAPCA), 909 Sleater-Kinney Rd. SE - Suite 1, Lacey, WA 98503.

(v) Puget Sound Air Pollution Control Authority (PSAPCA), 110 Union Street, Suite 500, Seattle, WA 98101.

(vi) Southwest Air Pollution Control Authority (SWAPCA), 1308 N.E. 134th Street, Suite D, Vancouver, WA 98685-2747.

(vii) Spokane County Air Pollution Control Authority (SCAPCA), West 1101 College Avenue, Health Building, Room 403, Spokane, WA 99201.

(viii) [Reserved]

(ix) The following is a table indicating the delegation status of the New Source Performance Standards for the State of Washington.

DELEGATION OF AUTHORITY—NEW SOURCE PERFORMANCE STANDARDS STATE OF WASHINGTON

Subpart	Description	WDOE [1]	BFCCAA [2]	NWAPCA [3]	OAPCA [4]	PSAPCA [5]	SWAPCA [6]	SCAPCA [7]
A	General Provisions	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
D	Fossil-Fuel-Fired Steam Generators	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Da	Electric Utility Steam Generating Units	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Db	Industrial-Commercial-Institutional Steam Generating Units	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Dc	Small Industrial-Commercial-Institutional Steam Generating Units	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
E	Incinerators	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Ea	Municipal Waste Combustion	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
F	Portland Cement Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
G	Nitric Acid Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
H	Sulfuric Acid Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
I	Asphalt Concrete Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
J	Petroleum Refineries	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
K	Petroleum Liquid Storage Vessels 6/11/73–5/19/78	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Ka	Petroleum Liquid Storage Vessels After 5/18/78–7/23/84	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Kb	Volatile Organic Liquid Storage Vessels After 7/23/84	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
L	Secondary Lead Smelters	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
M	Brass & Bronze Ingot Production Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
N	Iron & Steel Plants: BOPF Particulate	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Na	Iron & Steel Plants BOPF, Hot Metal & Skimming Stations	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
O	Sewage Treatment Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
P	Primary Copper Smelters	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Q	Primary Zinc Smelters	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
R	Primary Lead Smelters	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
S	Primary Aluminum Reduction Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
T	Wet Process Phosphoric Acid Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
U	Superphosphoric Acid Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
V	Diammonium Phosphate Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
W	Triple Superphosphate Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
X	Granular Triple Superphosphate Storage Facilities	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Y	Coal Preparation Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
Z	Ferroalloy Production Facilities	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
AA	Steel Plant Electric Arc Furnaces 10/21/74–8/17/83	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
AAa	Steel Plant Electric Arc Furnaces & Argon-Oxygen Decarburization Vessels after 8/7/83.	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
BB	Kraft Pulp Mills	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
CC	Glass Manufacturing Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
DD	Grain Elevators	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
EE	Surface Coating of Metal Furniture	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
GG	Stationary Gas Turbines	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
HH	Lime Manufacturing Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
KK	Lead-Acid Battery Manufacturing Plant	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
LL	Metallic Mineral Processing Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
MM	Automobile & Light Duty Truck Surface Coating Operations	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
NN	Phosphate Rock Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
PP	Ammonium Sulfate Manufacture	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
QQ	Graphic Arts Industry: Publication Rotogravure Printing	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93

DELEGATION OF AUTHORITY—NEW SOURCE PERFORMANCE STANDARDS STATE OF WASHINGTON—Continued

Subpart	Description	WDOE [1]	BFCCAA [2]	NWAPCA [3]	OAPCA [4]	PSAPCA [5]	SWAPCA [6]	SCAPCA [7]
RR	Pressure Sensitive Tape & Label Surface Coating Operations	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
SS	Industrial Surface Coating: Large Appliances	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
TT	Metal Coil Surface Coating	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
UU	Asphalt Processing & Asphalt Roofing Manufacturer	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
VV	SOCMI Equipment Leaks (VOC)	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
WW	Beverage Can Surface Coating Operations	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
XX	Bulk Gasoline Terminals	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
AAA	Residential Wood Heaters	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
BBB	Rubber Tire Manufacturing	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
DDD	Polymer Manufacturing Industry (VOC)	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
FFF	Flexible Vinyl and Urethane Coating and Printing	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
GGG	Equipment Leaks of VOC in Petroleum Refineries	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
HHH	Synthetic Fiber Production Facilities	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
III	VOC Emissions from SOCMI Air Oxidation Unit Processes	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
JJJ	Petroleum Dry Cleaners	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
KKK	VOC Emissions from Onshore Natural Gas Production	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
LLL	Onshore Natural Gas Production (SO2)	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
NNN	VOC Emissions from SOCMI Distillation Facilities	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
OOO	Nonmetallic Mineral Processing Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
PPP	Wool Fiberglass Insulation Manufacturing Plants	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
QQQ	VOC Emissions from Petroleum Refinery Wastewater Systems	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
SSS	Magnetic Tape Coating Facilities	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
TTT	Surface Coating of Plastic Parts for Business Machines	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
UUU	Calciners & Dryers In Mineral Industries	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93
VVV	Polymeric Coating of Support Substrates Facilities	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93	01/01/93

[1] WDOE—State of Washington Department of Ecology
[2] BFCCAA—Benton Franklin Counties Clean Air Authority
[3] NWAPCA—Northwest Air Pollution Control Authority
[4] OAPCA—Olympic Air Pollution Control Authority.
[5] PSAPCA—Puget Sound Air Pollution Control Agency
[6] SWAPCA—Southwest Air Pollution Control Authority.
[7] SCAPCA—Spokane County Air Pollution Control Authority.

(XX) State of West Virginia: Air Pollution Control Commission, 1558 Washington Street East, Charleston, WV 25311.

(YY) Wisconsin—Wisconsin Department of Natural Resources, P O. Box 7921, Madison, WI 53707.

(ZZ) State of Wyoming, Department of Environmental Quality, Air Quality Division, Herschler Building, 122 West 25th Street, Cheyenne, WY 82002.

EDITORIAL NOTE: For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(AAA) *Territory of Guam:* Guam Environmental Protection Agency, Post Office Box 2999, Agana, Guam 96910.

(1) The following table lists the specific source and pollutant categories that have been delegated to the air pollution control agency in Guam. A star (*) is used to indicate each category that has been delegated

E:GRAPHICS EC01JN92.006

E:GRAPHICS EC01JN92.007

(BBB) Commonwealth of Puerto Rico: Commonwealth of Puerto Rico Environmental Quality Board, P.O. Box 11488, Santurce, PR 00910, Attention: Air Quality Area Director (see table under § 60.4(b)(FF)(1)).

(CCC) U.S. Virgin Islands: U S. Virgin Islands Department of Conservation and Cultural Affairs, P.O. Box 578, Charlotte Amalie, St. Thomas, VI 00801

(c) The following is a table indicating the delegation status of New Source Performance Standards for Region VIII.

DELEGATION STATUS OF NEW SOURCE PERFORMANCE STANDARDS

[(NSPS) for Region VIII]

Subpart	State					
	CO	MT [1]	ND [1]	SD [1]	UT [1]	WY
A General Provisions	(*)	(*)	(*)	(*)	(*)	(*)
D Fossil Fueled Fired Steam Generators	(*)	(*)	(*)	(*)	(*)	(*)
Da Electric Utility Steam Generators	(*)	(*)	(*)	(*)	(*)	(*)
Db Industrial-Commercial-Institutional Steam Generators	(*)	(*)	(*)	(*)	(*)	(*)
Dc Industrial-Commercial-Institutional Steam Generators	....	(*)	(*)	....	(*)	(*)
E Incinerators	(*)	(*)	(*)	(*)	(*)	(*)
Ea Municipal Waste Combustors	....	(*)	(*)	(*)	(*)	(*)
F Portland Cement Plants	(*)	(*)	(*)	(*)	(*)	(*)
G Nitric Acid Plants	(*)	(*)	(*)	....	(*)	(*)
H Sulfuric Acid Plants	(*)	(*)	(*)	....	(*)	(*)
I Asphalt Concrete Plants	(*)	(*)	(*)	(*)	(*)	(*)
J Petroleum Refineries	(*)	(*)	(*)	....	(*)	(*)
K Petroleum Storage Vessels (6/11/73–5/19/78)	(*)	(*)	(*)	(*)	(*)	(*)
Ka Petroleum Storage Vessels (5/18/78–7/23/84)	(*)	(*)	(*)	(*)	(*)	(*)
Kb Petroleum Storage Vessels (after 7/23/84)	....	(*)	(*)	(*)	(*)	(*)
L Secondary Lead Smelters	(*)	(*)	(*)	....	(*)	(*)
M Secondary Brass & Bronze Production Plants	(*)	(*)	(*)	....	(*)	(*)
N Primary Emissions from Basic Oxygen Process Furnaces (after 6/11/73)	(*)	(*)	(*)	....	(*)	(*)
Na Secondary Emissions from Basic Oxygen Process Furnaces (after 1/20/83)	(*)	(*)	(*)	....	(*)	(*)
O Sewage Treatment Plants	(*)	(*)	(*)	(*)	(*)	(*)
P Primary Copper Smelters	(*)	(*)	(*)	....	(*)	(*)
Q Primary Zinc Smelters	(*)	(*)	(*)	....	(*)	(*)
R Primary Lead Smelter	(*)	(*)	(*)	....	(*)	(*)
S Primary Aluminum Reduction Plants	(*)	(*)	(*)	....	(*)	(*)
T Phosphate Fertilizer Industry Wet Process Phosphoric Plants	(*)	(*)	(*)	....	(*)	(*)
U Phosphate Fertilizer Industry Superphosphoric Acid Plants	(*)	(*)	(*)	....	(*)	(*)
V Phosphate Fertilizer Industry Diammonium Phosphate Plants	(*)	(*)	(*)	....	(*)	(*)
W Phosphate Fertilizer Industry Triple Superphosphate Plants	(*)	(*)	(*)	....	(*)	(*)
X Phosphate Fertilizer Industry Granular Triple Superphosphate Storage Facilities	(*)	(*)	(*)	....	(*)	(*)
Y Coal Preparation Plants	(*)	(*)	(*)	(*)	(*)	(*)
Z Ferroalloy Production Facilities	(*)	(*)	(*)	....	(*)	(*)
AA Steel Plants: Electric Arc Furnaces (10/21/74—8/17/83)	(*)	(*)	(*)	....	(*)	(*)
AAa Steel Plants: Electric Arc Furnaces and Argon-Oxygen *Decarburization Vessels (after 8/7/83)*	....	(*)	(*)	....	(*)	(*)
BB Kraft Pulp Mills	(*)	(*)	(*)	....	(*)	(*)
CC Glass Manufacturing Plants	(*)	(*)	(*)	....	(*)	(*)
DD Grain Elevators	(*)	(*)	(*)	(*)	(*)	(*)
EE Surface Coating of Metal Furniture	(*)	(*)	(*)	....	(*)	(*)
GG Stationary Gas Turbines	(*)	(*)	(*)	(*)	(*)	(*)
HH Lime Manufacturing Plants	(*)	(*)	(*)	(*)	(*)	(*)
KK Lead Acid Battery Plants	(*)	(*)	(*)	....	(*)	(*)
LL Metallic Mineral Processing Plants	(*)	(*)	(*)	(*)	(*)	(*)
MM Automobile & Light Duty Truck Surface Coating Operations	(*)	(*)	(*)	....	(*)	(*)
NN Phosphate Rock Plants	(*)	(*)	(*)	....	(*)	(*)
PP Ammonium Sulfate Manufacturing	(*)	(*)	(*)	....	(*)	(*)
QQ Graphic Arts Industry: Publication Rotogravure Printing	(*)	(*)	(*)	....	(*)	(*)
RR Pressure Sensitive Tape & Label Surface Coating	(*)	(*)	(*)	....	(*)	(*)

DELEGATION STATUS OF NEW SOURCE PERFORMANCE STANDARDS—Continued

[(NSPS) for Region VIII]

Subpart	State					
	CO	MT[1]	ND[1]	SD[1]	UT[1]	WY
SS Industrial Surface Coating: Large Appliances	(*)	(*)	(*)	....	(*)	(*)
TT Metal Coil Surface Coating	(*)	(*)	(*)	....	(*)	(*)
UU Asphalt Processing & Asphalt Roofing Manufacture	(*)	(*)	(*)	....	(*)	(*)
VV Synthetic Organic Chemicals Manufacturing: Equipment Leaks of VOC	(*)	(*)	(*)	....	(*)	(*)
WW Beverage Can Surface Coating Industry	(*)	(*)	(*)	....	(*)	(*)
XX Bulk Gasoline Terminals	(*)	(*)	(*)	....	(*)	(*)
AAA Residential Wood Heaters	....	(*)	(*)	....	(*)	(*)
BBB Rubber Tires	....	(*)	(*)	....	(*)	(*)
DDD VOC Emissions from Polymer Manufacturing Industry	....	(*)	....	....	(*)	(*)
FFF Flexible Vinyl & Urethane Coating & Printing	(*)	(*)	(*)	....	(*)	(*)
GGG *Equipment Leaks of VOC in Petroleum Refineries*	(*)	(*)	(*)	....	(*)	(*)
HHH Synthetic Fiber Production	(*)	(*)	(*)	....	(*)	(*)
III VOC Emissions from the Synthetic Organic Chemical Manufacturing Industry Air Oxidation Unit Processes	....	(*)	(*)	....	(*)	(*)
JJJ Petroleum Dry Cleaners	(*)	(*)	(*)	....	(*)	(*)
KKK Equipment Leaks of VOC from Onshore Natural Gas Processing Plants	(*)	(*)	(*)	....	(*)	(*)
LLL Onshore Natural Gas Processing, SO2 Emissions	(*)	(*)	(*)	....	(*)	(*)
NNN VOC Emissions from the Synthetic Organic Chemical Manufacturing Industry Distillation Operations	....	(*)	(*)	....	(*)	(*)
OOO Nonmetallic Mineral Processing Plants	(*)	(*)	(*)	(*)	(*)	(*)
PPP Wool Fiberglass Insulation Manufacturing Plants	(*)	(*)	(*)	....	(*)	(*)
QQQ VOC Emissions from Petroleum Refinery Wastewater Systems	....	(*)	(*)	....	(*)	(*)
SSS Magnetic Tape Industry	....	(*)	(*)	....	(*)	(*)
TTT Plastic Parts for Business Machine Coatings	....	(*)	(*)	....	(*)	(*)
VVV *Polymeric Coating of Supporting Substrates*	....	(*)	(*)	....	(*)	(*)

[1] Indicates approval of New Source Performance Standards as part of the State Implementation Plan (SIP)
(*) Indicates approval of state regulation.

[40 FR 18169, Apr. 25, 1975]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 60.4 see the List of CFR Sections Affected appearing in the Finding Aids section of this volume.

§ 60.5 Determination of construction or modification.

(a) When requested to do so by an owner or operator, the Administrator will make a determination of whether action taken or intended to be taken by such owner or operator constitutes construction (including reconstruction) or modification or the commencement thereof within the meaning of this part.

(b) The Administrator will respond to any request for a determination under paragraph (a) of this section within 30 days of receipt of such request

[40 FR 58418, Dec. 16, 1975]

§ 60.6 Review of plans.

(a) When requested to do so by an owner or operator, the Administrator will review plans for construction or modification for the purpose of providing technical advice to the owner or operator.

(b)(1) A separate request shall be submitted for each construction or modification project.

(2) Each request shall identify the location of such project, and be accompanied by technical information describing the proposed nature, size, design, and method of operation of each affected facility involved in such project, including information on any equipment to be used for measurement or control of emissions.

(c) Neither a request for plans review nor advice furnished by the Administrator in response to such request shall (1) relieve an owner or operator of legal responsibility for compliance with any provision of this part or of any applicable State or local requirement, or (2) prevent the Administrator from implementing or enforcing any provision of this part or taking any other action authorized by the Act.

[36 FR 24877, Dec. 23, 1971, as amended at 39 FR 9314, Mar. 8, 1974]

§ 60.7 Notification and record keeping.

(a) Any owner or operator subject to the provisions of this part shall furnish the Administrator written notification as follows:

(1) A notification of the date construction (or reconstruction as defined under § 60.15) of an af-

fected facility is commenced postmarked no later than 30 days after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form.

(2) A notification of the anticipated date of initial startup of an affected facility postmarked not more than 60 days nor less than 30 days prior to such date.

(3) A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date.

(4) A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable subpart or in § 60.14(e) This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change. The Administrator may request additional relevant information subsequent to this notice.

(5) A notification of the date upon which demonstration of the continuous monitoring system performance commences in accordance with § 60.13(c). Notification shall be postmarked not less than 30 days prior to such date.

(6) A notification of the anticipated date for conducting the opacity observations required by § 60.11(e)(1) of this part. The notification shall also include, if appropriate, a request for the Administrator to provide a visible emissions reader during a performance test. The notification shall be postmarked not less than 30 days prior to such date.

(7) A notification that continuous opacity monitoring system data results will be used to determine compliance with the applicable opacity standard during a performance test required by § 60.8 in lieu of Method 9 observation data as allowed by § 60.11(e)(5) of this part. This notification shall be postmarked not less than 30 days prior to the date of the performance test.

(b) Any owner or operator subject to the provisions of this part shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative.

(c) Each owner or operator required to install a continuous monitoring system (CMS) or monitoring device shall submit an excess emissions and monitoring systems performance report (excess emissions are defined in applicable subparts) and/or a summary report form (see paragraph (d) of this section) to the Administrator semiannually, except when: more frequent reporting is specifically required by an applicable subpart; or the CMS data are to be used directly for compliance determination, in which case quarterly reports shall be submitted; or the Administrator, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the source. All reports shall be postmarked by the 30th day following the end of each calendar half (or quarter, as appropriate). Written reports of excess emissions shall include the following information:

(1) The magnitude of excess emissions computed in accordance with § 60.13(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions. The process operating time during the reporting period.

(2) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted.

(3) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

(4) When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

(d) The summary report form shall contain the information and be in the format shown in figure 1 unless otherwise specified by the Administrator One summary report form shall be submitted for each pollutant monitored at each affected facility.

(1) If the total duration of excess emissions for the reporting period is less than 1 percent of the total operating time for the reporting period and CMS downtime for the reporting period is less than 5 percent of the total operating time for the reporting period, only the summary report form shall be submitted and the excess emission report described in § 60.7(c) need not be submitted unless requested by the Administrator.

(2) If the total duration of excess emissions for the reporting period is 1 percent or greater of the total operating time for the reporting period or the total CMS downtime for the reporting period is 5 percent or greater of the total operating time for the reporting period, the summary report form and the excess emission report described in § 60.7(c) shall both be submitted.

FIGURE 1—SUMMARY REPORT—GASEOUS AND OPACITY EXCESS EMISSION AND MONITORING SYSTEM PERFORMANCE

Pollutant (Circle One—SO_2/NO_X/TRS/H_2S/CO/Opacity)
Reporting period dates: From _____ to _____
Company:
Emission Limitation ____________
Address:
Monitor Manufacturer and Model No. ____________
Date of Latest CMS Certification or Audit ____________
Process Unit(s) Description:
Total source operating time in reporting period [1] ______

Emission data summary [1]		CMS performance summary [1]	
1. *Duration of excess emissions in reporting period due to:*		1. *CMS downtime in reporting period due to:*	
a. Startup/shutdown	....	a. Monitor equipment malfunctions	....
b. Control equipment problems	....	b. Non-Monitor equipment malfunctions	....
c. Process problems	....	c. Quality assurance calibration	....
d. Other known causes	....	d. Other known causes	....
e. Unknown causes	....	e. Unknown causes	....
2. Total duration of excess emission	....	2 Total CMS Downtime	....
3. Total duration of excess emissions × (100) [Total source operating time].	% [2]	3. [Total CMS Downtime] × (100) [Total source operating time].	% [2]

[1] For opacity, record all times in minutes. For gases, record all times in hours.

[2] For the reporting period: If the total duration of excess emissions is 1 percent or greater of the total operating time or the total CMS downtime is 5 percent or greater of the total operating time, both the summary report form and the excess emission report *described in § 60 7(c) shall be submitted.*

On a separate page, describe any changes since last quarter in CMS, process or controls I certify that the information contained in this report is true, accurate, and complete.

____
Name

____
Signature

____
Title

____
Date

(e)(1) Notwithstanding the frequency of reporting requirements specified in paragraph (c) of this section, an owner or operator who is required by an applicable subpart to submit excess emissions and monitoring systems performance reports (and summary reports) on a quarterly (or more frequent) basis may reduce the frequency of reporting for that standard to semiannual if the following conditions are met.

(i) For 1 full year (e.g., 4 quarterly or 12 monthly reporting periods) the affected facility's excess emissions and monitoring systems reports submitted to comply with a standard under this part continually demonstrate that the facility is in compliance with the applicable standard;

(ii) The owner or operator continues to comply with all recordkeeping and monitoring requirements specified in this subpart and the applicable standard; and

(iii) The Administrator does not object to a reduced frequency of reporting for the affected facility, as provided in paragraph (e)(2) of this section.

(2) The frequency of reporting of excess emissions and monitoring systems performance (and summary) reports may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change and the Administrator does not object to the intended change. In deciding whether to approve a reduced frequency of reporting, the Administrator may review information concerning the source's entire previous performance history during the required recordkeeping period prior to the intended change, including performance test results, monitoring data, and evaluations of an owner or operator's conformance with operation and maintenance requirements. Such information may be used by the Administrator to make a judgment about the source's potential for noncompliance in the future. If the Administrator disapproves the owner or operator's request to reduce the frequency of reporting, the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.

(3) As soon as monitoring data indicate that the affected facility is not in compliance with any emission limitation or operating parameter specified in the applicable standard, the frequency of reporting shall revert to the frequency specified in the applicable standard, and the owner or operator shall submit an excess emissions and monitoring systems performance report (and summary report, if required) at the next appropriate reporting period following the noncomplying event. After demonstrating compliance with the applicable standard for another full year, the owner or operator may again request approval from the Administrator to reduce the frequency of reporting for that

standard as provided for in paragraphs (e)(1) and (e)(2) of this section.

(f) Any owner or operator subject to the provisions of this part shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this part recorded in a permanent form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, maintenance, reports, and records.

(g) If notification substantially similar to that in paragraph (a) of this section is required by any other State or local agency, sending the Administrator a copy of that notification will satisfy the requirements of paragraph (a) of this section.

(h) Individual subparts of this part may include specific provisions which clarify or make inapplicable the provisions set forth in this section.

[36 FR 24877, Dec. 28, 1971, as amended at 40 FR 46254, Oct. 6, 1975; 40 FR 58418, Dec. 16, 1975; 45 FR 5617, Jan. 23, 1980; 48 FR 48335, Oct. 18, 1983; 50 FR 53113, Dec 27, 1985; 52 FR 9781, Mar. 26, 1987; 55 FR 51382, Dec. 13, 1990; 59 FR 12428, Mar. 16, 1994; 59 FR 47265, Sep 15, 1994]

§ 60.8 Performance tests.

(a) Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility and at such other times as may be required by the Administrator under section 114 of the Act, the owner or operator of such facility shall conduct performance test(s) and furnish the Administrator a written report of the results of such performance test(s).

(b) Performance tests shall be conducted and data reduced in accordance with the test methods and procedures contained in each applicable subpart unless the Administrator (1) specifies or approves, in specific cases, the use of a reference method with minor changes in methodology, (2) approves the use of an equivalent method, (3) approves the use of an alternative method the results of which he has determined to be adequate for indicating whether a specific source is in compliance, (4) waives the requirement for performance tests because the owner or operator of a source has demonstrated by other means to the Administrator's satisfaction that the affected facility is in compliance with the standard, or (5) approves shorter sampling times and smaller sample volumes when necessitated by process variables or other factors. Nothing in this paragraph shall be construed to abrogate the Administrator's authority to require testing under section 114 of the Act.

(c) Performance tests shall be conducted under such conditions as the Administrator shall specify to the plant operator based on representative performance of the affected facility. The owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard.

(d) The owner or operator of an affected facility shall provide the Administrator at least 30 days prior notice of any performance test, except as specified under other subparts, to afford the Administrator the opportunity to have an observer present.

(e) The owner or operator of an affected facility shall provide, or cause to be provided, performance testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such facility. This includes (i) constructing the air pollution control system such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and procedures and (ii) providing a stack or duct free of cyclonic flow during performance tests, as demonstrated by applicable test methods and procedures.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment

(f) Unless otherwise specified in the applicable subpart, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the three runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the three runs must be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances, beyond the owner or operator's control, compliance may, upon the Administrator's approval, be determined using the arithmetic mean of the results of the two other runs.

[36 FR 24877, Dec 23, 1971, as amended at 39 FR 9314, Mar 8, 1974; 42 FR 57126, Nov 1, 1977; 44 FR 33612, June 11, 1979; 54 FR 6662, Feb 14, 1989; 54 FR 21344, May 17, 1989]

§ 60.9 Availability of information.

The availability to the public of information provided to, or otherwise obtained by, the Administrator under this part shall be governed by part 2 of this chapter. (Information submitted voluntarily to the Administrator for the purposes of §§ 60.5 and 60.6 is governed by §§ 2.201 through 2.213 of this chapter and not by § 2.301 of this chapter.)

§ 60.10 State authority.

The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

(a) Adopting and enforcing any emission standard or limitation applicable to an affected facility, provided that such emission standard or limitation is not less stringent than the standard applicable to such facility.

(b) Requiring the owner or operator of an affected facility to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such facility.

§ 60.11 Compliance with standards and maintenance requirements.

(a) Compliance with standards in this part, other than opacity standards, shall be determined only by performance tests established by § 60.8, unless otherwise specified in the applicable standard.

(b) Compliance with opacity standards in this part shall be determined by conducting observations in accordance with Reference Method 9 in appendix A of this part, any alternative method that is approved by the Administrator, or as provided in paragraph (e)(5) of this section. For purposes of determining initial compliance, the minimum total time of observations shall be 3 hours (30 6-minute averages) for the performance test or other set of observations (meaning those fugitive-type emission sources subject only to an opacity standard).

(c) The opacity standards set forth in this part shall apply at all times except during periods of startup, shutdown, malfunction, and as otherwise provided in the applicable standard.

(d) At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

(e)(1) For the purpose of demonstrating initial compliance, opacity observations shall be conducted concurrently with the initial performance test required in § 60.8 unless one of the following conditions apply. If no performance test under § 60.8 is required, then opacity observations shall be conducted within 60 days after achieving the maximum production rate at which the affected facility will be operated but no later than 180 days after initial startup of the facility. If visibility or other conditions prevent the opacity observations from being conducted concurrently with the initial performance test required under § 60.8, the source owner or operator shall reschedule the opacity observations as soon after the initial performance test as possible, but not later than 30 days thereafter, and shall advise the Administrator of the rescheduled date. In these cases, the 30-day prior notification to the Administrator required in § 60.7(a)(6) shall be waived. The rescheduled opacity observations shall be conducted (to the extent possible) under the same operating conditions that existed during the initial performance test conducted under § 60.8. The visible emissions observer shall determine whether visibility or other conditions prevent the opacity observations from being made concurrently with the initial performance test in accordance with procedures contained in Reference Method 9 of appendix B of this part. Opacity readings of portions of plumes which contain condensed, uncombined water vapor shall not be used for purposes of determing compliance with opacity standards. The owner or operator of an affected facility shall make available, upon request by the Administrator, such records as may be necessary to determine the conditions under which the visual observations were made and shall provide evidence indicating proof of current visible observer emission certification. Except as provided in paragraph (e)(5) of this section, the results of continuous monitoring by transmissometer which indicate that the opacity at the time visual observations were made was not in excess of the standard are probative but not conclusive evidence of the actual opacity of an emission, provided that the source shall meet the burden of proving that the instrument used meets (at the time of the alleged violation) Performance Specification 1 in appendix B of this part, has been properly maintained and (at the time of the alleged violation) that the resulting data have not been altered in any way.

(2) Except as provided in paragraph (e)(3) of this section, the owner or operator of an affected facility to which an opacity standard in this part applies shall conduct opacity observations in accordance with paragraph (b) of this section, shall record the opacity of emissions, and shall report to the Administrator the opacity results along with the results of the initial performance test required

under § 60.8. The inability of an owner or operator to secure a visible emissions observer shall not be considered a reason for not conducting the opacity observations concurrent with the initial performance test.

(3) The owner or operator of an affected facility to which an opacity standard in this part applies may request the Administrator to determine and to record the opacity of emissions from the affected facility during the initial performance test and at such times as may be required. The owner or operator of the affected facility shall report the opacity results. Any request to the Administrator to determine and to record the opacity of emissions from an affected facility shall be included in the notification required in § 60.7(a)(6). If, for some reason, the Administrator cannot determine and record the opacity of emissions from the affected facility during the performance test, then the provisions of paragraph (e)(1) of this section shall apply.

(4) An owner or operator of an affected facility using a continuous opacity monitor (transmissometer) shall record the monitoring data produced during the initial performance test required by § 60.8 and shall furnish the Administrator a written report of the monitoring results along with Method 9 and § 60.8 performance test results.

(5) An owner or operator of an affected facility subject to an opacity standard may submit, for compliance purposes, continuous opacity monitoring system (COMS) data results produced during any performance test required under § 60.8 in lieu of Method 9 observation data. If an owner or operator elects to submit COMS data for compliance with the opacity standard, he shall notify the Administrator of that decision, in writing, at least 30 days before any performance test required under § 60.8 is conducted. Once the owner or operator of an affected facility has notified the Administrator to that effect, the COMS data results will be used to determine opacity compliance during subsequent tests required under § 60.8 until the owner or operator notifies the Administrator, in writing, to the contrary. For the purpose of determining compliance with the opacity standard during a performance test required under § 60.8 using COMS data, the minimum total time of COMS data collection shall be averages of all 6-minute continuous periods within the duration of the mass emission performance test. Results of the COMS opacity determinations shall be submitted along with the results of the performance test required under § 60.8. The owner or operator of an affected facility using a COMS for compliance purposes is responsible for demonstrating that the COMS meets the requirements specified in § 60.13(c) of this part, that the COMS has been properly maintained and operated, and that the resulting data have not been altered in any way. If COMS data results are submitted for compliance with the opacity standard for a period of time during which Method 9 data indicates noncompliance, the Method 9 data will be used to determine opacity compliance.

(6) Upon receipt from an owner or operator of the written reports of the results of the performance tests required by § 60.8, the opacity observation results and observer certification required by § 60.11(e)(1), and the COMS results, if applicable, the Administrator will make a finding concerning compliance with opacity and other applicable standards. If COMS data results are used to comply with an opacity standard, only those results are required to be submitted along with the performance test results required by § 60.8. If the Administrator finds that an affected facility is in compliance with all applicable standards for which performance tests are conducted in accordance with § 60.8 of this part but during the time such performance tests are being conducted fails to meet any applicable opacity standard, he shall notify the owner or operator and advise him that he may petition the Administrator within 10 days of receipt of notification to make appropriate adjustment to the opacity standard for the affected facility.

(7) The Administrator will grant such a petition upon a demonstration by the owner or operator that the affected facility and associated air pollution control equipment was operated and maintained in a manner to minimize the opacity of emissions during the performance tests; that the performance tests were performed under the conditions established by the Administrator; and that the affected facility and associated air pollution control equipment were incapable of being adjusted or operated to meet the applicable opacity standard.

(8) The Administrator will establish an opacity standard for the affected facility meeting the above requirements at a level at which the source will be able, as indicated by the performance and opacity tests, to meet the opacity standard at all times during which the source is meeting the mass or concentration emission standard. The Administrator will promulgate the new opacity standard in the FEDERAL REGISTER.

(f) Special provisions set forth under an applicable subpart of this part shall supersede any conflicting provisions of this section.

[38 FR 28565, Oct 15, 1973, as amended at 39 FR 39873, Nov 12, 1974; 43 FR 8800, Mar. 3, 1978; 45 FR 23379, Apr. 4, 1980; 48 FR 48335, Oct. 18, 1983; 50 FR 53113, Dec. 27, 1985; 51 FR 1790, Jan 15, 1986; 52 FR 9781, Mar. 26, 1987]

§ 60.12 Circumvention.

No owner or operator subject to the provisions of this part shall build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere.

[39 FR 9314, Mar. 8, 1974]

§ 60.13 Monitoring requirements.

(a) For the purposes of this section, all continuous monitoring systems required under applicable subparts shall be subject to the provisions of this section upon promulgation of performance specifications for continuous monitoring systems under appendix B to this part and, if the continuous monitoring system is used to demonstrate compliance with emission limits on a continuous basis, appendix F to this part, unless otherwise specified in an applicable subpart or by the Administrator. Appendix F is applicable December 4, 1987.

(b) All continuous monitoring systems and monitoring devices shall be installed and operational prior to conducting performance tests under § 60.8. Verification of operational status shall, as a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of the device

(c) If the owner or operator of an affected facility elects to submit continous opacity monitoring system (COMS) data for compliance with the opacity standard as provided under § 60.11(e)(5), he shall conduct a performance evaluation of the COMS as specified in Performance Specification 1, appendix B, of this part before the performance test required under § 60.8 is conducted. Otherwise, the owner or operator of an affected facility shall conduct a performance evaluation of the COMS or continuous emission monitoring system (CEMS) during any performance test required under § 60.8 or within 30 days thereafter in accordance with the applicable performance specification in appendix B of this part, The owner or operator of an affected facility shall conduct COMS or CEMS performance evaluations at such other times as may be required by the Administrator under section 114 of the Act.

(1) The owner or operator of an affected facility using a COMS to determine opacity compliance during any performance test required under § 60.8 and as described in § 60.11(e)(5) shall furnish the Administrator two or, upon request, more copies of a written report of the results of the COMS performance evaluation described in paragraph (c) of this section at least 10 days before the performance test required under § 60.8 is conducted.

(2) Except as provided in paragraph (c)(1) of this section, the owner or operator of an affected facility shall furnish the Administrator within 60 days of completion two or, upon request, more copies of a written report of the results of the performance evaluation.

(d)(1) Owners and operators of all continuous emission monitoring systems installed in accordance with the provisions of this part shall check the zero (or low-level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) calibration drifts at least once daily in accordance with a written procedure. The zero and span shall, as a minimum, be adjusted whenever the 24-hour zero drift or 24-hour span drift exceeds two times the limits of the applicable performance specifications in appendix B. The system must allow the amount of excess zero and span drift measured at the 24-hour interval checks to be recorded and quantified, whenever specified. For continuous monitoring systems measuring opacity of emissions, the optical surfaces exposed to the effluent gases shall be cleaned prior to performing the zero and span drift adjustments except that for systems using automatic zero adjustments. The optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds 4 percent opacity.

(2) Unless otherwise approved by the Administrator, the following procedures shall be followed for continuous monitoring systems measuring opacity of emissions. Minimum procedures shall include a method for producing a simulated zero opacity condition and an upscale (span) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam. Such procedures shall provide a system check of the analyzer internal optical surfaces and all electronic circuitry including the lamp and photodetector assembly.

(e) Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under paragraph (d) of this section, all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

(1) All continuous monitoring systems referenced by paragraph (c) of this section for measuring opacity of emissions shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period.

(2) All continuous monitoring systems referenced by paragraph (c) of this section for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

(f) All continuous monitoring systems or monitoring devices shall be installed such that representative measurements of emissions or process parameters from the affected facility are obtained. Additional procedures for location of continuous monitoring systems contained in the applicable Performance Specifications of appendix B of this part shall be used.

(g) When the effluents from a single affected facility or two or more affected facilities subject to the same emission standards are combined before being released to the atmosphere, the owner or operator may install applicable continuous monitoring systems on each effluent or on the combined effluent. When the affected facilities are not subject to the same emission standards, separate continuous monitoring systems shall be installed on each effluent. When the effluent from one affected facility is released to the atmosphere through more than one point, the owner or operator shall install an applicable continuous monitoring system on each separate effluent unless the installation of fewer systems is approved by the Administrator. When more than one continuous monitoring system is used to measure the emissions from one affected facility (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required from each continuous monitoring system.

(h) Owners or operators of all continuous monitoring systems for measurement of opacity shall reduce all data to 6-minute averages and for continuous monitoring systems other than opacity to 1-hour averages for time periods as defined in § 60.2. Six-minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6-minute period. For continuous monitoring systems other than opacity, 1-hour averages shall be computed from four or more data points equally spaced over each 1-hour period. Data recorder during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this paragraph. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or nonreduced form (e.g., ppm pollutant and percent O_2 or ng/J of pollutant). All excess emissions shall be converted into units of the standard using the applicable conversion procedures specified in subparts. After conversion into units of the standard, the data may be rounded to the same number of significant digits as used in the applicable subparts to specify the emission limit (e.g., rounded to the nearest 1 percent opacity).

(i) After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring procedures or requirements of this part including, but not limited to the following:

(1) Alternative monitoring requirements when installation of a continuous monitoring system or monitoring device specified by this part would not provide accurate measurements due to liquid water or other interferences caused by substances with the effluent gases.

(2) Alternative monitoring requirements when the affected facility is infrequently operated.

(3) Alternative monitoring requirements to accommodate continuous monitoring systems that require additional measurements to correct for stack moisture conditions.

(4) Alternative locations for installing continuous monitoring systems or monitoring devices when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements.

(5) Alternative methods of converting pollutant concentration measurements to units of the standards.

(6) Alternative procedures for performing daily checks of zero and span drift that do not involve use of span gases or test cells.

(7) Alternatives to the A.S.T.M. test methods or sampling procedures specified by any subpart.

(8) Alternative continuous monitoring systems that do not meet the design or performance requirements in Performance Specification 1, appendix B, but adequately demonstrate a definite and consistent relationship between its measurements and the measurements of opacity by a system complying with the requirements in Performance Specification 1. The Administrator may require that such demonstration be performed for each affected facility.

(9) Alternative monitoring requirements when the effluent from a single affected facility or the combined effluent from two or more affected facilities are released to the atmosphere through more than one point.

(j) An alternative to the relative accuracy test specified in Performance Specification 2 of appendix B may be requested as follows:

(1) An alternative to the reference method tests for determining relative accuracy is available for sources with emission rates demonstrated to be less than 50 percent of the applicable standard. A source owner or operator may petition the Administrator to waive the relative accuracy test in section 7 of Performance Specification 2 and substitute the procedures in section 10 if the results of a performance test conducted according to the requirements in § 60.8 of this subpart or other tests performed following the criteria in § 60.8 demonstrate that the emission rate of the pollutant of interest in the units of the applicable standard is less than 50 percent of the applicable standard. For sources subject to standards expressed as control efficiency levels, a source owner or operator may

petition the Administrator to waive the relative accuracy test and substitute the procedures in section 10 of Performance Specification 2 if the control device exhaust emission rate is less than 50 percent of the level needed to meet the control efficiency requirement. The alternative procedures do not apply if the continuous emission monitoring system is used to determine compliance continuously with the applicable standard. The petition to waive the relative accuracy test shall include a detailed description of the procedures to be applied. Included shall be location and procedure for conducting the alternative, the concentration or response levels of the alternative RA materials, and the other equipment checks included in the alternative procedure. The Administrator will review the petition for completeness and applicability. The determination to grant a waiver will depend on the intended use of the CEMS data (e.g., data collection purposes other than NSPS) and may require specifications more stringent than in Performance Specification 2 (e.g., the applicable emission limit is more stringent than NSPS).

(2) The waiver of a CEMS relative accuracy test will be reviewed and may be rescinded at such time following successful completion of the alternative RA procedure that the CEMS data indicate the source emissions approaching the level of the applicable standard. The criterion for reviewing the waiver is the collection of CEMS data showing that emissions have exceeded 70 percent of the applicable standard for seven, consecutive, averaging periods as specified by the applicable regulation(s) For sources subject to standards expressed as control efficiency levels, the criterion for reviewing the waiver is the collection of CEMS data showing that exhaust emissions have exceeded 70 percent of the level needed to meet the control efficiency requirement for seven, consecutive, averaging periods as specified by the applicable regulation(s) [e.g., § 60.45(g) (2) and (3), § 60.73(e), and § 60.84(e)]. It is the responsibility of the source operator to maintain records and determine the level of emissions relative to the criterion on the waiver of relative accuracy testing. If this criterion is exceeded, the owner or operator must notify the Administrator within 10 days of such occurrence and include a description of the nature and cause of the increasing emissions. The Administrator will review the notification and may rescind the waiver and require the owner or operator to conduct a relative accuracy test of the CEMS as specified in section 7 of Performance Specification 2.

[40 FR 46255, Oct. 6, 1975; 40 FR 59205, Dec. 22, 1975, as amended at 41 FR 35185, Aug. 20, 1976; 48 FR 13326, Mar. 30, 1983; 48 FR 23610, May 25, 1983; 48 FR 32986, July 20, 1983, 52 FR 9782, Mar 26, 1987; 52 FR 17555, May 11, 1987; 52 FR 21007, June 4, 1987]

§ 60.14 Modification.

(a) Except as provided under paragraphs (e) and (f) of this section, any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act. Upon modification, an existing facility shall become an affected facility for each pollutant to which a standard applies and for which there is an increase in the emission rate to the atmosphere.

(b) Emission rate shall be expressed as kg/hr of any pollutant discharged into the atmosphere for which a standard is applicable. The Administrator shall use the following to determine emission rate:

(1) Emission factors as specified in the latest issue of "Compilation of Air Pollutant Emission Factors," EPA Publication No. AP-42, or other emission factors determined by the Administrator to be superior to AP-42 emission factors, in cases where utilization of emission factors demonstrate that the emission level resulting from the physical or operational change will either clearly increase or clearly not increase.

(2) Material balances, continuous monitor data, or manual emission tests in cases where utilization of emission factors as referenced in paragraph (b)(1) of this section does not demonstrate to the Administrator's satisfaction whether the emission level resulting from the physical or operational change will either clearly increase or clearly not increase, or where an owner or operator demonstrates to the Administrator's satisfaction that there are reasonable grounds to dispute the result obtained by the Administrator utilizing emission factors as referenced in paragraph (b)(1) of this section. When the emission rate is based on results from manual emission tests or continuous monitoring systems, the procedures specified in appendix C of this part shall be used to determine whether an increase in emission rate has occurred. Tests shall be conducted under such conditions as the Administrator shall specify to the owner or operator based on representative performance of the facility. At least three valid test runs must be conducted before and at least three after the physical or operational change. All operating parameters which may affect emissions must be held constant to the maximum feasible degree for all test runs.

(c) The addition of an affected facility to a stationary source as an expansion to that source or as a replacement for an existing facility shall not by itself bring within the applicability of this part any other facility within that source.

(d) [Reserved]

(e) The following shall not, by themselves, be considered modifications under this part:

(1) Maintenance, repair, and replacement which the Administrator determines to be routine for a source category, subject to the provisions of paragraph (c) of this section and § 60.15.

(2) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility.

(3) An increase in the hours of operation.

(4) Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, as provided by § 60.1, the existing facility was designed to accommodate that alternative use. A facility shall be considered to be designed to accommodate an alternative fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change. Conversion to coal required for energy considerations, as specified in section 111(a)(8) of the Act, shall not be considered a modification.

(5) The addition or use of any system or device whose primary function is the reduction of air pollutants, except when an emission control system is removed or is replaced by a system which the Administrator determines to be less environmentally beneficial.

(6) The relocation or change in ownership of an existing facility

(f) Special provisions set forth under an applicable subpart of this part shall supersede any conflicting provisions of this section.

(g) Within 180 days of the completion of any physical or operational change subject to the control measures specified in paragraph (a) of this section, compliance with all applicable standards must be achieved.

(h) No physical change, or change in the method of operation, at an existing electric utility steam generating unit shall be treated as a modification for the purposes of this section provided that such change does not increase the maximum hourly emissions of any pollutant regulated under this section above the maximum hourly emissions achievable at that unit during the 5 years prior to the change.

(i) Repowering projects that are awarded funding from the Department of Energy as permanent clean coal technology demonstration projects (or similar projects funded by EPA) are exempt from the requirements of this section provided that such change does not increase the maximum hourly emissions of any pollutant regulated under this section above the maximum hourly emissions achievable at that unit during the five years prior to the change.

(j)(1) Repowering projects that qualify for an extension under section 409(b) of the Clean Air Act are exempt from the requirements of this section, provided that such change does not increase the actual hourly emissions of any pollutant regulated under this section above the actual hourly emissions achievable at that unit during the 5 years prior to the change.

(2) This exemption shall not apply to any new unit that:

(i) Is designated as a replacement for an existing unit;

(ii) Qualifies under section 409(b) of the Clean Air Act for an extension of an emission limitation compliance date under section 405 of the Clean Air Act; and

(iii) Is located at a different site than the existing unit.

(k) The installation, operation, cessation, or removal of a temporary clean coal technology demonstration project is exempt from the requirements of this section. A *temporary clean coal control technology demonstration project*, for the purposes of this section is a clean coal technology demonstration project that is operated for a period of 5 years or less, and which complies with the State implementation plan for the State in which the project is located and other requirements necessary to attain and maintain the national ambient air quality standards during the project and after it is terminated.

(l) The reactivation of a very clean coal-fired electric utility steam generating unit is exempt from the requirements of this section.

[40 FR 58419, Dec. 16, 1975, amended at 43 FR 34347, Aug. 3, 1978; 45 FR 5617, Jan. 23, 1980; 57 FR 32339, July 21, 1992]

§ 60.15 Reconstruction.

(a) An existing facility, upon reconstruction, becomes an affected facility, irrespective of any change in emission rate.

(b) "Reconstruction" means the replacement of components of an existing facility to such an extent that:

(1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and

(2) It is technologically and economically feasible to meet the applicable standards set forth in this part.

(c) "Fixed capital cost" means the capital needed to provide all the depreciable components.

(d) If an owner or operator of an existing facility proposes to replace components, and the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, he shall notify the Administrator of the proposed replacements. The notice must be postmarked 60 days (or as soon as practicable) before construction of the replacements is commenced and must include the following information:

(1) Name and address of the owner or operator.

(2) The location of the existing facility.

(3) A brief description of the existing facility and the components which are to be replaced.

(4) A description of the existing air pollution control equipment and the proposed air pollution control equipment.

(5) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new facility.

(6) The estimated life of the existing facility after the replacements.

(7) A discussion of any economic or technical limitations the facility may have in complying with the applicable standards of performance after the proposed replacements.

(e) The Administrator will determine, within 30 days of the receipt of the notice required by paragraph (d) of this section and any additional information he may reasonably require, whether the proposed replacement constitutes reconstruction.

(f) The Administrator's determination under paragraph (e) shall be based on:

(1) The fixed capital cost of the replacements in comparison to the fixed capital cost that would be required to construct a comparable entirely new facility;

(2) The estimated life of the facility after the replacements compared to the life of a comparable entirely new facility;

(3) The extent to which the components being replaced cause or contribute to the emissions from the facility; and

(4) Any economic or technical limitations on compliance with applicable standards of performance which are inherent in the proposed replacements.

(g) Individual subparts of this part may include specific provisions which refine and delimit the concept of reconstruction set forth in this section.

[40 FR 58420, Dec. 16, 1975]

§ 60.16 Priority list.

PRIORITIZED MAJOR SOURCE CATEGORIES

Priority Number[1]	*Source Category*
1.	Synthetic Organic Chemical Manufacturing Industry (SOCMI) and Volatile Organic Liquid Storage Vessels and Handling Equipment
	(a) SOCMI unit processes
	(b) Volatile organic liquid (VOL) storage vessels and handling equipment
	(c) SOCMI fugitive sources
	(d) SOCMI secondary sources
2.	Industrial Surface Coating: Cans
3.	Petroleum Refineries: Fugitive Sources
4.	Industrial Surface Coating: Paper
5.	Dry Cleaning
	(a) Perchloroethylene
	(b) Petroleum solvent
6.	Graphic Arts
7.	Polymers and Resins: Acrylic Resins
8.	Mineral Wool (Deleted)
9.	Stationary Internal Combustion Engines
10.	Industrial Surface Coating: Fabric
11.	Industrial-Commercial-Institutional Steam Generating Units.
12.	Incineration: Non-Municipal (Deleted)
13.	Non-Metallic Mineral Processing
14.	Metallic Mineral Processing
15.	Secondary Copper (Deleted)
16.	Phosphate Rock Preparation
17.	Foundries: Steel and Gray Iron
18.	Polymers and Resins Polyethylene
19.	Charcoal Production
20.	Synthetic Rubber
	(a) Tire manufacture
	(b) SBR production
21.	Vegetable Oil
22.	Industrial Surface Coating: Metal Coil
23.	Petroleum Transportation and Marketing
24.	By-Product Coke Ovens
25.	Synthetic Fibers
26.	Plywood Manufacture
27.	Industrial Surface Coating: Automobiles
28.	Industrial Surface Coating: Large Appliances
29.	Crude Oil and Natural Gas Production
30.	Secondary Aluminum
31.	Potash (Deleted)
32.	Lightweight Aggregate Industry: Clay, Shale, and Slate[2]
33	Glass
34.	Gypsum
35.	Sodium Carbonate
36.	Secondary Zinc (Deleted)
37.	Polymers and Resins: Phenolic
38.	Polymers and Resins: Urea-Melamine
39.	Ammonia (Deleted)
40.	Polymers and Resins. Polystyrene
41.	Polymers and Resins: ABS-SAN Resins
42.	Fiberglass
43.	Polymers and Resins: Polypropylene
44.	Textile Processing
45.	Asphalt Processing and Asphalt Roofing Manufacture
46.	Brick and Related Clay Products
47	Ceramic Clay Manufacturing (Deleted)
48.	Ammonium Nitrate Fertilizer
49.	Castable Refractories (Deleted)
50.	Borax and Boric Acid (Deleted)
51.	Polymers and Resins: Polyester Resins
52.	Ammonium Sulfate
53.	Starch
54.	Perlite
55.	Phosphoric Acid Thermal Process (Deleted)
56.	Uranium Refining
57.	Animal Feed Defluorination (Deleted)
58.	Urea (for fertilizer and polymers)
59.	Detergent (Deleted)
	Other Source Categories
Lead acid battery manufacture[3]	
Organic solvent cleaning[3]	
Industrial surface coating: metal furniture[3]	
Stationary gas turbines[4]	

PRIORITIZED MAJOR SOURCE CATEGORIES—Continued

Priority Number[1]	Source Category
	Municipal solid waste landfills[4]

[1] Low numbers have highest priority, e.g., No. 1 is high priority, No. 59 is low priority.
[2] Formerly titled "Sintering: Clay and Fly Ash".
[3] Minor source category, but included on list since an NSPS is being developed for that source category.
[4] Not prioritized, since an NSPS for this major source category has already been promulgated.

[47 FR 951, Jan. 8, 1982, as amended at 47 FR 31876, July 23, 1982; 51 FR 42796, Nov. 25, 1986; 52 FR 11428, Apr. 8, 1987; 61 FR 9919, Mar. 12, 1996]

§ 60.17 Incorporations by reference.

The materials listed below are incorporated by reference in the corresponding sections noted. These incorporations by reference were approved by the Director of the Federal Register on the date listed. These materials are incorporated as they exist on the date of the approval, and a notice of any change in these materials will be published in the FEDERAL REGISTER. The materials are available for purchase at the corresponding address noted below, and all are available for inspection at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC and at the Library (MD–35), U.S. EPA, Research Triangle Park, NC.

(a) The following materials are available for purchase from at least one of the following addresses: American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103; or the University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.

(1) ASTM D388–77, Standard Specification for Classification of Coals by Rank, incorporation by reference (IBR) approved for §§ 60.41(f); 60.45(f)(4)(i), (ii), (vi), 60.41a, 60.41b; 60.41c; 60.25(b), (c)

(2) ASTM D3178–73, Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke, IBR approved January 27, 1983 for § 60.45(f)(5)(i)

(3) ASTM D3176–74, Standard Method for Ultimate Analysis of Coal and Coke, IBR approved January 27, 1983, for § 60.45(f)(5)(i); appendix A to part 60, Method 19.

(4) ASTM D1137–53 (Reapproved 1975), Standard Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectrometer, IBR approved January 27, 1983 for § 60.45(f)(5)(i).

(5) ASTM D1945–64 (Reapproved 1976), Standard Method for Analysis of Natural Gas by Gas Chromatography, IBR approved January 27, 1983 for § 60.45(f)(5)(i).

(6) ASTM D1946–77, Standard Method for Analysis of Reformed Gas by Gas Chromatography, IBR approved for §§ 60.45(f)(5)(i), 60.18(f), 60.614(d)(2)(ii), 60.614(d)(4), 60.664(d)(2)(ii), 60.664(d)(4) and 60.564(f), 60.704(d)(2)(ii) and 60.704(d)(4).

(7) ASTM D2015–77, Standard Test Method for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter, IBR approved January 27, 1983 for § 60.45(f)(5)(ii); § 60.46(g); appendix A to part 60, Method 19.

(8) ASTM D1826–77, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, IBR approved January 27, 1983, for §§ 60.45(f)(5)(ii); 60.46(g); 60.296(f); appendix A to part 60, Method 19.

(9) ASTM D240–76, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, IBR approved January 27, 1983, for § 60.46(g); 60.296(f); appendix A to part 60, Method 19.

(10) ASTM D396–78, Standard Specification for Fuel Oils, IBR approved for §§ 60.40b; 60.41b; 60.41c; 60.111(b); 60.111a(b).

(11) ASTM D2880–78, Standard Specification for Gas Turbine Fuel Oils, IBR approved January 27, 1983 for §§ 60.111(b), 60.111a(b), 60.335(b)(2).

(12) ASTM D975–78, Standard Specification for Diesel Fuel Oils, IBR approved January 27, 1983 for §§ 60.111(b), 60.111a(b)

(13) ASTM D323–82, Test Method for Vapor Pressure of Petroleum Products (Reid Method), IBR approved April 8, 1987 for §§ 60.111(l), 60.111a(g), 60.111b(g), and 60.116b(f)(2)(ii).

(14) ASTM A99–76, Standard Specification for Ferromanganese, IBR approved January 27, 1983 for § 60.261.

(15) ASTM A483–64 (Reapproved 1974), Standard Specification for Silicomanganese, IBR approved January 27, 1983 for § 60.261.

(16) ASTM A101–73, Standard Specification for Ferrochromium, IBR approved January 27, 1983 for § 60.261.

(17) ASTM A100–69 (Reapproved 1974), Standard Specification for Ferrosilicon, IBR approved January 27, 1983 for § 60.261.

(18) ASTM A482–76, Standard Specification for Ferrochromesilicon, IBR approved January 27, 1983 for § 60.261

(19) ASTM A495–76, Standard Specification for Calcium-Silicon and Calcium Manganese-Silicon, IBR approved January 27, 1983 for § 60.261.

(20) ASTM D 1072–80, Standard Method for Total Sulfur in Fuel Gases, IBR approved July 31, 1984 for § 60.335(b)(2).

(21) ASTM D2986–71 (Reapproved 1978), Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test, IBR approved January 27, 1983 for appendix A to part 60, Method 5, par. 3.1.1, Method 12, par. 4.1.1, Method 17, par. 3.1.1

(22) ASTM D 1193–77, Standard Specification for Reagent Water, for appendix A to part 60, Method 6, par. 3.1.1; Method 7, par. 3.2.2; Method 7C, par. 3.1.1; Method 7D, par. 3.1.1; Method 8, par. 3.1.3; Method 12, par. 4.1.3; Method 25D, par. 3.2.2.4; Method 26A, par. 3.1.1; Method 29, pars. 4.2.2., 4.4.2., and 4.5.6.

(23) [Reserved]

(24) ASTM D2234–76, Standard Methods for Collection of a Gross Sample of Coal, IBR approved January 27, 1983, for appendix A to part 60, Method 19

(25) ASTM D3173–73, Standard Test Method for Moisture in the Analysis Sample of Coal and Coke, IBR approved January 27, 1983, for appendix A to part 60, Method 19.

(26) ASTM D3177–75, Standard Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke, IBR approved January 27, 1983, for appendix A to part 60, Method 19.

(27) ASTM D2013–72, Standard Method of Preparing Coal Samples for Analysis, IBR approved January 27, 1983, for appendix A to part 60, Method 19.

(28) ASTM D270–65 (Reapproved 1975), Standard Method of Sampling Petroleum and Petroleum Products, IBR approved January 27, 1983, for appendix A to part 60, Method 19

(29) ASTM D737–85, Standard Test Method for Air Permeability of Textile Fabrics, IBR approved January 27, 1983 for §61.23(a)

(30) ASTM D1475–60 (Reapproved 1980), Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products, IBR approved January 27, 1983 for § 60 435(d)(1), appendix A to part 60, Method 24, par. 2.1, and Method 24A, par. 2.2.

(31) ASTM D2369–81, Standard Test Method for Volatile Content of Coatings, IBR approved January 27, 1983 for appendix A to part 60, Method 24.

(32) ASTM D3792–79, Standard Method for Water Content of Water-Reducible Paints by Direct Injection Into a Gas Chromatograph, IBR approved January 27, 1983 for appendix A to part 60, Method 24, par. 2.3.

(33) ASTM D4017–81, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, IBR approved January 27, 1983 for appendix A to part 60, Method 24, par 2.4

(34) ASTM E169–63 (Reapproved 1977), General Techniques of Ultraviolet Quantitative Analysis, IBR approved for § 60 485(d), § 60 593(b), and § 60 632(f).

(35) ASTM E168–67 (Reapproved 1977), General Techniques of Infrared Quantitative Analysis, IBR approved for § 60 485(d), § 60.593(b), and § 60.632(f).

(36) ASTM E260–73, General Gas Chromatography Procedures, IBR approved for § 60.485(d), § 60.593(b), and § 60 632(f)

(37) ASTM D2879–83, Test Method for Vapor Pressure—Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, IBR approved April 8, 1987 for §§ 60 485(e), 60.111b(f)(3), 60.116b(e)(3)(ii), and 60 116b(f)(2)(i)

(38) ASTM D2382-76, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter [High-Precision Method], IBR approved for §§ 60.18(f), 60.485(g), 60.614(d)(4), 60 664(d)(4), and 60 564(f), and 60.704(d)(4)

(39) ASTM D2504–67 (Reapproved 1977), Noncondensable Gases in C_3 and Lighter Hydrocarbon Products by Gas Chromatography, IBR approved for § 60 485(g).

(40) ASTM D86–78, Distillation of Petroleum Products, IBR approved for § 60.593(d), § 60.633(h), and § 60 562-2(d)

(41) [Reserved]

(42) ASTM D 3031–81, Standard Test Method for Total Sulfur in Natural Gas by Hydrogenation, IBR approved July 31, 1984 for § 60.335(b)(2).

(43) ASTM D 4084–82, Standard Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method), IBR approved July 31, 1984 for § 60.335(b)(2).

(44) ASTM D 3246–81, Standard Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry, IBR approved July 31, 1984 for § 60.335(b)(2).

(45) ASTM D2584–68, Standard Test Method for Ignition Loss of Cured Reinforced Resins, IBR approved February 25, 1985 for § 60.685(e).

(46) ASTM D3431–80, Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons (Microcoulometric Method), IBR approved November 25, 1986, for appendix A to part 60, Method 19.

(47) ASTM D129–64 (reapproved 1978), Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), IBR approved for appendix A to part 60, Method 19.

(48) ASTM D1552–83, Standard Test Method for Sulfur in Petroleum Products (High Temperature Method), IBR approved for appendix A to part 60, Method 19.

(49) ASTM D1835–86, Standard Specification for Liquefied Petroleum (LP) Gases, to be approved for § 60 41b

(50) ASTM D1835–86, Standard Specification for Liquefied Petroleum (LP) Gases, IBR approved for §§ 60.41b; 60.41c.

(51) ASTM D4057–81, Standard Practice for Manual Sampling of Petroleum and Petroleum Products, IBR approved for appendix A to part 60, Method 19.

(52) ASTM D4239–85, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods, IBR approved for appendix A to part 60, Method 19.

(53) ASTM D2016–74 (Reapproved 1983), Standard Test Methods for Moisture Content of Wood * * * for appendix A, Method 28

(54) ASTM D4442–84, Standard Test Methods for Direct Moisture Content Measurement in Wood and Wood-base Materials * * * for appendix A, Method 28.

(55) [Reserved]

(56) ASTM D129–64 (Reapproved 1978), Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), IBR approved August 17, 1989, for § 60.106(j)(2)

(57) ASTM D1552–83, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method), IBR approved August 17, 1989, for § 60 106(j)(2)

(58) ASTM D2622–87, Standard Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry, IBR approved August 17, 1989, for § 60.106(j)(2).

(59) ASTM D1266–87, Standard Test Method for Sulfur in Petroleum Products (Lamp Method), IBR approved August 17, 1989, for § 60 106(j)(2)

(60) ASTM D2908–74, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, IBR approved for § 60.564(j)

(61) ASTM D3370–76, Standard Practices for Sampling Water, IBR approved for § 60 564(j)

(62) ASTM D4457–85 Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph, IBR approved for appendix A, Method 24.

(63) ASTM D 5403–93 Standard Test Methods for Volatile Content of Radiation Curable Materials. IBR approved September 11, 1995 for Method 24 of Appendix A.

(b) The following material is available for purchase from the Association of Official Analytical Chemists, 1111 North 19th Street, Suite 210, Arlington, VA 22209.

(1) AOAC Method 9, Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11–12, IBR approved January 27, 1983 for §§ 60.204(d)(2), 60.214(d)(2), 60.224(d)(2), 60.234(d)(2), 60.244(f)(2).

(c) The following material is available for purchase from the American Petroleum Institute, 1220 L Street NW., Washington, DC 20005.

(1) API Publication 2517, Evaporation Loss from External Floating Roof Tanks, Second Edition, February 1980, IBR approved January 27, 1983, for §§ 60.111(i), 60.111a(f), 60.111a(f)(1) and 60.116b(e)(2)(i)

(d) The following material is available for purchase from the Technical Association of the Pulp and Paper Industry (TAPPI), Dunwoody Park, Atlanta, GA 30341.

(1) TAPPI Method T624 os–68, IBR approved January 27, 1983 for § 60.285(d)(4)

(e) The following material is available for purchase from the Water Pollution Control Federation (WPCF), 2626 Pennsylvania Avenue NW., Washington, DC 20037.

(1) Method 209A, Total Residue Dried at 103–105 °C, in Standard Methods for the Examination of Water and Wastewater, 15th Edition, 1980, IBR approved February 25, 1985 for § 60.683(b)

(f) The following material is available for purchase from the following address: Underwriter's Laboratories, Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062.

(1) UL 103, Sixth Edition revised as of September 3, 1986, Standard for Chimneys, Factory-built, Residential Type and Building Heating Appliance.

(g) The following material is available for purchase from the following address: West Coast Lumber Inspection Bureau, 6980 SW. Barnes Road, Portland, OR 97223.

(1) West Coast Lumber Standard Grading Rules No. 16, pages 5–21 and 90 and 91, September 3, 1970, revised 1984.

(h) The following material is available for purchase from the American Society of Mechanical Engineers (ASME), 345 East 47th Street, New York, NY 10017.

(1) ASME QRO–1–1994, Standard for the Qualification and Certification of Resource Recovery Facility Operators, IBR approved for § 60.56a.

(2) ASME PTC 4.1–1964 (Reaffirmed 1991), Power Test Codes: Test Code for Steam Generating Units (with 1968 and 1969 Addenda), IBR approved for §§ 60.46b and 60.58a(h)(6)(ii).

(3) ASME Interim Supplement 19.5 on Instruments and Apparatus: Application, Part II of Fluid Meters, 6th Edition (1971), IBR approved for § 60.58a(h)(6)(ii).

(i) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW–846 Third Edition (November 1986), as amended by Updates I (July, 1992), II (September 1994), IIA (August, 1993), and IIB (January, 1995). Test Method are incorporated by reference for appendix A to part 60, Method 29, pars. 2.2.1; 2.3.1; 2.5; 3.3.12.1; 3.3.12.2; 3.3.13; 3.3.14; 5.4.3; 6.2; 6.3; 7.2.1; 7.2.3; and Table 29–2. The Third Edition of SW–846 and Updates I, II, IIA, and IIB (document number 955–001–00000–1) are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, (202) 512–1800. Copies may be obtained from the Library of the U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

(j) *Standard Methods for the Examination* of Water and Wastewater, 16th edition, 1985. Method 303F Determination of Mercury by the Cold Vapor Technique. This document may be obtained from the American Public Health Association, 1015 18th Street, NW., Washington, DC 20036, and is incorporated by reference for Method 29, pars 5.4.3; 6.3; and 7.2.3 of appendix A to part 60.

[48 FR 3735, Jan. 27, 1983]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 60.17, see the List of CFR Sections Affected in the Finding Aids section of this volume.

EFFECTIVE DATE NOTE: At 60 FR 65414, Dec. 19, 1995, § 60.17 was amended by revising paragraphs (h)(1), (2) and (3) without establishing an effective date. For the convenience of the user, the existing text continues to be carried within the body of the section and the new text is set forth below:

§ 60.17 Incorporations by reference.

* * * * *

(h) * * *

(1) ASME QRO–1–1994, Standard for the Qualification and Certification of Resource Recovery Facility Operators, IBR approved for §§ 60.56a, 60.54b(a) and 60.54b(b).

(2) ASME PTC 4.1–1964 (Reaffirmed 1991), Power Test Codes: Test Code for Steam Generating Units (with 1968 and 1969 Addenda), IBR approved for §§ 60.46b, 60.58a(h)(6)(ii), and 60.58b(i)(6)(ii).

(3) ASME Interim Supplement 19.5 on Instruments and Apparatus: Application, Part II of Fluid Meters, 6th Edition (1971), IBR approved for §§ 60.58a(h)(6)(ii) and 60.58b(i)(6)(ii).

* * * * *

§ 60.18 General control device requirements.

(a) *Introduction.* This section contains requirements for control devices used to comply with applicable subparts of parts 60 and 61. The requirements are placed here for administrative convenience and only apply to facilities covered by subparts referring to this section.

(b) *Flares.* Paragraphs (c) through (f) apply to flares.

(c)(1) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in paragraph (f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

(2) Flares shall be operated with a flame present at all times, as determined by the methods specified in paragraph (f).

(3) Flares shall be used only with the net heating value of the gas being combusted being 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted being 7.45 MJ/scm (200 Btu/scf) or greater if the flare is nonassisted. The net heating value of the gas being combusted shall be determined by the methods specified in paragraph (f).

(4)(i) Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in paragraph (f)(4), less than 18.3 m/sec (60 ft/sec), except as provided in paragraphs (b)(4) (ii) and (iii).

(ii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in paragraph (f)(4), equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec) are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

(iii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in paragraph (f)(4), less than the velocity, V_{max}, as determined by the method specified in paragraph (f)(5), and less than 122 m/scc (400 ft/sec) are allowed.

(5) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, V_{max}, as determined by the method specified in paragraph (f)(6).

(6) Flares used to comply with this section shall be steam-assisted, air-assisted, or nonassisted.

(d) Owners or operators of flares used to comply with the provisions of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs. Applicable subparts will provide provisions stating how owners or operators of flares shall monitor these control devices.

(e) Flares used to comply with provisions of this subpart shall be operated at all times when emissions may be vented to them.

(f)(1) Reference Method 22 shall be used to determine the compliance of flares with the visible emission provisions of this subpart. The observation period is 2 hours and shall be used according to Method 22.

(2) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

E:GRAPHICS EC01JN92.008

where:

H_T=Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 °C;

E:GRAPHICS EC01JN92.009

C_i=Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946–77 (Incorporated by reference as specified in § 60.17); and

H_i=Net heat of combustion of sample component i, kcal/g mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382–76 (incorporated by reference as specified in § 60 17) if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

(5) The maximum permitted velocity, V_{max}, for flares complying with paragraph (c)(4)(iii) shall be determined by the following equation.

$$\log_{10} (V_{max})=(H_T+28.8)/31.7$$

V_{max}=Maximum permitted velocity, M/sec

28 8=Constant

31.7=Constant

H_T=The net heating value as determined in paragraph (f)(3).

(6) The maximum permitted velocity, V_{max}, for air-assisted flares shall be determined by the following equation.

$$V_{max}=8\ 706+0\ 7084\ (H_T)$$

V_{max}=Maximum permitted velocity, m/sec

8.706=Constant

0.7084=Constant

H_T=The net heating value as determined in paragraph (f)(3).

[51 FR 2701, Jan. 21, 1986]

§ 60.19 General notification and reporting requirements.

(a) For the purposes of this part, time periods specified in days shall be measured in calendar days, even if the word "calendar" is absent, unless otherwise specified in an applicable requirement.

(b) For the purposes of this part, if an explicit postmark deadline is not specified in an applicable requirement for the submittal of a notification, application, report, or other written communication to the Administrator, the owner or operator shall postmark the submittal on or before the number of days specified in the applicable requirement. For example, if a notification must be submitted 15 days before a particular event is scheduled to take place, the notification shall be postmarked on or before 15 days preceding the event; likewise, if a notification must be submitted 15 days after a particular event takes place, the notification shall be delivered or postmarked on or before 15 days following the end of the event. The use of reliable non-Government mail carriers that provide indications of verifiable delivery of information required to be submitted to the Administrator, similar to the postmark provided by the U.S. Postal Service, or alternative means of delivery agreed to by the permitting authority, is acceptable

(c) Notwithstanding time periods or postmark deadlines specified in this part for the submittal of information to the Administrator by an owner or operator, or the review of such information by the Administrator, such time periods or deadlines may be changed by mutual agreement between the owner or operator and the Administrator. Procedures governing the implementation of this provision are specified in paragraph (f) of this section.

(d) If an owner or operator of an affected facility in a State with delegated authority is required to submit periodic reports under this part to the State, and if the State has an established timeline for the submission of periodic reports that is consistent with the reporting frequency(ies) specified for such facility under this part, the owner or operator may change the dates by which periodic reports under this part shall be submitted (without changing the frequency of reporting) to be consistent with the State's schedule by mutual agreement between the owner or operator and the State. The allowance in the previous sentence applies in each State beginning 1 year after the affected facility is required to be in compliance with the applicable subpart in this part. Procedures governing the implementation of this provision are specified in paragraph (f) of this section

(e) If an owner or operator supervises one or more stationary sources affected by standards set under this part and standards set under part 61, part 63, or both such parts of this chapter, he/she may arrange by mutual agreement between the owner or operator and the Administrator (or the State with an approved permit program) a common schedule on which periodic reports required by each applicable standard shall be submitted throughout the year. The allowance in the previous sentence applies in each State beginning 1 year after the stationary source is required to be in compliance with the applicable subpart in this part, or 1 year after the stationary source is required to be in compliance with the applicable 40 CFR part 61 or part 63 of this chapter standard, whichever is latest. Procedures governing the implementation of this provision are specified in paragraph (f) of this section.

(f)(1)(i) Until an adjustment of a time period or postmark deadline has been approved by the Administrator under paragraphs (f)(2) and (f)(3) of this section, the owner or operator of an affected facility remains strictly subject to the requirements of this part.

(ii) An owner or operator shall request the adjustment provided for in paragraphs (f)(2) and (f)(3) of this section each time he or she wishes to change an applicable time period or postmark deadline specified in this part.

(2) Notwithstanding time periods or postmark deadlines specified in this part for the submittal of information to the Administrator by an owner or operator, or the review of such information by the Administrator, such time periods or deadlines may be changed by mutual agreement between the owner or operator and the Administrator. An owner or operator who wishes to request a change in a time period or postmark deadline for a particular requirement shall request the adjustment in writing as soon as practicable before the subject activity is required to take place. The owner or operator shall include in the request whatever information he or she considers useful to convince the Administrator that an adjustment is warranted.

(3) If, in the Administrator's judgment, an owner or operator's request for an adjustment to a particular time period or postmark deadline is warranted, the Administrator will approve the adjustment. The Administrator will notify the owner or operator in writing of approval or disapproval of the request for an adjustment within 15 calendar days of receiving sufficient information to evaluate the request.

(4) If the Administrator is unable to meet a specified deadline, he or she will notify the owner or operator of any significant delay and inform the owner or operator of the amended schedule.

[59 FR 12428, Mar. 16, 1994]

APPENDIX D

MSW LANDFILL CONTACTS

APPENDIX D

MSW LANDFILL CONTACTS

D1 EPA Regional MSW Landfill Rule Contacts
D2 State MSW Landfill Rule Contacts
D3 Other Contacts

Appendix D1

EPA Regional MSW Landfill Rule Contacts

EPA Regional MSW Landfill Rule Contacts

Regional Contact	Phone #	Fax #
Jeanne Cosgrove U.S. EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont) John F. Kennedy Federal Bldg. Boston, MA 02203	617/565-9451	617/565-4940
Christine DeRosa U.S. EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands) 290 Broadway New York, NY 10007-1866	212/637-4022	212/637-3901
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Scott Davis U.S. EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee) 100 Alabama St., S.W. Atlanta, GA 30303	404/562-9127	404/562-9095
Charles Hatten U.S. EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin) 77 W. Jackson Chicago, IL 60604	312/886-6031	312/886-0617
Mick Cote U.S. EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas) 1445 Ross Av., Suite 1200 Dallas, TX 75202-2733	214/665-7219	214/665-7263

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Ward Burns U.S. EPA Region VII (Iowa, Kansas, Missouri, Nebraska) 726 Minnesota Av. Kansas City, KS 66101	913/551-7960	913/551-7065
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Patricia Bowlin U.S. EPA Region IX (American Samoa, Arizona, California, Guam, Hawaii, Nevada) 75 Hawthorne Street San Francisco, CA 94105	415/744-1188	415/744-1076
Catherine Woo U.S. EPA Region X (Alaska, Idaho, Oregon, Washington) 1200 Sixth Av. Seattle, WA 98101	206/553-1814	206/553-0404

Appendix D2

State MSW Landfill Rule Contacts

State Contacts

Contact	State	Phone #	Fax #
REGION I			
Scott Koschwitz	CT	860/424-3427	860/424-4063
Nancy Seidman	MA	617/292-5593	617/556-1046
John Chandler	ME	207/287-2437	207/287-7641
Don Anderson	ME	207/287-2437	207/287-7641
Andy Bodnarik	NH	603/271-1370	603/271-1381
Barbara Morin	RI	401/277-2808	401/277-2017
Harold Garabedian	VT	802/241-3840	802/241-2590
REGION II			
John Elstan	NJ	609/292-6710	
Tom Lynch	NJ	518/457-2051	
Tom Christoffell	NY	518/457-7688	
Eduardo Del Rio	PR	787/767-8025	
REGION III			
Ron Amirikian	DE	302/323-4542	302/323-4561
Ruben Deza	MD	410/631-3240	410-631-3202
Carl York	MD	410/631-3234	410-631-3202
Jayme Graham	PA Allegheny Co.	412/578-8129	412-578-8058
John Slade	PA	717/783-9476	717/772-2303
Kris Ramamurthy	PA	717/787-9256	717/772-2303
Karen Sabasteanski	VA	804/698-4426	804-698-4510
Lucy Pontiveros	WV	304/558-1220	304-558-1222
REGION IV			
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Larry Brown	AL	334/271-7861	334/271-7950
Cindy Phillips	FL	904/921-9534	-
Venkata Panchakarla	FL	904/488-0114	904/922-6979
Kent Pierce	GA	404/363-7103	404/363-7100
Millie Ellis	KY	502/573-3382	502/573-3787
Mark Wyatt	MS	601/961-5367	601/961-5742
Tom Allen	NC	919/733-1489	919/715-7175
Renee Shealy	SC	803/734-4750	803/734-4556

State Contacts

Contact	State	Phone #	Fax #
Malcolm Butler	TN	615/532-0604	615/532-0614
Gene Bradley	TN	615/532-0593	615/532-0614
REGION V			
Dick Forbes	IL	217/785-1889	
Pat Daniel	IN	317/233-0429	
Jerry Trautman	MI	517/373-7059	517-335-3122
Margaret McCourtney	MN	612/297-7894	612-297-8701
Tammy Hilkens	OH	614/644-3596	
Steve Dunn	WI	608/267-0566	608-267-0560
REGION VI			
Mark McCorkle	AR	501/682-0736	
Annette Sharp	LA	504/765-0914	
Karen Blackmore	LA	504/765-0130	
David Duran	NM	505/827-2950	
Angel Martinez	NM (Albuquerque)	505/768-1961	
Joyce Sheedy or Cheryl Bradley	OK	405/290-8247	405/962-2200
Gus Eghneim	TX	512/239-1965	
REGION VII			
Catharine Fitsimmons	IA	515/281-8034	515/281-8895
Chuck Layman	KS	913/296-1579	913/296-1545
Paul Myers	MO	573/751-4817	573/751-2706
Susan Fields	NE	402/471-0019	402/471-2909
REGION VIII			
Kirsten King	CO	303/692-3212	303/782-0278
Dave Klemp	MT	406/444-0286	406/444-5275
Tom Bachman	ND	701/328-5188	701/328-5200
Jackie Flowers	SD	605/773-5708 605/773-4068	605/773-4035
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Bernie Dailey	WY	307/777-7345	307/777-5616

State Contacts

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Bill Walker	AK	907/465-5124	
Sue Richards	ID	208/334-5898	
Kathleen Craig	OR	503/229-6833	
Judy Geier	WA	360/407-6850	

Appendix D3

Other MSW Landfill Contacts

Other MSW Landfill Contacts

Contact	Phone #	Fax #
For information concerning analyses performed in developing the landfills rule, contact:		
Michele Laur U.S. Environmental Protection Agency Waste and Chemical Processes Group Emission Standards Division (MD-13) Research Triangle Park, NC 27711	919/541-5256	919/541-0246
For implementation issues, contact:		
Mary Ann Warner U.S. Environmental Protection Agency Program Review Group Information Transfer and Program Integration Division (MD-12) Research Triangle Park, NC 27711	919/541-1192	919/541-2664
For information on the Landfill Model, contact:		
Susan Thorneloe U.S. Environmental Protection Agency Air Pollution Prevention and Control Division (MD-63) Research Triangle Park, NC 27711 thorneloe.susan@epamail.epa.gov	919/541-2709	919/541-2382
For enforcement and compliance assurance contact:		
Zofia S. Kosim, P.E. (2242A) U.S. Environmental Protection Agency Air Enforcement Division/ Office of Regulatory Enforcement Office of Enforcement and Compliance Assurance 401 M Street, S.W. Washington, DC 20460	202/564-8733	202/564-0068

Other MSW Landfill Contacts (Continued)

Contact	Phone #	Fax #
For Title V permit issues:		
Joanna Swanson U.S. Environmental Protection Agency Operating Permits Group Information Transfer Program Integration Division (MD-12) Research Triangle Park, North Carolina 27711	919/541-5282	919/541-5509
To order documents/receive general information on the Landfill Methane Outreach Program, contact:		
LMOP Hotline Home page: www.epa.gov/landfill	1-888/STAR YES	703/934-3895
For more specific requests on landfill gas-to-energy, contact:		
Tom Kerr U.S. Environmental Protection Agency 401 M Street, S.W. 6202J Washington, DC 20460	202/233-9768	204/233-9569
For information on monitoring and sampling methods contact:		
Foston Curtis U.S. Environmental Protection Agency Source Characterization Group Emissions, Monitoring, and Analysis Division (MD-19) Research Triangle Park, NC 27711	919/541-1063	919/541-1039

APPENDIX E

COLLECTION SYSTEM DESIGN PLANS

APPENDIX E

COLLECTION SYSTEM DESIGN PLANS

All owners and operators of affected landfills are required to submit to the Administrator a collection and control system design plan prepared by a professional engineer. This appendix provides a summary of the design plan requirements for all collection systems: active collection systems that meet the requirements of §60.759 as well as alternate collection systems. It also provides guidance on what to look for in such plans and case study examples.

Design Plan Requirements

Under §60.752(b)(2), landfill owners/operators subject to control requirements (i.e., those with a calculated NMOC emission rate $\geq$50 Mg/yr) are given the option to:

(a) submit a collection and control system plan conforming to the specifications provided in §60.759, or

(b) submit a collection and control plan for an alternative design.

The design plan provisions of the rule were intended to provide flexibility and allow innovation. It is clear that some landfill owners/operators will choose to submit a plan for a collection system that does not conform to the specifications in §60.759. Because of the many site-specific factors involved with landfill gas collection system design, alternative systems may be more appropriate for a given landfill. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, horizontal trenches, and passive systems. All plans will need to be reviewed by the implementing agency on a case-by-case basis to ensure that they meet the requirements of §60.752(b)(2)(ii).

For active collection systems, the plan must demonstrate that the collection system will:

(1) be designed to handle, over the intended use period of the gas control or treatment system equipment, the maximum expected gas flow rate from the entire landfill area that warrants control;

(2) collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active or 2 years or more if closed or at final grade;

(3) collect gas at a sufficient extraction rate (a rate sufficient to maintain a negative pressure at all well heads in the collection system without causing air infiltration, including any well heads connected to the system as a result of expansion or excess surface emissions, for the life of the blower); and

(4) be designed to minimize off-site migration of subsurface gas.

For passive collection systems, the plan must demonstrate that the collection system will:

(1) be designed to handle, over the intended use period of the gas control or treatment system equipment, the maximum expected gas flow rate from the entire landfill area that warrants control;

(2) collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active or 2 years or more if closed or at final grade;

(3) be designed to minimize off-site migration of subsurface gas; and

(4) include landfill liners on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required by the RCRA solid waste rules under 40 CFR 258.40.

Specifications for Active Collection Systems

Owners or operators seeking to comply with the specifications for active collection systems in §60.759 must meet the following:

(1) Demonstrate that the siting of active collection wells, horizontal collectors, surface collectors, or other extraction devices is of sufficient density throughout all gas producing areas.

(2) Devices located within the interior and along the perimeter must be certified by a professional engineer to achieve uniform control of surface gas emissions.

(3) Design plans must address the 13 issues listed in Table E-1.

(4) Collection system siting should be of sufficient density to address landfill gas migration issues, and augmentation of the system through the use of active or passive systems at the perimeter or exterior.

(5) The system should control all gas producing areas except those that are excluded because either (1) they are segregated and shown to contain asbestos or nondegradable material, (documentation must include nature, location, amount of asbestos or nondegradeable material deposited, and date of deposition) or (2) they are nonproductive areas and can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill (amount, location, and age of the material must be documented).

(6) To qualify for exclusion based on nonproductivity, emissions must be calculated for each section proposed for exclusion, and the sum of all such sections must be compared with the NMOC emission estimate for the entire landfill. Emissions from each section must be calculated according to the following equation, from §60.759(a)(3)(ii) of the NSPS:

$$Q_i = 2\, k\, L_o\, M_i\, (e^{-kt_i})\, (C_{NMOC})\, (3.6 \times 10^{-9})$$

where,

Q_i	=	NMOC emission rate from the i^{th} section, Mg/yr
k	=	methane generation rate constant, year^{-1}
L_o	=	methane generation potential, m^3/Mg solid waste
M_i	=	mass of the degradable solid waste in the i^{th} section, Mg
t_i	=	age of the solid waste in the i^{th} section, years
C_{NMOC}	=	concentration of NMOCs, ppmv
3.6×10^{-9}	=	conversion factor

The values for k and C_{NMOC} determined in field testing must be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence. The radii of influence is the distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero. If field testing has not been performed, default values for k, L_o and C_{NMOC} of 0.05/year (0.02/year in arid areas), 170 m^3/Mg, and 4,000 ppmv, respectively, must be used as provided for Tier 1 calculations from § 60.754(a)(1). For landfills located in

TABLE E-1. LIST OF DESIGN PLAN REQUIREMENTS

	Issue Description
1.	Depth(s) of refuse
2.	Refuse gas generation rates and flow characteristics
3.	Cover properties
4.	Gas system expandability
5.	Leachate and condensate management
6.	Accessibility
7.	Compatibility with filling operations
8.	Integration with closure end use
9.	Air intrusion control
10.	Corrosion resistance
11.	Fill settlement
12.	Resistance to the refuse decomposition heat
13.	Topographical map of the surface area and proposed surface monitoring route [required in § 60.753(d)]

geographical areas with a 30-year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorological site, a k value of 0.02 per year should be used as provided in the Tier 1 calculations in §60.754(a)(1). Note: The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as indicated in paragraph (5) above.

(7) The gas extraction components must be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion-resistant material.

(8) The extraction components must be of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads.

(9) The collection system must be capable of any expansion needed to comply with emission and migration standards.

(10) Collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations must be situated to prevent excessive air infiltration.

(11) Vertical wells cannot endanger underlying liners and must address the occurrence of water within the landfill.

(12) Holes and trenches must be of sufficient cross-section for proper construction and completion. For example: the design should call for the centering of pipes and allow for the placement of gravel backfill.

(13) Collection devices must be constructed of PVC, HDPE pipe, fiberglass, stainless steel, or other nonporous corrosion-resistant material and must not allow for air intrusion into the cover, refuse into the collection system, or landfill gas into the atmosphere.

(14) Any gravel used around the pipe perforations should be large enough to prevent penetration or blockage of the perforations.

(15) The connections for collection devices may be above or below ground, but must include: a positive closing throttle valve, necessary seals and couplings, access couplings, and at least one sampling port.

(16) The system must convey the landfill gas to a control system through the collection header pipe(s). The gas mover equipment must be of a size capable of handing the maximum gas generation flow rate expected over the intended use period of the equipment.

(17) For existing systems the maximum flow rate must be determined by existing flow data, or by using the following equation. New systems must also use the equation.

Two equations are provided for determining the maximum flow rate: one equation for sites with an unknown year-to-year solid waste acceptance rate, and one equation for sites with a known year-to-year solid waste acceptance rate. A combination of the equations can be used if the acceptance rate is known for only part of the life of the landfill.

For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_o R (e^{-kc} - e^{-kt})$$

where,

Q_m	=	maximum expected gas generation flow rate, m^3/yr
L_o	=	methane generation potential, m^3/Mg solid waste
R	=	average annual acceptance rate, Mg/yr
k	=	methane generation rate constant, $year^{-1}$
t	=	age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years
c	=	time since closure, years (for an active landfill c = O and e^{-kc} = 1)

For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^{n} 2 \, k \, L_o \, M_i \, (e^{-kt_i})$$

where,

Q_M	=	maximum expected gas generation flow rate, m^3/yr
k	=	methane generation rate constant, $year^{-1}$
L_o	=	methane generation potential, m^3/Mg solid waste
M_i	=	mass of solid waste in the i^{th} section, Mg
t_i	=	age of the i^{th} section, years

Review of Plans

In reviewing design plans for active collection systems designed to meet §60.759, it is important to ensure that adherence to each of the requirements in the section entitled "Specifications for Active Collection Systems" is adequately demonstrated. In reviewing alternate plans (for active or passive systems), it is important to ensure that the requirements listed in the "Design Plan Requirements" section are followed. It is also important to recognize that the rule includes operational standards along with monitoring and reporting requirements to ensure that landfill gas is extracted from the landfill at a sufficient rate. Section 60.753 requires operation of collection systems so that the methane concentration is less than 500 ppmv at all points around the perimeter of the collection area and along a pattern that traverses the landfill at 30-meter intervals. The design plan must include a topographical map with the proposed monitoring route. This operational standard ensures that LFG is extracted at a sufficient rate and off-site migration is minimized. Any undetected flaws in the plan will most likely have to be corrected after the system is operating to meet the operational standards.

At the same time, sufficient discretion needs to be exercised to avoid the installation of inadequate collection systems. Failure to recognize an inadequate collection system design could lead to excessive periods of noncompliance or required replacement of the collection system. Such an occurrence would be detrimental to the environment and create an unnecessary financial burden on the landfill owner or operator.

For this reason, an appropriate burden must be placed on the landfill owner/operator to demonstrate that the operational standards will be achievable with the proposed design. Such demonstrations should be supported by performance data at that landfill or a similar landfill when practical. At a minimum, the landfill owner/operator should be required to provide a written rational and appropriate engineering calculations for the design of systems which do not adhere to the requirements in §60.759.

Possible Design for an Active Vertical Collection System (AVCS)

This section presents the design for an AVCS that the EPA believes would satisfy all the requirements in §60.759. It should be noted that final approval of such a design plan is left to a State's discretion, and adherence to the specifications presented do not guarantee design plan approval by a State. Furthermore, other designs may satisfy the criteria in §60.759.

Well Siting: Site active vertical collection wells such that the radius of influence (ROI) from a collection well includes all gas-producing areas of the landfill that contain solid waste. The ROI is the radial distance that a well can effectively extract LFG through compacted refuse without causing air infiltration. A well extracts LFG from compacted refuse by creating a negative pressure drop in the surrounding refuse. The negative pressure drop is produced by maintaining a negative gauge pressure within a well using blowers or air compressors. The pressure drop at a location in the landfill decreases as the distance from the collection well increases. The ROI for a collection well is defined as the shortest distance radially out from a collection well to where the pressure drop gradient applied by the blower or compressor approaches zero.

The interior ROI and perimeter ROI used to determine well placement will be determined using one of the following:

- Use a single ROI of 30 meters for siting both perimeter and interior wells; or
- Establish a site-specific ROI by following the procedure in EPA Method 2E. (Method 2E data may already be available if LFG flow rate was tested to perform Tier 3 NMOC emission rate calculations.)

The ROI will be used to site wells along the perimeter of all gas-producing areas of the landfill, at a maximum of one ROI from the perimeter boundary. After siting the perimeter wells, the interior wells will be sited. Both perimeter and interior wells will be spaced no more than two times the ROI apart. (Well spacing greater than this value will create gaps between the ROI of adjacent wells. The wells would be unable to collect LFG from these gaps.) Wells will be staggered such that all gas-producing areas of the landfill containing solid waste that has been in the landfill for at least 5 years (for active sites) or 2 years (for sites at closure or final grade) are covered by the ROI.

Wells do not need to be placed in segmented areas documented as containing (1) asbestos or nondegradeable material or (2) older, nonproductive areas (provided that they contribute less than 1 percent of the total NMOC emissions). The documentation will provide the nature, location, amount of asbestos or nondegradable material deposited in the area, and date of deposition. This documentation will be provided to the Administrator upon request. The amount, location, and age of the material in nonproductive areas will also be documented and provided to the Administrator upon request. A separate NMOC emission estimate will be made for each section proposed for exclusion, and the sum of all such sections compared to the NMOC emission estimate for the entire landfill. Emissions from each section will be computed using the equation presented in item (6) under "Specifications for Active Collection Systems" in this appendix. [This equation is from §60.759(a)(3)(2) of the rule.]

Well pipe construction: Table E-2 summarizes example well pipe construction. The landfill gas extraction well will be constructed of either: PVC, HDPE pipe, fiberglass, stainless steel, or other noncorrosive, nonporous material. Pipe material should be non-corrosive to minimize maintenance and failures, thereby maximizing the overall effectiveness of the gas collection system. Materials such as black-iron or galvanized pipe are not recommended because the collection system must remain operational for at least 15 years. These materials would most likely corrode within that period and sacrifice the effectiveness of the gas collection system. Pipe material should also be non-porous so LFG is collected without air infiltration. Porous well pipes could allow ambient air to be drawn from the landfill surface into the upper section of the pipe.

The well will be at least 0.075 meters in diameter and of suitable wall-thickness. The length of the pipe will be at least 75 percent of the depth of the solid waste or the depth to the water table, whichever is less. Installing a well pipe equal to 75 percent of the refuse depth prevents collection wells from being extended through landfill liners. Collection wells are

TABLE E-2. EXAMPLE WELL PIPE SPECIFICATIONS

Parameter	Specification
Material of construction	Schedule 40 or 80 PVC, HDPE, fiberglass, or stainless steel pipe.
Diameter of pipe	At least 0.075 m (3 in.).
Length of pipe	Pipe length will be 75 percent of the refuse depth or the distance from the landfill surface to the top of the water table, whichever is less.
Perforations along pipe length	Perforations will have a diameter of 0.012 m (1/2 in.). Four perforations will be located in a horizontal row around the pipe at intervals of 90°. Well pipes will have perforations along the lower two-thirds of the well pipe. The top 20 feet of a well pipe will not be perforated. The horizontal spacing between each row of holes will be 0.1 to 0.2 m (4 to 8 in.) apart.
Placement of pipe in well hole	The center line (longitudinal axis) of the well pipe will be located on the center line of the well hole.

extended only to the top of a water table because pipe extensions below the water level would be unable to collect LFG.

Perforations or holes are drilled into the well pipe at designated locations. The perforations allow LFG to be drawn into the pipe over a range of landfill depths. Four perforations with a diameter of 0.012 m (0.5 in.) will be located in a horizontal row around the pipe at intervals of 90°. The horizontal spacing between each row of holes will be 0.1 to 0.2 m (4 to 8 in.). Each well pipe will include perforations along the lower two-thirds of the pipe. However, no perforations must be present in the top 20 feet of a well pipe. In addition, the centerline of the pipe will be located on the centerline of the well hole in order to maintain an equal pressure drop throughout the cross sectional area of the well.

Well hole specifications: Table E-3 summarizes example will hole specifications. A well drilling rig will be used to dig a hole at least 0.60 meters in diameter in the landfill to a depth of at least 75 percent of the landfill depth or the depth to the water table. (This corresponds to the depth of the wells.)

The extraction well will be placed in the center of the hole and the hole will be backfilled with materials selected to accomplish two objectives:

(1) Allow unrestricted passage of LFG from the landfill through the perforations in a well pipe; and

(2) Create a sealed barrier near the top of the collection well to prevent air infiltration into the well.

Gravel with a diameter range of 2 to 7.5 cm (1 to 3 in) is used to fill the bottom of the well hole where well pipe perforations exist as shown in Figure E-1. Gravel is added to the well hole to a level 0.3 m (1 ft) above the uppermost perforation on the well pipe. This gravel layer acts as a filter to prevent refuse from clogging well pipe perforations. On top of the gravel are three more layers of material. First a layer of backfill consisting of at least 1.2 m (47 in.) is placed over the gravel. Next is a layer of bentonite clay with a depth of at least 1.0 m (39 in.). Bentonite clay acts as a seal or cap for the well hole to prevent air infiltration. Finally, a layer of

TABLE E-3. EXAMPLE WELL HOLE SPECIFICATIONS

Parameter	Specification
Diameter of well hole	At least 0.6 m (2 ft) in diameter.
Depth of well hole	A depth equal to 75 percent of the refuse depth or the distance from the landfill surface to the top of the water table, whichever is less. (Same as depth of well pipe.)
Fill material: Surrounding pipe perforations	Fill with gravel sized 2 to 7.5 cm (1 to 3 in) in diameter to a level of 0.3 m (1 ft) above the uppermost perforation.
Fill material: Above pipe perforations	Sequence of adding fill material over the crushed stone: (1) At least 1.2 m (47 in.) of backfill, (2) At least 1.0 m (39 in.) of bentonite, and (3) For the remainder, cover material or material of permeability equal to the existing cover material.

cover material or other material of equal permeability to the cover material can be used to fill the remaining space.

Well head fittings: The wellhead may be connected to the collection header pipes below or above the landfill surface. The wellhead assembly will include a ball or butterfly valve, flanges, gaskets, connectors, access couplings and at least one sampling port. The cap and header pipe will be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable wall thickness. A schematic of the gas extraction well and wellhead assembly is also illustrated in Figure E-1.

Conveyance system: The gas conveyance system transports LFG from the collection wells to the gas control system. The conveyance system must consist of gas movers and piping for the gas collection header. Gas movers can be either a fan, blower, or compressor. Piping for conveying collected LFG may run above or below the landfill surface. The gas mover equipment will be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment based on flow data (if existing) or the following equation:

$$\text{Peak Flow } [m^3/yr] = 2L_o R (e^{-kc} - e^{-kt})$$

where,

L_o	= methane generation potential, m^3/Mg solid waste
R	= average annual acceptance rate, Mg/yr
k	= methane generation rate constant, $year^{-1}$
t	= age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or expected active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfills at installation, yrs c = time since closure, yrs (for active landfill c = O and $e^{-kc} = 1$)

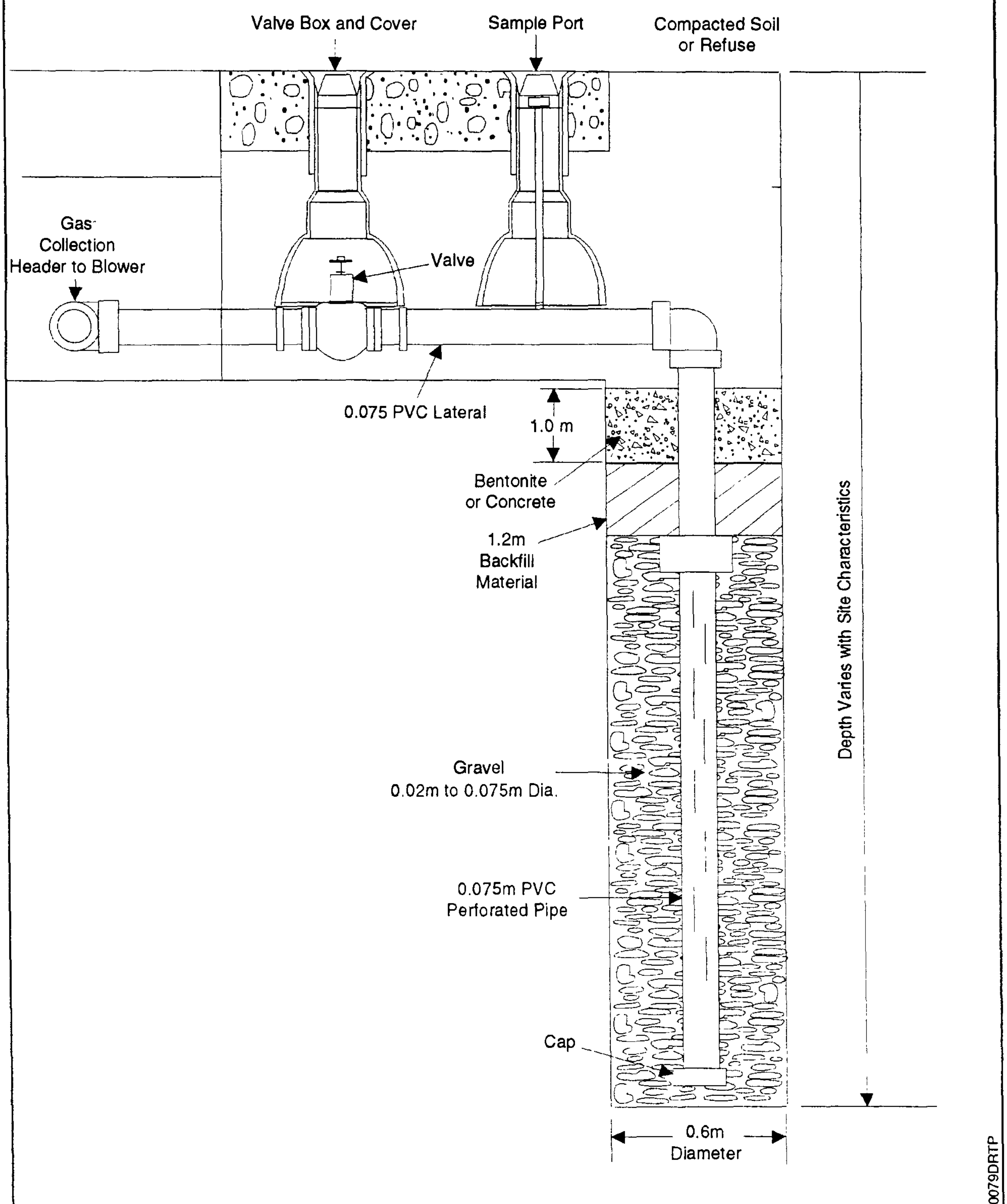

Figure E-1. Gas Extraction and Well Head Assembly

An average value will be used for L_o. If k has been determined, the value of k determined from the test will be used; if k has not been determined, an average value will be used. The average values specified in Compilation of Air Pollutant Emission Factors (AP-42) (currently 125 m^3/Mg for L_o and 0.04 $year^{-1}$ for k) may be used.

Case Studies

While the EPA believes that the AVCS presented above would qualify for approval, it does not represent the range of approvable systems. The EPA anticipates that variations on some of the design specifications would also be approvable. This section of the appendix illustrates some of those variations in the form of case studies.

Based on case studies provided by the Solid Waste Association of North America (SWANA), three types of collection designs other than that presented for an AVCS can be anticipated. These include:

(1) alternative vertical well specifications and/or construction;
(2) horizontal collection systems; and
(3) combinations of vertical and horizontal collectors.

Case studies illustrating each of these are provided in this section. Alternative specifications and/or construction for vertical well collection systems are presented in Case Studies A through E. Case Study F presents an alternative to the nitrogen monitoring procedures for determining air infiltration presented in Method 2E. Case Studies G and H present alternatives to standard vertical collection systems. All of these case studies were provided by SWANA. The purpose of these case studies is to illustrate the kind of demonstrations that should be provided by owners or operators submitting collection plans. Additionally, these demonstrations might be used in combination with other supporting information to demonstrate the adequacy of these designs for other landfills. The case studies provided in this appendix are as follows:

A. Gas wells with depths less than 75 percent of refuse depth.

B. Perforations for wells less than 90 feet deep

C. Alternate gas well perforations

D. Pile-driven vertical gas well installation

E. Compacted low permeability

F. Monitoring vacuum levels as an indicator of air infiltration in arid regions

G. Horizontal collector design

H. Design for LF with horizontal collectors and vertical wells

As included in most of these case studies, a key to demonstrating effectiveness of system designs is showing it can meet the operational standards (i.e., methane concentration less than 500 ppmv around the perimeter of the collection area and along a pattern that traverses the landfill at 30-meter intervals).

In some cases, the design already exists at that particular landfill and actual data on performance of the design can be provided. In other cases, it may be necessary to demonstrate the effectiveness of a design based on data collected at another landfill (such as the case studies included in this appendix). In these cases, it is important for the owner/operator to demonstrate similarities between the landfill where supporting data were collected and the landfill where the design is being proposed.

Case Study A: Gas Wells With Depths Less Than 75 Percent of Refuse Depth

AVCS Specification: The pipe the lesser of 75 percent of the depth of refuse or the depth to the water table in length.

Alternative Design: Gas wells with depths less than 75 percent of refuse depth

Location: Palos Verdes Landfill, City of Rolling Hills Estates, CA.
Operated by Los Angeles County Sanitation Districts (Districts)

The Districts operate an extensive gas collection system at the Palos Verdes Landfill (PVLF) which collects approximately 8000 cfm of landfill gas. Parcel 6 of the main site which extends along the northeast boundary was filled starting in the early 1970's and completed in October, 1980. The depth of refuse as measured from the top deck of Parcel 6 is approximately 185 feet.

The top deck at the eastern end of Parcel 6 covers an area of approximately 390,000 ft^2. Landfill gas is collected and emissions controlled in this area by fifteen vertical gas collection wells (approx. 26,000 ft^2/well), shown in Figure 1. All but two of the wells, listed in Table 1, are 60 feet in depth which is approximately 32 percent of the refuse depth. As shown in Table 2, integrated surface gas emissions, measured along the five routes covering this area, from July 1993 through July 1994 have averaged between 2 and 3 ppm total organic compounds as methane. These background level concentrations are well below the SCAQMD's stringent 50 ppm average surface gas limit and indicate that the area has excellent gas control.

Clearly, the 75 percent of refuse depth specification should be relaxed to allow for well installations such as those at PVLF where 32 percent depth of refuse wells have proven effective in controlling surface gas emissions.

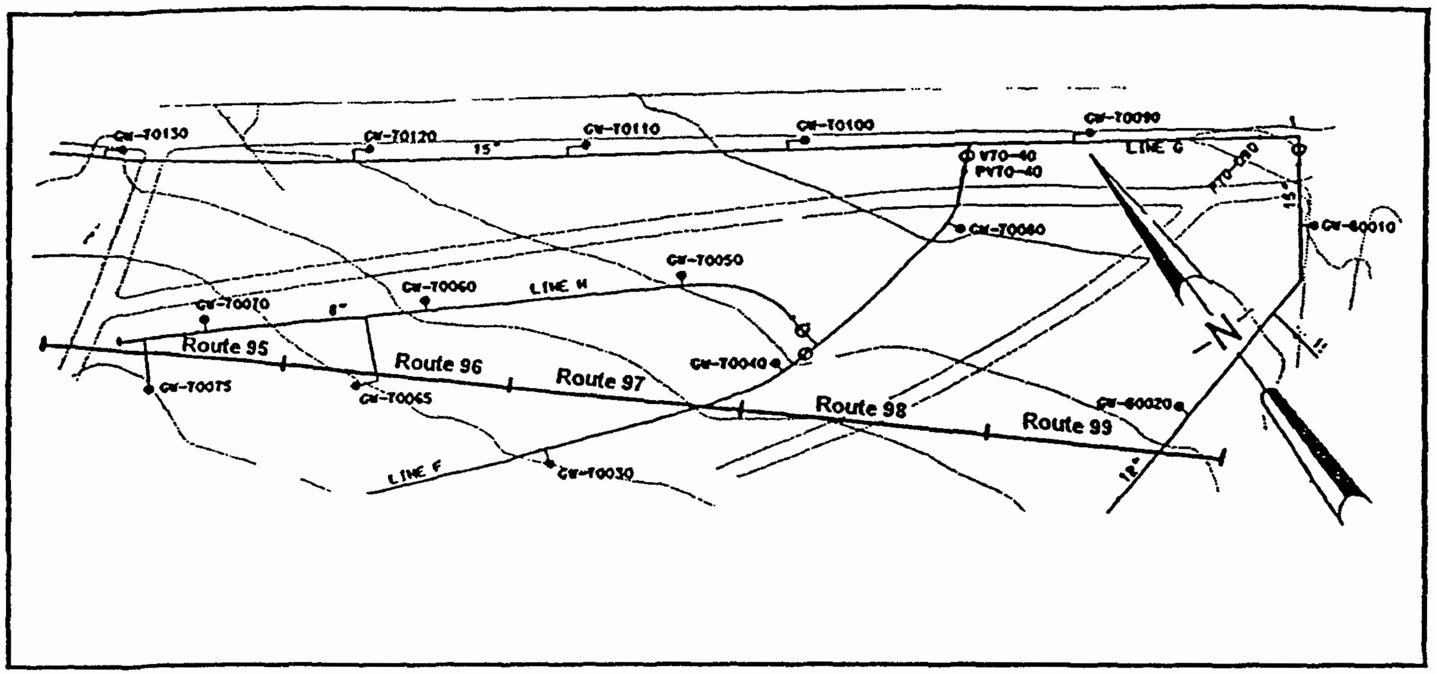

Figure 1. PVLF - Parcel Six Top Deck Gas Wells

Table 1
Parcel 6 - Top Deck Gas Wells

Well Number	Well Depth (ft)	Refuse Depth (ft)	Well Depth as Percent of Refuse Depth
70030	60	185	32%
70040	60	185	32%
70050	60	185	32%
70060	60	185	32%
70065	135	185	73%
70070	60	185	32%
70075	78	185	42%
70080	60	185	32%
70090	60	185	32%
70100	60	185	32%
70110	60	185	32%
70120	60	185	32%
70130	60	185	32%
80010	60	185	32%
80020	60	185	32%

Table 2
Parcel 6 - Top Deck Surface Gas Results

Surface Gas Route No.	7/93 - 7/94 Avg. TOC (ppm)
95	3
96	3
97	2
98	2
99	2

Case Study B: Perforations For Wells Less Than 90 Feet Deep

AVCS Specification: The bottom two-thirds of the pipe should be perforated

Alternative Design: At least the bottom two-thirds of the pipe should be perforated if the well is at least 90 feet deep. For wells less than 90 feet deep, the well perforations should be at least 5 feet in length or 30 percent of the well depth.

Location: Spadra Landfill, Pomona, CA
Operated by Los Angeles County Sanitation Districts (Districts)

Table 1 demonstrates that for this particular well installation, the Districts used an alternative to the AVCS design of perforating the bottom 66 percent of the gas extraction wells. SCAQMD requires surface gas route monitoring for methane at Spadra Landfill. As shown in Table 2, the areas around these gas extraction wells were reading at 4-5 ppm of methane. That is far below the SCAQMD's 50 ppm regulatory limit, and reflects that these wells are having good collection, even though they are designed differently than the proposed AVCS design. In addition, for 1993, the average methane collection percentage in the gas at Spadra Landfill was approximately 36 percent, but in the five wells in question, 47 percent of the collected gas was methane.[1] (Figure 1 is a map of the area of discussion at the Spadra Landfill.) Most of the other wells on site meet the AVCS specification of at least 66 percent of the pipe being perforated. This shows that these wells are performing better than the majority of the wells on site. Most of the other wells on site meet the AVCS specification of at least 66 percent of the pipe being perforated.

1 This calculation was based on the monthly readings at each wellhead.

Table 1
Spadra Landfill Case Study Well Specifications

Well No.	Well Depth	Slotted Length	Corresponding Surface Gas Route
03-040	60'	30'	32, 33
03-050	60'	30'	33
15-010	60'	30'	115, 118
15-020	60'	30'	118, 117
15-030	60'	30'	117, 116

Table 2

Cooresponding Surface Gas Monitoring Results

Surface Gas Route	Avg CH_4 Reading Over Past Year (ppm)
32	3.5
33	4
115	5
116	4
117	4
118	4

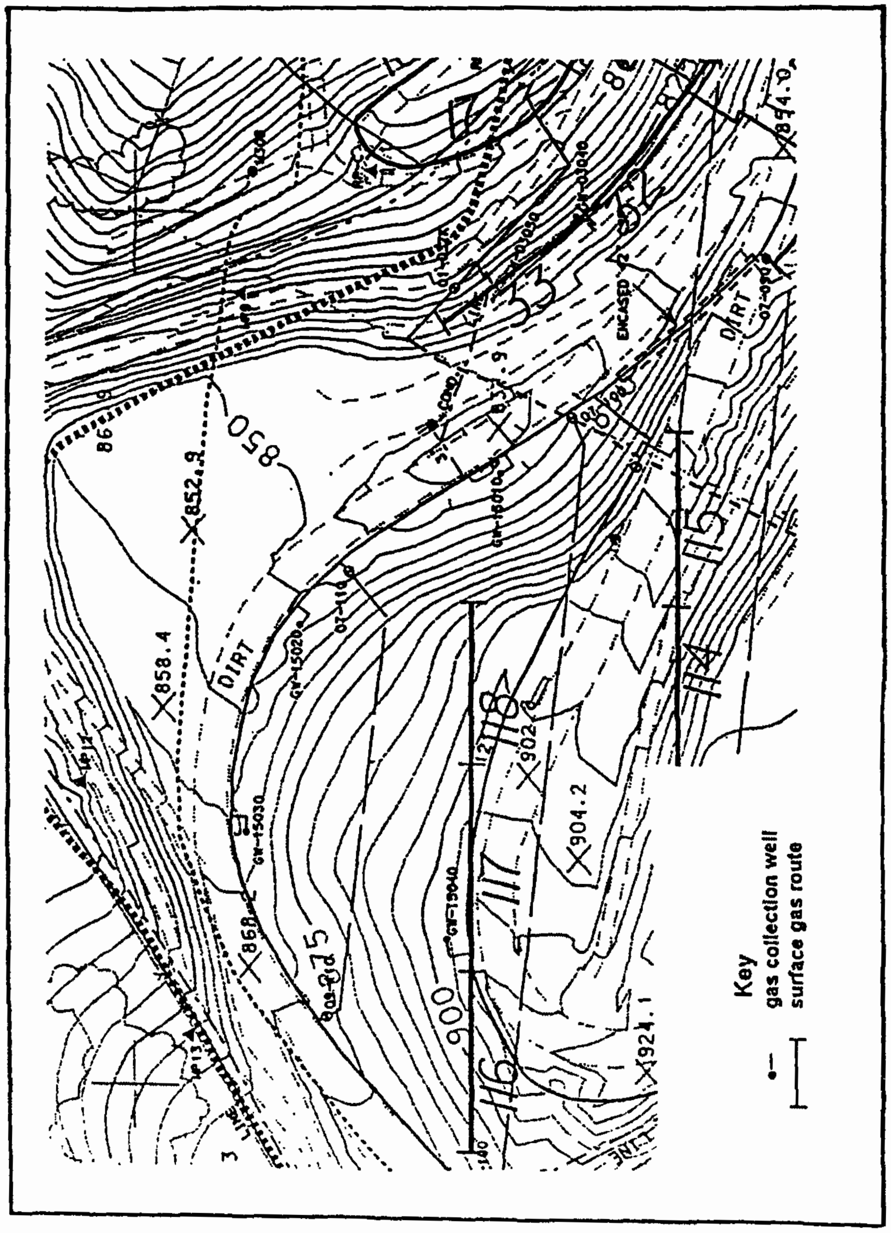

Figure 1. Partial Map of Gas Collection System and Surface Gas Routes at Spadra Landfill

There are often situations in which perforating the bottom two-thirds of the pipe is not advisable. For example, a well that is only 30 feet deep would be required by the AVCS design to have its lower 20 feet slotted or perforated. In an arid region like Southern California, it is not advisable to be applying a vacuum that is only 10 feet below the surface. Significant air infiltration could result. However, for a sufficiently deep well, perforating the bottom 66 percent of the well casing would not pose a threat. Accordingly, the bottom two-thirds specification for perforations should be specified only for wells that are at least 90 feet deep. For wells less than 90 feet deep, a minimum of 5 feet should always be perforated or 30 percent of the well depth. This additional alternative design is based on successful field designs implemented in the past.

Case Study C: Alternate Gas Well Perforations

AVCS Specification: ...with a minimum of four .012 m (1/2 inch) diameter holes, or other perforations spaced 90 degrees apart every 0.1 to 0.2 m (4 to 8 inch).

Alternative Design: The use of either slots or circular perforations with a minimum open area/ft. of pipe of 1-2 $inch^2$/ft.

Locations: Palos Verdes Landfill, Rolling Hills Estates, CA.
Spadra Landfill, Pomona, CA.
Operated by Los Angeles County Sanitation Districts

Lopez Canyon Landfill, Lakeview Terrace, CA.
Sheldon-Arleta Landfill, Sun Valley, CA.
Operated by City of Los Angeles

Table 1 presents specifications for a variety of slots and perforations used at landfills in Southern California as well as the AVCS specifications. The data contained in Table 1 suggest that the slots used by all the landfills are more than adequate to collect landfill gas in terms of percent open area of the pipe. The slots used include both vertical and horizontal slots, as shown in Figure 1. All the landfills in this case study have integrated surface gas measurements of less than 50 ppm. Therefore, all sites are in compliance with the SCAQMD's stringent site-average limit of 50 ppm methane. The specifications listed in Table 1 reflect a range of open areas used between 3.1 to 16 $inch^2$/ft. The AVCS requirements result in an open area of either 1.2 to 2.4 $inch^2$/ft. Accordingly, a reasonable minimum open area/ft. of pipe would be 1 to 2 $inch^2$/ft.

Table 1

Comparison Between Industry Examples and EPA New Source Performance Standards

Source of Specification	A Diameter	B Width	C Length	D Distance Between Centers	Orientation of Slots	Openings Per Row	Staggered? Offset in Row	Open Area/ft (sq.in)
Palos Verdes LF	3" to 4"	1/4"	2"	6"	Vertical	8	Y	8.0
Spadra LF	4" to 6"	1/8"	1"	3/8"	Horizontal	4	N	16.0
Lopez Canyon LF	4"	1/4"	2"	6"	Vertical	8	Y	8.0
Sheldon-Arleta LF	6"	1/4"	12"	18"	Vertical	4	N	8.0
EPA required	none	0.5" circle	0.5" circle	4.5"	N/A	4	N	2.4
EPA required	none	0.5" circle	0.5" circle	8.5"	N/A	4	N	1.2

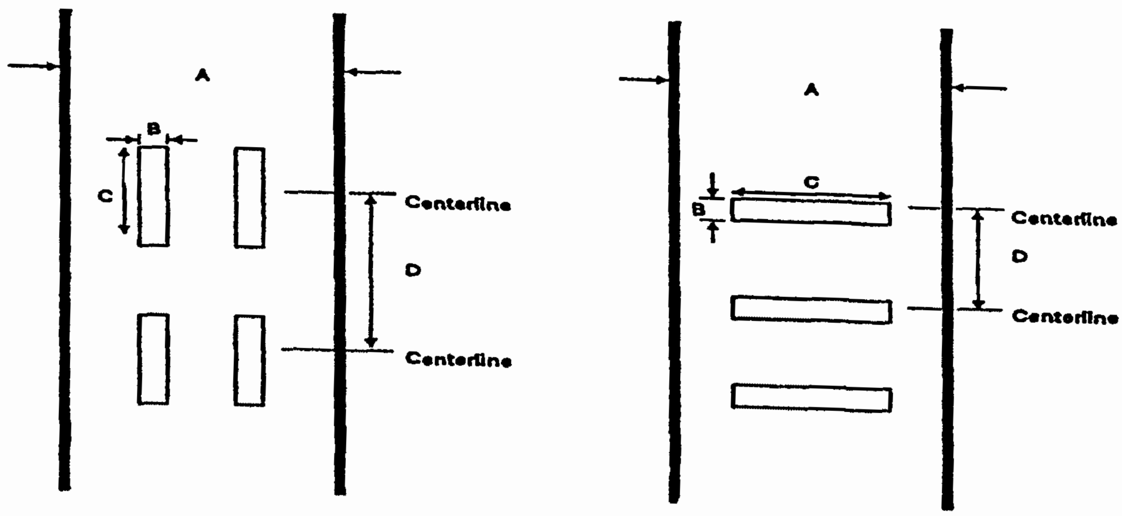

Figure 1. Key to Slot Specifications

Case Study D: Pile Driven Vertical Gas Well Installation

AVCS Specification: A well drilling rig will be used to dig a 0.60 m (24 inch) diameter hole in the landfill

Alternative Design: Pile driven vertical gas well installation

Location: Calabasas Landfill, Agoura, CA.
Operated by Los Angeles County Sanitation Districts (Districts)

The Districts operate an extensive gas collection system at the Calabasas Landfill (CALF) which collects approximately 6000 cfm of landfill gas. In 1989 and again in 1991, a series of vertical gas collection wells were installed along one of the site's benches, shown in Figure 1. Two pile driving installation methodologies were employed. For the 1989 wells, a 20 inch diameter hollow steel casing with an expendable, slip fit steel point was driven to the designed depth. A permanent well casing with slotted sections was centered within the pile casing, backfilled and the pile casing was then removed. For the 1991 wells, a steel casing with a conical steel point, and slotted section was driven to the design depth. It was left in place and served as the gas well casing. Both of these pile driven gas well installation techniques offered advantages over conventional drilling methodologies most important of which being the elimination of drill spoils.

The pile driven wells have performed well in collecting landfill gas and controlling surface gas emissions. Table 1 lists well performance data, including gas flow, percent methane, and percent oxygen, measured in July 1994. Table 2, lists the integrated surface gas monitoring routes which cover the pile driven gas well area and the one year average of surface gas concentrations. The one year average surface gas concentrations are well below the SCAQMD's stringent 50 ppm average surface gas limit and indicate that the area has excellent gas control.

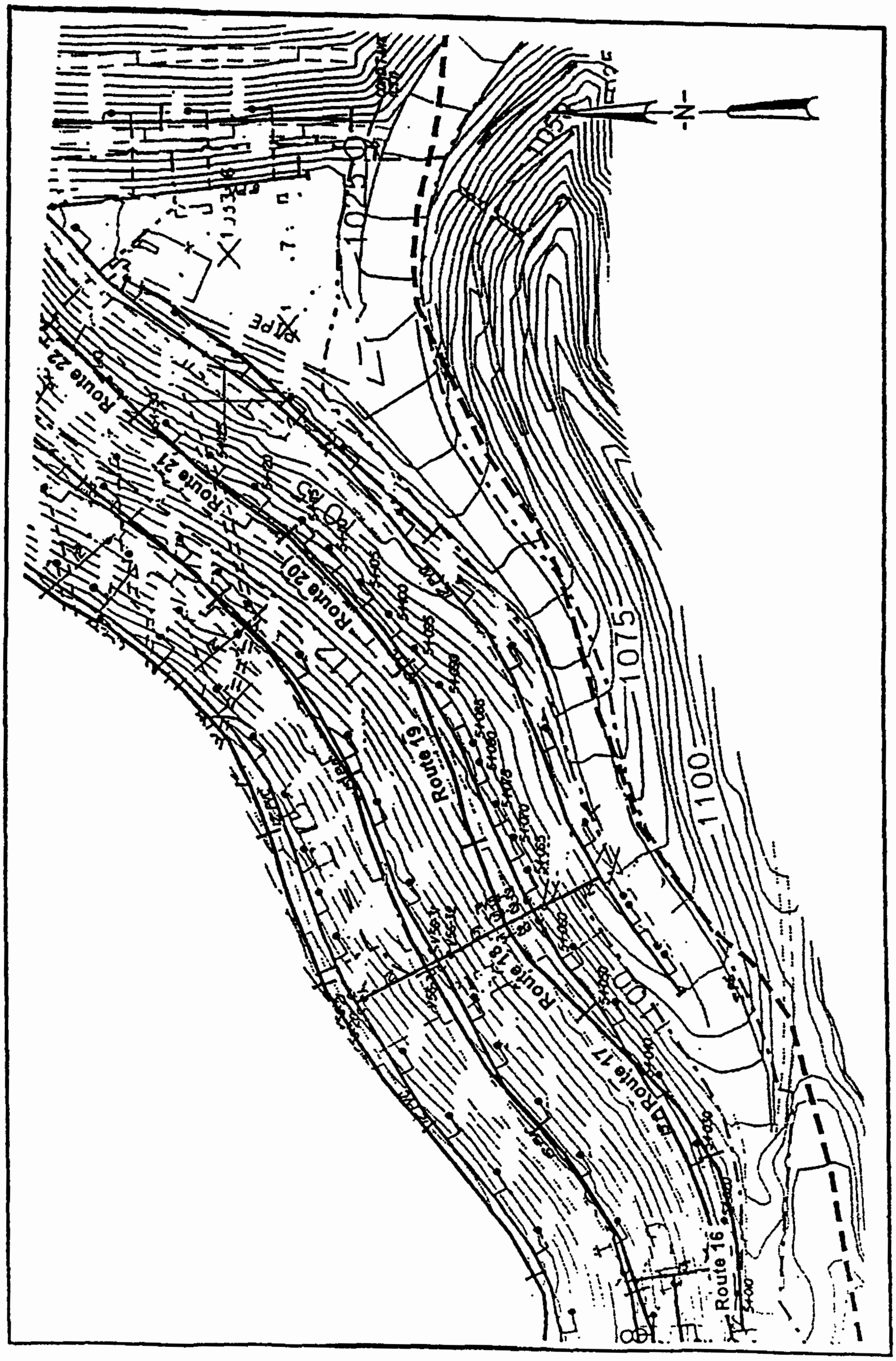

Figure 1. CALF - Pile Driven Gas Wells (54-000 Series)

Table 1

Calabasas Landfill - Pile Driven Gas Wells (54-000 Series)

				Well Data - July 1994		
Well No.	Install Date	Install Method	Depth (ft)	CH_4 (%)	0_2 (%)	Flow (cfm)
54020	11/9/89	pile driven	36.5	52	0	10
54030	11/9/89	pile driven	36	52	1	10
54040	11/9/89	pile driven	35.5	44	7	10
54050	11/9/89	pile driven	35.5	56	0	10
54060	11/9/89	pile driven	36.5	57	0	10
54065	10/25/91	pile driven	100	55	0	10
54070	11/9/89	pile driven	36	12	15	10
54075	11/9/89	pile driven	100	48	3	39
54080	11/9/89	pile driven	36	46	3	10
54085	10/29/91	pile driven	96	56	0	10
54090	11/9/89	pile driven	36.5	50	2	10
54095	10/29/91	pile driven	100	58	0	50
54100	11/9/89	pile driven	36.5	55	1	10
54105	10/29/91	pile driven	100	57	0	31
54110	11/9/89	pile driven	36.5	55	0	10
54115	11/1/91	pile driven	100	55	0	10
54120	11/13/89	pile driven	36.5	54	0	10
54125	11/1/91	pile driven	100	11	16	10
54130	11/13/89	pile driven	36	55	0	29
54140	11/13/89	pile driven	61	50	0	10

Table 2

Integrated Surface Gas Routes Controlled by 54-Series Gas Wells

Surface Gas Rt. No.	June 93 - June 94 Average TOC* (ppm)
16	12
17	15
18	17
19	9
20	12
21	17
22	12

* TOC = total organic compounds as methane.

Clearly, pile driven vertical gas well installations offer a viable alternative to conventional drilling methodologies as evidenced by the CALF wells. This alternative to drilling is not be excluded by regulation.

Case Study E: Compacted Low Permeability

AVCS Specification: ... the hole will be backfilled with gravel to a level at least 0.3 m (1 ft.) above the perforated section. A layer of backfill material at least 1.2 m (4 ft.) thick will be added on top of the gravel. A layer of bentonite at least 0.9 m (3 ft.) thick will be added on top of the backfill material, and the remainder of the hole will be backfilled with cover material or material equal to the permeability to the existing cover material.

Alternative Design 1. From the fill surface, a 19 ft. layer of compacted low permeability cover soil backfill which extends down to the gravel.

Alternative Design 2. From the fill surface, the uppermost 10 ft. is a layer of compacted low permeability cover soil backfill that is underlain by a 4 inch thick lean concrete layer. The concrete layer is in turn underlain by backfill down to the gravel.

Location: Puente Hills Landfill, Whittier, CA
Operated by Los Angeles County Sanitation Districts (Districts)

The Districts operate an extensive gas collection system at Puente Hills Landfill (PHLF) which collects approximately 26,000 scfm of landfill gas. Three foot bentonite seals for gas wells had been consistently used by the Districts for ten years. However, high swelling materials including bentonites shrink on dehydration and allow short circuiting under applied well vacuums. Well seal air short circuiting had been identified as a significant problem at Districts operated landfills.

Two alternative designs utilizing compacted soil were developed which significantly reduced air short circuiting. Both well alternatives were implemented in 30 inch diameter bore wells.

Alternative Design 1

Alternative Design 1 substitutes compacted low permeability cover soil for the bentonite seal. It stemmed from a study of well seal designs performed by the Districts.[1] The seals in the study each commenced with backfilling the hole with gravel to a level 1 ft. above the perforated section. Four different designs were developed for the remainder of the fill:

- Bentonite: One foot cap of backfill, underlain by 5 ft. of bentonite-cement grout. The bentonite-cement grout is underlain by 10 ft. of backfill, which is in turn underlain by 3 ft. of hydrated bentonite pellets extending down to the gravel. Backfill for all seal designs was cover soil backfill (low permeability marine siltstone).
- Soil backfill: Nineteen feet of backfill extending down to the gravel.
- Compacted soil: Nineteen feet of compacted backfill extending down to the gravel. Backfill placed in 3 ft. lifts. Each lift wetted with 5 gallons of water. (See Table 5).
- Sand-cement grout: One foot cap of backfill, underlain by 17 ft. of a sand-cement grout, which is in turn underlain by 1 ft. of backfill extending down to the gravel.

Twenty-eight wells scheduled for construction in early 1991 were selected for the study. The twenty-eight wells were divided into seven groups of four wells each. Wells in each group were selected in order to be as close to one another as possible. The four seal designs were then randomly assigned among the four wells in each group.

Five months after construction, the wells were monitored in a series of ten daily monitoring to determine short term seal effectiveness. Intermediate term seal effectiveness was

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1 Cutts, S. P., Huitric, R. L., and Ackman, P. W., "Alternative Landfill Gas Well Seal Designs", SWANA 16th Annual Landfill Gas Symposium Proceedings, 1993.

observed by repeating the daily monitoring nine months later. Subsequent routine monthly monitoring data were analyzed to provide long term results.

Well seal effectiveness was ascertained in terms of three performance parameters: methane flow, air fraction, and aerobic gas production. Aerobic gas production was quantified in terms of a composting ratio[1]. The composting ratio measures apparent aerobic decomposition gases relative to anaerobic gases. Higher methane flow, lower air fraction, and lower composting ratio are desirable traits.

Average performance parameter values for the four different seal designs are presented in Tables 1 through 4.

Results from the controlled short term and intermediate term monitoring programs, as well as the long term routine monitoring data, consistently show a much higher average methane collection rate for wells with compacted soil seals, nearly twice that of wells with any of the other seal designs. Wells with compacted soil seals also have a lower average air fraction than other wells. Associated with the lower air fraction is a lower level of aerobic activity. The differences in the performance parameters between the compacted seal and other seals are almost always significant for all the monitoring programs.

The investigation of alternative seal designs shows significantly better performance for wells with compacted soil seals than for wells with a bentonite seal design: higher methane flow, lower air fraction, and lower composting ratio. Compacted soil seals have since been implemented in all subsequent gas well designs at the Districts.

Table 1
Bentonite

Parameter	Controlled Monitoring Programs		Routine Monitoring Data: Long Term		
	Short Term	Intermediate Term	7/92 to 12/92	1/93 to 12/93	1/94 to 7/94
CH_4 Flow (cfm)	12.1	15.2	12.8	17.5	12.3
Air Fraction (%)	32.5	39.2	30.2	21.4	30.8
Composting Ratio X 100	6.29	11.3	11.0	5.35	5.36

Table 2
Soil Backfill

Parameter	Controlled Monitoring Programs		Routine Monitoring Data: Long Term		
	Short Term	Intermediate Term	7/92 to 12/92	1/93 to 12/93	1/94 to 7/94
CH_4 Flow (cfm)	11.8	12.2	10.3	11.5	12.3
Air Fraction (%)	40.2	34.9	35.7	22.5	30.0
Composting Ratio X 100	5.76	7.60	12.7	5.21	7.51

Table 3
Compacted Soil

Parameter	Controlled Monitoring Programs		Routine Monitoring Data. Long Term		
	Short Term	Intermediate Term	7/92 to 12/92	1/93 to 12/93	1/94 to 7/94
CH_4 Flow (cfm)	23.7	17.3	22.8	21.9	18.9
Air Fraction (%)	24.3	26.8	25.5	16.1	20.2
Composting Ratio X 100	2.05	4.99	5.43	4.38	4.43

Table 4
Sand-Cement Grout

Parameter	Controlled Monitoring Programs		Routine Monitoring Data: Long Term		
	Short Term	Intermediate Term	7/92 to 12/92	1/93 to 12/93	1/94 to 7/94
CH_4 Flow (cfm)	10.4	8.04	7.24	9.20	6.10
Air Fraction (%)	29.0	34.4	32.3	29.4	44.9
Composting Ratio X 100	2.20	8.30	11.3	10.6	18.8

Alternative Design 2

Alternative Design 2 differs from Design 1 in that a shorter depth of compacted soil is used (10 ft compared to 19 ft) and a 4 inch layer of lean concrete underlies the compacted soil. A slightly different compaction method was used at the Puente Hills Landfill in 1992/3. Table 5 summarizes the two compaction methods.

To evaluate the performance of Alternative Design 2, fifteen wells were randomly selected from the 1992/3 installation. Eighteen months of routine monthly monitoring data through July 1994 were analyzed to determine average values of the methane collection rate, air fraction, and composting ratio. These data are presented in Table 6.

The average methane flow, air fraction, and composting ratio for these wells constructed with Alternative Design 2 are comparable to the respective parameter values in Table 3 for the compacted soil seal wells constructed according to Alternative Design 1.

Table 5
Compaction Specifications for Well Seals

Parameter	Wells Installed in 1991	Wells Installed in 1992/3
Soil Lift Size	3'	1'
Wetting of Soil	Each lift wetted with 5 gallons of water	Soiled mixed with water prior to backfilling to bring to optimum moisture content. Thoroughly mixed to a uniform moisture content.
Compaction Procedure	Compaction with 28" circular steel disk w/6" annular opening. Disk welded to 6" diameter pipe. Disk/pipe assembly (weight > 500 lb) lowered into well bore hole, raised 1', and dropped to compact soil. This procedure repeated five time for each lift	Compaction with hand-held pneumatic tamper (Ingersoll-Rand Model 241A2M). Weight = 26.9 lb, length = 52.8", barrel bore = 1 5/16", avg. piston stroke = 4", blows per minute = 1590. Compaction to 90% of optimum density.

Table 6
Average Data for Wells with 1992/3 Compaction Method

CH_4 Flow (cfm)	Air Fraction (%)	Composting Ratio X 100
19 9	21.5	5.85

Case Study F: Monitoring Vacuum Levels As An Indicator Of Air Infiltration In Arid Regions

Test Method Specification:	Test for infiltration of air into the landfill by measuring the gauge pressures of the shallow pressure probes and using Method 3C to determine the LFG N_2 concentration ... reduce the blower vacuum so that the N_2 concentration is less than 1 percent. (Section: Method 2E: Section 3.7.2)
Alternative Design:	Determine appropriate vacuum levels from landfill gas composition rather than nitrogen content
Locations:	Palos Verdes Landfill, Rolling Hills Estates, CA. Scholl Canyon Landfill, Glendale, CA. Spadra Landfill, Pomona, CA. Calabasas Landfill, Agoura, CA. Puente Hills Landfill, Whittier, CA. Mission Canyon Landfill, Los Angeles, CA. Operated by Los Angeles County Sanitation Districts (Districts)

The rationale for the proposed rules in the Federal Register (56 FR 24491, May 30, 1991) states:

> "Excessive air infiltration poses a safety hazard, because too much air may lead to an explosion or landfill fire. Nitrogen concentration is used as a surrogate measure for air infiltration. Based on these safety concerns, EPA has determined that N_2 concentration should be maintained under 1 percent by volume."

All the landfills in the case study generally operate at nitrogen concentrations greater than 20 percent in the header lines. Table 1 presents the average of the monthly gas analyses for the

1993 year. The nitrogen percentage ranges from 24 to 60 percent. Being in an arid region, these landfills probably draw in more air than the majority of landfills in the nation. That fact alone does not mean that the landfills are being dangerously operated or that the header lines face danger of explosion.

The Permanent Gas Sample[1] results from Table 1 were used to produce the two attached graphs. Figure 1[2] shows the percent volume of methane relative to the percent volume of additional inerts. The "additional inerts" is the quantity of inert gas that is present but not accounted for by the presence of air. For example, if a mixture was 50 percent air, there would be a corresponding percent nitrogen present; any nitrogen present above that percent would be additional inert gas in the sample. The volume percent of air is approximated by the oxygen content found in the sample. Figure 1 includes a curve that represents the flammability limits of a mixture of methane, nitrogen and air. Considering a mixture with nitrogen is the most conservative approach because the other inert gas found in landfill gas, carbon dioxide, limits the flammability of methane even more. The area bounded by the y-axis on the left and the curve on the right is a region wherein the gas mixture is flammable. Outside of this curve, the gas mixture is not flammable. The gas characteristics from all six of the landfills in the case study fall outside of this curve, and therefore are not flammable gas mixtures despite their volume percentages of nitrogen being well above 1 percent.

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1 Permanent gas samples are samples of gas collected at each landfill on a monthly basis and then analyzed in a laboratory by a gas chromatograph.

2 This graph was adapted from Figure 28 of the Michael G. Zabetakis article "Flammability Characteristics of Combustible Gases and Vapors", published in 1965 as Bulletin 627 of the U.S. Bureau of Mines.

Table 1
Gas Composition Data for Case Study Landfills

	Average 1993 Permanent Gas Monthly Samples				* Calculation of Corresponding	
Landfill	Oxygen %	Carbon Dioxide %	Nitrogen %	Methane %	Air %	Additional Inerts %
Puente Hills (PH)	4.3	31.4	23.7	38.5	20.5	39.1
Palos Verdes (PV)	10.8	17.2	50.0	20.2	51.5	27.0
Spadra (SP)	4.7	32.6	24.4	36.2	22.4	39.5
Calabasas (CA)	5.6	30.5	29.8	31.6	26.6	39.5
Mission Canyon (MC)	7.9	16.6	60.4	13.4	37.7	47.6
Scholl Canyon (SC)	6.0	29.0	30.9	32.0	28.6	37.6

* Air percent is determined from oxygen percent in sample. Additional inerts are the sum of nitrogen and carbon dioxide present that would be additional to percents present due to air percent.

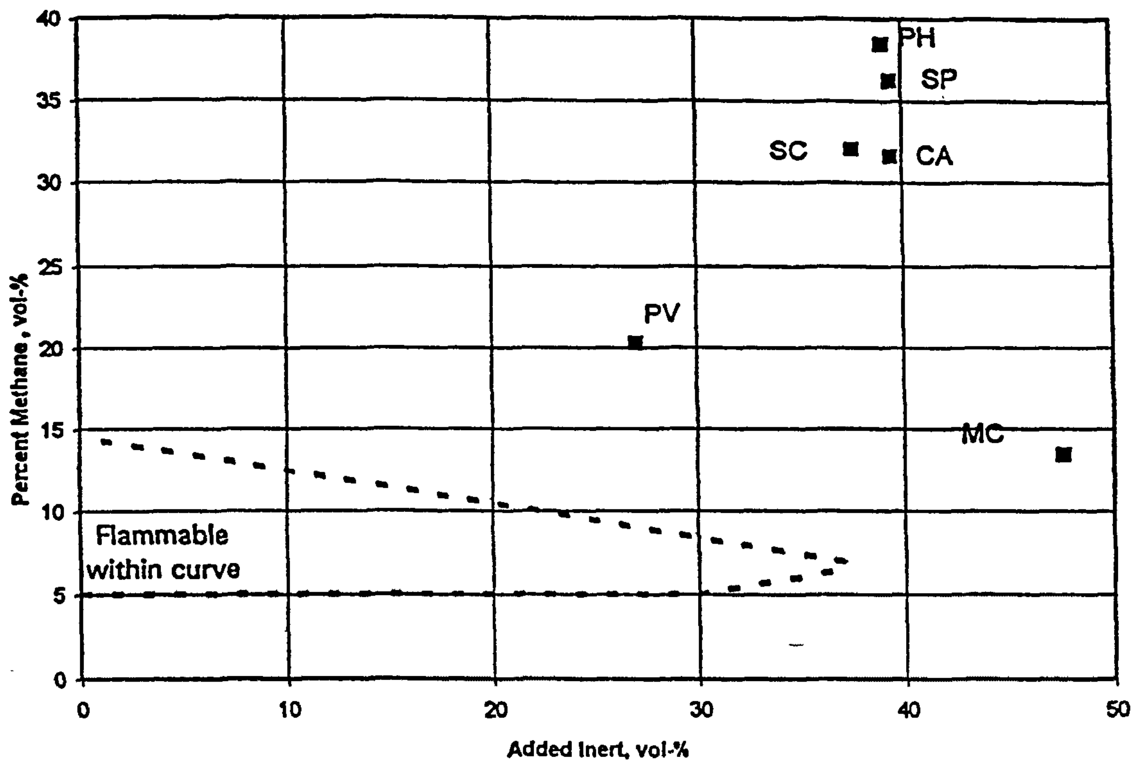

Figure 1. Limits of Flammability of Methane-Nitrogen-Air Mixture

Figure 2[3] presents the range of flammability of gases according to their volume percent of methane and oxygen. Once again, the data from the case study landfills fall well outside the specified flammable area. If a considerable amount of oxygen was added to the landfill gas, the composition would start to approach the flammable region. However, the landfills are operating safely at the current specifications. For the landfills in the case study, at least, the proposed nitrogen percent limit would make it impossible to operate what is currently safely operated landfills.

3 This graph was adapted from Figure 22 of the H. F. Coward and G. W. Jones article "Limits of Flammability of Gases and Vapors", published in 1952 as Bulletin 503 of the U. S. Bureau of Mines.

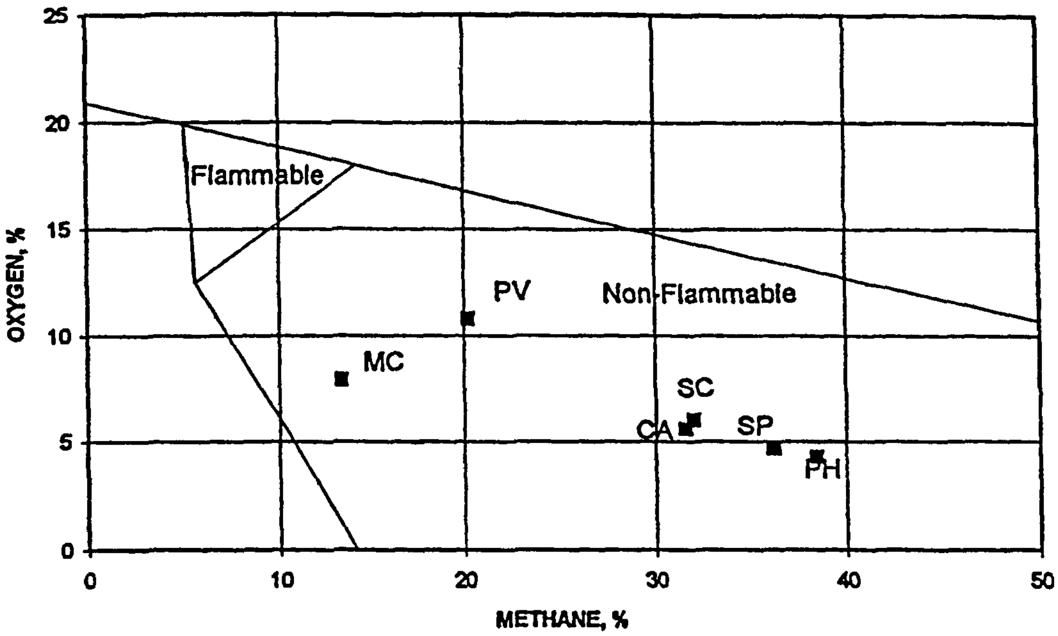

Figure 2. Relation Between Gas Composition and Flammability

Case Study G: Horizontal Collector Design

Specification: Horizontal Collector (only) System

Location: Scholl Canyon Landfill, Glendale CA.
Operated by Los Angeles County Sanitation District (Districts)

Introduction

In 1988, a group of horizontal landfill gas collectors was installed on the top deck area of Scholl Canyon Landfill (SCLF). Twelve collectors were installed in an area that had no existing gas collection system (either vertical wells or horizontal collectors) in place. These twelve collectors, shown in Figure 1, are the subject of this case study. Eight of the twelve collectors (main collectors) span the width of the landfill from its southern to its northern border. The remaining four collectors (auxiliary collectors) follow roughly the daylight line along the site's southeast boundary. All twelve collectors are connected to the same 18-inch diameter gas header which is located on a fire road which runs along the southern boundary. The following discussion provides design details, operational information and performance data for the subject collectors.

Horizontal Collector Design

Main Collectors

The main top deck horizontal collectors span the width of the landfill from the southern border where they connect to the header to the northern border. In general, they consist of a trench, casing, backfill material, and header connection. The main collectors (listed in Table 1) range in length from 1300 to 1800-feet with a horizontal spacing of 250-feet. They are constructed in 2-foot 3-inch wide by 5-foot 9-inch deep trenches that span the top deck but are

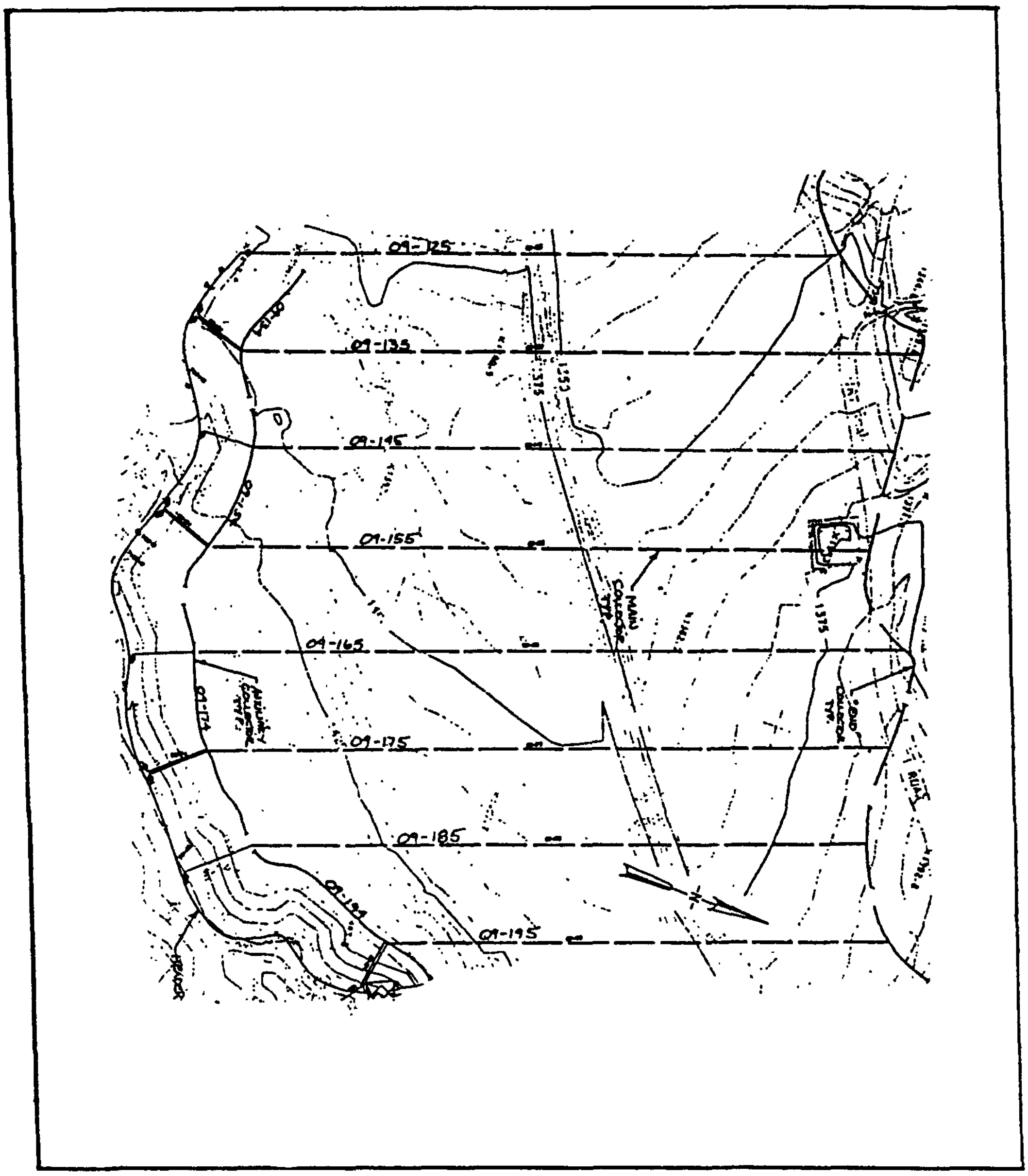

Figure 1. Scholl Canyon Landfill - Horizontal Collectors

Scholl Canyon Landfill

Table 1
Main Horizontal Collectors

Collector Number	Casing Diameter (inch)	Length (feet)	Spacing (feet)	End Collector *	
				Casing Dia (in.)	Length (ft)
09-125	15 and 18	1320	250	8 and 12	450
09-135	15 and 18	1700	250	8 and 12	225
09-145	15 and 18	1600	250	8 and 12	225
09-155	15 and 18	1650	250	8 and 12	275
09-165	15 and 18	1780	250	8 and 12	200
09-175	15 and 18	1710	250	8 and 12	250
09-185	15 and 18	1540	250	8 and 12	225
09-195	15 and 18	1260	250	8 and 12	250

* inset 75-feet from northwest boundary daylight line

inset approximately 75-feet from the northern boundary daylight line and 30-feet from the southern boundary daylight line. These collectors have casings comprised of 10-foot sections of alternating 15-inch and 18-inch diameter corrugated steel pipe (CSP). The alternating sections of CSP have a 2-foot overlapping connection, as shown in Figure 2. The annular space created at each overlap connection allows the landfill gas to enter the casing when vacuum is applied to the collector. The casing is horizontally centered within the trench supported by a 6-inch bed of uncrushed, 0.5 to 1.5-inch diameter, rock. The trench is backfilled with additional uncrushed rock to within 2-feet of the trench top. A polypropylene filter fabric covers the gravel and extends 2-feet vertically up the trench walls. The filter fabric is covered with on-site soil filling the trench to the top as shown in Figure 3.

The main horizontal collectors have a unique termination at their northwest end where they connect to the midpoint of smaller diameter horizontal collectors (end collectors) which run roughly perpendicular to the main trench. These "end" collectors which are constructed like the main collectors except with alternating sections of 8 and 12-inch diameter CSP casing. They range in length from 250 to 500-feet, follow along the site's northern boundary (inset approximately 30-feet from the refuse line), and are spaced 30-feet apart end to end. The casing opening at both ends of these collectors is covered with 2 layers of polypropylene filter fabric. The end collectors obtain their vacuum from the main collector and have no separate vacuum control valve of their own.

The main horizontal collectors are connected at their southern end to an 18-inch diameter gas header. The header runs along a fire road which follows the southern boundary but at a higher elevation than the site's top deck. Consequently, connections from the main collectors are routed up the side slope from the top deck to the header as shown in Figure 4. As previously mentioned, the main collector trenches end approximately 30-feet in from the southern boundary daylight line. Extending from the trench end is a section of 12-inch diameter CSP which is connected within the trench to the collector casing. This 12-inch diameter section of CSP protrudes approximately 5-feet beyond the trench end where it connects, using a neoprene gasket CSP expansion joint, to another section of CSP. This CSP section connects to a 40 degree elbow

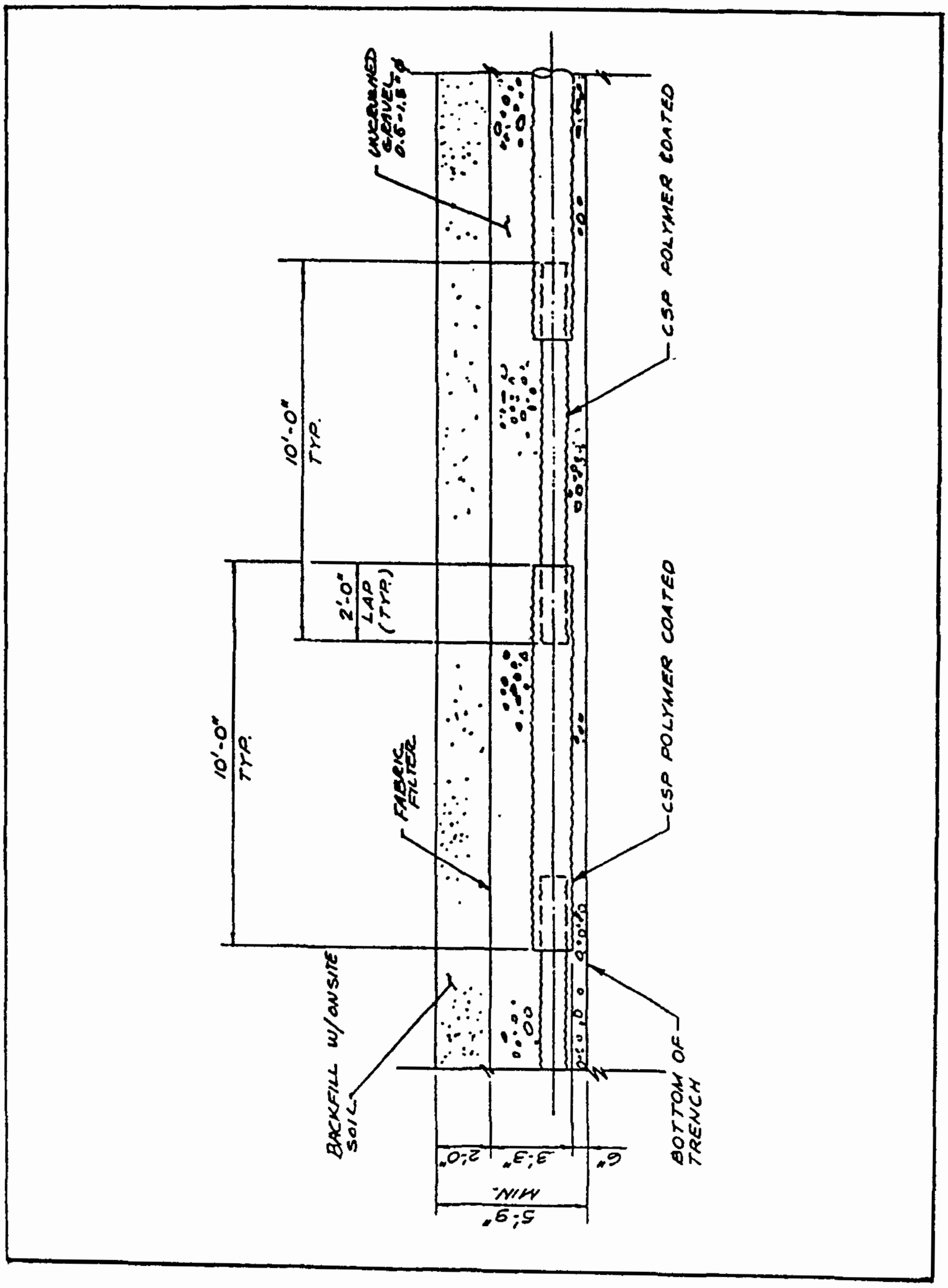

Figure 2. Horizontal Collector - Casing Sections

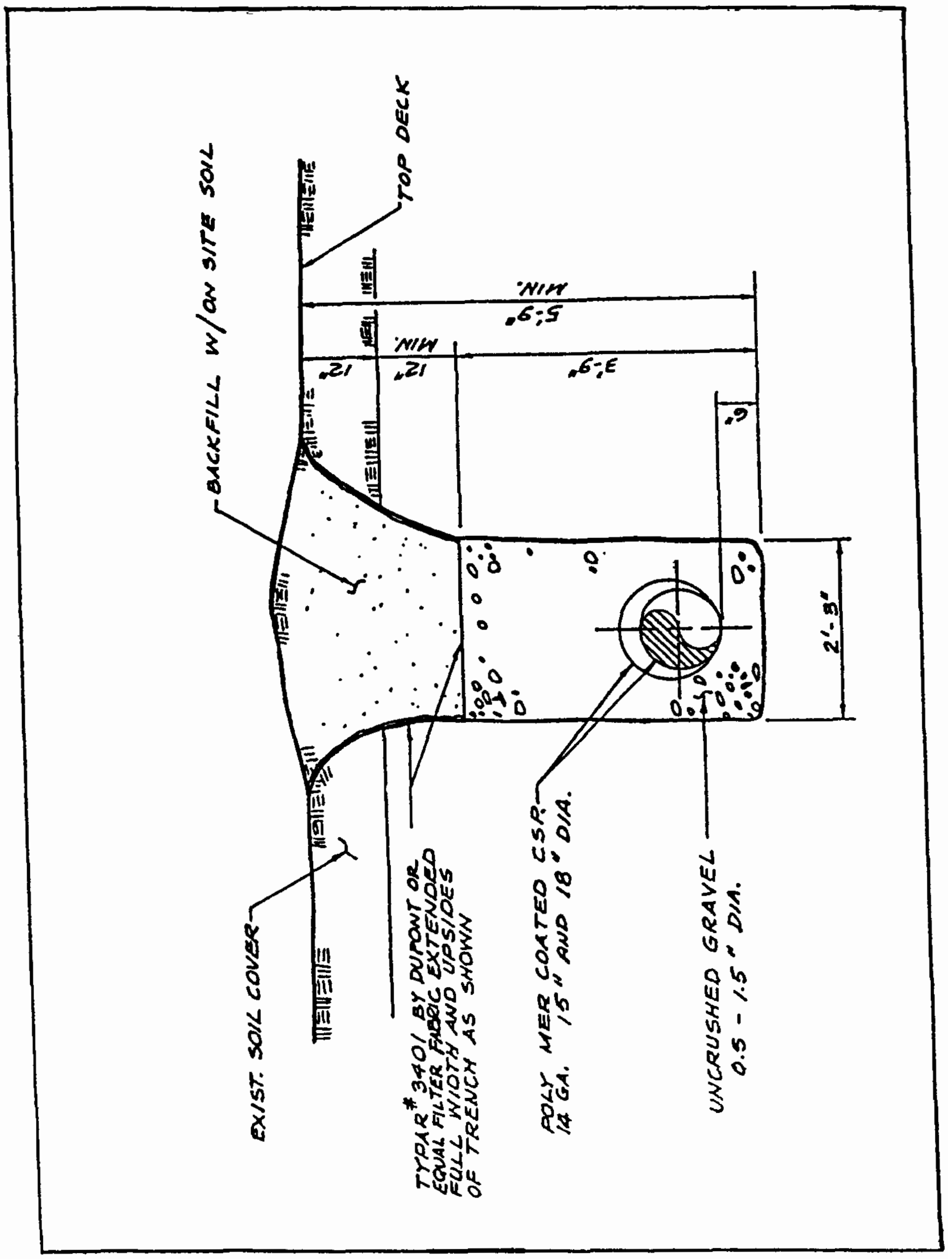

Figure 3. Horizontal Collector - Trench with Casing and Backfill

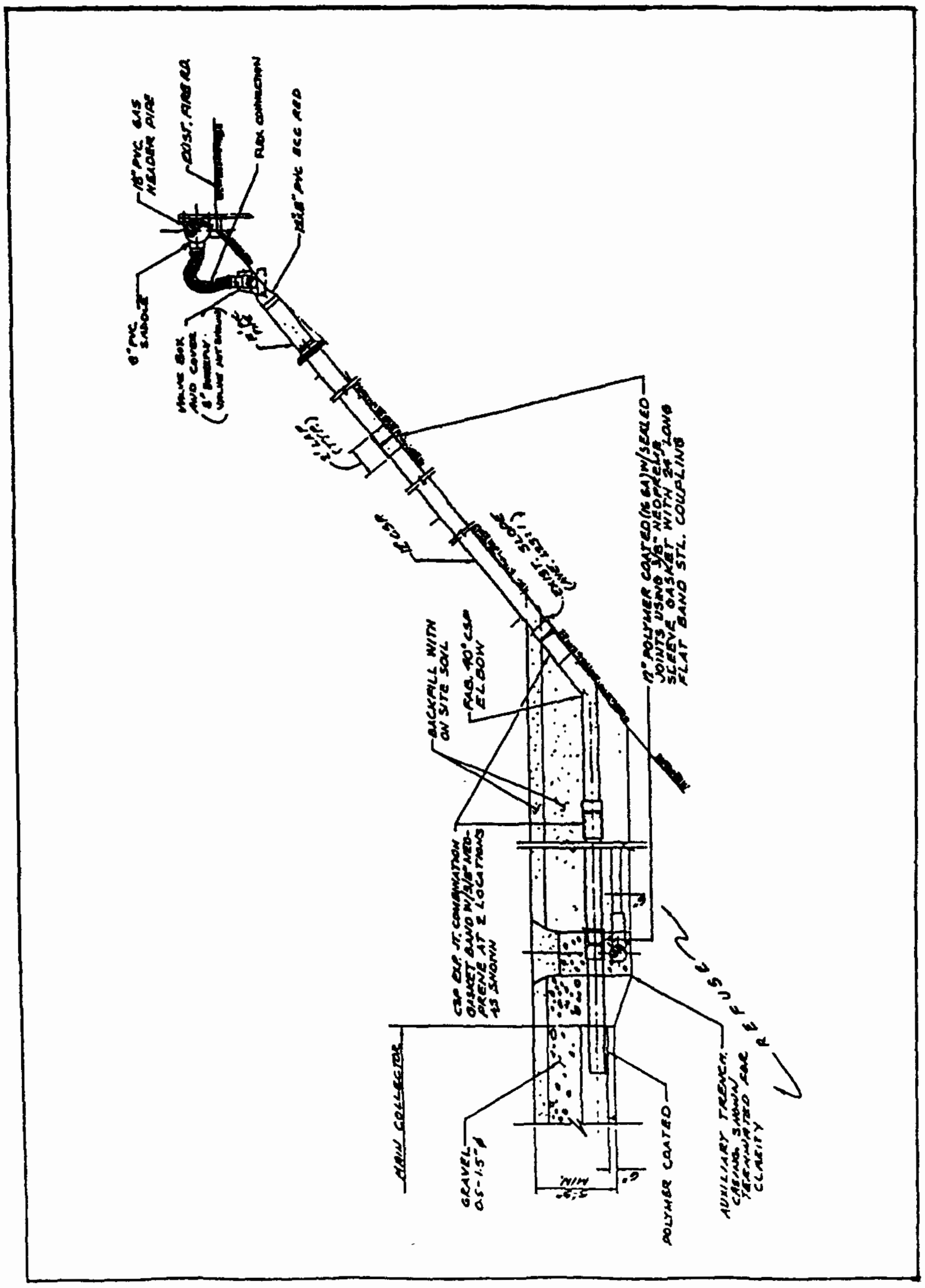

Figure 4. Main Collector to Header Connection

which re-directs the CSP up the side slope toward the gas header. As the CSP extends up the slope it breaks through the top deck and continues above ground. The CSP then connects to a 24-inch long flat band coupling that joins it to another section of CSP that has a steel flange end. The steel flange is mated to a PVC flange and a 12-inch to 8-inch diameter PVC reducer. An 8-inch diameter PVC pipe connects the reducer to an 8-inch butterfly valve (used to regulate the collector vacuum), to an 8-inch diameter by 5-foot long flex connection. The flex connection attaches to the 18-inch diameter header through an 8-inch PVC saddle.

Auxiliary Collectors

The four auxiliary collectors are located along the site's southern boundary, inset approximately 30-feet from the daylight line, as shown in Figure 1. They range in length from 400-feet to 600-feet, see Table 2, and are spaced apart at 60-foot intervals end to end. They are constructed like the main collectors described above but with alternating sections of 8 and 12-inch diameter CSP casing. The casing opening at both ends of the auxiliary collectors is covered with 2 layers of polypropylene filter fabric. At the point where main and auxiliary collectors cross, the auxiliary collector is routed under the main collector as shown in Figure 5. An 8-inch CSP tee, installed in the collector casing, is used as the collector to header connection point. From the tee, the header connection is the same as the main collector header connection except that 8-inch CSP and 4-inch PVC pipe (or 12-inch CSP and 8-inch PVC) is used as shown in Figure 6. The auxiliary collectors are connected to the header through 4-inch butterfly valves which allows independent vacuum adjustments.

Operational and Performance Characteristics

Operation

The primary objective in the operation of the SCLF horizontal collectors described above is to control surface gas emissions from the site. To meet this objective, surface gas monitoring results and collector operational data (e.g. flow rate, percent methane, percent oxygen, gas temp,

Table 2
Auxiliary Horizontal Collectors

Collector Number	Casing Diameter (inch)	Length (feet)	Spacing (feet)
09-134	8 and 12	400	60
09-154	8 and 12	500	60
09-174	8 and 12	600	60
09-194	8 and 12	600	60

* inset 30-feet from northwest boundary daylight line

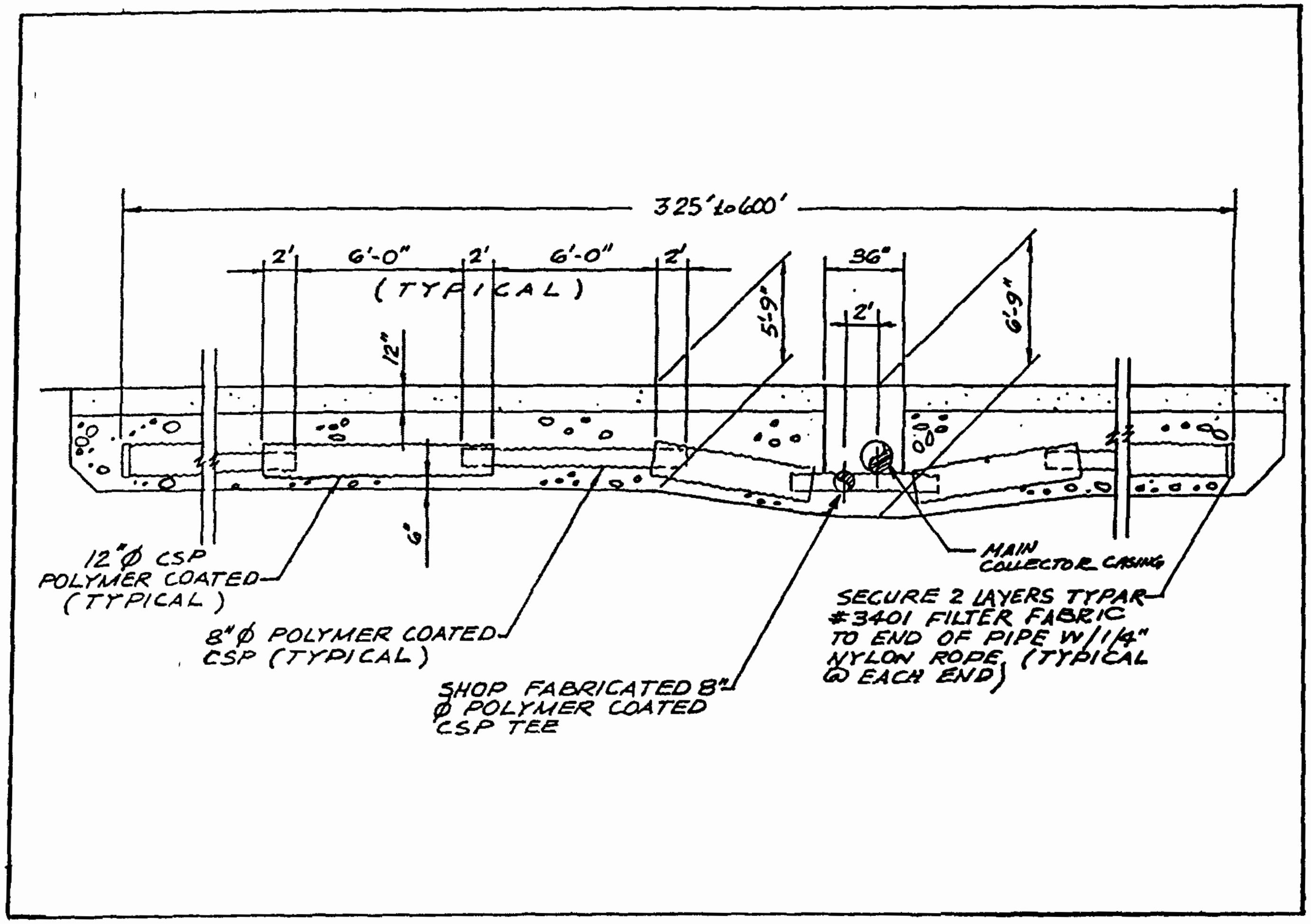

Figure 5. Auxiliary Collector - Casing Sections

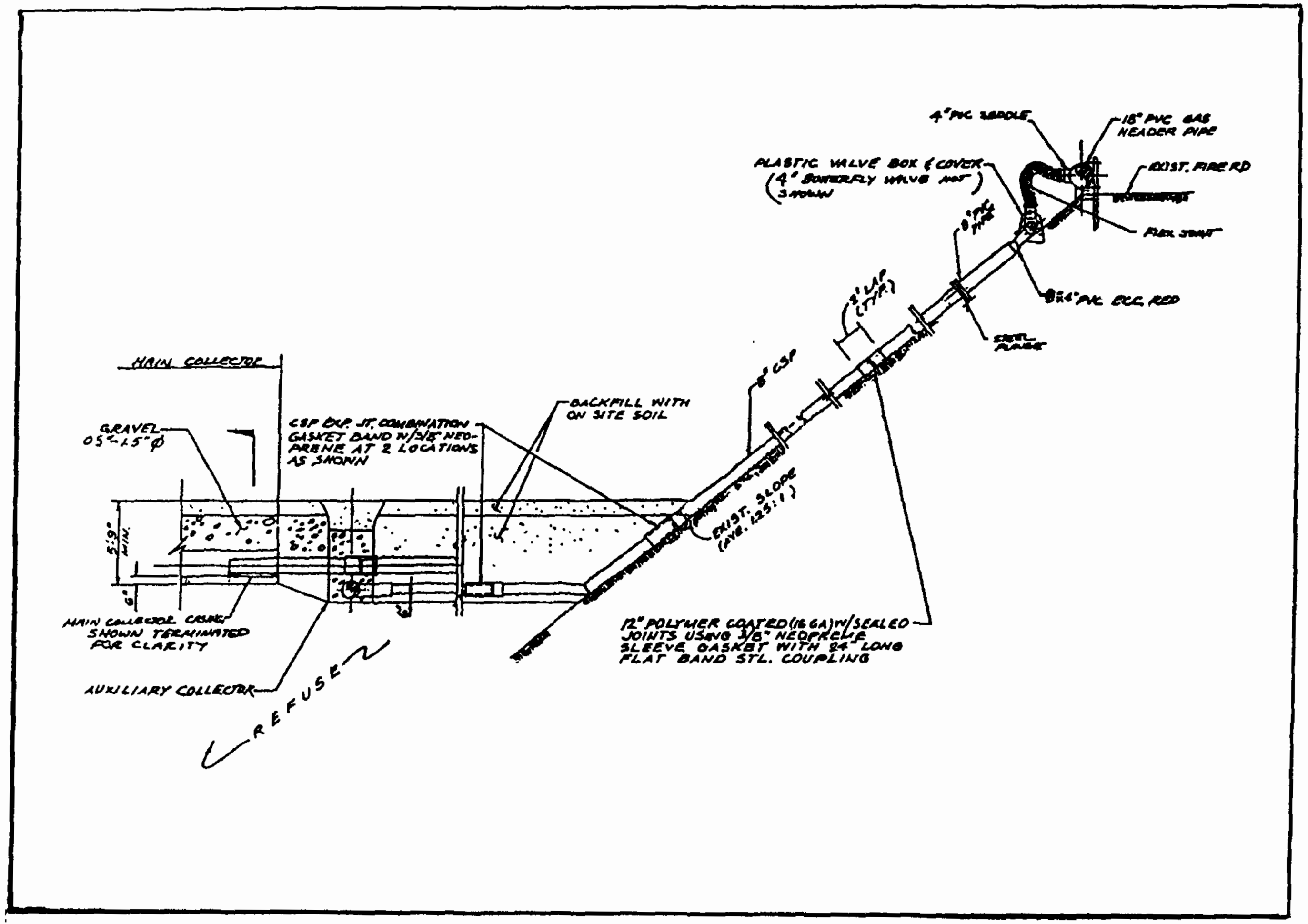

Figure 6. Auxiliary Collector to Header Connection

vacuum pressure, etc.) are obtained and reviewed on an ongoing basis. Slight variations in the operational data are corrected as necessary with minor adjustments to the collector vacuum. Any significant increase in surface gas emissions would warrant immediate and perhaps more drastic collector adjustment.

The 1993 average operational data for the horizontal collectors described herein are contained in Tables 3 and 4. Valve position corresponds to control valve opening where zero degrees is "fully closed" and 90 degrees is "fully open." Surface gas monitoring results are presented below.

Performance

In the Los Angeles area, the South Coast Air Quality Management District (SCAQMD) adopted in 1985 a rigorous landfill gas control rule, Rule 1150.1, "Control of Gaseous Emissions from Active Landfills". The rule, with its January 1989 compliance deadline, required the installation of gas collection systems at active sites and the implementation of a field monitoring program. It established a 50 ppm total organic compounds as methane (TOC as methane) limit for average gas emissions measures over the surface of the landfill (integrated surface gas monitoring). Sites complying with Rule 1150.1 are considered as having good gas control with those maintaining emission levels far below the 50 ppm limit having excellent control.

SCLF is located within SCAQMD jurisdiction and it complies with the requirements of Rule 1150.1. In the area controlled by the horizontal collectors described herein the average surface gas emissions since 1989 have stayed at background levels below 5 ppm TOC as methane.

Scholl Canyon Landfill

Table 3
Main Horizontal Gas Collectors
Average Operational Characteristics - 1993

Collector Number	Valve Position (degrees)	Percent of Time at Position	Average Percent CH_4	Average Percent O_2	Average Flow (cfm)	Average Vacuum (in. H_20)	Average Temp. (deg F)
09-125	15	100	44.9	1.2	292	0.71	88.9
09-135	15	100	44.4	0.8	215	0.53	88.9
09-145	15	36	34.9	2.8	191	0.6	87
	30	57	30.5	4.5	302	0.8	87.2
	45	7	31	7	711	0.1	71
09-155	15	73	26.6	5	183	0.5	82.4
	30	27	16.6	11.9	194	0.56	64.9
09-165	30	21.4	45.8	0.63	191	0.52	76.5
	45	78.6	37.9	0.64	305	0.77	83.8
09-175	30	100	39.4	1.1	222	0.55	75.7
09-185	0	100	9.9	14.4	0	-0.01	80.2
09-195	15	100	42.9	1.3	257	0.48	75.2

Table 4
Auxiliary Horizontal Collectors
Average Operational Characteristics

Collector Number	Valve Position (degrees)	Percent of Time at Position	Average Percent CH_4	Average Percent O_2	Average Flow (cfm)	Average Vacuum (in H_20)	Average Temp (deg F)
09-134	15	100	44.7	1.7	35	0.46	90.6
09-154	30	12.5	19.6	11.6	71	0.84	78.8
	45	87.5	23	7.8	62	0.65	75.7
09-174	15	14.3	37.5	2	64.5	0.6	73.7
	30	7.1	39	1	51	1	60
	45	78.6	39.1	0.61	65.8	0.6	79
09-194	15	100	35.8	1.8	77	0.55	76.2

Case Study H: Design For LF With Horizontal Collectors and Vertical Wells

Specification: Front Face Horizontal Collectors and Vertical Gas Wells

Location: Scholl Canyon Landfill, Glendale CA.
Operated by Los Angeles County Sanitation Districts (Districts)

Introduction

In 1988, a number of horizontal collectors and vertical gas collection wells were installed on the top deck area and front face respectively of Scholl Canyon landfill (SCLF). They were installed to collect landfill gas and control surface emissions in accordance with local regulations. A group of horizontal collectors were installed in a east-west orientation with connection (at their western end) to a front face gas header. The header which runs along a front face bench was also connected to a series of vertical gas collection wells. These wells were installed, evenly spaced, along the top of the slope leading from the header bench to the next lower bench. Six of the horizontal collectors and eight of the vertical wells, described above are shown in Figure 1. This group of wells and collectors are the subject of this case study. The following discussion provides design details, operational information, and performance data for the subject wells and collectors.

Collector/Well Design

Horizontal Collectors

The horizontal collectors (listed in Table 1) are connected at one end to the front face header, described above, and extend easterly toward the center of the landfill. The collectors range in length from 880 to 1020-feet, have a 2 percent slope downward toward the front face, and are spaced at 200-foot intervals. They are the first and only horizontal collectors installed at SCLF and consequently have no collectors below them. In general, they consist of a horizontal

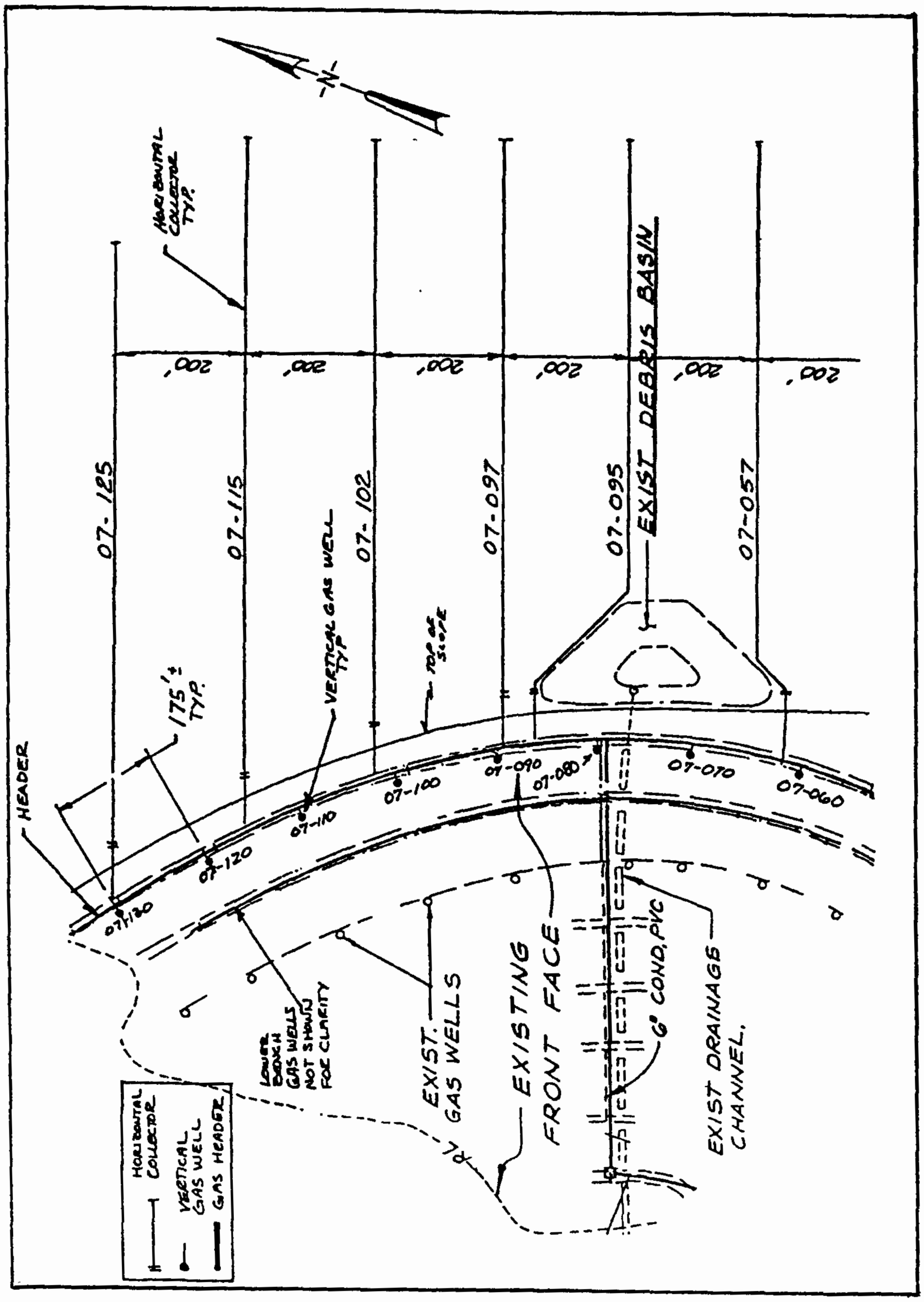

Figure 1. Scholl Canyon Landfill - Front Face Horizontal Collectors and Vertical Gas Wells

School Canyon Landfill

Table 1
Horizontal Collectors

Collector Number	Casing Diameter (inch)	Length (feet)	Spacing (feet)
07-057	12 and 15	880	200
07-095	12 and 15	910	200
07-097	12 and 15	880	200
07-102	12 and 15	930	200
07-115	12 and 15	1020	200
07-125	12 and 15	950	200

trench, casing, backfill material, and a header connection. They are constructed in a 2-foot 3-inch wide by 5-foot 9-inch deep trench that runs the length of the collector inset a minimum of 30-feet from the front face to prevent air intrusion. These collectors have casings comprised of 10-foot sections of alternating 12 and 15-inch diameter corrugated steel pipe (CSP). The alternating sections of CSP have a 2-foot overlapping connection, as shown in Figure 2. The annular space created at each overlap connection allows the landfill gas to enter the casing when vacuum is applied to the collector. The casing is horizontally centered within the trench supported by a 6-inch bed of uncrushed, 0.5 to 1.5-inch diameter, rock. The trench is backfilled with additional uncrushed rock to within 2-feet of the trench top. A polypropylene filter fabric covers the gravel and extends 2-feet vertically up the trench walls. The filter fabric is covered with on-site soil filling the trench to the top as shown in Figure 3.

The casing opening at the eastern, unconnected, end of the horizontal collectors is covered with 2 layers of polypropylene filter fabric, as shown in Figure 4. The western end of the collectors is connected to an 18-inch diameter gas header which runs along a front face bench which is at a lower elevation than the collectors. Consequently, connections from the collectors are routed down the slope from the top deck to the header bench as shown in Figure 5. The 12-inch diameter collector casing extends past the end of the trench and is coupled, using a 36-inch long flat band coupling, to another 12-inch diameter section of CSP which terminates in a steel flange. The steel flange is mated to a PVC flange and 12-inch by 8-inch diameter reducer.

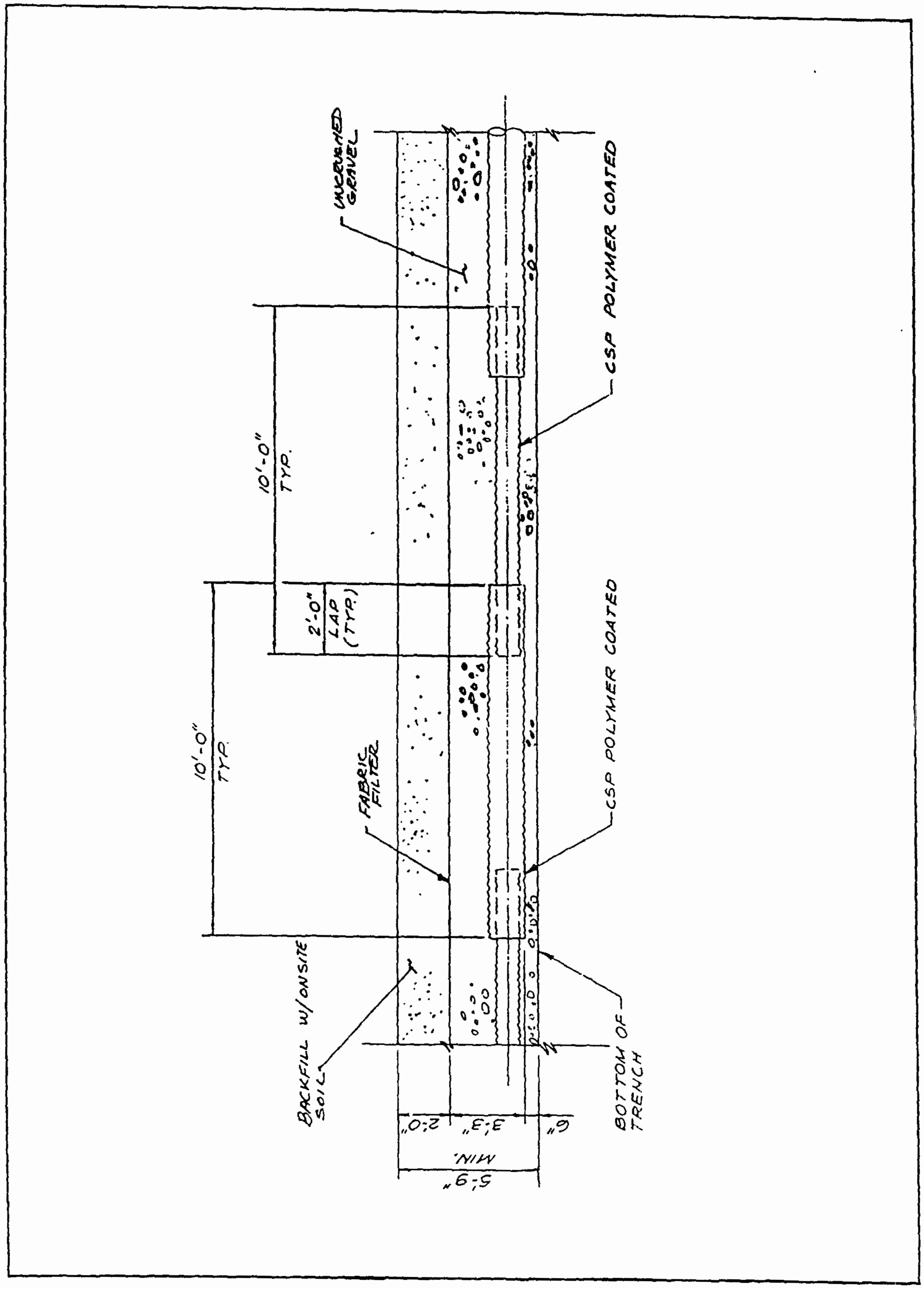

Figure 2. Horizontal Collector - Casing Sections

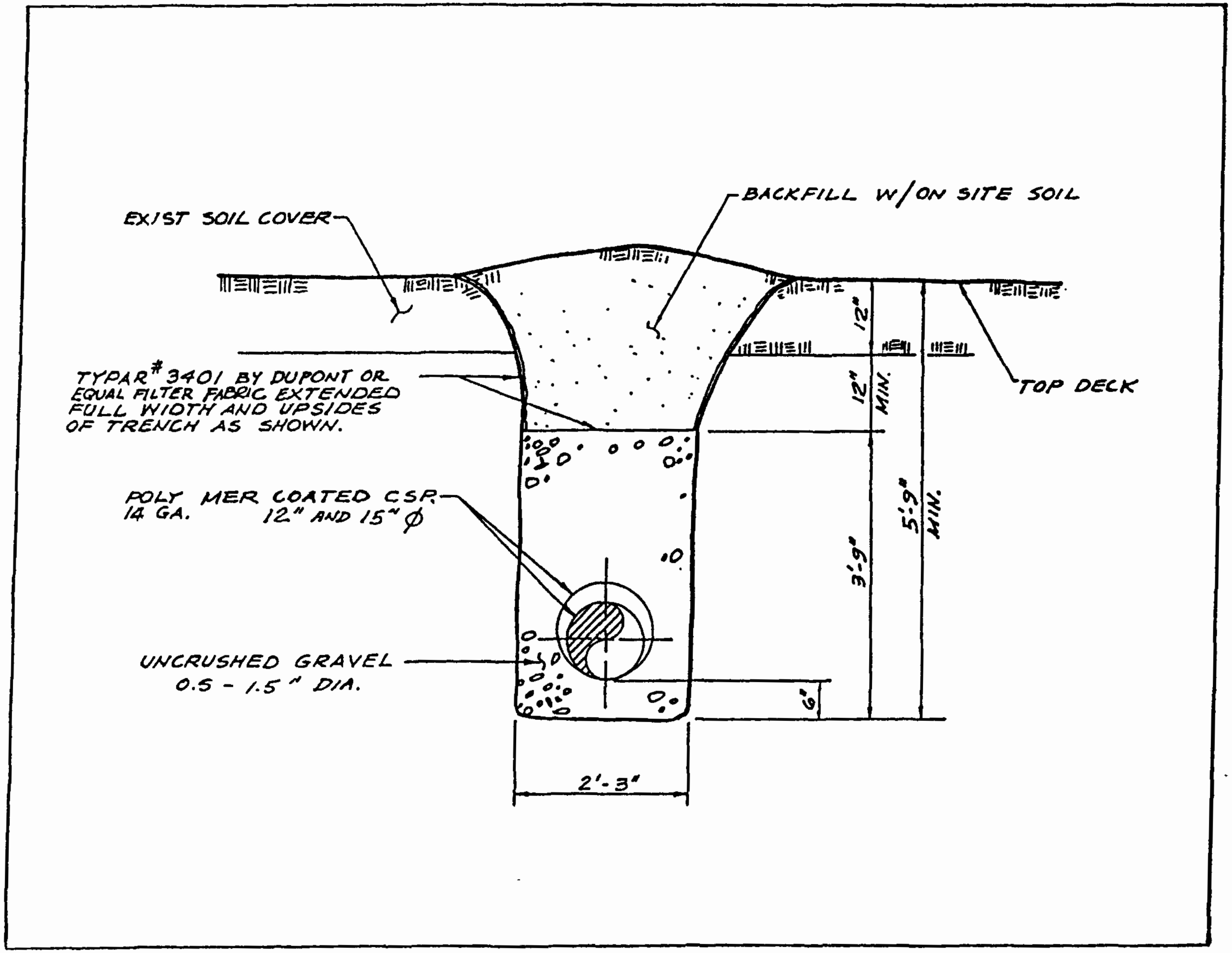

Figure 3. Horizontal Collector - Trench with Casing and Backfill

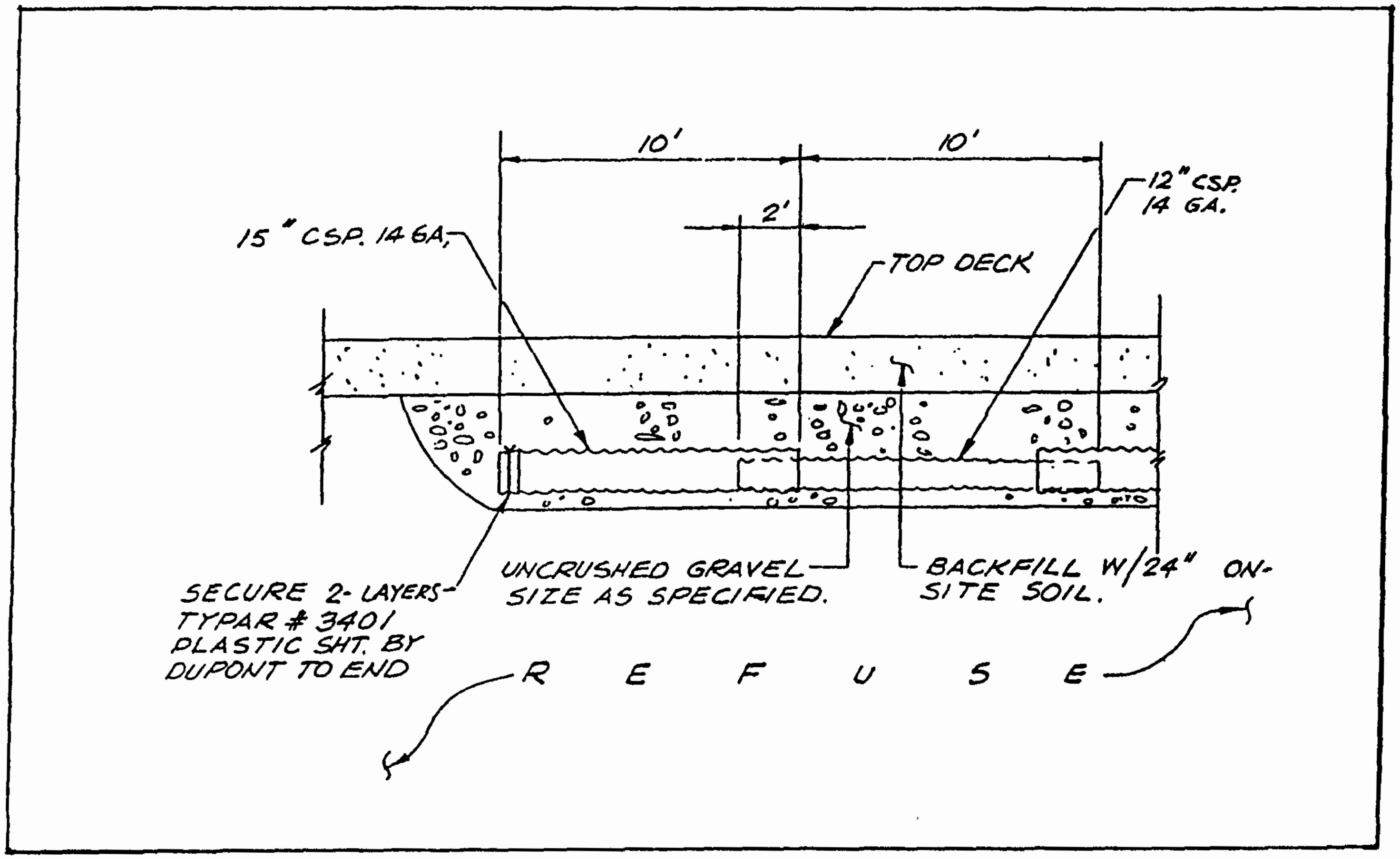

Figure 4. Horizontal Collector Termination

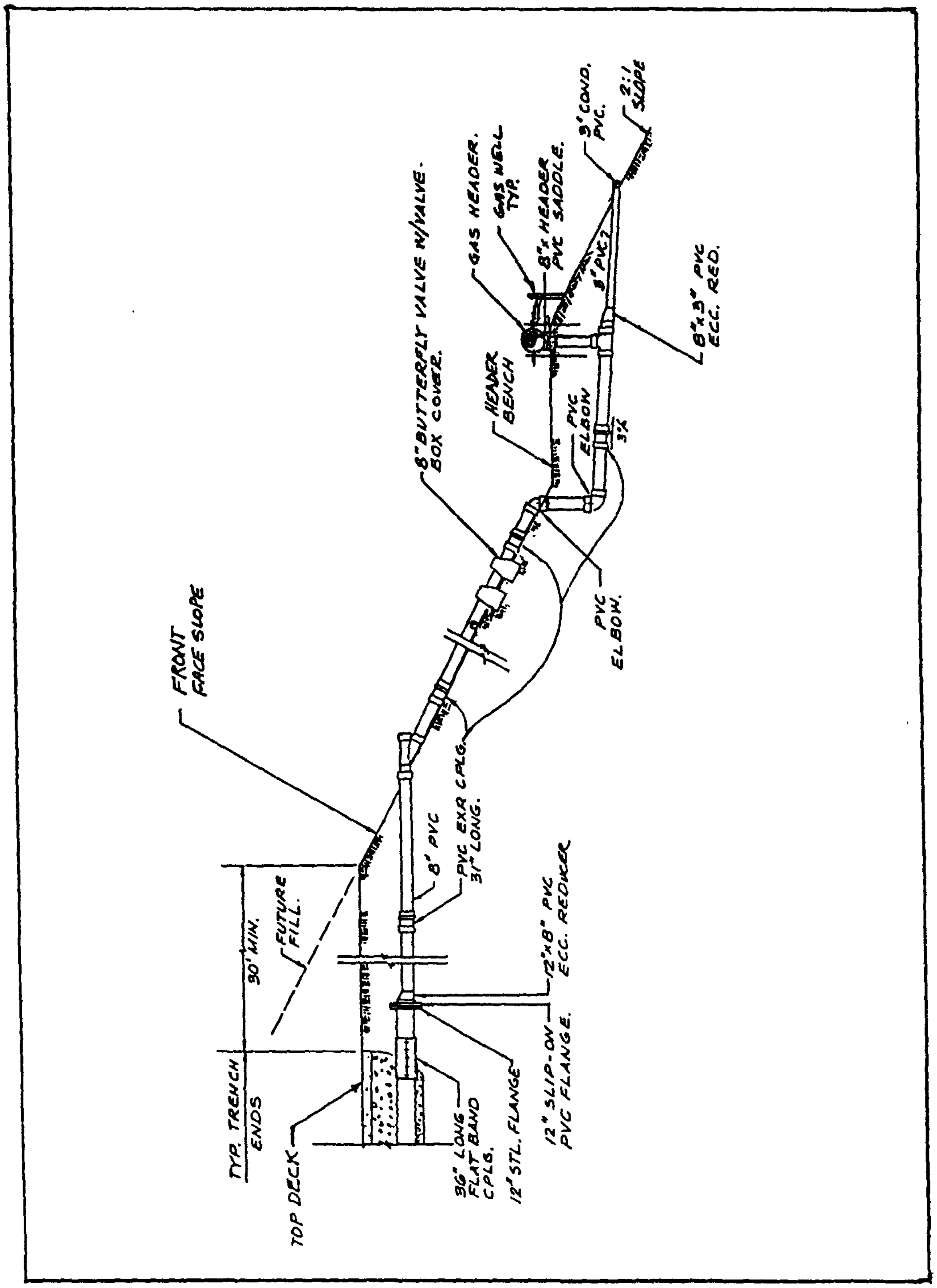

Figure 5. Horizontal Collector to Header Connection

The reducer connects to a section of 8-inch diameter PVC pipe, a 31-inch long expansion coupling, followed by another section of 8-inch diameter PVC pipe which protrudes through the front face terminating in a branch angle tee. From this point, the collector to trench connection is routed above ground as it extends down the front face slope to the toe of the header bench. The above ground section, starting at the branch angle tee, consists of three in-line sections of 8-inch diameter PVC pipe connected by two 31-inch long expansion couplings. An 8-inch butterfly valve, used to adjust the collector vacuum, is in-line between the two expansion couplings. At the toe of the slope, the 8-inch diameter PVC pipe is routed under the header bench. This buried section of pipe is sloped at 3 percent downward toward the face to facilitate the draining of condensate from the line. The buried section of pipe which transverses the bench has a 31-inch long PVC expansion coupling at its mid-point and terminates into a 8-inch PVC tee. A 3-inch diameter PVC pipe is connected to the side of the tee through a 3-inch by 8-inch reducer. It extends horizontally out through the face to the surface where it connects to the condensate collection system. An 8-inch diameter PVC pipe extends vertically from the top of the tee through the surface of the bench where it connects to a 31-inch long PVC expansion coupling. From the expansion coupling the pipe is attached to an 8-inch PVC saddle connected to the header.

Vertical Gas Wells

The vertical gas wells (listed in Table 2) are located along the front face bench on which the collector header is located. They are installed approximately 4-feet out from the header on the slope which extends down to the lower bench. The wells which are all 60-feet in length are horizontally spaced at approx. 150-foot intervals (see Figure 1). They are constructed as shown in Figure 6 with alternating sections of 4 and 6-inch diameter perforated PVC pipe in the bottom 40 feet and a 4-inch diameter PVC pipe riser. The riser connects to a 4-inch by 3-inch reducing tee which connects to a section of 3-inch PVC pipe. The pipe is connected to a 3-inch wafer type butterfly valve which is used to adjust well vacuum. A section of PVC pipe connects the valve to 3-inch diameter flex connection which is attached to the header with a 3-inch PVC saddle.

Table 2
Vertical Gas Wells

Well Number	Casing Diameter (inch)*	Length (feet)	Spacing (feet)
07-060	4 and 6	60	175
07-070	4 and 6	60	175
07-080	4 and 6	60	175
07-090	4 and 6	60	175
07-100	4 and 6	60	175
07-120	4 and 6	60	175
07-130	4 and 6	60	175

* 4 and 6-inch dia perforated sections, 4-inch dia solid riser

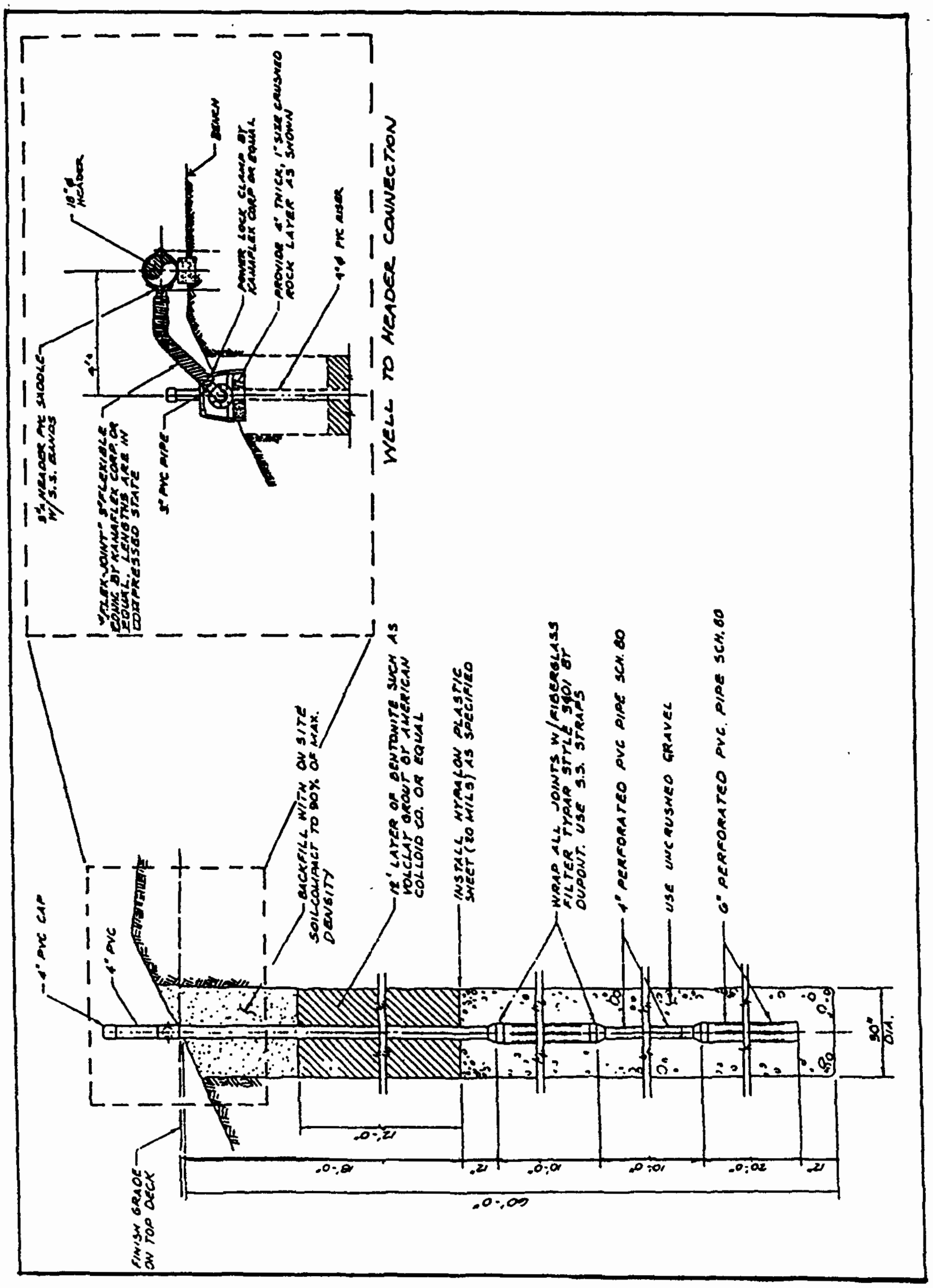

Figure 6. Vertical Gas Collection Well

Operational and Performance Characteristics

Operation

The primary objective in the operation of the SCLF horizontal collectors and vertical gas wells is to control surface gas emissions from the site. To meet this objective, surface gas monitoring results and collector/well operational data (e.g. flow rate, percent methane, percent oxygen, gas temperature, vacuum pressure, etc.) are obtained and reviewed on an ongoing basis. Slight variations in the operational data are corrected as necessary with minor adjustments to the collector/well vacuum. Any significant increase in surface gas emissions would warrant immediate and perhaps more drastic collector/well adjustments.

The 1993 average operational data for the horizontal collectors and vertical gas wells described herein are contained in Tables 3 and 4. Valve position corresponds to valve opening where zero degrees is closed and 90 degrees is wide open. Surface gas monitoring results are presented below.

Performance

In the Los Angeles area, the South Coast Air Quality Management District (SCAQMD) adopted in 1985 a rigorous landfill gas control rule, Rule 1150.1, "Control of Gaseous Emissions from Active Landfills". The rule, with its January 1989 compliance deadline, required the installation of gas collection systems at active sites and the implementation of a field monitoring program. It established a 50 ppm total organic compounds as methane (TOC as methane) limit for average gas emissions measured over the surface of the landfill (integrated surface gas monitoring). Sites complying with Rule 1150.1 are considered as having good gas control with those maintaining emission levels far below the 50 ppm limit having excellent control.

SCLF is located within SCAQMD jurisdiction and it complies with the requirements of Rule 1150.1. In the area along the header bench where the vertical gas wells are located surface

Scholl Canyon Landfill

Table 3
Horizontal Collectors
Average Operational Characteristics - 1993

Collector Number	Valve Position (degrees)	Percent of Time at Position	Average Percent CH_4	Average Percent O_2	Average Flow (cfm)	Average Vacuum (in H_20)	Average Temp. (deg. F)
07-125	15	100	50	0	118	0 6	94
07-115	15	100	50	1	159	0.7	93
07-102	15	100	35	5	117	3.2	95
07-097	15	100	49	1	152	0.6	98
07-095	15	100	45	1	131	0.6	103
07-057	15	56	44	1	115	0.9	90
	0	44	51	1	0	0.1	79

Table 4
Vertical Gas Wells
Average Operational Characteristics - 1993

Gas Well Number	Valve Position (degrees)	Percent of 1993 at that Position	Average Percent CH_4	Average Percent O_2	Average Flow (cfm)	Average Vacuum in. H_20	Average Temp. (deg. F)
07-060	30	27	54	1	37	5.0	95
	15	73	53	1	22	4 0	102
07-070	30	27	40	1	26	8 0	84
	15	73	24	1	11	4.0	94
07-080	15	100	41	2	32	9.0	97
07-090	45	92	54	0	36	2 0	102
	15	8	50	0	33	2 2	99
07-100	30	100	50	1	22	1.0	104
07-110	15	100	28	6	14	0.0	105
07-020	15	100	46	1	21	0.0	115
07-130	15	100	33	4	21	0.0	119

gas emissions since 1990 have stayed at background levels below 5 ppm TOC as methane. In the top deck area covered by the horizontal collectors surface gas emissions have also stayed at background levels below 4 ppm TOC as methane.

APPENDIX F

REPORT CHECKLISTS

APPENDIX F

REPORT CHECKLISTS

The following checklists are provided in this appendix:

- Initial Design Capacity Report [§ 60.757(a)].
- Amended Design Capacity Report [§ 60.757(a)(3)].
- Annual or 5-year NMOC Emission Rate Report (Tier 1) [§ 60.757(b)].
- Revised NMOC Emission Rate Report (Tier 2) [§ 60.757(c)(1)].
- Revised NMOC Emission Rate Report (Tier 3) [§ 60.757(c)(2)].
- Collection and Control System Design Plan [§ 60.757(c)].
- Initial Control System Performance Test Report [§ 60.757(g)].
- Annual Reports [§ 60.757(f)].
- Landfill Closure Report [§ 60.757(d)].
- Control Equipment Removal Report [§ 60.757(e)].

Complete these checklists to determine compliance with the reporting requirements in §60.757. A "yes" response to all questions indicates full compliance. A "no" response does not necessarily indicate non-compliance with the regulations. In situations where a "no" response is appropriate, note whether the intent of the requirements have been met and whether the information provided by the landfill is acceptable.

INITIAL DESIGN CAPACITY REPORT [§60.757(a)]

All landfills subject to the regulations must submit this report.

Yes	No		
		1.	Was the report submitted within the timeframe given below?
☐	☐		• on or before June 10, 1996 for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996.
☐	☐		• within 90 days after the date of construction, modification, reconstruction for landfills that commenced construction, modification, or reconstruction on or after March 12, 1996. [Note: The initial design capacity report fulfills the requirements of the notification of the date construction is commenced as required under §60.7(a)(1) of the part 60 General Provisions.]
		2.	Did the report contain the following?
☐	☐		• a map or plot map of the landfill, providing the size and location of the landfill, and identifying all areas where refuse may be landfilled according to the permit issued by the State, local, or tribal agency responsible for regulating the landfill.
☐	☐		• the maximum design capacity of the landfill. [Note: Where the maximum design capacity is specified in the permit issued by the State, local, or tribal agency responsible for regulating the landfill, a copy of the permit specifying the maximum design capacity may be submitted. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity must be calculated using good engineering practices. The calculations must be provided, along with the relevant parameters.]

Additional information may be requested to verify the maximum design capacity of the landfill.

AMENDED DESIGN CAPACITY REPORT [§60.757(a)(3)]

All landfills subject to the regulations must submit an amended design capacity report if the design capacity included in the initial design capacity report has increased and the resulting capacity is equal to or greater than 2.5 million Mg and 2.5 million m^3.

Yes	No		
☐	☐	1.	Was the report submitted within 90 days of an increase in the permitted volume of the landfill or an increase in the density that results in a maximum design capacity equal to or greater than 2.5 million Mg and 2.5 million m^3. [Note: A landfill owner or operator who converts design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million Mg or 2.5 million m^3, must keep readily accessible, on-site records of the annual recalculation of site-specific density, design capacity, and the supporting documentation. Off-site records may be maintained if they are retrievable within 4 hours.]

ANNUAL NMOC EMISSION RATE REPORT (TIER 1) [§ 60.757(b)]

Landfills that have an initial or amended design capacity equal to or greater than 2.5 million Mg and 2.5 million m^3 must submit this report. Once a collection and control system has been installed, this report is no longer required.

Yes	No		
		1.	Was the report submitted no later than either of the following, as appropriate:
☐	☐		• June 10, 1996, for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996, or
☐	☐		• Ninety days after the date of commenced construction, modification, or reconstruction on or after March 12, 1996.
			[Note: This report may be combined with the Initial Design Capacity Report required in § 60.757(a)(1). Subsequent reports should be submitted annually thereafter unless the owner or operator elects to submit an estimate of the NMOC emission rate for the next 5 years (5-year NMOC Emission Rate Report) in lieu of the Annual Report. In order to submit a 5-year NMOC Emission Rate Report, the estimated NMOC emission rate in each of 5 consecutive years must be less than 50 Mg/yr]
		2.	Did the Annual report include the following?
☐	☐		• emission estimate; and
☐	☐		• all data, calculations, sample reports, and measurements upon which the estimate is based.

Additional information may be requested to verify the reported NMOC emission rate.

FIVE-YEAR NMOC EMISSION RATE REPORT [§ 60.757(b)]

This report may be submitted in lieu of the Annual NMOC Emission Rate Report if the annual NMOC emission rate is less than 50 Mg/year for 5 consecutive years.

Yes	No		
☐	☐	1.	Was the report revised and submitted at least every 5 years?
☐	☐	2.	If the actual waste acceptance rate exceeded the estimated waste acceptance rate in any year reported in the 5-year revised estimate, was a revised 5-year estimate submitted? [The revised estimate must cover the 5 years beginning with the year in which actual rate exceeded the estimated waste acceptance rate.]
		3.	Did the 5-year report include the following?
☐	☐		• current amount of refuse-in-place;
☐	☐		• estimated NMOC emission rate estimates for each of the 5 years;
☐	☐		• estimated waste acceptance rate for each of the 5 years for which the NMOC emission rate is estimated; and
☐	☐		• all data, calculations, sample reports, and measurements upon which the estimate is based.

[Note: The annual or Five-year NMOC Emission Rate Report (Tier 1) is not required after the installation of a collection and control system in compliance with section § 60.752(b)(2).]

REVISED NMOC EMISSION RATE REPORT (TIER 2) [§ 60.757(c)(1)]

Landfills that have a 50 Mg/year or greater NMOC emission rate determined using the Tier 1 formulas and defaults must submit this report if they choose not to submit a collection and control system design plan but choose instead to use the Tier 2 procedures to recalculate the NMOC emission rate.

Yes	No		
☐	☐	1.	Was the report submitted within 180 days of the first Tier 1 NMOC emission rate report that showed emissions ≥50 Mg/year.
☐	☐	2.	Does the report include the site-specific NMOC concentration determined according to § 60.754(a)(3)?
☐	☐	3.	If the recalculated NMOC emission rate was < 50 Mg/year, was annual periodic reporting resumed?
☐	☐	4.	If the recalculated NMOC emission rate was ≥ 50 Mg/year, did the owner or operator submit a Collection and Control System Design Plan, or recalculate the NMOC emission rate according to Tier 3 procedures?

REVISED NMOC EMISSION RATE REPORT (TIER 3) [§ 60.757(c)(2)]

Landfills that have calculated a 50 Mg/year NMOC emission rate or greater using the Tier 2 procedures must submit this report if they choose not to submit a collection and control system design plan but choose instead to use the Tier 3 procedures to recalculate the NMOC emission rate.

Yes	No		
☐	☐	1.	Was the report submitted within 1 year of the first Tier 1 NMOC emission rate report that showed emissions ≥50 Mg/yr?
☐	☐	2.	Did the report include the revised (Tier 2) NMOC emission rate and the site-specific methane generation rate constant (k) determined according to § 60.754(a)(4)?
☐	☐	3.	If the annual emission rate was 50 Mg or greater, was the report submitted along with a Collection and Control System Design Plan within 1 year of the first calculated exceedance of the standard?

COLLECTION AND CONTROL SYSTEM DESIGN PLAN [§60.757(c)]

Landfills that have an NMOC emission rate equal to or greater than 50 Mg/year must submit a Collection and Control System Design Plan unless the owner or operator elected to recalculate the NMOC emission rate using NMOC sampling and analysis (Tier 2 or Tier 3) and the resulting rate is less than 50 Mg/yr.

Yes	No		
☐	☐	1.	Was the design plan submitted within 1 year of the first report of an NMOC emission rate ≥50 Mg/yr?
☐	☐	2.	Did the design plan include either of the following? • a collection and control system conforming to the specifications provided in §60.759, or • an alternative collection system design plan meeting the requirements of §60.752(b)(2).
☐	☐	3.	If an active collection system is planned, does it meet the following criteria in §60.752(b)(2)(ii)?
☐	☐		• Is it designed to handle the maximum expected gas flow from the entire area of the landfill that warrants control over the intended use period of the equipment?
☐	☐		• Is it designed to collect gas from each area or cell in which the initial solid waste has been placed for a period of: 5 years or more if active; or 2 years or more if closed or at final grade?
☐	☐		• Will gas be collected at a sufficient extraction rate? (A sufficient extraction rate means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration. All wellheads includes any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.)
☐	☐		• Is it designed to minimize off-site migration of subsurface gas?

COLLECTION AND CONTROL SYSTEM DESIGN PLAN [§60.757(c)] (Continued)

4. If a passive collection system is planned, does it meet the following criteria in §60.752(b)(2)(ii)?

☐ ☐ • Is it designed to handle the maximum expected gas flow from the entire area of the landfill that warrants control over the intended use period of the equipment?

☐ ☐ • Is it designed to collect gas from each area or cell in which the initial solid waste has been placed for a period of: 5 years or more if active; or 2 years or more if closed or at final grade?

☐ ☐ • Is it designed to minimize off-site migration of subsurface gas?

☐ ☐ • Will it have liners on the bottom and all sides of all areas in which gas is to be collected?

[See Appendix E for additional information on the contents and review of collection system design plan]

INITIAL CONTROL SYSTEM PERFORMANCE TEST REPORT [§ 60.757(g)]

Landfills that are required to install collection and control systems must submit a Control System Performance Test Report.

Yes	No		
☐	☐	1.	Was the following information submitted with the Initial Control System Performance Test Report required under § 60.8 within 180 days of emission control system start-up?
		2.	Did the report include the following information?
☐	☐		a. a diagram of the collection system showing extraction well spacing, including the locations of any areas excluded from collection and the proposed sites for the future addition of wells.
☐	☐		b. the data upon which sufficient density of wells or other extraction devices and the gas mover equipment sizing are based. (Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance.)
☐	☐		c. the documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material.
☐	☐		d. the sum of the gas generation flow rates for areas from which collection wells have been excluded based on the presence of nonproductive materials and the calculations of gas generation flow rate for each excluded area.
☐	☐		e. the provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill.
☐	☐		f. The provisions for the control of off-site migration.

ANNUAL REPORTS [§ 60.757(f)]

Landfills that have installed collection and control systems must submit this report.

Yes	No		
☐	☐	1.	Was the report submitted annually beginning 180 days after submittal of the Initial Control System Performance Test Report?
		2.	Did the report include the value and length of time for exceedance of the following?
☐	☐		• the gauge pressure in the gas collection header (measured on a monthly basis).
☐	☐		• the nitrogen or oxygen concentration in the landfill (measured on a monthly basis).
☐	☐		• the temperature of the landfill gas (measured on a monthly basis).
		3.	If an enclosed combustion device was used to comply, did the report include the following?
☐	☐		• all 3-hour periods of operation (unless the control device is a boiler or process heater >44 megawatts) during which the average combustion temperature based on continuous temperature monitoring was more than 28^{o} Celcius below the average combustion temperature as established during the initial or most recent performance test [60.752(b)(2)(iii)(B)(2)]. (Note: This is not required for boilers and process heaters > 44 megawatts)
☐	☐		• duration of periods when control device was bypassed.

ANNUAL REPORTS [§60.757(f)] (Continued)

Yes	No		
		4.	If an open flare was used to comply, did the report include the following?
☐	☐		• length of time during which flare flame was absent based on continuous monitoring for presence of a flame at the pilot light or flare.
☐	☐		• duration of periods when control device was bypassed
☐	☐	5.	Did the report include the date of installation and the location of each well added to the collection system?
☐	☐	6.	Did the report include description and duration of periods > 1 hr when control device was not operating?
☐	☐	7.	Did the report include all periods >5 days when the collection system was not operating?
☐	☐	8.	Did the report include location of exceedances of the 500 ppm methane concentration and the concentration recorded at each location for which an exceedance was reported the previous monitoring period?
☐	☐	9.	For systems not conforming to the specifications for active collection systems (§60.759), did the report include exceedances of any monitoring parameters that have been specified by the Administrator per §60.756(e)?

LANDFILL CLOSURE REPORT [§ 60.757(d)]

Controlled landfills must submit this report within 30 days of ceasing to accept waste.

Yes	No		
☐	☐	1.	Was this report submitted within 30 days of when the landfill stopped accepting MSW?
		2.	Did the closure report include the following?
☐	☐		• date landfill last accepted waste.
☐	☐		• date landfill closed.
☐	☐	3.	Did the report indicate that closure is permanent? [If additional wastes are to be placed in the landfill, the landfill owner or operator must file a notification of modification as described under § 60.7(a)(4).]

CONTROL EQUIPMENT REMOVAL REPORT [§ 60.757(e)]

Landfills that wish to remove their gas collection and control system must submit this report prior to removing or ceasing operation of their system.

Yes	No		
☐	☐	1.	Was the report submitted 30 days prior to removal or cessation of operation of the control equipment?
		2.	Did the Control Equipment Removal Report include the following?
☐	☐		a. a copy of the closure report.
☐	☐		b. a copy of the Initial Performance Test Report (demonstrating that the 15-year minimum control period has expired).
☐	☐		c. dated copies of three successive NMOC emission rate reports (demonstrating that the landfill is no longer emitting 50 Mg or above NMOC per year prior to the control device).

Additional information may be requested to verify that all conditions for removal in § 60.752(b)(2)(V) have been met.

APPENDIX G

ON-SITE INSPECTION CHECKLISTS

APPENDIX G

ON-SITE INSPECTION CHECKLISTS

The following checklists are provided in this appendix:

- Monitoring Equipment
- Recordkeeping
- Collection and Control Equipment

ON-SITE INSPECTION CHECKLISTS FOR DETERMINING COMPLIANCE WITH MSW LANDFILL NSPS AND EG

These checklists can be used to verify compliance with the NSPS or EG monitoring, recordkeeping, and control equipment requirements. Inspectors should use copies of these checklists for each inspection.

A "yes" response to checklist questions indicates compliance with the regulations. A "no" response does not necessarily indicate non-compliance. The inspector has the discretion to determine compliance or non-compliance. Therefore, the inspector should determine if the intent of the requirements has been achieved. In the case of a "no" response, indicate whether the checklist question, and hence the requirement, is satisfied.

MONITORING EQUIPMENT CHECKLIST

Refer to each appropriate section below to determine compliance with monitoring requirements of the rule. Complete the checklist by indicating "yes" or "no" to the questions. A "yes" indicates compliance. A "no" does not necessarily indicate non-compliance with the regulations.

ACTIVE GAS COLLECTION SYSTEMS [§60.756(a)]

Yes	No	
☐	☐	1. Is a sampling port installed at each wellhead?
☐	☐	2. Is there a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead?
		3. Are the following parameters being monitored?
☐	☐	• gauge pressure in the gas collection header on a monthly basis
☐	☐	• nitrogen concentration in the landfill gas as provided in Method 3C or oxygen concentration as provided in Method 3A
☐	☐	• temperature of the landfill gas on a monthly basis
☐	☐	4. If an alternative method is used to monitor for infiltration, is this method documented and maintained with the landfill records?

ENCLOSED COMBUSTION DEVICES [§60.756(b)]

Yes	No		
		1.	Is the following required equipment being calibrated, maintained, and operated according to the manufacturer's specifications?
☐	☐		• a temperature monitoring device equipped with a continuous recorder and having an accuracy of ±1 percent of the temperature being measured, expressed in degrees Celsius or ±0.5 °C, whichever is greater (except when the control device is a boiler or process heater >44 megawatts)
☐	☐		• a gas flow measuring device that records the gas flow to the control device <u>or</u> bypass lines are sealed shut and seals are inspected monthly
☐	☐	2.	Are the temperature and the gas flow (if applicable) being recorded at least every 15 minutes?

OPEN FLARES [§60.756(c)]

Yes	No		
		1.	Is the following required equipment being calibrated, maintained, and operated according to the manufacturer's specifications?
☐	☐		• a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or at the flare flame to indicate the continuous presence of a flame
☐	☐		• a device that records the gas flow to or bypass of the flare <u>or</u> bypass lines are sealed shut and seals are inspected monthly
☐	☐	2.	Are the presence of the pilot light and the gas flow (if applicable) being recorded at least every 15 minutes?

OTHER CONTROL DEVICES [§60.756(d) and §60.756(e)]

A. OTHER CONTROL DEVICES

Yes	No		
☐	☐	1.	If a control device other than a flare or enclosed combustion device is used, does the landfill have documentation demonstrating that the alternative device was approved by the Administrator?
☐	☐	2.	If the Administrator specified additional monitoring procedures, does the landfill have appropriate records demonstrating compliance with these procedures?

B. COLLECTION SYSTEMS NOT CONFORMING TO §60.759

Yes	No		
☐	☐	1.	If a collection system not conforming to §60.759 is used, does the landfill have documentation demonstrating that the alternative design was approved by the Administrator?
☐	☐	2.	If the Administrator specified additional monitoring procedures, does the landfill have appropriate records demonstrating compliance with these procedures?

MONITORING METHANE CONCENTRATIONS AT THE LANDFILL SURFACE [§60.756(f)]

Yes	No		
☐	☐	1.	Are surface concentrations of methane being monitored on a quarterly basis to determine compliance (unless the skip period method described in #3 below is used)?
		2.	Does the monitoring device comply with the following instrumentation specifications and procedures for surface emission monitoring devices [§60.755(d)]:
☐	☐		• Does the portable analyzer meet the instrument specifications in Section 3 of Method 21, except that "methane" replaces all references to VOC?
☐	☐		• Is the calibration gas methane, diluted to a nominal concentration of 500 ppm in air?
☐	☐		• To meet the performance evaluation requirements in Section 3.1.3 of Method 21, are the instrument evaluation procedures of Section 4.4 of the method used?
☐	☐		• Are the calibration procedures provided in Section 4.2 of Method 21 followed immediately before commencing a surface monitoring survey?
		3.	Are the following procedures, provided in §60.756(f), followed if skip period monitoring is used:
☐	☐		• If no exceedances are detected for three successive quarterly monitoring periods, is the surface monitored annually until an exceedance is detected?
☐	☐		• If an exceedance is detected and corrected as provided in §60.755(a)(5), is the surface monitored quarterly until a concentration >500 ppm is not detected for three successive quarters?

RECORDKEEPING CHECKLIST

Refer to each appropriate section below to determine compliance with the recording requirements of the rule. A "yes" indicates compliance. A "no" does not necessarily indicate non-compliance with the regulations.

GENERAL RETENTION REQUIREMENTS [§60.758(a)]

Yes	No		
		1.	Are all records
☐	☐		• available for at least the past 5 years?
☐	☐		• up-to-date?
☐	☐		• readily accessible?
☐	☐		• on-site or, if offsite, retrievable in 4 hours?
☐	☐		• in hardcopy or electronic format?
		2.	Are records of the following information available?
☐	☐		• maximum design capacity
☐	☐		• current amount of MSW in place
☐	☐		• year-by-year waste acceptance rate

INITIAL PERFORMANCE TEST OR COMPLIANCE DETERMINATION FOR CONTROL EQUIPMENT [§60.758(b)]

Yes	No		
☐	☐	1.	Are records that document the initial performance test or compliance determination kept for the life of the control equipment?
☐	☐	2.	Are records of any subsequent compliance tests or compliance determinations maintained for at least 5 years?
		3.	Do the records include the following information?
☐	☐		• the density of wells is sufficient as calculated by procedures in §60.759(a)(1), and
☐	☐		• the maximum expected gas generation flow rate as calculated by the procedure in §60.755(a)(1); or
☐	☐		• the maximum expected gas generation flow rate as calculated by another approved method.
		4.	For owners or operators using enclosed combustion devices other than boilers and process heaters, do the records include the following?
☐	☐		• average combustion temperature measured at least every 15 minutes and averaged over the same time period as the performance test
☐	☐		• a percent reduction of 98 percent or greater, or an NMOC concentration less than 20 ppm by volume, dry basis as hexane at 3% oxygen
		5a.	For owners or operators using any size boiler or process heater, do the records include the following?
☐	☐		• description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing

INITIAL PERFORMANCE TEST OR COMPLIANCE DETERMINATION FOR CONTROL EQUIPMENT [§60.758(b)] (Continued)

Yes	No		
		5b.	For owners or operators using boilers or process heaters with a design heat input capacity of less than 44 megawatts, do the records include the following?
☐	☐		• the average combustion temperature of the boiler or process heater measured at least every 15 minutes and averaged over the same time period of the performance testing
☐	☐		• a percent reduction of 98 percent or greater or an NMOC concentration less than 20 ppm by volume, dry basis as hexane at 3 percent oxygen
		6.	For owners or operators using an open flare, do the records include the following?
☐	☐		• flare type (i.e., steam assisted, air-assisted, or nonassisted)
☐	☐		• all visible emission readings
☐	☐		• heat content determinations
☐	☐		• flow or bypass flow records
☐	☐		• exit velocity determinations
☐	☐		• continuous records of the flare flame or pilot flame monitoring
☐	☐		• records of all periods of operation during which the pilot flame or flare flame was absent
☐	☐	7.	For owners or operators using a flare, do the visible emission, heat content, flow rate, and exit velocity data show that specifications in §60.18 are met? (The specifications vary by flare type.)

EQUIPMENT OPERATING PARAMETERS AND PARAMETER BOUNDARY EXCEEDANCES [§60.758(c)]

Yes	No		
☐	☐	1.	Are records available of all equipment operating parameters and parameter boundary exceedances?
☐	☐	2.	Are the records retained for at least 5 years?
☐	☐	3.	Are the records continuous (i.e., a value recorded at least every 15 minutes)?
☐	☐	4.	For enclosed combustion devices (except for boilers and process heaters with design heat input capacity of 44 megawatts or greater and open flares), were all 3-hour periods of operation during which the average combustion temperature was more than 28°C below the average combustion temperature during the most recent performance test recorded and reported?
☐	☐	5.	For all boilers and process heaters, were any changes in location at which the vent stream was introduced into the flame zone recorded and reported?
		6.	For all control devices,
☐	☐		• were continuous records of LFG flow to the control device or bypass flow maintained <u>or</u>, if bypass lines were sealed closed, were monthly seal inspection results recorded?
☐	☐		• were all periods when the gas stream was diverted from the control device or had no flowrate recorded and reported?
☐	☐	7.	For owners or operators using a boiler or process heater with a design input capacity of 44 megawatts or greater, are records of all periods of operation of the boiler or process heater available?
		8.	For owners or operators using an open flare:
☐	☐		• were continuous records maintained of pilot flame or flare flame monitoring?
☐	☐		• were all periods of operation in which the flare or pilot flame was absent recorded and reported?

COLLECTION SYSTEM INFORMATION [§60.758(d)]

Yes	No		
☐	☐	1.	Is an up-to-date, readily accessible collection system plot map available?
		2.	Does the plot map include the following?
☐	☐		• the location of each existing and planned collector in the system
☐	☐		• a unique identification label for each collector
		3.	Did the well records include the following information related to newly installed collectors?
☐	☐		• installation date of each collector
☐	☐		• location of each collector

WASTE EXCLUDED FROM COLLECTION - AREAS INCLUDED IN THE 1 PERCENT THAT DO NOT WARRANT CONTROL [§60.758(d)]

Yes	No		
		1.	Do the records pertaining to asbestos-containing or nondegradable waste excluded from collection and/or any area included in the 1 percent that does not warrant control include the following?
☐	☐		• nature of the waste
☐	☐		• date of deposition of the waste
☐	☐		• amount of the waste
☐	☐		• location of waste on the landfill site

COLLECTION AND CONTROL EXCEEDANCE [§60.758(e)]

Yes	No		
		1.	Are records of the following available:
☐	☐		• all collection and control system exceedances of the operational standards in §60.753? These include: readings of positive pressure at any wellhead (except as allowed in §60.753(b); wellhead temperature >55°C or other approved temperature; nitrogen level ≥20% or oxygen level ≥5%; and surface methane concentration ≥500 ppm
☐	☐		• a reading in the month following an exceedance
☐	☐		• location of each exceedance

DESIGN CAPACITY CALCULATION [§60.758(f)]

Yes	No		
☐	☐	1.	For landfill owners or operators who convert design capacity from volume to mass or from mass to volume to demonstrate that landfill design capacity is less than the design capacity size limit, do the records include the annual recalculation of site-specific density, design capacity, and all supporting documentation?

COLLECTION AND CONTROL EQUIPMENT CHECKLIST

This checklist is to be used for collection and control systems that conform to the specifications provided in §60.759. If an alternative collection and control system was installed, the approved alternative design plans should be used to check for compliance. Complete the checklist by indicating "yes" or "no" to the questions. A "yes" indicates compliance. A "no" does not necessarily indicate non-compliance with the regulations.

SITING ACTIVE COLLECTION SYSTEMS [§60.759(a)]

Yes	No		
☐	☐	1.	Are the active collection wells sited throughout all gas producing areas of the landfill (that are at least 5 years old for active areas or 2 years old for areas that are closed or at final grade)?
☐	☐	2.	Is sufficient density of collectors demonstrated? (Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance.)
☐	☐	3.	If gas is not collected from any areas because they contain asbestos or nondegradable material, is the nature, date of deposition, location, and amount of asbestos or nondegradable material documented?
☐	☐	4.	If gas is not collected from nonproductive areas, has it been demonstrated that total emissions from the excluded areas are <1% of total NMOC emissions from the landfill?
☐	☐	5.	If gas is not collected from nonproductive areas, has the amount, location, and age of the material been documented?

CONSTRUCTION OF ACTIVE COLLECTION SYSTEMS [§60.759(b)]

Yes	No		
☐	☐	1.	Does the connector assembly used to connect the wellhead to the collection header pipes include the following: • positive closing throttle valve, • any necessary seals and couplings, • access couplings, • at least one sampling port?
☐	☐	2.	Are the landfill gas extraction components constructed of one of the following? (Circle material used) • polyvinyl chloride (PVC) • high density polyethylene (HDPE) pipe • fiberglass • stainless steel • other nonporous, corrosion-resistant material ___________
☐	☐	3.	Is the collection device constructed of one of the following? (Circle material used.) • PVC • HDPE • fiberglass • stainless steel • other nonporous material of suitable thickness _______
☐	☐	4.	Does the construction and location of wells and other collection system components match the approved collection and control system design plan?

GAS MOVER EQUIPMENT [§60.759(c)]

☐ ☐ 1. Is the gas mover equipment operating?

☐ ☐ 2. Is the gas mover equipment sized to handle the maximum gas generation flow rate expected over the intended use period?

☐ ☐ 3. Has the gas mover equipment exceeded its intended use period? (The intended use period of the equipment should be specified in the approved collection and control system design plan.)

APPENDIX H

EXAMPLE REPORT FORMS

APPENDIX H

EXAMPLE REPORT FORMS

(separate form for each report)

The following example forms are included in this appendix:

1. Initial Design Capacity Report;

2. Initial NMOC Emission Rate Report, including

    a. Tier 1 calculation form,

    b. Emission inventory form;

3. Landfill Closure Report; and

4. Control Equipment Removal Report.

INITIAL DESIGN CAPACITY REPORT FORM

(Please Print or Type)

This form fulfills the requirements of the Initial Design Capacity Report for the municipal solid waste landfills new source performance standards and emission guidelines promulgated on March 12, 1996 (61 FR 9905) 40 CFR 60, subparts WWW and Cc. All new landfills subject to the regulations must submit this report. For new landfills, this report also fulfills the requirements of the notification of the date construction is commenced as required under 40 CFR 60.7(a)(1).

This form must be completed and submitted to the implementing agency within the following timeframe:

- on or before June 10, 1996 for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996.

- within 90 days after the date of commenced construction, modification, or reconstruction for landfills that commenced construction, modification, or reconstruction on or after March 12, 1996. [Note: The initial design capacity report fulfills the requirements of the notification of the date construction is commenced as required under §60.7(a)(1) of the part 60 General Provisions.]

I. IDENTIFYING INFORMATION

1. Name of person completing form______________________________

   Telephone number______________________________________

2. Person's position_______________________________________

3. Name of landfill____

4. Address of landfill______________________________________

5. Name of landfill owner___________________________________

6. Address of landfill owner________________________________

7. Name of landfill operator____

8. Address of landfill operator______________________________________

9. Is landfill new or existing?

___ new (began construction, reconstruction, or modification on or after May 30, 1991)

___ existing (began construction, reconstruction, or modification before May 30, 1991; and has accepted waste after November 8, 1987 or has additional capacity available for future waste deposition)

II. DATES

10. Date construction or operating permit was issued____________________

11. Date landfill began construction, modification, or reconstruction__________

12. Date landfill first accepted waste______________________________

13. Date this form is submitted_________________________________

III. DESIGN CAPACITY INFORMATION

14. Maximum design capacity of landfill in Mg or m^3____________________

(To calculate Mg, multiply tons by 0.907. To calculate m^3, multiply yd^3 by 0.7646)

A. If the landfill has a State, county or tribal agency construction or RCRA permit stating the maximum design capacity, attach a copy of the permit to this form. If there is any waste in place not accounted for in the most recent permit, include this amount in the design capacity and attach documentation.

B. If maximum design capacity is NOT specified in a permit, attach design capacity calculations, and provide documentation of the relevant parameters used to calculate design capacity (for example, landfill horizontal dimensions, depth of landfill, waste acceptance rates and/or other parameters that might be used to calculate design capacity).

15. If design capacity is converted from mass to volume or from volume to mass, attach the calculation, including the site-specific density.

16. Attach a map or plot map of the landfill to this form. The map should provide the size and location of the landfill. Include an identification of all areas where refuse may be landfilled according to the permit issued by the State, local, or tribal agency responsible for regulating the landfill.

IV. SIGNATURE

17. Signature of person completing form

____

18. Date of signature

____

EXAMPLE INITIAL NMOC EMISSION RATE REPORT

State Air Agency Director
State Air Agency
Air Agency Address
Air Agency's Town, State, and Zip Code

RE: Initial NMOC Emission Rate Report as required by the MSW Landfill NSPS

Dear State Air Agency Director:

Facility A is currently regulated according to the MSW Landfill NSPS. Under the requirements of the regulations, Landfill A must submit an estimate of the NMOC emissions. The estimated NMOC emission rate is ___ Mg/yr. This estimate was calculated based on the Tier 1 procedures in the regulations. A copy of the calculations is enclosed.

Sincerely,

Landfill A Owner/Operator
enclosure

EXAMPLE TIER 1 NMOC EMISSION RATE CALCULATION FORM

NMOC EMISSION RATE REPORT

TIER 1 CALCULATION FORM

This calculation form presents the equations and default values used in the Tier 1 NMOC emission rate analysis. Completing this form will yield the annual NMOC emission rate, which should be entered in the space provided in the cover letter.

Note that Equation 1 is for landfills where the annual MSW acceptance rate is not known. Equation 2 is to be used if the annual acceptance rate is known. The equations are to be used together if the annual acceptance rate is known for only part of the life of the landfill. For example, a 30-year old landfill with an unknown annual acceptance rate during the first 10 years would require Equation 1 for that time period, and would require Equation 2 for the subsequent 20 years when the annual acceptance rate was known.

Equation 1. *(For landfills where the annual acceptance rate is **not** known)*

$$M_{NMOC} = 2L_oR(e^{-kc} - e^{-kt})(C_{NMOC})(3.6 \times 10^{-9})$$

where,

M_{NMOC} = mass emission rate of NMOC, (Mg/yr)

L_o	=	Refuse methane generation potential:	170*	(m^3/Mg)
R	=	Average annual acceptance rate:	______	(Mg/yr)
k	=	Methane generation rate constant:	0.05*	(1/yr)
c	=	Years since closure (c = 0 for active and/or new landfills):	______	(yrs)
t	=	Age of landfill (i.e., years since landfill first opened)	______	(yrs)
C_{NMOC}	=	Concentration of NMOC:	4,000*	(ppm as hexane)
		Conversion factor:	3.6×10^{-9}	

NMOC EMISSION RATE CALCULATION (continued)

$M_{NMOC} = 2\ (170)\ (\quad)\ (e^{-(0.05)(\ )} - e^{-(0.05)(\ )})\ (4{,}000)\ (3.6 \times 10^{-9})$

M_{NMOC} = ______ Mg/yr

*Default values. An alternative methane generation rate constant (k) of 0.02 can be used for landfills located in geographical areas with a 30-year annual average precipitation of less than 25 inches. The average annual precipitation must be indicated by the nearest representative meteorological site.

Equation 2. *(For landfills where the annual acceptance rate is known)*

$$M_{NMOC} = Q_1 + Q_2 + Q_3 + \text{etc.}$$

and,

$$Q_i = 2\ k\ L_o\ M_i\ (e^{-kt_i})\ (C_{NMOC})\ (3.6 \times 10^{-9})$$

where,

M_{NMOC} = total mass emission rate of NMOC from all sections of the landfill (Mg/yr)
Q_i = mass emission rate of NMOC from the ith section of the landfill (Mg/yr)

Variables			Example Values for Calculations: Q1	Q2	Q3	
k	=	methane generation rate constant (1/yr)	0.05	0.05	0.05	(default*)
L_o	=	refuse methane generation potential (m^3/Mg)	170	170	170	(default)
M_i	=	mass of waste in the i^{th} section of the landfill (Mg)	500	600	800	(landfill-specific)
t_i	=	age of the ith section of the landfill	20	19	18	(landfill-specific)
C_{NMOC}	=	concentration of NMOC in landfill gas (ppm as Hexane)	4,000	4,000	4,000	(default)
		conversion factor	3.6×10^{-9}	3.6×10^{-9}	3.6×10^{-9}	(fixed factor)

* As described above, an alternative default k of 0.02 can be used in arid areas.

Calculate the mass emission rate (Q_i) = for each segment of the landfill:

$$Q_i = 2\ (0.05)\ (170)\ (\_\_\_\_\_)\ (e^{-(0.05\ (\_))})\ (4{,}000)\ (3.6 \times 10^{-9})$$

Add the emission rate of the various landfill segments to calculate total mass emission rate (M_{NMOC}):

$$\begin{aligned} M_{NMOC} &= Q_1 + Q_2 + Q_3 + \text{etc} \\ &= \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_, \text{ etc.} \end{aligned}$$

If annual waste acceptance rates are known as Q_i, Q_i would be emissions from the ith year, and Q_1 would be emissions from the first year, Q_2 for the second year, etc.

If a landfill was in operation for 3 years then:

$$M = Q_1 + Q_2 + Q_3$$

If the first year of operation was 20 years ago and waste acceptance was 500 then:

$$Q_1 = 2\ (.05)\ (170)\ (500)\ (e^{-(.05)\ (20)})\ (4{,}000)\ (3.6 \times 10^{-9})$$

the 2nd year of operation was 19 years ago and acceptance was 600:

$$Q_2 = 2\ (.05)\ (170)\ (600)\ (e^{-(.05)\ (19)})\ (4{,}000)\ (3.6 \times 10^{-7})$$

the 3rd year of operation was 18 years ago and acceptance was 800:

$$Q_3 = 2\ (.05)\ (170)\ (800)\ (e^{-(.05)\ (18)})\ (4{,}000)\ (3.6 \times 10^{-7})$$

EXAMPLE LANDFILL CLOSURE REPORT

State Air Agency Director
State Air Agency
Air Agency Address
Air Agency's Town, State, and Zip Code

RE: Landfill Closure Report as required by the MSW Landfill NSPS

Dear State Air Agency Director:

Facility A is currently regulated according to the MSW Landfill NSPS. Under the requirements of the regulations, Landfill A must submit a Landfill Closure Report within 30 days of ceasing to accept MSW. The last day of waste acceptance was _______ and the landfill was closed on _______. The closure is intended to be permanent.

The design capacity of the landfill is ________. The estimated quantity of refuse-in-place is ______. Therefore, there is no additional capacity. (Include the following if there is additional capacity: If additional waste is accepted by Landfill A, a notification of modification will be submitted according to 60.7(a)(4).)

Also note that Landfill A is not being controlled. (Include the following if the landfill is controlled: The controls are planned to be removed after operating for 15 years and the NMOC emissions are demonstrated to be below 50 Mg/yr which will be in __ years.)

Sincerely,

Landfill A Owner/Operator

EXAMPLE CONTROL EQUIPMENT REMOVAL REPORT

State Air Agency Director
State Air Agency
Air Agency Address
Air Agency's Town, State, and Zip Code

RE: Control Equipment Removal Report as required by the MSW Landfill NSPS

Dear State Air Agency Director:

Facility A is currently regulated according to the MSW Landfill NSPS. Under the requirements of the regulations, Landfill A must submit a Control Equipment Removal Report 30 days prior to ceasing to operate and removing landfill gas collection and control equipment. Operation of the collection and control system is scheduled to cease on ________.

The control system has been in operation since _______. Therefore the minimum 15 year operating requirement has been fulfilled. As indicated by 60.757(e), a dated copy of the Initial Performance Test Report is enclosed to document the date of initial installation of the system. Also enclosed per 60.757(e) are dated copies of the three most recent NMOC Emission Rate Reports demonstrating that the landfill is no longer emitting 50 Mg/yr of NMOC.

Note that a Landfill Closure Report was submitted on _______. The last day of waste acceptance was ________ and the landfill was closed_______.

Sincerely,

Landfill A Owner/Operator

enclosures

APPENDIX I

TIER CALCULATION DETAILS AND EQUATIONS

APPENDIX I

TIER CALCULATION DETAILS AND EQUATIONS

This rule includes detailed procedures for calculating NMOC emissions from landfills (§60.754). The procedure consists of a 3-tiered approach, with Tier 1 being the simplest. All "Tier" calculations provide an estimate of NMOC emissions, as a function of three variables:

(1) NMOC concentration in LFG, (C_{NMOC});

(2) Methane generation rate constant, (k); and

(3) Refuse methane generation potential, (L_o).

Tier 1 calculations are based on default values that yield conservative NMOC emission rates. If Tier 1 calculations indicate emissions greater than 50 Mg/yr, a landfill may elect to perform Tier 2 or Tier 3 calculations, which require site-specific data gathered through testing. Otherwise, a landfill owner/operator must submit a notice of intent to install a gas collection and control system to the implementing agency.

Tier 2 calculations are based on site-specific NMOC concentrations and yield a more accurate estimate of the NMOC emission rate. The NMOC concentrations are determined by performing EPA Method 25C or EPA Method 18. If Tier 2 calculations result in NMOC emissions greater than 50 Mg/yr, then Tier 3 calculations may be performed.

Tier 3 calculations are based on both site-specific NMOC concentrations and methane generation rates. Tier 3 calculations yield the most accurate determination of NMOC emission rates. The NMOC concentrations are determined by following the Tier 2 procedures. The methane generation rate is determined by performing EPA Method 2E in conjunction with EPA Method 25C or EPA Method 18.

Figure I-1 presents a flow chart showing the steps for determining NMOC emissions from a landfill and whether the landfill must be controlled.

Tier 1 Procedures

The procedures in Tier 1 estimate an NMOC emission rate using refuse acceptance rates for a landfill and default values for the parameters listed above. The default values are as follows:

(1) 4,000 ppmv, NMOC concentration (C_{NMOC});

(2) 0.05 yr^{-1}, methane generation rate constant (k); and

(3) 170 m^3/Mg, refuse methane generation potential (L_o).

For landfills located in a geographical area with a 30-year annual average precipitation of less than 25 inches (as measured by the nearest representative official meteorological site), a k value of 0.02 per year should be used. Otherwise, the default k value of 0.05 per year should be used.

The following equation determines the NMOC emission rate for individual landfill sections (or cells) when the actual year-to-year refuse acceptance rate is known and the default k value is used.

$$M_{NMOC} = \sum_{i=1}^{n} 2\, k\, L_o\, M_i\, (e^{-kt_i})\, (C_{NMOC})\, (3.6 \times 10^{-9})$$

where,

M_{NMOC}	=	Total NMOC emission rate from the landfill, Mg/yr;
k	=	methane generation rate constant, $year^{-1}$;
L_o	=	methane generation potential, m^3/Mg of refuse;

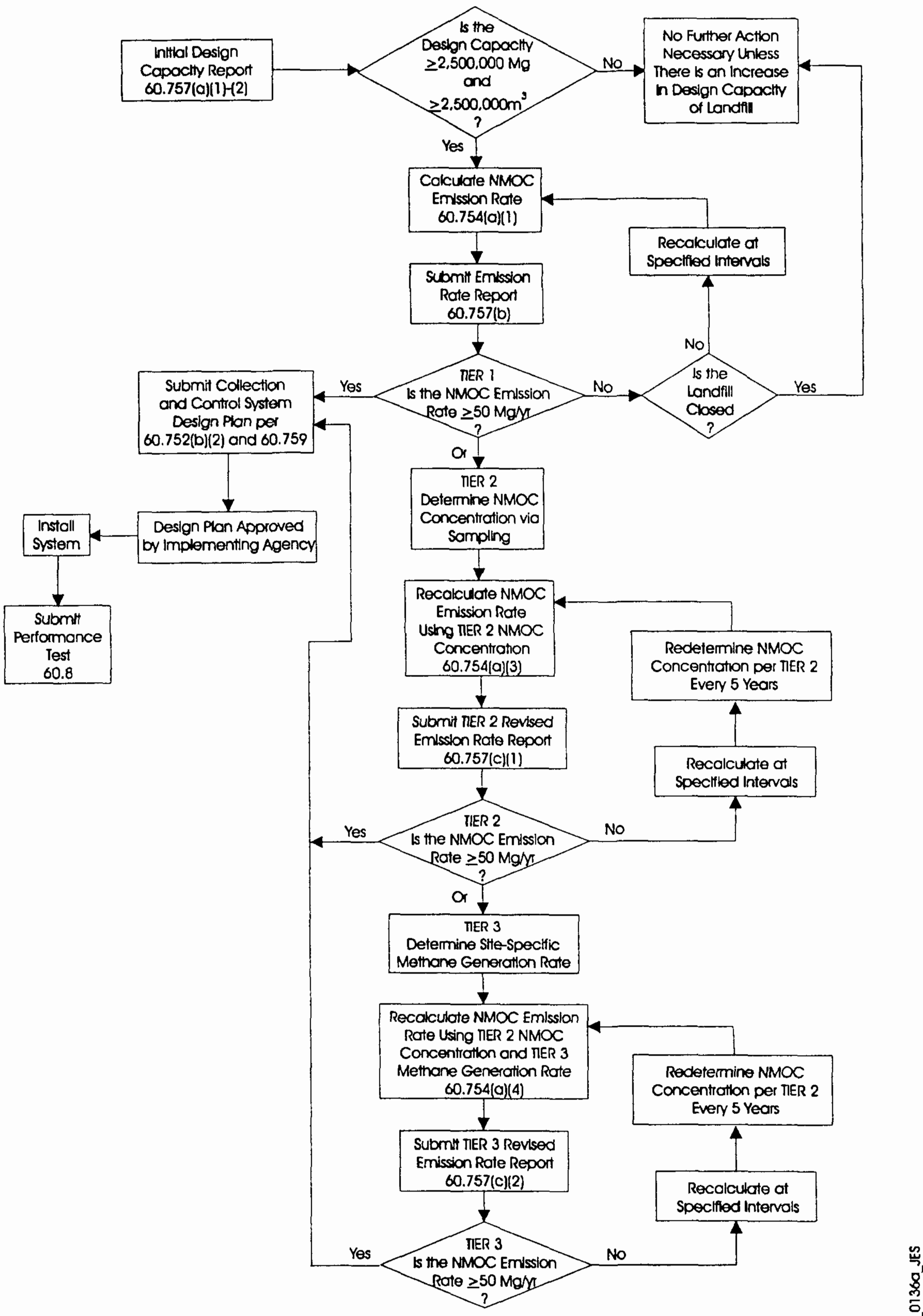

Figure I-1. Flow Chart for Determining Control Requirements

M_i	=	mass of refuse in the i^{th} section, Mg;
t_i	=	age of the i^{th} section, years;
C_{NMOC}	=	concentration of NMOC, ppmv as hexane; and
3.6×10^{-9}	=	conversion factor.

The total NMOC emission rate for a landfill (M_{NMOC}) is the sum of the NMOC emissions from each landfill section. This equation can be used more easily when the defined landfill section represents accumulated refuse of 1 year. Nondegradable refuse such as asbestos or demolition refuse may be subtracted from the total mass of refuse in a particular landfill section when calculating the value for M_i. Nondegradable waste can be excluded provided the nature and amount of the refuse is documented.

When the actual year-by-year refuse acceptance rate is unknown, an average refuse acceptance rate (R) is determined by dividing the total quantity of refuse currently in place by the age of the landfill. This average refuse acceptance rate (and the default k value) is then used in the following equation to estimate the NMOC emission rate:

$$M_{NMOC} = 2\, L_o\, R\, (e^{-kc} - e^{-kt})\, (C_{NMOC})(3.6 \times 10^{-9})$$

where,

M_{NMOC}	=	mass emission rate of NMOC, Mg/yr;
L_o	=	methane generation potential, m^3/Mg of refuse;
R	=	average annual acceptance rate, Mg/yr;
k	=	methane generation rate constant, year^{-1};
t	=	age of landfill, years;
C_{NMOC}	=	concentration of NMOC, ppmv as hexane;
c	=	time since closure, years. For active landfill c = O and $e^{-kc} = 1$, years; and
3.6×10^{-9}	=	conversion factor.

The result of this equation is the total NMOC emission rate for the entire landfill (or specified section). This equation automatically accounts for variability in NMOC emission rates for refuse in landfill sections with different ages. Nondegradable refuse such as asbestos or demolition refuse may be subtracted from the total mass of refuse currently disposed in a landfill when calculating the R. Nondegradable waste can be excluded provided the nature and amount of the refuse is documented.

Tier 1 calculations are likely to overestimate the NMOC emission rate because the values for k, L_0, and the *NMOC concentration* are conservative. Landfills with Tier 1 NMOC emission rates less than 50 Mg/yr are not required to install emission controls. However, the NMOC emission rate must be recalculated at a specified interval of once a year or once every 5 years for the NMOC emission rate report.

Landfills with Tier 1 NMOC emission rates equal to or greater than 50 Mg/yr are required to submit a gas collection and control system design plan or recalculate the NMOC emission rate by determining the site-specific NMOC concentration. The site-specific NMOC concentration allows for a more accurate estimate of the NMOC emission rate. The procedures for determining a site-specific NMOC concentration are detailed in Tier 2.

Tier 2 Procedures

Under Tier 2, the landfill owner/operator conducts sampling to determine a site-specific NMOC concentration. This site-specific value will be substituted for the default NMOC concentration used in the Tier 1 equation. The general sampling procedures for determining a site-specific NMOC concentration are as follows:

(1) Install a minimum of two gas sampling probes per hectare of landfill surface that has retained refuse for at least 2 years. In the unlikely event that landfill emission are equal to or greater than 50 Mg/yr and none of the landfill has retained waste for at least 2 years, the landfill owner/operator may wait until the first waste deposited is 2 years old before conducting Tier 2 sampling. Landfills with a surface area greater than 25 hectares only need to install a maximum of 50 sampling probes;

(2) Collect and analyze one gas sample from each sample probe following the procedures in EPA Method 25C or EPA Method 18. An alternative testing

method can be used as long as the method has been approved by the implementing agency;

(3) If composite gas samples are used, they must be created using equal gas volumes from each sample probe;

(4) All gathered gas samples must be used in the analysis; and

(5) Divide the NMOC concentration determined by Method 25C by six to convert the concentration basis from total carbon to hexane.

A landfill owner/operator is required to submit a gas Collection and Control System Design Plan if a site-specific NMOC concentration results in a recalculated NMOC emission rate equal to or greater than 50 Mg/yr. As an alternative, a landfill owner/operator may recalculate the NMOC emission rate by determining the site-specific methane generation rate constant. This additional site-specific measurement, in conjunction with the site-specific NMOC concentration, allows for the most accurate estimate of the NMOC emission rate. The procedures for determining a site-specific gas generation rate constant are detailed in Tier 3.

If a site-specific NMOC concentration results in a recalculated NMOC emission rate less than 50 Mg/yr, a landfill owner/operator must recalculate the NMOC emission rate at a specified interval of once a year or once every 5 years for the NMOC emission rate report. Annual Tier 2 NMOC emission rate reports are due on the anniversary of the Initial Tier 1 report submittal. The site-specific NMOC concentration used in the Tier 2 (or Tier 3) calculations must be recalculated at least once every 5 years.

Tier 3 Procedures

Under Tier 3, the landfill owner/operator conducts additional sampling to determine a site-specific methane generation rate constant, k. This site-specific k will be determined following the procedures in EPA Method 2E. An alternative testing method can be used as long as the method has been approved by the implementing agency. The default values for k and the NMOC concentration used in the Tier 1 equation will be replaced with the site-specific values. The general sampling procedures for determining a site-specific k includes the installation of extraction wells either in a cluster of three or at five locations dispersed throughout the landfill.

A blower is used to create a negative pressure gradient between the extraction well and the surrounding refuse. Extracted landfill gas is analyzed for volumetric flow rate, composition, and the landfill pressure near the extraction well. For each extraction well, these data are used to determine the site-specific methane generation rate constant for a landfill.

If a site-specific k and NMOC concentration result in a recalculated NMOC emission rate equal to or greater than 50 Mg/yr, a landfill owner/operator is required to submit a gas Collection and Control System Design Plan. For those landfills where the recalculated NMOC emission rate is less than 50 Mg/yr, a landfill owner/operator must recalculate the NMOC emission rate at a specified interval of once a year or once every 5 years for the NMOC emission rate report. The site-specific NMOC concentration must be determined at least once every 5 years. However, the site-specific value for k is determined once for the landfill.

The cost of Method 2E testing for Tier 3 can be significant, especially for a small landfill. It is unlikely that a site-specific Tier 3 evaluation will lower the annual NMOC emission estimate below the 50 Mg/yr threshold unless the Tier 2 emission estimate is only slightly higher than this threshold. Dry, arid regions may show a more significant lowering of emissions at Tier 3 than wet regions. The likelihood that Tier 3 will indicate an emission rate less than 50 Mg/yr should be assessed before performing Tier 3 measurements. For example, the owner/operator could utilize the EPA's landfill air emissions model (see Appendix J) to assess by trial and error the k value necessary to achieve an emission rate below the 50 Mg/yr threshold, based on the site-specific disposal history and the measured Tier 2 NMOC concentrations. Information on typical ranges for k values could be reviewed to judge the likelihood of obtaining the necessary k value from a Tier 3 test.

After Installing Controls

After the installation of a gas collection and control system at a landfill, a landfill owner/operator must calculate the NMOC emission rate for purposes of determining when the control system can be removed. The following equation is used:

$$M_{NMOC} = 1.89 \times 10^{-3} * Q_{LFG} * C_{NMOC}$$

where,

M_{NMOC}	=	mass emission rate of NMOC, Mg/yr;
Q_{LFG}	=	flow rate of landfill gas entering the control system, m^3/min; and
C_{NMOC}	=	NMOC concentration as measured in the gas collection common header pipe, ppmv as hexane.

The landfill gas flow rate must be determined by measuring the total LFG flow rate at the common header pipe that leads to the control device. A gas-measuring device calibrated according to provisions of Section 4 of Method 2E must be used. The average NMOC concentration must be determined by collecting and analyzing LFG sampled from the common header pipe using Method 25C or Method 18. The sample location must be prior to any gas moving, condensate removal, or other gas refining equipment. The resulting NMOC concentration as determined by Method 25C must be divided by six to convert the concentration basis from total carbon to hexane.

Special Situations

Questions have arisen as to how to calculate emissions from landfills that already have control systems. Two of these questions are discussed below:

1. Question: If an existing landfill greater than 2.5 million Mg and 2.5 million m^3 already has a collection system in place that is controlled, how should it be determined if it emits NMOC greater than less/than 50 Mg/yr? Under Tier 1 calculations they would probably show landfill gas emissions ≥ 50 Mg/yr. Tier 2 calculations also may not be appropriate.

1. Discussion: This issue was raised in one case where Tier 1 calculations for a landfill that already had a control system indicated emissions greater than 50 Mg/yr. The tier procedures in the NSPS do not specifically address how to estimate uncontrolled emissions from already controlled landfills for purposes of determining if the emissions exceed 50 Mg/yr and whether the landfill must meet the NSPS or EG control requirements and emission limits. The State agency reasoned that to determine uncontrolled emissions for a landfill with a collection and control system already in place, it would be appropriate to use the equation and NMOC concentrations measurement procedure in § 60.754(b). This equation is the one used for controlled landfills to determine if uncontrolled emissions have fallen below 50 Mg/yr such that the control system can be removed.

Using this approach, landfills that already have collection and control systems would calculate uncontrolled NMOC emissions for the portion of the landfill from which gas is collected using the equation and NMOC concentration measurement procedures in § 60.754(b). (If there are areas of the landfill from which gas is not collected, the tier procedures would be used for these areas.) In order for the equation in § 60.754(b) to be appropriate, the collection system must be well designed and operated. In particular, for an active collection system, a negative pressure should be maintained at the wellheads without excess air infiltration. Also, if surface monitoring has been done at the landfill, it should show methane concentrations below 500 ppm.

In addition to using the equation found in § 60.654(b) in combination with the actual measured NMOC concentration collected at the header, the NMOC concentration measured at the header could also be used in the equation found in § 60.754(a)(1) to determine if the landfill should be subject to the requirements found in the NSPS or EG.

If total uncontrolled emissions are <50 Mg/yr, the landfill is not subject to the control requirements of the NSPS or EG, but must continue to submit annual NMOC emission rate reports (unless it is closed). If the annual NMOC report shows that the uncontrolled emission rate has increased to 50 Mg/yr or greater, the landfill would become subject to the control requirements of the NSPS or EG. The landfill would then have 1 year to submit a design plan to either document that the existing system meets the requirements of the NSPS or EG or to specify plans to upgrade the system to achieve compliance. The landfill would need to come into compliance and begin required testing and monitoring within the time frames specified in the NSPS or EG.

2. **Question:** Can a landfill with uncontrolled emissions ≥50 Mg/yr install a control system that does not meet NSPS or EG requirements to reduce actual emissions to <50 Mg/yr and thereby avoid being subject to NSPS or EG control requirements?

2. **Discussion:** No. As explained in the answer to the previous question, the uncontrolled emission rate is used to determine whether the landfill is subject to NSPS or EG control requirements.

APPENDIX J

COMPUTER MODEL FOR LANDFILL AIR EMISSIONS ESTIMATION

APPENDIX J

COMPUTER MODEL FOR LANDFILL AIR EMISSIONS ESTIMATION

The U.S. Environmental Protection Agency sponsored the development of a computer model to provide individuals with the ability to estimate gaseous emissions from landfills. The Landfill Air Emissions Estimation Model, available for Windows™, utilizes a first-order decomposition model to estimate emissions of methane, carbon dioxide, NMOC and pollutants regulated under the Clean Air Act Amendments. The model combines user-entered landfill operating characteristics with defaults derived from either the landfills NSPS and EG or AP-42 to provide yearly estimates of gaseous emissions. These estimates may be displayed as text or in graphical depictions. The model also allows the user to replace internal defaults with landfill-specific parameters to refine the calculations for a specific site. Version 2.0 was released in February 1998.

The model is consistent with the equations specified in the landfill NSPS and EG for calculating NMOC emissions. Landfills using the model to calculate annual emission rates for purposes of NSPS applicability determination must use the NSPS default values rather than the AP-42 default values.

A package with a diskette containing the model as well as the user's guide is available under the title: "Landfill Gas Emissions Model, User's Manual," Version 2.0 and may be purchased from:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: (703) 487-4650

or accessed on the EPA TTN Web at http://www.epa.gov/ttn/catc/products.html#software. Additionally, information or questions regarding the model and its operation may be obtained from Susan A Thorneloe, the EPA Project Officer overseeing its development. She may be contacted at:

Air and Energy Engineering Research Laboratory
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711
Telephone: (919) 541-2709

APPENDIX K

LANDFILL REPORT LOG

LANDFILL REPORT LOG

This log provides a means of tracking reports from landfills and indicates the next report expected from the landfill. As reports are received, this log should be completed. Instructions for filling out this log are listed below.

1. Enter the facility name and contact person's name and telephone number in the spaces provided.

2. The due date of the first report (Initial Design Capacity Report) is June 10, 1996 for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996, or 90 days after the date the landfill commenced construction, modification, or reconstruction for landfills that do so on or after March 12, 1996. Therefore, enter the appropriate date in the space labeled "Trigger Date" provided in the upper left corner of the log.

3. Enter the due date of the Initial Design Capacity Report. See footnote "a" for a description on computing the due date.

4. Note that the due date for the Initial NMOC Emission Rate Report is the same as for the Initial Design Capacity Report. However, if the design capacity is less than 2.5 million Mg or 2.5 million m^3 of MSW, an NMOC Emission Rate Report is not required.

5. The due date is the date that the regulations require the report to be submitted. When reports are received, enter the date of the postmark. This date is effectively the date the report was submitted. If the submittal date is late, penalties may be considered.

6. The far right column describes the next action to track the reports. These actions indicate the next report expected from the landfill. For example, if the NMOC emission rate is equal to or greater than 50 Mg/yr, the next report expected from the landfill is the Collection and Control System Design Plan or the Revised NMOC Emission Rate Report based on Tier 2 procedures. Footnotes indicate how to calculate the due date of each report.

7. Two attached forms, Attachments A and B, are to be used in the cases of reports that will be received annually. Attachment A is to be used to track the annual NMOC Emission Rate Reports. These reports will be submitted annually or every 5 years if specific criteria are met and as long as the emission rate is less than 50 Mg/yr. Attachment B is to be used to track the Annual Compliance Reports. These reports will be submitted every 12 months after a collection and control system is installed. All landfills with capacities

greater than 2.5 million Mg and 2.5 million m^3 must submit either the NMOC Emission Rate Reports or the Annual Reports.

LANDFILL REPORT LOG

Trigger Date

___/___/___

FACILITY NAME: ______________________

CONTACT PERSON. ______________________

TELEPHONE NUMBER: ______________________

#	Report	Due Date	Date Postmarked	Acceptable (yes or no)	Comments	Actions if Report is Acceptable
1	Initial Design Capacity Report[a]					If capacity is $\geq$ 2.5 million Mg and 2.5 million m^3, go to #2. If capacity is < 2.5 million Mg or 2.5 million m^3, no further action is required unless capacity is increased.
2	Initial NMOC Emission Rate Report[b]					If NMOC emission rate is $\geq$ 50 Mg, go to #3 or #4. If NMOC emission rate is < 50 Mg, go to Attachment A (NMOC emission rate report tracking form).
3	Collection and Control System Design Plan[c]					Go to Attachment B (Annual report tracking form).
4	Revised NMOC Emission Rate Report (Tier 2)[d]					If NMOC emission rate is $\geq$ 50 Mg, go to #3 or #5. If NMOC emission rate is < 50 Mg, go to Attachment A (NMOC emission rate report tracking form).
5	Revised NMOC Emission Rate Report (Tier 3)[e]					If NMOC emission rate is $\geq$ 50 Mg, go to #3. If NMOC emission rate is < 50 Mg, go to Attachment A (NMOC emission rate report tracking form).
6	Landfill Closure Report[f]					
7	Control Equipment Removal Report[g]					
8	Amended Design Capacity Report[h]					If the amended design capacity is $\geq$ 2.5 million Mg and 2.5 million m^3, go to #2. If capacity is < 2.5 million Mg or 2.5 million m^3, no further action is required unless capacity is increased.

[a]The Initial Design Capacity Report is due no later than:

1. June 10, 1996 for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991 but before March 12, 1996, or
2. 90 days after the date the landfill commenced construction, modification, or reconstruction on or after March 12, 1996.

[b]The Initial NMOC Emission Rate Report is due by the same date as the Initial Design Capacity Report.

[c]1 year after reporting ≥50 Mg/yr of NMOC.

[d]180 days after reporting ≥50 Mg/yr of NMOC.

[e]1 year after reporting ≥50 Mg/yr of NMOC.

[f]within 30 days after ceasing to accept MSW.

[g]The Control Equipment Removal Report is required to be submitted 30 days prior to removal or ceasing to operate the control equipment. In addition, the following three conditions must be met prior to removing controls:

1. closure report has been submitted,
2. controls have been operated for at least 15 years, and
3. three consecutive NMOC emission rate reports have demonstrated emissions < 50 Mg/yr.

[h]The Amended Design Capacity Report must be submitted within 90 days of an increase in the maximum design capacity of the landfill above the 2.5 million Mg and 2.5 million m^3 size exemption.

TECHNICAL REPORT DATA

(Please read Instructions on reverse before completing)

1. REPORT NO. EPA-453R/96-004	2	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Municipal Solid Waste Landfills, Volume 1: Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills		5. REPORT DATE September 1998
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Research Triangle Park, NC 27711		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Director Office of Air Quality Planning and Standards Office of Air and Radiation U.S. Environmental Protection Agency Research Triangle Park, NC 27711		13. TYPE OF REPORT AND PERIOD COVERED
		14. SPONSORING AGENCY CODE EPA/200/04

15 SUPPLEMENTARY NOTES

This volume is one of several documents designed to assist States, EPA regional offices, and municipal solid waste (MSW) landfill owners and operators in implementing the New Source Performance Standards (NSPS) and Emission Guidelines (EG) for MSW landfills. Full references to all related documents are provided. Enclosed is a summary of the NSPS and EG and the control, monitoring, recordkeeping and reporting requirements. Explanations are included to help implementing agencies determine applicability, ensure compliance, collect and review reports, and conduct inspections. The appendices include tools for ensuring compliance.

17 KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
	Air Pollution control	

18. DISTRIBUTION STATEMENT Release Unlimited	19 SECURITY CLASS *(Report)* Unclassified	21 NO OF PAGES
	20 SECURITY CLASS *(Page)* Unclassified	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

LANDFILL REPORT LOG

ATTACHMENT A: NMOC EMISSION RATE REPORTS

#	Report	Due Date	Date Postmarked	Acceptable (yes or no)	NMOC Emission Rate[a] (Mg/yr)	Comments
A-1	Initial NMOC Emission Rate Report[b,c]					
A-2	2nd NMOC Emission Rate Report					
A-3	3rd NMOC Emission Rate Report					
A-4	4th NMOC Emission Rate Report					
A-5	5th NMOC Emission Rate Report					
A-6	6th NMOC Emission Rate Report					
A-7[d]	7th NMOC Emission Rate Report					

[a]If NMOC emission rate is $\geq$ 50 Mg, go to #3 or #4 on Landfill Report Log If NMOC emission rate is < 50 Mg, go to next row.

[b]Complete the information for the Initial NMOC Emission Rate Report using the information from the Landfill Report log.

[c]Subsequent NMOC Emission Rate Reports are due annually after the initial report. However, if the projected emission rate is < 50 Mg in each of 5 consecutive years, the NMOC Emission Rate Report may be submitted every 5 years

[d]Add rows as necessary.

LANDFILL REPORT LOG

ATTACHMENT B: ANNUAL REPORTS

#	Report	Due Date	Date Postmarked	Acceptable (yes or no)	Any Exceedances?[a] (yes or no)	Comments
B-1	Initial Performance Test and Annual Report[b,c]					
B-2	2nd Annual Report					
B-3	3rd Annual Report					
B-4	4th Annual Report					
B-5	5th Annual Report					
B-6	6th Annual Report					
B-7	7th Annual Report					
B-8	8th Annual Report					
B-9[d]	9th Annual Report					

[a]Refer to the appropriate Annual Report for details on exceedances

[b]The Initial Performance Test and Annual Reports are due within 180 days of installation and start-up of collection and control system.

[c]Subsequent Annual Reports are due every 12 months thereafter, as long as the collection and control system are operating.

[d]Add rows as necessary.