

Estado Libre Asociado de Puerto Rico / Oficina de la Gobernadora  
Junta de Calidad Ambiental

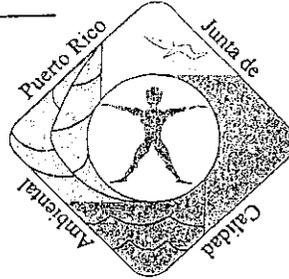
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RECIBIDO: Aida Sepveda  
ENTREGADO: Ferdinand Mercado  
FECHA: 21 Abril 2001  
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DEPARTAMENTO DE ESTADO

NUM. 6303  
FECHA: 21-MARZO-2001  
3:08 P.M.



APROBADA: Hon. Ferdinand Mercado  
Secretario de Estado

POR: [Signature]  
Secretaria Auxiliar de Servicios

Enmiendas al Reglamento para el Control de la Contaminación  
Atmosférica de la Junta de Calidad Ambiental para cumplir con  
los requisitos para Planes Estatales de la Sección 111(d) de la  
Ley Federal de Aire Limpio para implantar las Guías de  
Emisiones para Sistemas de Relleno Sanitario



## CERTIFICACION

**CERTIFICO** que el Reglamento 6303 *Guías de Emisión para Sistemas de Relleno Sanitario Municipales (versión español e inglés)* adjunto son una copia fiel y exacta del original radicado en el Departamento de Estado el 21 de marzo de 2001.

En San Juan, Puerto Rico a 2 de abril de 2001.

**ELSY E. FERNANDEZ GARCÍA**

Secretaria

Junta de Gobierno

VOLANTE SUPLETORIO

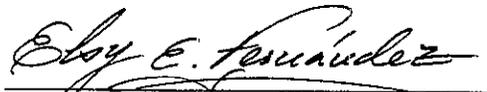
- |   |   |   |  |
|---|---|---|--|
| 1 | Referencia a todo reglamento que se enmiende o derogue mediante la adopción del presente Reglamento | : | Enmiendas al Reglamento para el Control de la Contaminación Atmosférica Regla 102 y VII  |
| 2 | Fecha de aprobación   | : | 10 de enero de 2001  |
| 3 | Persona o personas que lo aprobaron   | : | La Junta de Gobierno,<br>reunida en pleno, compuesta por:<br><br>Lcdo Héctor Russe Martínez<br>Presidente<br><br>Ing Jorge Marrero Huertas<br>Vicepresidente |
| 4 | Fecha de Publicación en Periódicos  | : | San Juan Star – 3 de agosto de 2001<br>El Vocero – 3 de agosto de 2001   |
| 5 | Fecha de Efectividad  | : | 30 días después de su radicación en el Departamento de Estado  |
| 6 | Fecha de Radicación   | : | 21 de marzo de 2001  |
| 7 | Reglamento Número   | : | <u>6303</u>  |
| 8 | Oficina donde se aprobó   | : | Junta de Calidad Ambiental<br>Edificio Nacional Plaza<br>431 Ave Ponce de León<br>Hato Rey, Puerto Rico  |
| 9 | Referencia sobre la autoridad estatutaria para promulgar reglamentos                                | : | Ley Núm. 9 del 18 de junio de 1970, según enmendada, conocida como la Ley sobre Política Pública Ambiental de Puerto Rico.                                   |

CERTIFICACIÓN

Certifico que el procedimiento de reglamentación seguido en este caso se llevó a tenor con las disposiciones de Ley Número 170 de 12 de agosto de 1988, según enmendada; y que el reglamento a que se hace referencia este Volante Supletorio fue debidamente revisado y no contiene errores sustantivos o tipográficos

21 de marzo 2001

Fecha



Secretaria de la Junta de Gobierno  
Junta de Calidad Ambiental

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## **RULE 102 DEFINITIONS**

### **Active Collection System**

Means a gas collection system that uses Gas Mover Equipment.

### **Active Sanitary Landfill System**

Any parts of a facility or unit that has received or is receiving wastes and has not been closed.

### **Administrator**

Means the Administrator of the United States Environmental Protection Agency (EPA).

### **Board**

Means the Environmental Quality Board (EQB) of the Commonwealth of Puerto Rico.

### **Closed Sanitary Landfill System**

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 40CFR 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 40CFR 258.60.

### **Closure (For the purpose of Part VII)**

The act of shutting down an installation for the storage, treatment or disposal of solid waste after it or any portion of it has ceased of receiving, in a way that satisfies the conditions and requirements prescribed by the rules of the EQB Non-Hazardous Solid Waste Regulation.

### **Controlled Sanitary Landfill System**

Means any SLS at which collection and control systems are required under the Part VII as a result of the nonmethane organic compounds emission rate. The SLS is considered controlled at the time a collection and control system design plan is submitted in compliance with Rule 702(f)(1)

**Design Capacity**

Means the maximum amount of solid waste a SLS can accept, as specified in the construction or operating permit issued by the EQB

**Effectively Capture**

Means the gas collection obtained by a collection system that meets the criteria specified in Rule 702(f)(2).

**Enclosed Combustor**

Means an enclosed fire box which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an Enclosed Combustor.

**EPA**

Means the United States Environmental Protection Agency.

**EQB**

Means the Board; the Environmental Quality Board of the Commonwealth of Puerto Rico

**Flare**

Means an open combustor without enclosure or shroud.

**Gas Mover Equipment**

Means the equipment (i.e., fan, blower, compressor) used to move SLS gas through the header system

**Industrial Solid Waste (For the purpose of Part VII)**

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, and Parts 264 and 265 of Title 40. 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.

**Lateral expansion (For the purpose of Part VII)**

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.

**Modification (For the purpose of Part VII)**

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. A modification does not occur until the owner or operator commences construction on the horizontal or vertical expansion.

**Municipal Sanitary Landfill System or Municipal SLS (For the purpose of Part VII)**

See "Sanitary Landfill System".

**Municipal Sanitary Landfill System Emissions or Municipal SLS Emissions**

Means gas generated by the decomposition of organic waste deposited in an Municipal SLS or derived from the evolution of organic compounds in the waste.

**NMOC**

Means nonmethane organic compounds, as measured according to the provisions of 40CFR 60.754 and Rule 704 of this Regulation.

**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 combustion ash, and metals.

**Passive Collection System**

Means a gas collection system that solely uses positive pressure within the SLS to move the gas rather than using Gas Mover Equipment.

**Sanitary Landfill System or SLS (For the purpose of Part VII)**

Means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An SLS 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 SLS may be separated by access roads. An SLS may be publicly or privately owned. An SLS may be a new SLS, an existing SLS, or a lateral expansion.

**Sludge (For the purpose of Part VII)**

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 (For the purpose of Part VII)**

Means any garbage, or refuse, 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 the Part VII of this regulation.

**Sufficient Extraction Rate**

Means a rate sufficient to maintain a negative pressure during normal operation 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.

**PART VII EMISSION GUIDELINES AND COMPLIANCE SCHEDULE FOR MUNICIPAL SANITARY LANDFILL SYSTEM**

**RULE 701 APPLICABILITY**

The provisions of this Part VII apply to each existing municipal Sanitary Landfill System (SLS) for which construction, reconstruction or modification was commenced before May 30, 1991. Physical or operational changes made to an existing municipal SLS solely to comply with the provisions of this Part are not considered a modification or reconstruction. Activities required by or conducted pursuant to a CERCLA, RCRA, or State remedial action are not considered construction, reconstruction, or modification.

The provisions of this Part 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.

**RULE 702 EMISSION GUIDELINES FOR MUNICIPAL SANITARY LANDFILL SYSTEM EMISSIONS**

**(a) Affected Facilities**

Any municipal SLS meeting the following three conditions must meet the control requirements listed in Rule 702(f):

- (1) The SLS has accepted waste at any time since November 8, 1987, or has additional Design Capacity available for future waste disposal;
- (2) The SLS has a Design Capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters. The SLS 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 initial design capacity report; and
- (3) The SLS has a nonmethane organic compound (hereinafter "NMOC") emission rate of equal to or greater than 50 megagrams per year.

**(b) Initial Design Capacity Report**

The owner or operator of a municipal SLS 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 Board in compliance with Rule 707(a). The

owner or operator of a SLS 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.

- (1) The owner or operator shall submit to the Board an amended design capacity report, as provided for in Rule 707(a)(3), when there is any increase in the Design Capacity of a SLS subject to the provisions of this Part, whether the increase results from an increase in the area or depth of the SLS, a change in the operating procedures of the SLS, or any other means.
- (2) If any increase in the Design Capacity of a SLS 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 Rule 702(d).

**(c) Permitting Requirements**

- (1) For purposes of Part VI, a SLS with a Design Capacity less than 2.5 million megagrams or 2.5 million cubic meters does not require an operating permit under Part VI of these regulations, unless it is a major source for any other reason. A closed SLS not subject to the requirements of Part VI is exempted to comply with the permits requirements of Rules 203 and 204 of the Regulations for the Control of Atmospheric Pollution (RCAP). An active SLS not subject to the requirements of Part VI is exempted to comply with the permits requirements of Rules 203 and 204 of the RCAP, if such SLS is not affected by any other regulation and notifies by written to the EQB an exemption claim together with the Design Capacity Report. An active SLS that operates with a previous permit under Rule 204 will be automatically exempted at the expiration of the permit if the exemption status is maintained. When a SLS is closed, and either never needed control or meets the conditions for control system removal specified in Rule 702(f)(4), a Part VI operating permit is no longer required.
- (2) Any existing SLS, active or closed, that is required to submit an initial design capacity report and a first annual emission rate report must do so within 90 days after the effective date of the Federal Plan to implement the Emission Guidelines for Sanitary Landfill Systems or by April 7, 2000. Any existing SLS that is not exempted and that is required to comply with Rules 203 and 204 of the RCAP shall submit a permit application together with above reports. Any existing SLS, active or closed, that is required to comply with Part VI of the RCAP shall submit a Title V permit application within 12 months after the first design capacity report.

**(d) Control Options**

The owner or operator of a municipal SLS having a Design Capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, shall either comply with Rule 702(f)

or calculate an NMOC emission rate for the SLS using the procedures specified in Rule 704. The NMOC emission rate shall be recalculated annually, except as provided in Rule 707(b)(1)(ii). The owner or operator of a municipal SLS subject to Part VII with a Design Capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters is subject to Part VI permitting requirements.

**(e) Requirements for Sanitary Landfills Systems with Emissions less than 50 Mg/Yr**  
If the calculated NMOC emission rate is less than 50 megagrams per year, the owner or operator shall:

- (1) Submit an annual emission report to the Board, or submit an estimate of the NMOC emission rate for the next 5 year period in compliance with Rule 707(b)(1)(ii); and
- (2) Include in the annual report required by Rule 707(b) a recalculation of the NMOC emission rate annually using the procedures specified in Rule 704(a) until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the SLS is closed.
  - (i) If the NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall, within 30 months of the date when the SLS acquired an emission rate of 50 megagrams per year, install a collection and control system, in compliance with Rule 702(f), that Effectively Captures the gas generated within the SLS. The submittal date of the annual report required in Rule 707(b)(1) will determine the date when the condition in Rule 702(a)(3) is met.
  - (ii) If the SLS is permanently closed, a Closure notification shall be submitted to the Board as provided in Rule 707(d).

**(f) Requirements for SLS's with Emission Equal to or Greater than 50 Mg/Yr**

- (1) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall comply with the following compliance schedule:
  - (i) Submit a final site specific collection and control system design plan prepared by a professional engineer to the Board. The owner or operator of the landfill must submit a collection and control system design plan within one year of the date of the initial NMOC emission rate report or the first annual emission rate report showing that the NMOC emission rate is 50 Mg/yr or greater. Existing landfills larger than the design capacity cutoff must submit their initial NMOC

emission rate report with the design capacity report within 90 days of the effective date of the EPA's Federal Plan.

- (A) The collection and control system as described in the plan shall meet the design requirements of paragraph (f)(1)(iv) of this Rule.
  - (B) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, record keeping or reporting provisions of Rule 703 through 708 proposed by the owner or operator and approved by EPA.
  - (C) The collection and control system design plan shall either conform with specifications for Active Collection Systems in Rule 709 or include a demonstration to the EPA satisfaction of the sufficiency of the alternative provisions to Rule 709.
  - (D) The Board shall review the information submitted in the collection and control design plan and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with SLS 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.
  - (E) Approval time for a system design plan is within 120 days of submittal of such plan. The EQB will conduct a preliminary review of the system design and submit its comments to the landfill within 60 days. The landfill owner or operator responds to the comments from the preliminary review within 30 days. The EQB will complete its final review of landfill responses to the agency's preliminary review comments within another 30 days.
- (ii) Award the necessary contracts for construction of collection and control systems or orders for purchase of components within 20 months after the initial NMOC emission rate report or the first annual emission rate showing NMOC emissions equal to or greater than 50 Mg/yr.

- (iii) Initiate on site construction or installation of the collection and control system within 24 months after the initial NMOC emission rate report or the first annual emission rate report showing NMOC emissions equal to or greater than 50 Mg/yr.
- (iv) Complete on site construction or installation of collection and control system within 30 months after the initial NMOC emission rate report or the first annual emission rate report showing NMOC emissions of 50 Mg/yr or greater , that effectively captures the gas generated within the SLS and that meets the following requirements:

(A) An Active Collection System shall:

- (1) Be designed to handle the maximum expected gas flow rate from the entire area of the SLS 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 SLS 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 Rule 702(f)(1) (iv) (A)(1), (2) and (4).
- (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 the 40 CFR Section 258.40 and contained in the Appendices of this Regulation.

- (v) Complete construction in accordance with the design specified in the approved final control plan and connect the landfill gas collection system and air pollution control equipment such that they are fully operating. This final compliance must be achieved within 30 months after the initial NMOC emission rate report or the first annual emission rate report showing NMOC emissions of 50 Mg/yr or greater.
  - (vi) A performance test must be completed within 180 days after the complete construction or installation of the collection and control system and that achieved final compliance.
- (2) Route all the collected gas to a control system that comply with the following requirements:
- (i) An open Flare designed and operated in accordance with the 40 CFR Section 60.18 and the Appendices of this regulation;
  - (ii) A control system designed and operated to reduce NMOC by 98 weight-percent; or
  - (iii) An enclosed combustion device designed and operated to reduce outlet NMOC concentration to less than 20 parts per million as hexane by volume, dry basis at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test, using the test methods specified in Rule 704(h).
    - (A) If a boiler or process heater is used as the control device, the SLS gas stream shall be introduced into the flame zone.
    - (B) 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 Rule 706;
  - (iv) Route the collected gas to a treatment system that processes the 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 (f)(2)(i), (ii), or (iii) of this Rule.
- (3) Operate the collection and control device installed in accordance with the provisions of Rules 703, 705 and 706.

- (4) Cap or remove the collection and control system when all the followings conditions are met:
  - (i) The SLS shall be no longer accepting solid waste and be permanently closed under the requirements of the 40 CFR Section 258.60 and contained in the Appendices of this Regulation. A closure report shall be submitted to the Board as provided in Rule 707(d);
  - (ii) The collection and control system shall have been in operation a minimum of 15 years; and
  - (iii) Following the procedures specified in Rule 704(f) the calculated NMOC gas produced by the SLS 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

**RULE 703 OPERATIONAL STANDARDS FOR COLLECTION AND CONTROL SYSTEMS**

**(a) Operational Requirements**

The owner or operator of an Municipal SLS gas collection and control system shall:

- (1) Operate the collection system such that the gas is collected from each area, cell, or group of cells in the Municipal SLS in which solid waste has been in place for:
  - (i) 5 years or more if active; or
  - (ii) 2 years or more if closed or at final grade;
- (2) Operate the collection system with negative pressure at each wellhead except under the following conditions:
  - (i) there is 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 Rule 707(f)(1);
  - (ii) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;

- (iii) 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 EPA.
- (3) Operate each interior wellhead in the collection system with a SLS 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.
- (i) The nitrogen level shall be determined using Method 3C in Appendix A of 40 CFR Part 60, as incorporated in this regulation, unless an alternative test method is established and approved by EPA.
  - (ii) Unless an alternative test method is established, the oxygen shall be determined by an oxygen meter using Method 3A in Appendix A of 40 CFR Part 60, as incorporated in this regulation, except that:
    - (A) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;
    - (B) A data recorder is not required;
    - (C) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;
    - (D) A calibration error check is not required;
    - (E) The standard drift is more or less  $\pm$  10 percent.
- (4) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the SLS. 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 SLS at 30 meter intervals and where visual observations indicate elevated concentrations of SLS gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that the owner or operator has determined, 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

- (5) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with Rule 702(f)(2). 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 as soon as possible, but no later than 1 hour after detection; and
- (6) Operate the control or treatment system at all times when the collected gas is routed to the system.

**(b) Corrective Action**

If monitoring demonstrates that the operational requirements in Rule 703(a)(2), (3), (4) or (5) are not met, corrective action shall be taken as specified in Rule 705(a)(3) through (5) or Rule 705(c). If corrective actions are taken as specified in Rule 705, the monitored exceedance is not a violation of the operational requirements in this section. A failure to take the necessary corrective actions will constitute a violation.

**RULE 704 TEST METHODS AND PROCEDURES**

**(a) Calculation of NMOC Emissions**

The SLS owner or operator shall calculate the NMOC emission rate using either the equation provided in Rule 704(a)(1) or the equation provided in Rule 704(a)(2). The values to be used in both equations are 0.05 per year for  $k$ , 170 cubic meters per megagram for  $L_0$ , and 4,000 parts per million by volume as hexane for the  $C_{NMOC}$ .

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

$$M_{NMOC} = \sum_{i=1}^n 2 k L_0 M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9})$$

where,

$M_{NMOC}$  = Total NMOC emission rate from the SLS, megagrams per year  
 $k$  = methane generation rate constant, year<sup>-1</sup>

- $L_o =$  methane generation potential, cubic meters per megagram solid waste
- $M_i =$  mass of solid waste in the  $i^{\text{th}}$  section, megagrams
- $t_i =$  age of the  $i^{\text{th}}$  section, years
- $C_{\text{NMOC}} =$  concentration of NMOC, parts per million by volume as hexane
- $3.6 \times 10^{-9} =$  conversion factor

If the owner or operator follows the provisions of Rule 708(d)(2), the mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the SLS when calculating the value for  $M_i$ .

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

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

where,

- $M_{\text{NMOC}} =$  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<sup>-1</sup>
- $t =$  age of SLS, years
- $C_{\text{NMOC}} =$  concentration of NMOC, parts per million by volume as hexane
- $c =$  time since closure, years. For Active SLS  $c = 0$  and  $e^{-kc} = 1$
- $3.6 \times 10^{-9} =$  conversion factor

If the owner or operator follows the documentation provisions of Rule 708(d)(2), the mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the SLS when calculating a value for  $R$ .

#### (b) Tier 1 Emission Calculations

The owner or operator shall compare the calculated NMOC mass emission rate to the standard of 50 megagrams per year.

- (1) If the NMOC emission rate calculated is less than 50 megagrams per year, then the SLS owner shall submit an emission rate report as

provided in Rule 707(b)(1), and shall recalculate the NMOC mass emission rate annually as required under Rule 702(e).

- (2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, then the SLS owner shall either comply with Rule 702(f), or determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in Rule 704(c)

**(c) Tier 2 Emission Calculations**

The SLS owner or operator shall determine the NMOC concentration using the following sampling procedure. The SLS owner or operator shall install at least two sample probes per hectare of SLS surface that has retained waste for at least 2 years. If the SLS 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 SLS gas from each probe to determine the NMOC concentration using Method 25C of appendix A of 40 CFR Part 60 or Method 18 of appendix A of 40 CFR Part 60, and incorporated in this regulation's appendix. If using Method 18, 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 SLS owner or operator shall divide the NMOC concentration from Method 25C of the appendix by six to convert from  $C_{\text{NMOC}}$  as carbon to  $C_{\text{NMOC}}$  as hexane.

- (1) The SLS owner or operator shall recalculate the NMOC mass emission rate using either of the equations provided in Rule 704(a) and using the average NMOC concentration from the collected samples instead of the default value in the equation provided in Rule 704(a).
- (2) 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 SLS owner or operator shall either comply with Rule 702(f), 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 Rule 704(d).
- (3) 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 Rule 707(b)(1) and retest the

site-specific NMOC concentration every 5 years using the methods specified in this section.

**(d) Tier 3 Emission Calculations**

The site-specific methane generation rate constant shall be determined using the procedures provided in Method 2E of appendix A of 40 CFR Part 60, as incorporated in this regulation's appendix. The SLS owner or operator shall estimate the NMOC mass emission rate using equations in Rule 704(a) and using a site-specific methane generation rate constant  $k$ , and the site-specific NMOC concentration as determined in Rule 704(c) instead of the default values provided in Rule 704(a). The SLS owner or operator shall compare the resulting NMOC mass emission rate to the standard of 50 megagrams per year.

- (1) 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 Rule 702(f).
- (2) 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 Rule 707(b)(1) and shall recalculate the NMOC mass emission rate annually, as provided in Rule 707(b)(1) using the equations in Rule 704(a) and using the site-specific methane generation rate constant and NMOC concentration obtained in Rule 704(c). 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.

**(e) Other Emission Calculation Methods**

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 Rule 704(c) and (d) if the method has been approved by the EPA as provided in Rule 702(f)(1)(i)(B).

**(f) Removal of Control Equipment**

After the installation of a collection and control system in compliance with Rule 705, the owner or operator shall calculate the NMOC emission rate for the purposes of determining when the system can be removed as provided in Rule 702(f)(4), using the following equation:

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

where,

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

- (1) The flow rate of SLS gas,  $Q_{\text{LFG}}$ , shall be determined by measuring the total SLS 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 the 40 CFR Part 60 Appendix A and the Appendices of this regulation.
- (2) The average NMOC concentration,  $C_{\text{NMOC}}$ , shall be determined by collecting and analyzing SLS gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18. If using Method 18, 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 SLS owner or operator shall divide the NMOC concentration from Method 25C by six to convert from  $C_{\text{NMOC}}$  as carbon to  $C_{\text{NMOC}}$  as hexane.
- (3) The owner or operator may use another method to determine SLS gas flow rate and NMOC concentration if the method has been approved by the EPA as provided in Rule 702(f)(1)(i)(B).

**(g) Comparison to PSD Levels**

The owner or operator of each Municipal SLS subject to the provisions of this Part shall estimate the NMOC emission rate for comparison to the PSD major source and significance levels as established in 40 CFR Section 51.166 or 52.21 and in the Appendices of this Regulations, using EPA's Compilation of Air Pollutant Emission Factors (AP-42) or other EPA approved measurement procedures. If a collection system, which complies with the provisions in Rule 702(f) is already installed, the owner or operator shall estimate the NMOC emission rate using the procedures provided in Rule 704(f).

**(h) Compliance Determination**

For the performance test required in Rule 702(f)(1)(v), Method 25 or Method 18 of the 40 CFR Part 60 Appendix A and the Appendices of this Regulations 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 EPA as provided by Rule 702(f)(1)(i)(B). If using Method 18 of the

Appendix A, 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:

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

where,

$$\begin{aligned} \text{NMOC}_{\text{in}} &= \text{mass of NMOC entering control device} \\ \text{NMOC}_{\text{out}} &= \text{mass of NMOC exiting control device} \end{aligned}$$

## **RULE 705 COMPLIANCE PROVISIONS**

### **(a) Compliance Methods**

Except as provided in Rule 702(f)(1)(i)(B), the specified methods in Rule 705 shall be used to determine whether the gas collection system is in compliance with Rule 702(f)(1)(iv).

- (1) For the purposes of calculating the maximum expected gas generation flow rate from the SLS to determine compliance with Rule 702(f)(1)(iv)(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 EPA. If  $k$  has been determined as specified in Rule 704(d), 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 SLS is the age of the SLS 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<sup>-1</sup>

- t = age of the SLS at equipment installation plus the time the owner or operator intends to use the Gas Mover Equipment or active life of the SLS, whichever is less. If the equipment is installed after Closure, t is the age of the SLS at installation, years
- c = time since Closure, years (for an Active SLS c = 0 and  $e^{-kc} = 1$ )

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

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

where:

- $Q_M$  = maximum expected gas generation flow rate, cubic meters per year
- k = methane generation rate constant, year<sup>-1</sup>
- $L_o$  = methane generation potential, cubic meters per megagram solid waste
- $M_i$  = mass of solid waste in the i<sup>th</sup> section, megagrams
- $t_i$  = age of the i<sup>th</sup> 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 Rule 705 (a)(1)(i) and (a)(1)(ii). If the SLS is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in Rule 705(a)(1)(i) or (a)(1)(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 Rule 702 (f)(1)(iv)(A)(2), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Board, capable of controlling and extracting gas from all portions of the SLS 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 Rule 702 (f)(1)(iv)(A)(3), the owner or operator shall measure on a monthly basis gauge pressure in the gas collection header at each individual well. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under Rule 703(a)(2). 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 Rule 705(a)(3) during the first 180 days after gas collection system start-up.
- (5) For the purpose of identifying whether excess air infiltration into the SLS is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in Rule 703(a)(3). 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 Rule 702 (f)(1)(iv)(A)(4) through the use of a collection system not conforming to the specifications provided in Rule 709 shall provide information satisfactory to the EPA as specified in Rule 702 (f)(1)(i)(C) demonstrating that off-site migration is being controlled.

**(b) Compliance Methods for Operation Standards**

For purposes of compliance with Rule 703(a)(1), the owner or operator of a Controlled SLS shall place each well or design component as specified in the approved design plan as provided in Rule 702(f)(1)(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) Compliance Methods for Surface Methane Operation Standard**

The following procedures shall be used for compliance with the surface methane operational standard as provided in Rule 703(a)(4)

- (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 Rule 705(d)
- (2) The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the SLS 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 40 CFR Part 60, as incorporated in the appendix of this regulation, 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 owner or operator shall take the specified actions herein established. As long as the following specified actions are taken, the exceedance shall not be a violation of the operational requirements of Rule 703(a)(4)
  - (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
  - (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 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 owner or operator shall take the following specified actions.

- (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 EPA for approval and no further monitoring for the location is required until the action is implemented.
- (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) Instrumentation Specifications for Surface Methane Operational Standard**

The owner or operator seeking to comply with the provisions in paragraph (c) of this rule 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 in this regulation's appendix, 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 in this regulation's appendix, the instrument evaluation procedures of section 4.4 of Method 21 shall be used.
- (4) The calibration procedures provided in section 4.2 of Method 21 shall be followed immediately before commencing a surface monitoring survey.

## **RULE 706 MONITORING OF OPERATIONS**

### **(a) Monitoring for Active Gas Collection Systems**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator seeking to install a collection and control system in compliance with Rule 702(f)(1)(iv)(A) 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 Rule 705(a)(3); and
- (2) Monitor nitrogen or oxygen concentration in the SLS gas on a monthly basis as provided in Rule 705(a)(5); and
- (3) Monitor temperature of the SLS gas on a monthly basis as provided in Rule 705(a)(5).

### **(b) Monitoring for Enclosed Combustor**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator seeking to install an enclosed combustor as a control system in compliance with Rule 702(f)(2) 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 a minimum accuracy of  $\pm 1$  percent of the temperature being measured expressed in degrees Celsius or  $\pm 0.5$  deg.C, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or 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) Monitoring for Open Flare**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator seeking to install an open flare as a control system in compliance with Rule 702(f)(2) 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) Monitoring for Other Control Devices**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator seeking to install a device other than an open Flare or an Enclosed Combustor in compliance with Rule 702(f)(2) shall provide information satisfactory to the EPA describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The EPA shall review the information and either approve it, or request that additional information be submitted. The EPA may specify additional appropriate monitoring procedures.

**(e) Monitoring for Control Devices Meeting Other Specifications**

Except as provided in Rule 702(f)(1)(i)(B), each owner or operator seeking to install a collection system that does not meet the specifications in Rule 709 or seeking to monitor alternative parameters to those required by Rule 703 through Rule 706 shall provide information satisfactory to the EPA describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The EPA may specify additional appropriate monitoring procedures.

**(f) Monitoring for Surface Methane Operational Standard**

Except as provided in Rule 702(f)(1)(i)(B), each owner or operator seeking compliance with Rule 705(c), shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in Rule 705(d). Any Closed SLS 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 SLS to quarterly monitoring.

**RULE 707 REPORTING**

**(a) Initial Design Capacity Report**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator subject to the requirements of this Part shall submit an initial design capacity report to the Board.

- (1) The initial design capacity report shall be submitted within:
  - (i) 90 days after the effective date of the Federal Plan to implement the Emission Guidelines for Sanitary Landfill Systems.
- (2) The initial design capacity report shall contain the following information:
  - (i) A map or plot of the SLS, providing the size and location of the SLS, and identifying all areas where solid waste may be land filled according to the provisions of the EQB or RCRA construction or operating permit;
  - (ii) The maximum Design Capacity of the SLS. Where the maximum Design Capacity is specified in the EQB 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 SLS 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 EQB may request other reasonable information as may be necessary to verify the maximum Design Capacity of the SLS
- (3) An amended design capacity report shall be submitted to the Board to notify any increase in the Design Capacity of the SLS, whether the increase results

from an increase in the permitted area or depth of the SLS, a change in the operating procedures, or any other means which results in an increase in the maximum Design Capacity of the SLS 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) NMOC Emission Rate Report**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator subject to the requirements of this Part shall submit an NMOC emission rate report to the Board initially and annually thereafter, except as provided for in Rule 707 (b)(1)(ii) or (b)(3). The Board 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 Rule 704(a) through (f), as applicable.
  - (i) The initial NMOC emission rate report shall be submitted within 90 days after the effective date of the Federal Plan to implement the Emission Guidelines for Sanitary Landfill Systems, and may be combined with the initial design capacity report required in Rule 707(a). Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in Rule 707(b)(1)(ii) and (b)(3).
  - (ii) If the estimated NMOC emission rate as reported in the annual report to the Board 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 Board. 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 Board. 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) After the installation of a collection and control system in compliance with Rule 702(f), the owner or operator subject to this regulation shall be exempted from the requirements of Rule 707(b)(1) and (2), during such time as the collection and control system is in operation and in compliance with Rules 703 and 705.

**(c) Collection and Control System Design Report**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator subject to the provisions of Rule 702(f)(1) shall submit a collection and control system design plan to the Board within 1 year of the first report required under Rule 707(b), in which the emission rate equals or 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 Rule 704(c) 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 SLS 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 Rule 704(d), 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 Rule 704(d) and the resulting site-specific methane generation rate constant (k) shall be submitted to the Board within 1 year of the first calculated emission rate that equals or exceeds 50 megagrams per year.

**(d) Closure Report**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of a Controlled SLS shall submit a closure report to the Board within 30 days of waste acceptance cessation. The Board may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements established in 40 CFR Section 258.60. If a closure report has been submitted to the Board, no additional wastes may be placed into the SLS without filing a notification of modification as described under the 40 CFR Section 60.7(a)(4).

**(e) Equipment Removal Report**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of a Controlled SLS shall submit an equipment removal report to the Board 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 Rule 707(d);
  - (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 SLS is no longer producing 50 megagrams or greater of NMOC per year.
- (2) The Board may request such additional information as may be necessary to verify that all of the conditions for removal in Rule 702(f)(4) have been met.

**(f) Annual Reports**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of a SLS seeking to comply with Rule 702(f) using an Active Collection System designed in accordance with Rule 702(f)(1)(iv) shall submit to the Board 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 as required under the 40 CFR Section 60.8. For enclosed combustion devices and Flares, reportable exceedances are defined under Rule 708(c).

- (1) Value and length of time for exceedance of applicable parameters monitored under Rule 706(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 Rule 706
- (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 Rule 703(a)(4) 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 Rule 705(a)(3), (b), and (c)(4)

**(g) Initial Performance Test Report**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator seeking to comply with Rule 702(f)(1)(i) shall include the following information with the initial performance test report as required in the 40 CFR Section 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 SLS; and

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

**(h) Other Reporting**

All SLS that are required to comply with Rule 702 (f) shall report to the EQB their achievement towards meeting the increments of progress within sixty (60) days after achieving each of the increment of progress of the compliance schedule.

**RULE 708 RECORDKEEPING**

**(a) Design Capacity Records**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of an Municipal SLS subject to the provisions of Rule 702(d) 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) Control Equipment Records**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of a Controlled SLS shall keep up-to -date, readily accessible records for the life of the control equipment of the data listed in Rule 708(b) 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 of a Municipal SLS seeks to demonstrate compliance with Rule 702(f)(1)(iv), he shall record:

(i) The maximum expected gas generation flow rate as calculated in Rule 705(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 EPA.

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in Rule 709(a)(1).

- (2) Where an owner or operator of a Municipal SLS seeks to demonstrate compliance with Rule 702(f)(2) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity equal to or greater than 44 megawatts, he shall record:
  - (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 Rule 702(f)(2)(ii) and (f)(2)(iii) achieved by the control device.
- (3) Where an owner or operator of a Municipal SLS seeks to demonstrate compliance with Rule 702(f)(2)(iii)(A) through use of a boiler or process heater of any size, he shall record: 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 of a Municipal SLS seeks to demonstrate compliance with Rule 702(f)(2)(i) through use of an open Flare, the Flare type (i.e., steam-assisted, air-assisted, or non-assisted), he shall record 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 40 CFR Section 60.18, as incorporated in this regulation's appendix; 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) Equipment Operating Parameter Records**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of a Controlled SLS subject to the provisions of this Part shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in Rule 706 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 Rule 707(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 °C below the average combustion temperature during the most recent performance test at which compliance with Rule 702(f)(2) 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 Rule 708(b)(3).
- (2) The owner or operator of a Municipal SLS 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 Rule 706
- (3) The owner or operator of a Municipal SLS who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with Rule 702(f)(2) 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 EQB or Federal regulatory requirements.)
- (4) The owner or operator seeking to comply with this regulation 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 Rule 706(c), and up-to-date, readily accessible records of all periods of operation in which the flame or Flare pilot flame is absent

**(d) Other Records**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of a Municipal SLS 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) The owner or operator of a Municipal SLS shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under Rule 705(b).
- (2) The owner or operator of a Municipal SLS 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 Rule 709(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in Rule 709(a)(3)(ii)

**(e) Exceedance of Operational Standards Records**

Except as provided in Rule 702(f)(1)(i)(B), the owner or operator of a Municipal SLS 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 Rule 703, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance

**RULE 709 SPECIFICATIONS FOR ACTIVE COLLECTION SYSTEMS**

**(a) Siting of Active Collection Systems**

The owner or operator seeking to comply with Rule 702(f)(1)(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 Board and EPA as provided in Rule 702(f)(1)(i)(C) and (f)(1)(i)(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 expandability, 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 Rule 709(a)(1) section shall address SLS gas migration issues and augmentation of the collection system through the use of active or passive systems at the SLS perimeter or exterior.
- (3) The placement of gas collection devices determined in Rule 709(a)(1) shall control all gas producing areas, except as provided by Rule 709(a)(3)(i) and (a)(3)(ii)
  - (i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under Rule 708(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 Board upon request

- (ii) Any nonproductive area of the SLS 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 SLS. The amount, location, and age of the material shall be documented and provided to the Board 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 SLS. 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 $i^{\text{th}}$ section, megagrams per year
$k =$	methane generation rate constant, $\text{year}^{-1}$
$L_o =$	ethane generation potential, cubic meters per megagram solid waste
$M_i =$	mass of the degradable solid waste in the $i^{\text{th}}$ section, megagram
$t_i =$	age of the solid waste in the $i^{\text{th}}$ section, years
$C_{NMOC} =$	concentration of nonmethane organic compounds, parts per million by volume
$3.6 \times 10^{-9} =$	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 Rule 704(a) 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 Rule 709(a)(3)(i).

**(b) Construction of Gas Collection Devices**

The owner or operator seeking to comply with Rule 702(f)(1)(i)(A) shall construct the gas collection devices using the following equipment or procedures:

- (1) The SLS 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 SLS. 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 SLS 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) Conveying of SLS Gas**

The owner or operator seeking to comply with Rule 702(f)(1)(i)(A) shall convey the SLS gas to a control system in compliance with Rule 702(f)(2) 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 Rule 709(c)(2) shall be used.
- (2) For new collection systems, the maximum flow rate shall be in accordance with Rule 705(a)(1).

**RULE 710 FAILURE TO COMPLY PENALTIES**

A failure to comply with any of the requirements established in this Part will constitute a violation and the owner of a Municipal SLS will be subject to an administrative order to comply and/or liable to administrative penalties. The penalties will be imposed in accordance with the Commonwealth of Puerto Rico, Environmental Public Policy Act, Act No. 9 of July 18, 1970, as amended, and any other regulation created under it.