Landfill Gas Internal Combustion Engines

Corporate Wide Compliance

A CASE STUDY

Presented By

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Compliance Requirements

State
Title V
State Operating Permits

Landfill
NSPS Subpart WWW
NESHAP Subpart AAAA

Engine
NSPS Subpart JJJJ
NESHAP Subpart ZZZZ
General Compliance Specifications for Project – What Do We Have?

- Spark ignition internal combustion engines firing landfill gas
- Various manufacture and construction dates
- 1,825 hp to 2,233 hp
- Some sites include LFG treatment
- Area source for hazardous air pollutants
Subpart WWW (MSW Landfill NSPS)

§60.752(b)(2)(iii)(B) and (C)

§60.752(b)(2)(iii)(C)  
Landfill Owner

MSW  
Route gas to treatment system for subsequent sale/reuse

§60.752(b)(2)(iii)(B)  
LFGTE Treatment Owner

NMOC reduced by 98% or  
NMOC < 20 ppm
Subpart AAAAA (MSW Landfill NESHAP)

► Comply with MSW Landfill NSPS
► Collection and Control System Startup, Shutdown and Malfunction (SSM) Plans and Reports
► Submit Subpart WWW Annual Report Semi-Annually
NESHAP Subpart ZZZZ
NSPS Subpart JJJJJ

► NESHAP Subpart ZZZZ
  ▪ Existing Area Source, ≥ 500 hp
  ▪ Change oil and filter every 1,440 hrs

► NSPS Subpart JJJJJ
  ▪ ≥ 500 hp, Landfill/Digester Gas
  ▪ NO\textsubscript{x}, CO and VOC emission standards
  ▪ Purchase certified engine
Engine Compliance - Reconstruction

What is reconstruction?
What is Reconstruction?

► Subpart ZZZZ (NESHAP)

- 40 CFR 63 Subpart A definition + applicable dates
  - §63.2: Cost of new components > 50% cost to construct a comparable new source AND feasible to meet new standards
Compliance Strategy

► Recordkeeping and Reporting Practices
► Onsite Recordkeeping
► Other Compliance Practices
Compliance Recordkeeping and Reporting Practices

► Develop Central File Repository
  ▪ File naming system
  ▪ Available to onsite personnel and corporate compliance managers

► Review Air Permits
  ▪ Delegated reviewer/preparer for state electronic reporting
  ▪ Compliance requirements
  ▪ Filing requirements
Compliance Recordkeeping and Reporting Practices

► Evaluate Federal Regulatory Applicability
  ▪ NSPS Subpart JJJJ (Engines)
  ▪ NESHAP Subpart ZZZZ (Engines)
  ▪ NSPS Subpart WWW and NESHAP Subpart AAAA (Gas Treatment)

► Review and Refine Existing Spreadsheets
## Emissions Spreadsheet

### Basic Data
- Permit Dates
- Emission Standards

### Recurring Data
- Test Dates / Results
- Operating Hours (Meter)

<table>
<thead>
<tr>
<th>[Engine ID]</th>
<th>Hours (meter)</th>
<th>Total Hours</th>
<th>Rolling Total (hrs)</th>
<th>Gas Flow to Engine (scfm)</th>
<th>Gas Flow to Engine (dcfm)</th>
<th>MMBtu/hr (Actual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/22/06</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/24/06</td>
<td>1542</td>
<td>308</td>
<td>1542</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/04/07</td>
<td>1782</td>
<td>240</td>
<td>1782</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05/23/07</td>
<td>1900</td>
<td>118</td>
<td>1900</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08/29/07</td>
<td>2200</td>
<td>300</td>
<td>966</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/30/07</td>
<td>2600</td>
<td>400</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02/16/08</td>
<td>3000</td>
<td>400</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rolling total hrs based on:** 12 months

**Rolling total gas flow based on:** 3 months
*Testing required every 3 months for engines running 1,000 hrs in 3 months; otherwise once per year.

<table>
<thead>
<tr>
<th>NO_x</th>
<th>Rolling Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emissions</td>
</tr>
<tr>
<td>(lb/hr)</td>
<td>(tpy)</td>
</tr>
<tr>
<td>2.67</td>
<td>1.6</td>
</tr>
<tr>
<td>2.73</td>
<td>2.1</td>
</tr>
<tr>
<td>2.6</td>
<td>2.3</td>
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<tr>
<td>2.19</td>
<td>2.1</td>
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<td>1.99</td>
<td>1.0</td>
</tr>
<tr>
<td>2.57</td>
<td>1.4</td>
</tr>
<tr>
<td>2.5</td>
<td>1.5</td>
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</table>

Unhide for Historical Permit Conditions -->

[Engine ID] [Facility Eng ID]

Table:

<table>
<thead>
<tr>
<th>Std Effective Date</th>
<th>12/15/08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission Standard (g/hp-hr)</td>
<td>0.6</td>
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<tr>
<td>Emission Standard (lb/hr)</td>
<td>2.87</td>
</tr>
<tr>
<td>Emission Standard (tpy)</td>
<td>12.58</td>
</tr>
<tr>
<td>Basis</td>
<td>10</td>
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</tbody>
</table>

Test Frequency:

<table>
<thead>
<tr>
<th>Months</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours in this Period</td>
<td>998</td>
</tr>
<tr>
<td>Alternate (Months)</td>
<td>12</td>
</tr>
</tbody>
</table>

Next Test Date: 09/02/13

Next Test (Alt): 06/02/14
Compliance Calendar

LFG IC Engines Compliance Calendar

<table>
<thead>
<tr>
<th>Forms Link</th>
<th>Permit Section or Applicable Regulation</th>
<th>Compliance Item</th>
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</thead>
<tbody>
<tr>
<td>11</td>
<td>Title V Permit XXXXX issued January 10, 2011 and Application</td>
<td></td>
</tr>
<tr>
<td>8.A,B</td>
<td>Permit YYYY and PSD-TX-XXXX modified January XX, 20XX and Application</td>
<td></td>
</tr>
<tr>
<td>8.C</td>
<td>Initial Stack Test Results (Life of Permit)</td>
<td></td>
</tr>
<tr>
<td>2.G</td>
<td>SSM Plan issued July 20XX</td>
<td></td>
</tr>
<tr>
<td>2.G</td>
<td>SSM Action Logs (last 5 years)</td>
<td></td>
</tr>
<tr>
<td>3.A, 3.B</td>
<td>V5 Observation Records (Life of Permit)</td>
<td></td>
</tr>
</tbody>
</table>

Document and Records Maintained On Site

Recordkeeping/Compliance Frequency

EPA Reporting Deadline

<table>
<thead>
<tr>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 3</td>
<td>Week 4</td>
</tr>
<tr>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 3</td>
<td>Week 4</td>
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<tr>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 3</td>
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<tr>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 3</td>
<td>Week 4</td>
</tr>
<tr>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 3</td>
<td>Week 4</td>
</tr>
</tbody>
</table>
Onsite Audits
Onsite Audits: Reporting, Recordkeeping and Data Management

► Semi-Annual Compliance Reports

► Deviation Reports

► Record Retrieval System
  ▪ Continue efforts toward central file repository

► Data Recording
  ▪ Manual, automatic
  ▪ Laborious, “on-demand”
  ▪ Emissions spreadsheet
  ▪ Standardized forms
Onsite Audits: RICE Rule

► NESHAP Subpart ZZZZ
  ▪ Monitoring, maintenance and recordkeeping requirements (October 2013)
  ▪ Every 1,440 hours
    ◦ Oil change
    ◦ Inspect spark plug, belt and hoses

► Corporate-wide maintenance intervals ranged from 1,000 – 1,500 hrs
Onsite Audits: Spill Prevention, Control and Countermeasure (SPCC) Plans

► Site Inspection
  ▪ Containment structures
  ▪ Leak prevention
  ▪ Inspection

► Overhead Oil Fill and Discharge Galleys
  ▪ Potential for release
  ▪ Work practices
  ▪ Specific contingency plan

► Initial and Annual Training
Onsite Audits: Start-up, Shutdown and Malfunction (SSM)

- Interview with site personnel
- Piping and Instrumentation Diagrams
  - Potential untreated LFG by-pass
- Engine and Treatment System
  - Valves: fail-safe closed, pneumatic, redundant
Onsite Audits: Start-up, Shutdown and Malfunction (SSM)

- Standardize SSM Documentation Company-wide
- Recordkeeping and reporting for each individual SSM event
- Manual log: Add checkbox for “No discharge of untreated or treated landfill gas has occurred.”
- Manual log: Add steps to be taken if untreated LFG is discharged during a recordable SSM event
Onsite Audit: Observation of Conditions Associated with Frequent OSHA Violations

► Immediately retrievable MSDS for industrial and household products
  ▪ Proper labeling
► Bloodborne pathogen clean-up kits
► Hazard Communication Plan
Conclusions

► Challenging to manage LFGTE facilities with varying compliance requirements

► Understand and verify facility compliance requirements

► Consolidate data and records
  ▪ Emissions spreadsheet

► Provide means of efficient notification
  ▪ Compliance calendar
Conclusions

► Streamline data management
  ▪ Central file repository
  ▪ Standardize forms

► Site specific recordkeeping and data management audit

► SPCC and SSM audit

► Common OSHA violations
Thank You

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