



How to Prepare a Startup, Shutdown, Malfunction Plan for Collection and Control Systems at Municipal Solid Waste Landfills

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**How to Prepare a Startup, Shutdown, Malfunction Plan
for
Collection and Control Systems at
Municipal Solid Waste Landfills**

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**HOW TO PREPARE A
STARTUP, SHUTDOWN, MALFUNCTION PLAN
FOR
COLLECTION AND CONTROL SYSTEMS AT
MUNICIPAL SOLID WASTE LANDFILLS**

Purpose: This document explains how to prepare a startup, shutdown, malfunction plan for municipal solid waste (MSW) landfills. This document is provided for guidance only and should not be used for regulatory interpretation or enforcement purposes. See 40 CFR part 63, subparts A and AAAA for the regulatory requirements for MSW landfills to control hazardous air pollutants.

Intended users: Owners and operators of municipal solid waste landfills should use this document to help determine what to include in their startup, shutdown, malfunction plan. Landfill owners who are required to install a landfill gas collection and control system must prepare a startup, shutdown, malfunction plan for that collection and control system.

NOTE

This guidance is based on the landfills NESHAP (40 CFR part 63, subpart AAAA) as promulgated on January 16, 2003. It is also based on the Part 63 General Provisions (subpart A) as amended on May 30, 2003 (68 FR 32586). These amendments include provisions governing Startup, Shutdown, Malfunction plans and the changes made are reflected in this document. For landfills, the primary concern is with malfunction of the landfill gas collection and control system and associated monitoring equipment, because the landfill itself is not a typical "process" that can be started up or shut down.

The EPA is considering how these May 30, 2003 amendments to the part 63 General Provisions affect SSM Plans for landfills. We plan to amend this SSM Plan guidance document in the future if any clarifications are made to the landfills NSPS and NESHAP that would affect the contents of the SSM Plan. To obtain the latest regulatory information on the landfills NSPS and NESHAP, see www.epa.gov/ttn/atw/landfill/landflpg.html.

TABLE OF CONTENTS

BACKGROUND3

- What requires me to write a startup, shutdown, malfunction plan?3**
- What is meant by startup, shutdown, and malfunction?3**
- How does startup, shutdown, and malfunction apply to landfills?3**
- What is the purpose of a startup, shutdown, malfunction plan?3**
- When must I develop my startup, shutdown, and malfunction plan?4**

DEVELOPING YOUR LANDFILLS SSM PLAN4

- What information should my SSM plan contain?4**
- To which operations at my MSW landfill does the SSM plan apply?5**
- Should I develop tools for meeting the SSM recordkeeping provisions?7**

IMPLEMENTING YOUR LANDFILLS SSM PLAN8

- When am I required to use the SSM plan?8**
- Who sees the SSM plan and how long should I keep it?8**
- When do I need to modify my SSM plan?8**
- Do I have to submit any SSM reports?9**
- Can I combine my SSM reports with other reports?10**

APPENDIX A. EXAMPLE ELEMENTS OF AN SSM PLANA-1

BACKGROUND

What requires me to write a startup, shutdown, malfunction plan?

Sections 63.1955(b) and 63.1960 of subpart AAAA and §63.6(e)(3)(i) of subpart A, General Provisions, require owners or operators of landfills who are required by 40 CFR 60.752(b)(2) of subpart WWW, the landfills Federal plan, or an EPA approved and effective State or Tribal plan to install a collection and control system to develop and implement a written startup, shutdown, and malfunction plan (SSM Plan).

What is meant by startup, shutdown, and malfunction?

Section 63.2 of the General Provisions defines these terms as follows:

•***Startup*** is defined as “the setting in operation of an affected source or portion of an affected source for any purpose.”

•***Shutdown*** is defined as “the cessation of operation of an affected source or portion of an affected source for any purpose.”

•***Malfunction*** is defined as “any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.”

How does startup, shutdown, and malfunction apply to landfills?

The Part 63 General Provisions, which define startup, shutdown, and malfunction, were written for typical industrial or manufacturing sources and associated processes. Many of these sources and processes may, at times, shutdown entirely for clean-out, maintenance, or repairs, then restart the operation. The requirement to prepare an SSM plan is intended to prevent excess emissions when the source or process malfunctions, ceases operation, or commences operation.

A landfill, however, is not a typical affected source that can be started up or shut down. Landfill emissions are produced by a continuous biological process that cannot be stopped or shut down. For the landfills SSM plan, the primary concern is with malfunction of the landfill gas collection and control system and associated monitoring equipment, not with the startup, shutdown, or malfunction of the entire source. Therefore, this guidance and the example elements of an SSM plan (Appendix A) focus primarily on malfunction of the gas collection system, gas control system, and gas treatment system.

What is the purpose of a startup, shutdown, malfunction plan?

The purpose of the plan is to ensure that you:

•Operate and maintain your affected landfill collection and control system during a startup, shutdown, and malfunction event in a manner consistent with safety and good air pollution control practices for minimizing emissions to the levels required by the relevant standards (§63.6(e)(3)(i)(A)).

- Are prepared to correct malfunctions as soon as practicable after their occurrence to minimize excess emissions (§63.6(e)(3)(i)(B)).
- Reduce the reporting burden associated with periods of startup, shutdown, malfunction and the corrective actions taken to restore the malfunctioning equipment to its normal or usual manner of operation (§63.6(e)(3)(i)(C)).

When must I develop my startup, shutdown, and malfunction plan?

- New landfills must develop an SSM Plan by the date the landfill is required to install a collection and control system under the NSPS (§63.1945(c)).
- Existing landfills must develop an SSM Plan by the date the landfill is required to install a collection and control system by the emission guidelines, the landfills Federal plan, or the EPA approved and effective State or Tribal plan that applies to the landfill. If an existing landfill is already required to have a collection and control system, then the SSM Plan must be developed by 1 year after the NESHAP promulgation date, i.e., by January 16, 2004 (§63.1945(d), (f)).

DEVELOPING YOUR LANDFILLS SSM PLAN

What information should my SSM plan contain?

For the purposes of subpart AAAA, the SSM Plan should address the landfill gas collection system and the control system, as well as the required continuous parameter monitoring systems related to the control system (§§63.6(e)(3), 63.1960).

The SSM Plan should describe in detail the following (§63.6(e)(3)):

- Procedures for operating and maintaining the collection and control equipment during startup, shutdown, and malfunction events.
- Program to adequately provide corrective actions to repair the malfunctioning equipment as soon as practicable and to minimize excess emissions of hazardous air pollutants.

NOTE

The Solid Waste Association of North America submitted a letter to EPA inquiring whether time frames for shutdown of landfill gas control devices to conduct routine inspection and maintenance activities, as well as to address malfunctions, could be included in the SSM Plan. The EPA entered the SWANA letter into the public docket (OAR-2003-0215) and is considering rule changes to address the issues raised. We plan to amend this SSM Plan guidance document in the future if any clarifications are made to the landfills NSPS and NESHAP regarding contents of the SSM Plan. To obtain the latest regulatory information on the landfills NSPS and NESHAP, see www.epa.gov/ttn/atw/landfill/landflpg.html.

To which operations at my MSW landfill does the SSM plan apply?

Your SSM Plan applies to the landfill gas collection system and the landfill gas control system and their respective components. The SSM Plan must address the monitoring equipment associated with the control system. As described below, if you treat landfill gas, you must include the system to treat the landfill gas in your SSM Plan.

Gas collection system

Equipment that is used to collect the landfill gas must be included in your SSM Plan. The collection system components include equipment such as the landfill gas lines, landfill gas collection wells, landfill gas collection trenches, the field valves, and the blower. The SSM Plan applies to a malfunction of any part of the landfill gas collection system. Your SSM Plan needs to address procedures you would follow in the event of a malfunction of any collection system equipment, for example, if a blower stops working, a collection well is flooded with water or a collection trench is pinched. See Appendix A for an example showing information you should include in your SSM Plan.

To ensure proper operation of the gas collection system, the landfills NESHAP and NSPS require monthly monitoring of temperature, pressure, and either nitrogen concentration (Method 2A) or oxygen concentration (Method 2C) at each gas collection well and quarterly monitoring of methane concentration at the landfill surface (Method 21). Your SSM plan does not need to address potential failure of portable monitoring equipment that is used to collect these discrete measurements once per month or once per quarter. Failure to conduct a required monthly or quarterly measurement using the specified methods would be a violation of the monitoring requirements of the landfills NESHAP and NSPS. The SSM plan is intended to address malfunctions, not problems caused by poor maintenance. It is a maintenance and operational responsibility of the landfill to have working portable analyzers to conduct these measurements, and to either have a spare analyzer or quickly repair or replace a broken analyzer. The analyzers are off-the-shelf instruments that are readily available and can be quickly replaced. Therefore, a landfill could not realistically claim that a failure of one or these gauges or analyzers was a "malfunction" that caused them to be unable to take a monthly or quarterly measurement. It would serve no purpose to include potential failure of this portable monitoring equipment in SSM plans for the landfills NESHAP.

Similarly, the SSM Plan does not have to describe the actions you would take if the surface monitoring shows an exceedance of the 500 parts per million (ppm) methane level or if the temperature, pressure, nitrogen, or oxygen monitoring at a well head indicates a problem. The NSPS (§60.755) already specifies the corrective actions to be taken in such situations and the length of time allowed to correct the exceedance. Therefore, it is not necessary to include corrective procedures in your SSM Plan.

Gas control system

The gas control system must be included in your SSM Plan. The following control systems, or any approved alternative control system in use at the landfill, must be included in your SSM Plan.

- flare
- engine
- boiler
- turbine

Gas treatment system

The SSM Plan applies to your gas treatment system. Landfill owners and operators have the option of treating landfill gas for subsequent sale or use instead of combusting it. You must include all equipment used to treat the landfill gas prior to sale or use as a fuel, such as equipment used to filter, de-water, and compress the gas. Note that if you choose to treat the landfill gas, you must reduce NMOC emissions from any atmospheric vent from the gas treatment system by 98 weight percent or to less than 20 parts per million by volume (40 CFR 60.752(b)(2)(iii)(C)).

If you combust treated landfill gas, and the treated landfill gas meets the requirements of the regulation, then the combustion device does not have to meet any emission limits or monitoring requirements and you do not have to include the combustion device in your SSM Plan.

Note

The EPA proposed clarifications regarding what constitutes treated landfill gas and the corresponding compliance obligations on May 23, 2002 (67 FR 36476). To view the latest changes to the landfills regulations, visit www.epa.gov/ttn/atw/landfill/landflpg.html.

The following equipment may be used to fulfill the monitoring tasks for the gas control system, as prescribed by rule. You must include monitoring equipment in your SSM Plan.

- Flow recorder. Record gas flow from collection system to the open flare or enclosed combustion device at least once every 15 minutes.
- Temperature monitor with continuous recorder. Monitor the combustion temperature of the enclosed combustion device. The monitor must be equipped with a continuous recorder. (Not required for boilers or process heaters >44 megawatts.)

- Heat sensing device such as UV beam sensor or thermocouple. Monitor continuously the presence of a pilot flame or the flare flame for an open flare

Your SSM Plan must include procedures you will take to correct a malfunction of either the control system or the required continuous monitoring equipment. For example, it must address malfunctions that could cause your control device to shut down or to operate outside the required control device operating conditions. The NESHAP (§§63.1960 and 63.1965) and NSPS (§§60.758(c)(1)) establish the acceptable operating parameter ranges for each type of control device (e.g., the allowable temperature range for an enclosed combustion device).

NOTE

See Appendix A of this document for example information you should include in your SSM Plan. The table in Appendix A does not constitute an entire SSM Plan. Read this entire document and the *General Provisions (40 CFR 63.6(e))* to learn what information your SSM Plan should contain.

Should I develop tools for meeting the SSM recordkeeping provisions?

The SSM Plan should also describe procedures for recording the information listed below (§§63.6(e)(3) and 63.10(b)). The records may take the form of a “checklist” or other effective form of recordkeeping (§§63.6(e)(3)(iii) and 63.10(b)(2)(v)).

- The occurrence and duration of each startup, shutdown, malfunction at your MSW landfill (i.e., collection and control equipment).
- The occurrence and duration of each malfunction of your landfill gas collection and control and monitoring equipment.
- The actions taken to correct the malfunctioning equipment.
- Information to demonstrate that the SSM Plan has been followed.
- Any deviations from the SSM Plan.

You may use a standard operating procedures (SOP) manual, an Occupational Safety and Health Administration (OSHA) plan, or other plan to satisfy the requirements for writing an SSM Plan as long as the other plan meets all the requirements of an SSM Plan, as described in the *General Provisions (§63.6(e)(3)(vi))*.

IMPLEMENTING YOUR SSM PLAN

When am I required to use the SSM plan?

You should use the SSM Plan during all SSM events of your MSW landfill operations, and operate and maintain your MSW landfill gas collection and control system operations in accordance with the procedures specified in the SSM Plan (§§63.6(e)(3)(ii) and 63.1960).

Who sees the SSM plan and how long should I keep it?

- Your SSM Plan should be kept as a record and made available for inspection and submitted upon request to the Administrator (i.e., EPA or a State that has been delegated authority to enforce the NESHAP program) (§§63.6(e)(3)(v) and 63.1980(b)).
- If your SSM Plan is revised, the previous versions should be available for inspection or copying by the Administrator for five (5) years after the revisions are made (§63.6(e)(3)(v)).

When do I need to modify my SSM plan?

You may periodically revise your SSM Plan to reflect changes to your MSW landfill equipment, operations, or procedures (§63.6(e)(viii)). Revise your SSM Plan if any of the following are true:

- SSM Plan does not address an SSM event that has occurred (§63.6(e)(3)(vii)(A)).
- SSM Plan fails to provide for the operation of the air pollution control and monitoring equipment during an SSM event in a manner consistent with safety and good air pollution control practices to minimize emissions (§63.6(e)(3)(vii)(B)).
- SSM Plan does not provide adequate procedures for correcting the malfunctioning process and/or air pollution and monitoring equipment as quickly as practicable (§63.6(e)(3)(vii)(C)).
- SSM Plan includes an event that does not meet the definition of an SSM event listed in §63.2 (§63.6(e)(3)(vii)(D)).

If your SSM Plan fails to address or inadequately addresses an event that meets the definition of a malfunction, you must revise the SSM Plan within 45 days after the event to include detailed procedures for operating and maintaining your MSW landfill operations during similar malfunction events (§63.6(e)(3)(viii)). The revised SSM Plan should include a program of corrective action for similar malfunctions of monitoring or air pollution control equipment. Each revision to the SSM Plan must be reported in your semiannual SSM report (§63.10(d)(5)(i)).

Any revisions made to your SSM Plan as required by Subpart AAAA do not constitute Title V permit revisions. Also, none of the procedures in the SSM Plan fall within the “permit shield” provision in section 504(f) of the Clean Air Act (§63.6(e)(3)(ix)).

NOTE

If the revisions to your SSM Plan alter the scope of SSM activities at your MSW landfill operation or otherwise modify the applicability of any emission limit, work practice requirement, or other requirement in 40 CFR part 60, subpart AAAA, the revised SSM Plan is not effective until you have provided written notice to your permitting authority describing the SSM Plan revision (§63.6(e)(3)(viii)).

Do I have to submit any SSM reports?

Periodic SSM Reports. If an SSM event occurs during a semiannual reporting period, you must submit a semi-annual SSM report (§63.10(d)(5)(i)) with the following information included (§§63.6(e)(3)(iii), 63.10(d)(5)(i), and 63.1980(b)):

- Name, title, and certifying signature of the owner or operator or other responsible official.
- Statement that your actions taken during the SSM event were consistent with the SSM Plan (if this is the case)
- Identification of any instance where any action taken during an SSM event (including actions taken to correct a malfunction) is not consistent with your SSM Plan, but your landfill did not exceed any applicable emission limitation in the landfills NESHAP (63.10(d)(5)(i)).
- The number, duration, and brief description of each SSM event, which caused, or may have caused an applicable emission limit to be exceeded (63.10(d)(5)(i)).

If you revise your SSM Plan to reflect changes to your MSW landfill operations or procedures, you must report each revision to the SSM Plan in your semiannual compliance report (§§63.6(e)(3)(viii) and 63.10(d)(5)(i)).

Immediate SSM Reports. If your actions taken during an SSM event were not consistent with your SSM Plan and your landfill exceeded the applicable emission limitation in the landfills NESHAP, you must report such actions by telephone or facsimile (fax) transmission within two (2) working days after commencing actions inconsistent with the plan. Also, a letter must be sent within seven (7) working days after the end of the SSM event. The letter should include the following information (§§63.6(e)(3)(iv), 63.10(d)(5)(ii)):

- Name, title, certifying signature of the owner/operator or other responsible official.
- Explanation of the circumstances of the event.
- The reasons you did not follow the SSM Plan.

- Describe all excess emissions and/or parameter monitoring exceedances that you believe occurred during the SSM event.

Can I combine my SSM reports with other reports?

If you must submit a semiannual SSM report under 40 CFR 63.10(d)(5) of the general provisions because you had an SSM event during the reporting period, you may combine that report with the semiannual report required by the NESHAP. Per 40 CFR 63.1980(a) of the NESHAP, you must submit the NSPS annual report per 40 CFR 60.757(f) semiannually, not annually. The reports required by §63.1980(a) of the NESHAP and §60.757(f) of the NSPS summarize the collection and control system exceedances. These two semiannual reports contain similar information and may be combined as allowed by §63.10(d)(5)(i) of the General Provisions.

APPENDIX A. EXAMPLE ELEMENTS OF AN SSM PLAN

This appendix contains a table identifying the types of information you should include in your SSM Plan. Information in this appendix serves as only a tool to identify the information you will need to develop and does not address every piece of equipment or situation possible. We do not attempt to prescribe appropriate procedures and actions to follow in the event of a malfunction. The appropriate actions will vary depending on the site-specific design of the landfill gas collection and control system, and on site-specific safety and environmental considerations. You should refer to the landfills NESHAP (40 CFR part 63, subpart AAAAA) and the general provisions (40 CFR part 63, subpart A) that are referenced by Table 1 of subpart AAAAA for the requirements that apply to your landfill.

Table A identifies important elements of your SSM Plan. Although each cell is not complete, the table illustrates the types of information you should include in your SSM Plan. Basically, identify your equipment, anticipate likely malfunction events, and describe corrective action procedures. You may present the information in the most appropriate format for your landfill. We completed the final row of the table to illustrate appropriate information for a failure of the flare.

EQUIPMENT AND PURPOSE. Table A identifies typical equipment located at a MSW landfill that has installed a collection and control system. Specific equipment may vary, but certain equipment is required to fulfill the monitoring requirements of the NESHAP, which requires you to comply with the monitoring requirements in the NSPS/emission guidelines. In the table, the NSPS/emission guidelines monitoring requirements are noted in parentheses.

Include in your SSM Plan, each type of gas collection and control system equipment and control system operating parameter monitoring equipment present at your landfill. For each piece of collection, control, or monitoring equipment, your SSM Plan must show how you will minimize excess emissions of HAP during an SSM event and how you will repair or replace malfunctioning equipment as soon as practicable.

LIKELY MALFUNCTIONS. Include the potential malfunction events and causes for each type of gas collection, control, and control system monitoring equipment present at your landfill. Your SSM Plan will need to describe plans to correct potential malfunctions.

IMMEDIATE ACTION. Your SSM Plan shows how you will minimize emissions should any part of your landfill's collection, control, or monitoring equipment malfunction. To fulfill this requirement, for example, information in the **IMMEDIATE ACTION** column could be part of your program to minimize excess emissions of hazardous air pollutants upon an SSM event.

Immediate actions may include notifying the appropriate landfill staff and initiating immediate actions such as shutoff the flow of landfill gas to the malfunctioning control device or routing landfill gas to a backup control device, if available.

CORRECTIVE ACTION. You must outline your procedures for operating and maintaining the collection and control equipment during an SSM event. In addition to these procedures, you must provide in your SSM Plan a program to repair the malfunctioning equipment as soon as practicable to minimize excess emissions. For example, the **CORRECTIVE ACTION** column could be part of your program to provide corrective actions to repair the malfunctioning equipment as soon as practicable.

Table A. Example Elements of SSM Plans.

As examples to help you identify the types of scenarios to include in your SSM plan, we list below some potential malfunctions and a few possible corrective actions. This table is not comprehensive and does not constitute an entire SSM Plan. You will need to develop procedures for each type of equipment and malfunction scenario appropriate to your landfill. Read this entire document and the General Provisions (40 CFR 63.6(e)) to learn what information your SSM Plan should contain. We have completed the last row in the table as an example.

EQUIPMENT	PURPOSE	LIKELY MALFUNCTION	IMMEDIATE ACTION	CORRECTIVE ACTION
Collection system				
LFG lines	collect LFG			
LFG collection well	collect LFG			
LFG collection trenches	collect LFG			
LFG header pipes	collect LFG			
field valves	control flow of LFG			
blower	move LFG through lines			
Control system				
flow recorder	Record gas flow from collection system to enclosed combustion device (every 15 minutes), unless bypass lines are secured in a closed position (§60.756(b)(2))			

Table A. Example Elements of SSM Plans. (Continued)

EQUIPMENT	PURPOSE	LIKELY MALFUNCTION	IMMEDIATE ACTION	CORRECTIVE ACTION
flow recorder	Record gas flow from collection system to open flare (every 15 minutes), unless bypass lines are secured in a closed position (§60.756(c)(2))			
temperature monitoring device	Monitor and continuously record temperature of enclosed combustion device continuous recorder (§60.756(b)(1))			
UV scanner or thermocouple	Monitor the continuous presence of a pilot flame or the flare flame for an open flare (§60.756(c)(1))			
approved alternative control device	Owner or operator must submit appropriate monitoring requirements for alternative control device (§60.756(d))			
engine	Combust LFG	Power failure Cleanup system failure Compressor failure Instrumentation failure Filter failure Chiller failure Spark plugs Valves Sensors Cooling system Oil system	Notify engineering or maintenance office. LFG automatically redirected to flare.	

Table A. Example Elements of SSM Plans. (Continued)

EQUIPMENT	PURPOSE	LIKELY MALFUNCTION	IMMEDIATE ACTION	CORRECTIVE ACTION
turbine	Combust LFG	Power failure Cleanup system failure Compressor failure Instrumentation failure Filter failure Chiller failure Oil system Sensors	Notify engineering or maintenance office. LFG automatically redirected to flare.	
boiler	Combust LFG	Power failure Condensate system Cleanup system failure Compressor failure Instrumentation failure Filter failure Chiller failure	Notify engineering or maintenance office. LFG automatically redirected to flare.	
flare	combust LFG	Malfunction of sensors Power failure failure of condensate management system Blower failure Blowout of flare due to flow interruption, high wind, or drop in Btu content Blowout of flare due to loss of utility air used to operate instruments and valves	Notify engineering or maintenance office. Automatic shutoff of LFG to the flare.	Restart flare: purge combustible gases from flare, light pilot flame, verify pilot operation, begin flow of LFG
gas treatment system	treat gas prior to sale or use as fuel			

See ***“To which operations at my MSW landfill does the SSM plan apply?”*** section of this document for discussion of applicability of SSM plans to monitoring equipment.

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(Please read Instructions on reverse before completing)

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16 ABSTRACT This document explains how to prepare a startup, shutdown, malfunction plan for municipal solid waste landfills. Landfill owners and operators who are affected by the National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills (landfills NESHAP) and who must install a collection and control system must prepare a startup, shutdown, malfunction plan (SSM plan). For the landfills SSM plan, the primary concern is with malfunction of the landfill gas collection and controls system, not with the startup and shutdown of the entire source. Therefore, the guidance focuses primarily on the malfunction of the gas collection system, gas control system, and gas treatment system. The document describes what information the SSM plan should contain, to which operations the SSM plan applies, and explains how to keep records and reports. Also included is an appendix with example elements of an SSM plan for MSW landfills.		
KEY WORDS AND DOCUMENT ANALYSIS		
a	b	c
DESCRIPTORS	IDENTIFIERS/OPEN ENDED TERMS	COSATI Field/Group
Municipal solid waste landfill Air pollution Clean Air Act NESHAP Startup, shutdown, malfunction plan	Air Pollution control Nonmethane organic compounds Methane	
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