



## AIR QUALITY DIVISION POLICY AND PROCEDURE

### AQD-023: Replacement of Engines, Compressors, or Turbines as Part of a Normal Maintenance Program at Landfill Gas-To-Energy Facilities

Effective Date: June 10, 2016  
Last Reviewed Date: November 21, 2018  
Last Revision Date: November 21, 2018  
Distribution: External/Interpretive

#### ISSUE

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This document was prepared by staff of the Michigan Department of Environmental Quality (MDEQ), Air Quality Division (AQD), on behalf of the Landfill Gas-To-Energy Stakeholders Workgroup, hereinafter “Workgroup.” The purpose of this document is to provide a written record of the Workgroup background and discussions related to the replacement of landfill gas-fueled reciprocating internal combustion engines (hereinafter “engine(s)”) at landfill gas-to-energy facilities.

The AQD is responsible for regulating sources of air pollutants to minimize adverse impact on human health, the environment, and society. The laws governing those responsibilities are the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; and Michigan’s Air Pollution Control Rules.

#### STAKEHOLDER INVOLVEMENT

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An industry stakeholder Workgroup was formed to discuss how landfill gas-fueled engine replacements are to be handled from an AQD regulatory perspective. The Workgroup met at various times from August 2013 through August 2014. During these meetings, Workgroup members discussed different maintenance activities and various approaches that companies take as part of normal maintenance programs at landfill gas-to-energy facilities. In addition, the Workgroup discussed applicable rules, permitting requirements, preventative maintenance practices, reconstruction possibilities, formaldehyde emissions, and landfill gas control technologies. It was recognized that discussions set forth for landfill gas-to-energy facilities could have broader implications across a range of industries which utilize similar equipment. Therefore, the Workgroup was expanded in May 2014 to include other interested parties from the waste industry, the oil and natural gas industries, and the Michigan Manufacturers Association. However, discussions continued to focus on landfill gas-to-energy facilities and the unique issues surrounding landfill gas as a fuel.

Although many topics were discussed during the Workgroup meetings, this document focuses on the replacement of engines as conducted as part of a normal maintenance program at landfill gas-to-energy facilities. A list of participants, additional background information, and meeting minutes are available from the AQD's Permit Section.

## **Discussion**

### **Replacement of Landfill Engines During Maintenance**

As part of normal engine maintenance programs, overhaul and repair activities are conducted that can consist of repairing or replacing components, such as cylinder heads, turbochargers, valves, bearings, and other components. In some cases, routine maintenance of these engines may require removing the engine from service, sending the unit off-site for maintenance, and installing another engine on-site to replace the engine being maintained.

It was also noted that some companies maintain fleets of engines such that an engine at a particular site can be replaced with a "like-kind" unit of the same manufacturer, model, and capacity. These replaced engines undergo repairs and refurbishing as needed and are then deployed to other geographic locations to replace other "like-kind" engines.

In the case of a "like-kind" make and model engine replacement, the size, function, and operation should be identical and; therefore, a change in actual air pollutant emission rates above an enforceable permit limit is not expected. It is noted, however, that emissions test data has shown that emissions can vary from stack test to stack test and this variability can be the result of engine tuning and maintenance practices.

Regardless of whether the engine is considered a "like-kind" replacement, the replacement of an engine may result in a new manufacture date, serial number, and installation date. These parameters may have an impact on the applicability of state and federal rules including New Source Review permitting, federal New Source Performance Standards (NSPS), and federal National Emission Standards for Hazardous Air Pollutants (NESHAP).

### **Michigan's Rule 278, Rule 278a, & Rule 285(2)(a)(vi)**

In the case of a typical engine replacement, the Workgroup agreed that typical engine replacement activities for "like-kind" make and models as part of normal maintenance should have no appreciable increase in emissions above an enforceable limit in a permit and, therefore, should meet the requirements of Rule 278.

In addition, under Rule 278a:

- (1) To be eligible for a specific permit exemption listed in R 336.1280 to R 336.1291, any owner or operator of an exempt process or exempt process equipment must be able to provide information demonstrating the applicability of the exemption. The demonstration may include the following information:*

- (a) A description of the exempt process or process equipment, including the date of installation.*
- (b) The specific exemption being used by the process or process equipment.*
- (c) An analysis demonstrating that R 336.1278 does not apply to the process or process equipment.*
- (2) The demonstration required by this rule shall be provided within 30 days of a written request from the department.*

Rule 278a ensures that owners and operators are able to evaluate and document whether each engine replacement qualifies for the exemption. Information about the equipment must be maintained to clearly show existing engines and their corresponding replacement unit(s) meet the exemption. In addition, it is recommended that companies are required to maintain emissions calculations, stack test data, or other information which demonstrates that emissions do not exceed the thresholds in Rule 278.

Rule 285(2)(a) specifically states:

- (a) Routine maintenance, parts replacement, or other repairs that are considered by the department to be minor, or relocation of process equipment within the same geographical site not involving any appreciable change in the quality, nature, quantity, or impact of the emission of an air contaminant therefrom. Examples of parts replacement or repairs considered by the department to be minor include the following: . . .*
- (vi) Replacement of engines, compressors, or turbines as part of a normal maintenance program.*

After many Workgroup discussions, the AQD concurred with industry stakeholders that the Rule 285(2)(a)(vi) permit exemption may be applied to the replacement of engines, compressors, or turbines as long as the replacement activity was conducted as part of a normal maintenance program. It is noted that engines replaced under Rule 285(2)(a)(vi) would be expected to meet all permit requirements applicable to the originally permitted engines.

#### Modification

According to Rule 113(e), a “modification” means making a physical change in, or change in the method of operations of, existing process or process equipment which increases the amount of any air contaminant emitted into the outer air which is not already allowed to be emitted under the conditions of a permit or order or which results in the emission of any toxic air contaminant into the outer air not previously emitted.

In the case of a “like-kind” make and model engine replacement per Rule 285(2)(a)(vi), the size, function, and operation should be identical and; therefore, a change in actual air pollutant emission rates above an enforceable permit limit is not expected. It is noted, however, that emissions test data has shown that emissions can vary from stack test to stack test and this

variability can be the result of engine tuning and maintenance practices. A stationary engine that is overhauled as part of a maintenance program is not considered a modification if there is no increase in emissions.

In the NSPS provision, 40 CFR 60.14 (e), a modification does not occur for (1) maintenance, repair, and replacement, and (2) relocation or change in ownership of an existing facility. Therefore, simply relocating an engine to replace an existing unit would not trigger new NSPS applicability.

However, replacing an engine as part of engine maintenance may trigger the NESHAP applicability based on the new installation date(s) for each individual engine.

#### New Source Review Permitting for Landfill Engines

Engines installed as an entirely new landfill gas-to-energy emission unit and not as part of an engine maintenance activity are required to obtain a Permit to Install. The AQD has developed a permit condition template that includes many of the same conditions related to engine replacement, such as keeping records of equipment description, documenting maintenance activities, and addressing formaldehyde emissions. The template identifies applicable requirements for the permitted landfill gas-to-energy engine and any subsequent replacements for that engine under Rule 285(2)(a)(vi). It also consolidates NSPS and NESHAP requirements applicable to landfill gas engines.

The AQD evaluated formaldehyde impacts from all existing landfill gas-to-energy sources. Information from AQD permit files, modeling data for oxides of nitrogen and carbon monoxide (if available), air dispersion modeling results for facilities, and generic modeling for those without modeling data were used to evaluate formaldehyde impacts from existing engines. Half of the existing facilities had enough information to conduct cursory modeling. Based on the evaluation, it was determined that most sites could pass the Secondary Risk Screening Level with a minimum stack height of 60 feet. Permits for new or modified emission units require short-term formaldehyde limits, stack testing, and increased stack heights to meet health-based screening levels.

#### Exceptions to the Policy

##### Malfunction

According to Rule 113(a), malfunction means any sudden, infrequent, and not reasonably preventable failure of a source, process, process equipment, or air pollution control equipment to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Rule 912 requires the owner or operator of a source, process, or process equipment to operate a source, process, or process equipment in a manner consistent with good air pollution control practices for minimizing emissions during malfunctions, among other things. Rule 912 also contains notice requirements based upon how long excess emissions are being emitted, either

more than 1 hour or more than 2 hours. The implication being that a malfunction is generally viewed as a short-term occurrence from which the source, process, or process equipment can recover. In contrast, in the case of a catastrophic event or total engine failure, irrecoverable loss is presumed to occur. The Rule 285(2)(a)(vi) permit exemption applies to the replacement of engines, as long as the replacement activity was conducted as part of a normal maintenance program. Engines that are regularly maintained, yet experience a malfunction, are presumed salvageable and able to recover from the occurrence. Replacement of engines due to a catastrophic event that is the result of failure to perform regular maintenance is not part of a normal maintenance program. The distinction being made in this Policy and Procedure is the difference between a poorly-managed engine that fails and one that is following all recommended maintenance and yet still fails. If something unforeseen happens and on-site records support that the company was following their maintenance program, then Rule 285(2)(a) should apply. However, if the engine fails due to negligence or failure to perform appropriate preventive maintenance, such as manufacturers' recommendations, this may be cause for further investigation as to what happened and whether this situation was preventable.

## **POLICY**

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The Workgroup concluded that the Rule 285(2)(a)(vi) exemption applies to the replacement of engines, compressors, or turbines as part of a normal maintenance program. As a means of meeting state and federal rule requirements, the following will be used to address the issues identified at the beginning of this report and to provide consistency across the industry and the state:

1. Companies must be able to provide a demonstration of Rule 278a for each engine replacement activity which qualifies for the exemption, upon request.
2. Existing engines replaced under Rule 285(2)(a)(vi) shall meet original permit requirements for the unit that it replaced.
3. Engine replacements can only be exempt from obtaining a Permit to Install if done so under a normal maintenance program.
4. Notifications in accordance with NSPS and NESHAP requirements will be required for each engine when new requirements are triggered.

To document the description of the equipment being replaced under Rule 285(2)(a)(vi), the following items are an example of information that could be kept at the site or made available to the AQD upon request:

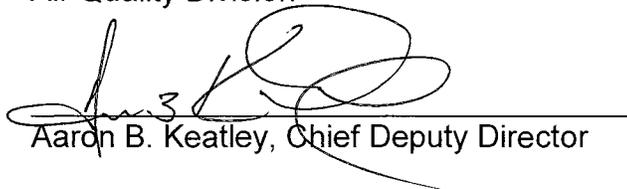
- Engine manufacturer
- Model
- Model year
- Date of manufacture
- Maximum engine power and displacement
- Engine family
- Serial number

- Engine type (rich burn or lean burn)
- Date of initial startup
- Date engine was removed from service at the stationary source

**APPROVING AUTHORITY**

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Mary Ann Dolehanty, Director  
Air Quality Division

  
Aaron B. Keatley, Chief Deputy Director

**HISTORY**

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Policy No.	Action	Date	Title
AQD-023	Original	6/10/2016	Replacement of Engines, Compressors, or Turbines as Part of a Normal Maintenance Program at Landfill Gas-To-Energy Facilities
AQD-023	Updated and Revised	11/21/2018	Replacement of Engines, Compressors, or Turbines as Part of a Normal Maintenance Program at Landfill Gas-To-Energy Facilities

**CONTACT/UPDATE RESPONSIBILITY**

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Any questions or concerns regarding this policy and procedure should be directed to Annette Switzer, Permit Section Manager, Air Quality Division, 517-284-6803 or [switzera2@michigan.gov](mailto:switzera2@michigan.gov).

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