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PROJECT SUMMARY  
FOR A  
CONSTRUCTION PERMIT APPLICATION FROM  
WASTE MANAGEMENT OF ILLINOIS, INC., FOR  
INSTALLATION OF A THIRD ENGINE AT THE  
NEW LANDFILL GAS-TO-ENERGY FACILITY AT THE  
PRAIRIE VIEW LANDFILL IN  
WILMINGTON, ILLINOIS

Site Identification No.: 197804AAB  
Application No.: 10040014  
Date Received: October 19, 2010

Schedule

Public Comment Period Begins: April 27, 2011  
Public Comment Period Closes: May 27, 2011

Illinois EPA Contacts

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## I. INTRODUCTION

Waste Management of Illinois, Inc. (Waste Management) has submitted an application for a revision to the construction permit for a new landfill gas-to-energy facility. This new facility will be located at the Prairie View Recycling and Disposal Facility in Wilmington, Illinois, which is also operated by Waste Management. The application addresses installation of a third engine at the gas-to-energy facility. The additional engine and the two existing engines at the facility will be used to generate electricity using the landfill gas collected at this landfill as fuel.

The Illinois EPA has reviewed Waste Management's application and made a preliminary determination that the application meets applicable requirements. Accordingly, the Illinois EPA has prepared draft of the revised construction permit that it would propose to issue for the gas-to-energy facility. The permit is intended to identify the applicable requirements that would apply to the affected facility with three engines and to set necessary limitations on the emissions from the facility. However, before issuing this permit, the Illinois EPA is holding a public comment period to receive comments on the proposed issuance of a revised permit and the terms and conditions of the draft permit.

## II. BACKGROUND

The Prairie View Recycling and Disposal Facility is a municipal solid waste (MSW) landfill developed for the final disposal of household and commercial waste, along with other types of wastes that do not have to be handled as hazardous waste. This landfill was originally constructed and began accepting waste in 2004. The permitted waste capacity of this landfill is about 30 million cubic yards, based on the permit issued by the Illinois EPA, Bureau of Land (see Permit 1999-291-LF, issued in September, 2003).

As a general matter, MSW landfills are stationary sources of emissions due to fugitive particulate matter emissions from handling of soil, waste and cover materials at the landfill and from vehicle traffic on roadways at the landfill. MSW landfills are also sources of emissions due to the gas that is gradually generated from the biodegradation, decomposition and volatilization of organic wastes and other degradable material deposited in the landfill. The resulting landfill gas is composed primarily of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>).<sup>1</sup> Small fractions of other constituents are also present in landfill gas, including nonmethane organic compounds (NMOC)<sup>2</sup> and hydrogen sulfide (H<sub>2</sub>S). Once a section of an MSW landfill is filled with waste and completed, the landfill gas generated by that section may be collected by vertical or horizontal perforated pipes that penetrate the waste mass and collect the landfill gas that is being generated.

At the Prairie View landfill Waste Management operates a collection system for landfill gas. The landfill gas that is collected is currently controlled by combustion in a flare. In the future, the collected landfill gas would also be combusted in the engines at the new gas-to-energy facility. The existing flare at the landfill will serve as a backup to the engines to combust landfill gas collected

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<sup>1</sup> The generation of methane and carbon dioxide by a landfill is mediated by microorganisms that are adapted for anaerobic conditions. Gas generation proceeds through four phases. The first phase is aerobic (i.e., with oxygen (O<sub>2</sub>) available from air trapped in the waste) and the primary gas produced is carbon dioxide (CO<sub>2</sub>). The second phase is characterized by oxygen depletion, resulting in anaerobic conditions, with large amounts of CO<sub>2</sub> and some hydrogen (H<sub>2</sub>) produced. In the third phase, methane (CH<sub>4</sub>) production begins, with an accompanying reduction in the amount of CO<sub>2</sub> produced. Nitrogen (N<sub>2</sub>) content is initially high in landfill gas in the first phase, and declines sharply as the landfill proceeds through the second and third phases. In the fourth phase, gas production of methane, carbon dioxide, and nitrogen becomes fairly steady. The duration of each phase and the total time of gas generation vary with landfill conditions (i.e., waste composition, design management, and anaerobic state).

<sup>2</sup> As applied to emissions of landfill gas, NMOC is generally synonymous with volatile organic material (VOM). A portion the NMOC is composed of various organic hazardous air pollutants (HAP). NMOC also commonly contains ozone depleting substances, i.e., organic compounds associated with stratospheric ozone depletion.

from this landfill when the engines are not in service or the flow of landfill gas is more than the engines can handle.

MSW landfills are also sources of emissions from the flares and engines that are used to combust the landfill gas collected at the landfill. The principal air contaminants emitted from these combustion devices are nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), and volatile organic matter (VOM). NO<sub>x</sub> can be formed thermally by combination of oxygen and nitrogen in the air at the temperatures at which fuel is burned. CO is formed by the incomplete combustion of fuel. CO is associated with most combustion processes and is found in measurable amounts in engine exhaust. VOM is also emitted as a result of incomplete combustion of fuel. SO<sub>2</sub> is formed from combustion of landfill gas because of the sulfur content of the gas. The emission rates for different pollutants from the combustion of landfill gas depend upon the composition of the landfill gas and the type(s) of equipment that are being used to combust the landfill gas.

### III. PROPOSED PROJECT

Waste Management has submitted an application for a revision to the construction permit for the new gas-to-energy facility at the Prairie View landfill, Construction Permit 10040014. The requested revision addresses installation of a third engine at the facility, increasing the capacity of the facility. This would result in increases in the potential emissions of the source, i.e., the combination of the gas-to-energy facility and the affected landfill, above the levels that are projected in the initial application and addressed in the original permit for the affected facility.

### IV. PROJECT EMISSIONS

The potential emissions of the source as requested by the Permittee in this application for a revised construction permit, are summarized below. The potential emissions represent the maximum emissions of the source as would be allowed by the revised construction permit. The determination of the source's potential emissions considers the calculated maximum amount of landfill gas that would be generated and collected from the affected landfill, the maximum capacities of the engines and the flare, and emissions factors from on-site emission testing, manufacturer's emission data, and emission factors from USEPS's Compilation of Air Pollutant Emission Factors (AP-42). The actual emissions of the source would commonly be less than its potential emissions. This is because the landfill would not be generating landfill gas at peak rates. In addition, the levels of nonmethane organic compounds (NMOC), hydrogen sulfide, and other constituents in landfill gas contributing to emissions would be less than the maximum concentrations used for the determination of potential emissions.

Pollutant	Potential Emissions (tons/year)
Nitrogen Oxides (NO <sub>x</sub> )	96
Carbon Monoxide (CO)	245
Sulfur Dioxide (SO <sub>2</sub> )	96
PM/PM <sub>10</sub> *	30/20
VOM/NMOC	50
Individual HAP	8
Total Haps	20

- \* Excluding emissions from roadways and other sources of fugitive emissions.

## V. APPLICABLE EMISSION STANDARDS

All emission units in Illinois must comply with the state emission standards adopted by the Illinois Pollution Control Board, 35 IAC Subtitle B, Subchapter c. These emission standards represent the basic requirements for emission units in Illinois. The application shows that the gas-to-energy facility would comply with applicable state emission standards.

The affected landfill is subject to the federal New Source Performance Standards (NSPS) for MSW landfills, 40 CFR 60 Subparts WWW. Pursuant to this NSPS, if emissions of NMOC from the landfill in the absence of control would be 50 megagrams per year or more, waste management, the source must reduce the NMOC in the collected landfill gas by at least 98 weight-percent or to no more than 20 ppmv in the exhaust. The source could comply with this NSPS requirement either by combusting the collected landfill gas in the flare or by treating the collected landfill gas at the affected facility to remove NMOC prior to use as fuel in the engines or by combusting the collected landfill gas in the engines. The affected landfill is also subject to the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) for MSW landfills, 40 CFR 63 Subpart AAAA. This NESHAP requires Waste Management to maintain and implement a Startup Shutdown Malfunction Plan to facilitate proper operation of the LFG control systems at all times.

The engines at the affected facility would be subject to the federal National Emission Standards of Hazardous Air pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines, 40 CFR 63 Subpart ZZZZ. This NESHAP requires that the affected engines comply with the applicable requirements of New Source Performance Standards (NSPS) for Spark Ignition internal combustion engines, 40 CFR 60 Subpart JJJJ.

## VI. APPLICABLE REGULATORY PROGRAMS

The affected facility with the requested revisions is not considered a major project under the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21, or Major Stationary Source Construction and Modification (MSSCAM), 35 IAC Part 203. This is because the total emissions of each regulated New Source Review (NSR) pollutant from the source, as limited by the revised permit, would still be less than the applicability thresholds of the MSSCAM and PSD rules for a major source. For this purpose, the affected facility and the associated affected landfill, are considered to be a single source pursuant to 40 CFR 52.21(b)(6), 35 IAC 203.112, 203.136, and 211.6130, and Section 39.5(1) of Illinois Environmental Protection Act.

## VII. DRAFT PERMIT

The conditions of the draft revised permit for the affected facility would contain limitations and requirements for the facility.

The draft revised permit includes enforceable limits on emissions and operation of the source to assure that it remains below the levels at which it would be considered major for purpose of MSSCAM and PSD. In addition to limiting annual emissions, the permit would also include limits on hourly emissions from the affected engines.

The draft permit also establishes appropriate compliance procedures for the emission units, including requirements for emission testing, monitoring, recordkeeping, and reporting. Emission testing is required as part of the initial shakedown and operation of the affected engines after completion of construction.

These measures are being imposed to assure that the emissions of the source are accurately tracked to confirm compliance with both the short-term and annual emission limits established for them.

## **VII. REQUEST FOR COMMENTS**

It is the Illinois EPA's preliminary determination that Waste Management's request for a revised permit meets all applicable state and federal air pollution control requirements. The Illinois EPA is therefore proposing to issue a revised permit as requested. Comments are requested on this proposed action by the Illinois EPA and the conditions of the draft of the revised permit.