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BUREAU OF AIR, PERMIT SECTION
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PROJECT SUMMARY FOR
CONSTRUCTION PERMIT APPLICATIONS FROM
COUNTRYSIDE LANDFILL INC. AND COUNTRYSIDE GENCO FOR
ACTIVITIES AT COUNTRYSIDE LANDFILL IN GRAYSLAKE, ILLINOIS

Facility Identification and Application Numbers:

Countryside Landfill, Inc.: ID 097806AAG, Application 98100039
Countryside Genco: ID 097025AAR, Application 98050077

Schedule

Public Comment Period Begins: February 03, 2011
Public Hearing Date: March 22, 2011
Public Comment Period Closes: April 21, 2011

Illinois EPA Contacts

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I. INTRODUCTION

Countryside Landfill, Inc., has submitted an air pollution control permit application involving its landfill in Grayslake to the Illinois Environmental Protection Agency, Bureau of Air (Illinois EPA). The application request a revision to the construction permit issued for an existing enclosed flare to address new data for the composition of the landfill gas (LFG) generated by this landfill. This flare serves as a backup to the engines at the associated gas-to-energy facility operated by Countryside Genco to combust collected LFG when that facility is not in service or the flow of LFG is more than that facility can handle.

Countryside Genco, which uses LFG collected from the Countryside Landfill to generate power, has also applied for revision to the construction permit issued for its facility to address new data for the composition of the LFG.

The Illinois EPA has reviewed these applications and made a preliminary determination that the applications for revisions meet applicable requirements. Accordingly, the Illinois EPA has prepared draft of the revised air pollution control construction permits that it would propose to issue. However, before issuing these permits, the Illinois EPA is holding a public comment period to receive comments on the proposed issuance of these permits and the terms and conditions of the draft permits.

The Countryside Landfill and Countryside Genco, 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.

II. BACKGROUND

The Countryside landfill 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. It was originally constructed and began accepting waste in 1976. The current waste capacity of the landfill is about 36.2 million cubic yards.

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 LFG is composed primarily of methane (CH₄) and carbon dioxide (CO₂).¹ Small fractions of other constituents are also present in LFG, including nonmethane organic compounds (NMOC)² and hydrogen sulfide (H₂S). Once a section of an MSW landfill is filled with waste and completed, the LFG

¹ 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 (O₂) available from air trapped in the waste) and the primary gas produced is carbon dioxide (CO₂). The second phase is characterized by oxygen depletion, resulting in an anaerobic environment, with large amounts of CO₂ and some hydrogen (H₂) produced. In the third phase, methane (CH₄) production begins, with an accompanying reduction in the amount of CO₂ produced. Nitrogen (N₂) content is initially high in LFG 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).

² As applied to emissions of LFG, 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.

generated by that section may be collected by vertical or horizontal perforated pipes that penetrate the waste mass and collect the LFG that is being generated. MSW landfills may also be sources of emissions from the flares and other equipment that is used to combust the LFG collected at the landfill and control emissions of NMOC and hydrogen sulfide from the landfill. The combustion products emitted from this equipment will include carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), and hydrogen chloride (HCL). The emission rates for different pollutants from the combustion of LFG depend upon the composition of the LFG from the landfill and the type(s) of equipment that are being used at the landfill to combust the LFG.

III. CURRENT APPLICATIONS

The application submitted by Countryside landfill requests a revision to Construction Permit 98100039, permit for the enclosed flare at the landfill. The application submitted by Countryside Genco requests a revision to Construction Permit 98050077, permit for the engines at the associated gas-to-energy facility.

The requested revisions address new data for the composition of the LFG generated by this landfill that shows more hydrogen sulfide in the gas,³ compared to the data provided in the original applications. This has resulted in emissions of sulfur dioxide from combustion of LFG that are higher than projected in the initial applications and addressed in the current permits.

IV. APPLICABLE EMISSION STANDARDS

The Countryside landfill and Countryside Genco are subject to the federal New Source Performance Standards (NSPS) for MSW landfills, 40 CFR 60 Subparts WWW. This NSPS requires control of emissions of NMOC in LFG at large MSW landfills that are constructed or expanded after May 30, 1991, such as the Countryside landfill, if the calculated emissions of NMOC from the landfill in the absence of any control would be 55 tons per year (50 Megagrams per year) or more. The LFG at a landfill that is subject to this NSPS must be collected by a well-designed and well-operated gas collection system.⁴ The collected LFG must then be processed by an appropriate control device, such as an open flare that meets certain specific design and operating requirements or an enclosed flare

³ One component of LFG that can vary greatly between landfills is hydrogen sulfide (H₂S). According to USEPA, *Compilation of Air Pollutant Emissions Factors*, AP-42, H₂S is normally present in LFG at levels that do not exceed 90 ppm, with an average concentration of 33 ppm. However, a recent trend at some landfills has been the use of shredded construction and demolition waste as daily cover. Under certain conditions that are not yet well understood, some microorganisms will rapidly convert the sulfur in the shredded wall-board present in this waste to H₂S. At these landfills, H₂S concentrations can be significantly higher than at MSW landfills that do not use this waste as daily cover. This effect from use of construction and demolition was generally not anticipated. Because of this phenomenon, USEPA recommends that actual measurements be used to determine the H₂S content of LFG and calculate emissions of sulfur dioxide at MSW landfills where construction and demolition waste has been used as daily cover at a landfill or was otherwise present in significant quantities in the waste deposited in the landfill.

⁴ The effectiveness of the LFG collection system is addressed by an operation standard that requires the methane concentrations at the surface of the landfill to be measured on a regular basis. If excessive levels of methane are detected, i.e., more than 500 ppm after three consecutive measurements, the LFG collection system must be expanded or enhanced to accommodate the excess LFG.

that reduces the NMOC in the collected LFG by at least 98 weight-percent or to no more than 20 ppmv in the exhaust.⁵

The Countryside Genco is also subject the applicable requirements of the NESHAP for Stationary Reciprocating Internal Combustion Engines, 40 CFR 63 Subpart ZZZZ, for each affected engine that meets the applicability provisions of this NESHAP, e.g., the engine is manufactured after June 11, 2006. In particular, pursuant to this NESHAP, 40 CFR 63.6590(c), each such subject engine shall comply with the applicable requirements of the NSPS for Stationary Spark Ignition Internal Combustion Engines, 40 CFR 60 Subpart JJJJ (the Engine NSPS).

The Countryside landfill and Countryside Genco are also subject to the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) for MSW landfills, 40 CFR 63 Subpart AAAA. This NESHAP requires control of the same landfills and has the same requirements for control of emissions as the landfill NSPS. The NESHAP also requires the operator of a subject landfill and the associated gas-to-energy facility to maintain and implement a Startup Shutdown Malfunction Plan to facilitate proper operation of the LFG control systems at all times to the extent practical.

The Countryside landfill and Countryside Genco can readily be equipped and operated to comply with the applicable requirements of the NSPS and NESHAP standards, as well as with applicable state emission standards.

IV. EMISSIONS

The potential emissions of the source, i.e., a combination of the Countryside landfill and the Countryside Genco, as requested in their respective application for the revised construction permits for the enclosed flare and the engines, are summarized below.⁶ The potential emissions represent the maximum emissions of the source as would be allowed by the revised construction permits. The determination of the source's potential emissions considers the calculated maximum amount of LFG that would be generated from this Countryside landfill, the maximum LFG burning capacity of the flares and the engines, 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), and continuous operations. The actual emissions of the source would commonly be less than its potential emissions. This is because the landfill would not be generating LFG at peak rates. In addition, the levels of NMOC, hydrogen sulfide and other constituents in LFG contributing to emissions would be less than the maximum concentrations used for the determination of potential emissions.

Pollutant	Potential Emissions of the Source (tons/year)
Nitrogen Oxides (NO _x)	245
Carbon Monoxide (CO)	245
Sulfur Dioxide (SO ₂)	97.5

V. APPLICABILITY OF THE FEDERAL AND STATE REGULATORY PROGRAMS

⁵ Another option under the NSPS for control of collected LFG is to appropriately process the gas to remove NMOC before combusting it. This option is commonly used when the collected LFG will be used as fuel in an engines or boilers to beneficially use the LFG and recovery its energy value as either electricity or steam.

The source is not considered a major project under the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21 and state rules for Major Stationary Source Construction and Modification (MSSCAM), 35 IAC Part 203. This is because the source was not a major source, prior to these modifications, and continued to be not major, as the emissions in these revised permits for the enclosed flare and the engines are limited less than the applicability thresholds of the PSD or MSSCAM rules.

VI. PERMIT CONDITIONS

The conditions of the draft revised permits would set forth additional air pollution control requirements that Countryside landfill and Countryside Genco must meet for the operations of the enclosed flare and the engines, respectively. The revised construction permits would also include the new limitations on the annual SO₂ emissions of the source, reflecting the new data for composition of LFG. These annual limitations would be accompanied by provisions to provide practical enforceability of the limitations. For example, the permit would require additional sampling and analysis of collected LFG for its sulfur content. The revised permits would also clarify applicable regulatory requirements that apply to the landfill and the gas-to-energy facility. The permits also identify measures that must be used as good air pollution control practices to minimize emissions from the enclosed flare and the engines.

VII. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the applications from the Countryside landfill and the Countryside Genco meet applicable state and federal air pollution control requirements. Illinois EPA is therefore proposing to issue constructions permits. Comments are requested on this proposed action by Illinois EPA and the conditions of the draft permits.