

**ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM**

October 5, 2011

SUBJECT: Review of Application
Title V Operating Permit
Allied Waste- Imperial Landfill
11 Boggs Road
Findlay Township, PA 15126

RE: Operating Permit File No.0068
Municipal Waste Landfill

TO: Sandra L. Etzel
Chief Engineer

FROM: Hafeez Ajenifuja.
Air Quality Engineer

FACILITY DESCRIPTION:

Allied Waste Systems of Pennsylvania, LLC operates Allied- Imperial Landfill, a municipal solid waste landfill, in Findlay Township, Allegheny County, Pennsylvania. The landfill is approximately 803 acres in surface area and is comprised of ten (10) disposal areas and has an active landfill gas (LFG) collection system with two (2) enclosed ground flare to control the offgas emissions. Currently nine (9) disposal areas have reached full capacity and are no longer accepting waste, only one disposal area is accepting waste. The total disposal capacity of the landfill is approximately 52,300,000 tons. Non metallic mineral processing, which includes crushing, conveying, diesel generators, excavating equipment and vehicles for extraction, is performed to produce cover soil for capping the landfill and for road construction and maintenance.

The primary source of emissions at the facility is the landfill itself, which emits VOCs and HAPs as defined in CAA section 112. Since the landfill was modified after May 30, 1991 and has a design capacity of greater than 2.5 million megagrams, this facility is subject to the requirements of the New Source Performance Standards (NSPS) for Municipal Solid Waste Landfills, 40 CFR 60 Subpart WWW. Pursuant to the requirements of 40 CFR 60, Subpart WWW, landfills having design capacities greater than or equal to 2.5 million megagrams must obtain a Part 70 operating permit. Imperial Landfill is a major source of carbon monoxide (CO) and nitrogen oxide (NO_x) emissions, and is a minor source for remaining criteria pollutant and HAP emissions, as defined at §2102.20 (Definitions) of Article XXI. This facility is therefore subject to the Part 70 major source operating permit requirements of §2103.20.

PROCESS DESCRIPTION:

This is a Title V renewal application for Imperial Landfill located in Findlay Township, Allegheny County.

The original operating permit was issued on June 30, 2005 and it was amended in March 1, 2006 to incorporate the changes in facility's name from BFI to Allied Waste System of Pennsylvania.

This renewal permit will incorporate the IP 0069-I004 conditions, issued in November 7, 2007 for the second enclosed flare. The enclosed flare capacity is 6000 scfm, similar to the first enclosed flare and will be operated continuously together with the existing enclosed ground flare, which was also 6000 scfm capacity. Allied Waste requested a federally enforceable operating restriction which will result in a maximum LFG flow rate of 8,000 SCFM from the gas collection system to both the existing flare and the newly installed flare.

Conditions V.C.1.e and V.C.2.a.1 from the original operating permit were deleted from the renewal permit because the source/operation does not have stack.

The facility's operations and processes are still the same as in the original operating permit and it is described below:

1. One (1) existing stationary municipal solid waste landfill with a design capacity of 47.44 million megagrams.
2. One (1) active landfill gas collection and control system consisting of two (2) enclosed ground flares, rated at a maximum capacity of 6,000 scfm of landfill offgas each, and combined capacity of 8,000 scfm.
3. Portable nonmetallic mineral processing plant, identified as P001, consisting of one impact crusher, screener, and stacking conveyor, with a maximum production rate of 250 ton/hr and 400,000 ton/yr.
4. Two (2) diesel powered generators (caterpillar models 3406 and 3408), identified as B001 and B002, used to power the impact crusher, screener and stacking conveyor for the portable nonmetallic mineral processing plant. Caterpillar model 3406 is a generator set rated at 350 HP and model 3408 rated at 475 HP.
5. Two (2) fuel tanks, including one (1) 1,000 gallon unleaded gasoline fuel tank and one (1) 10,000 gallon No. 2 diesel fuel tank.
6. Six (6) leachate storage tanks, including two (2) 1,000,000 gallon tanks, two (2) 2,500 gallon tanks at the Neville Location, one (1) 2,500 gallon tank at the Alcosan location, and one (1) 5,000 gallon tank at the Cell 4 location.
7. Paved and Unpaved roads.

POTENTIAL EMISSION SUMMARY:

Facility Potential Emissions Table 1

Pollutant	MSW Landfill tons/yr ¹	Enclosed Ground Flares tons/yr ¹	Non-metallic mineral processing tons/yr ^{1,2}	Two Diesel Generators tons/yr ¹	Unpaved & Paved Roads (tons/yr) ^{1,2}	Miscellaneous ³
PM	0.0	18.1	1.12	0.53	163.48	1.0
PM10	0.0	18.1	0.72	0.53	42.08	1.0
NOx	0.0	63.1	0.0	11.0	0.0	14.4
CO	0.0	210.2	0.0	1.63	0.0	18.3
SO ₂	0.0	17.5	0.0	2.04	0.0	1.0
VOC	19.06	47.9	0.0	0.202	0.0	1.8

1. A year is defined as any consecutive 12-month period.

2. PM and PM 10 emissions from unpaved roads and nonmetallic mineral processing are fugitive emissions only. These fugitive emissions are not counted towards the determination of this source as a major source, pursuant to §2101.20, Definitions.

3. Includes miscellaneous small combustion units (i.e. generators, pumps, air compressors, heated pressure washers, light plants, using diesel and gasoline as fuel), heated soap washer with a capacity rated at 16 HP using diesel fuel, and storage tanks.

Facility Potential Emissions Table 1 Cont.

Pollutant ²	Portable Soil Screening Plant (tons/yr) ¹	Landfill Operation & Construction (tons/yr) ¹	Dedicated Diesel Emission (tons/yr) ^{1,3}
PM	24.4	111.60	5.31
PM10	12.2	45.10	5.31
NOx	0.0	0.0	75.50
CO	0.0	0.0	16.25
SO ₂	0.0	0.0	4.96
VOC	0.0	0.0	4.01

¹A year is defined as any consecutive 12-month period.

² PM and PM 10 emissions from this activity are fugitive emissions only. Also all the criteria pollutants from dedicated diesel emissions are fugitive.

Sample Calculation (PM/PM₁₀ for Dedicated diesel emission)-Emission factor from AP-42, Table 3.3-1

$$\text{PM/PM}_{10}: (0.31 \text{ lb/MMBTU}) * (137,000 \text{ Btu/gal}) (250,000 \text{ gal/yr}) / (4,862 \text{ hrs}) = \mathbf{2.18 \text{ lb/hr}}$$

$$(5.31 \text{ lb/hr}) * (4,862 \text{ hr/yr}) / (2000 \text{ lb/ton}) = \mathbf{5.31 \text{ tpy}}$$

RENEWAL OPERATING APPLICATION COMPONENTS:

1. Renewal Permit Application No. 0068 was received on December 30, 2009.

METHOD OF COMPLIANCE DETERMINATION:

Compliance with the landfill offgas capture efficiency limitation, control device destruction efficiency, and other operational standards required for this landfill in accordance to 40 CFR 60, Subpart WWW will be demonstrated by complying with the monitoring requirements of §60.756, the reporting requirements

of §60.757, and the record keeping requirements of §60.758. Compliance with the operational standards required for the nonmetallic mineral processing plant in accordance to 40 CFR 60, Subpart OOO will be demonstrated by complying with the reporting requirements of §60.676 and the record keeping requirements of §60.676. Compliance with the fugitive particulate emission limitations for the stone crushing and soil handling activities, as well as vehicle travel on plant roads, will be demonstrated according to the work practice and fugitive dust control measures established in IP No. I003, as incorporated herein.

REGULATORY APPLICABILITY:

1. Article XXI, Requirements for Issuance:

The requirements of Article XXI, Parts B and C for the issuance of this major source renewal operating permits have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually.

2. Testing Requirements:

Plan Approval Order and Agreement Upon Consent Number 231A, Dated April 23, 1997:

In order to comply with §2105.06.a of Article XXI, Major Sources of NOx and VOCs Reasonably Available Control Technology, the facility will test the two (2) enclosed ground flares for compliance with the established VOC destruction efficiency (i.e., 98% by weight). Such testing will be conducted once every five (5) years according to approved U.S. EPA test methods and Section 2108.02 of Article XXI.

3. New Source Performance Standards (NSPS):

a. 40 CFR PART 60, Subpart Cc, Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills, and Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills:

The municipal solid waste landfill is subject to the New Source Performance Standard, Article XXI §2105.05 and §2105.73, (40 CFR 60, Subpart WWW) because the municipal solid waste landfill commenced construction, reconstruction or modification or began accepting waste on or after May 30, 1991. Since a plant modification occurred after May 30, 1991, the requirements of Subpart Cc are not applicable. Pursuant to Subpart WWW, the landfill must operate a landfill offgas collection system and the collection system must be operated with a negative pressure head, except under the conditions stated at 40 CFR 60.753. The collected gas must be vented to a control system designed and operated in accordance with §60.752 (b)(2)(iii). This landfill complies with these requirements by using a landfill offgas control system that consists of two (2) enclosed ground flare having a VOC destruction efficiency of at least ninety eight (98) percent by weight. The landfill is also subject to testing, compliance, monitoring, reporting and recordkeeping requirements specified in §60.754, §60.755, §60.756, §60.757 and §60.758, respectively.

Pursuant to 40 CFR 60.752, a municipal solid waste landfill with a design capacity greater than 2.5 million megagrams (Mg) shall comply with 40 CFR 60.752(b)(2)(ii) if the non methane organic compound emission (NMOC) rate is greater than 50 Mg/year based on calculation procedures specified in 40 CFR 60.754. Based on 40 CFR 60.754(a)(1); the following values for

the NMOC calculations: $k = 0.05$ /yr, $L_o = 170 \text{ m}^3/\text{Mg}$ and $\text{NMOC} = 4,000 \text{ ppmv}$ (as hexane); and using the EPA's LandGEM Model (Version 2.01), the calculation shows that the NMOC emission rate exceeds 50 Mg/year. The proposed gas collection and control systems are therefore required to comply with the requirements of 40 CFR 60, Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills.

Based on the above, and pursuant to IP 0068-I004, Issued on November 7, 2007, IP 0068-I001, issued on July 6, 1999, and Plan Approval Order and Agreement No.231A, issued on April 23, 1997, the requirements pertaining to the operation and maintenance of the offgas collection and control system apply to this source and are incorporated into the major source operating permit.

b. 40 CFR PART 60, Subpart Ka, Standards of Performance for Volatile Organic Liquid Storage Vessels for Petroleum Liquids:

The two (2) fuel storage tanks, with capacities of 1,000 gallons storing unleaded fuel and 10,000 gallons tank storing diesel fuel, are not subject to the New Source Performance Standard, Article XXI §2105.05, (40 CFR 60, Subpart Ka) because unleaded fuel and diesel fuel oil do not meet the definition of petroleum liquids.

c. 40 CFR PART 60, Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels:

The two (2) 1,000,000 gallon leachate storage tanks are not subject to the New Source Performance Standard, Article XXI §2105.05, (40 CFR 60, Subpart Kb), as modified October 15, 2003, because the maximum true vapor pressure of the stored material is less than 3.5 kPa for these two tanks with capacities that exceed 151 m^3 .

The two (2) fuel storage tanks, with capacities of 1,000 gallons storing unleaded fuel and 10,000 gallons tank storing diesel fuel, are not subject to the New Source Performance Standard, Article XXI §2105.05, (40 CFR 60, Subpart Kb), as modified on October 15, 2003, because the tank storage capacities are less than the rule applicability threshold of 75 m^3 (19,800 gallons).

d. 40 CFR PART 60, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants:

The portable nonmetallic mineral processing plant is subject to the New Source Performance Standard, Article XXI §2105.05, (40 CFR Part 60, Subpart OOO) because the plant has a stone crushing capacity of greater than 150 tons per hour. Pursuant to Subpart OOO, the portable nonmetallic mineral processing plant shall not cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any stack emissions which contain particulate matter in excess of 0.05 g/dscm (0.022 gr/dscf) and exhibit greater than 7 percent opacity. Pursuant to Subpart OOO, the portable nonmetallic mineral processing plant shall not cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any fugitive emissions which exhibit greater than 10 percent opacity. The portable nonmetallic mineral processing plant shall not cause to be discharged into the atmosphere from any crusher, at which a capture system is not used, fugitive emissions which exhibit greater than 15 percent opacity. The landfill is also subject to testing, compliance, monitoring and recordkeeping requirements specified in §60.675, §60.674, §60.676, §60.676 respectively.

4. **NESHAP and MACT Standards:**

40 CFR PART 63 Subpart AAAA--National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills:

The municipal solid waste landfill is subject to the National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills, 40 CFR 63, Subpart AAAA. This landfill, as an area source of HAP emissions, has a design capacity greater than 2.5 megagrams (Mg) and 2.5 million cubic meters (m³) and has uncontrolled NMOC emissions greater than 50 Mg/yr as calculated pursuant to 40 CFR 60.754(a) (see above discussion on Subpart WWW applicability). As such, the permittee is required to comply with the applicable requirements for an existing affected source that is an area source. These requirements are incorporated into the permit and primarily require the permittee to comply with all requirements of Subpart WWW. One additional requirement pursuant to Subpart AAAA is for the permittee to prepare and maintain a startup, shutdown and malfunction (SSM) plan, and such is incorporated into the permit.

5. **Compliance Assurance Monitoring:**

40 CFR PART 64, "Compliance Assurance Monitoring"

The requirements of 40 CFR Part 64, "Compliance Assurance Monitoring" are not applicable to the landfill. Pursuant to 40 CFR 64.2(b)(1)(i), the requirement of this rule do not apply to a source subject to emission limits or standards proposed by the Administrator after November 15, 1990 pursuant to section 111 (NSPS) or 112 (NESHAP) of the Act. This landfill is subject to both section 111 (40 CFR 60, Subpart WWW) and 112 (40 CFR 63, Subpart AAAA) and therefore is not subject to this rule. There are no other emission units (PSEUs) at the plant with emission rates above the Part 70 applicable emission rate thresholds that are controlled and that have established emission limits. Therefore, the requirements of this rule do not apply.

6. **Reasonably Available Control Technology (RACT) ('2105.06):**

Section 2105.06 of Article XXI requires that RACT be applied to all major sources of VOC (and NO_x). This landfill was determined to be subject to this rule as a major source of VOC, since the existing plant offgas collection and control system was not initially considered as federally enforceable by the U.S. EPA, and the uncontrolled potential to emit of VOC exceeded 50 tons per year. Plan Approval Order and Agreement No. 231A issued on April 28, 1997, determined RACT to be landfill offgas thermal incineration (i.e., ground flaring), with the flare properly maintained and operated at a minimum destruction efficiency of 98% by weight, and an offgas collection system efficiency of 75%. Related testing, recordkeeping, reporting and monitoring were also required. This approval made the existing offgas collection and control system federally enforceable, with potential VOC emissions thereafter determined by taking the existing collection/control system into account.

Although RACT Order No. 231A initially exempted Area Seven (7), Phase Two (2) from the requirements for the operation of the landfill gas collection and control system, such exemption expired after December 31, 1998. Subsequent to this date, the operating requirements for the collection/control system became applicable with the completion of installed vertical collection wells at this area of the landfill and such requirements are reflected in the operating permit for the entire source.

7. GREENHOUSE GASES:

Calculations of greenhouse gases are based on methodology found in 40 CFR Part 98, Subpart HH and EPA Climate Leaders Greenhouse Gas Inventory Protocol-Core Module Guidance, October 2004.

The 40 CFR Part 98, Subpart HH only addressed the reporting of methane (CH₄) emission even though CO₂ and CH₄ are made up of approximately equal amounts on a volumetric basis. According to the October 2004, EPA Climate Leaders Greenhouse Gas Inventory Protocol-Core Module Guidance, methane accounts for the majority of the GHG emissions from landfills. It was assumed that waste decomposition does not contribute to the net addition of CO₂ to the atmosphere, and this is consistent with intergovernmental panel on climate change (IPCC) guidance. The EPA guidance believes that CO₂ is produced from combustion of CH₄ in captured LFG, and it is considered biomass CO₂, which does not contribute to CO₂-equivalent emissions. This is evident in Table A-1 to Subpart A of Part 98, that shows the global warming potential of CO₂ is 1, while that of CH₄ is 21.

The CH₄ emission that contributes to CO₂-equivalent emissions is estimated using the equation HH-8 from 40 CFR Part 98, Subpart HH or equation from the EPA Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance, October 2004.

$$\text{CH}_4 \text{ Emissions} = \left[\frac{(\text{CH}_4 \text{ Collected} - \text{CH}_4 \text{ Collected})}{\text{Collection}_{\text{eff}}} \times (1 - \text{OF}) \right] + (\text{CH}_4 \text{ Collected} \times \text{Vent}) \text{-eq.1}$$

Equation 1 above is from EPA Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance, October 2004.

Where:

CH₄ Collected = CH₄ Collected by active gas collection system

Coll_{eff} = collection system efficiency

OF = oxidation fraction

Vent = fraction vented

$$\text{Emissions} = \left[\left(\frac{R}{\text{CE} \times f_{\text{Rec}}} - R \right) \times (1 - \text{OX}) + R \times (1 - (\text{DE} \times f_{\text{Dest}})) \right] \quad (\text{Eq. HH-8})$$

Where:

Emissions (CH₄) = Methane emissions from the landfill in the reporting year (metric tons CH₄).

R = Quantity of recovered CH₄ [from Equation HH-4 of this section in metric tons CH₄] or CH₄ collected for the reporting year.

CE = Collection efficiency estimated at landfill, taking into account system coverage, operation, and cover system materials from Table HH-3 of this subpart. If area by soil cover type information is not

available, use default value of 0.75 (CE4 in table HH-3 of this subpart) for all areas under active influence of the collection system.

f_{Rec} = Fraction of hours the recovery system was operating (annual operating hours/8760 hours per year).

OX = Oxidation fraction. Use the oxidation fractions default value of 0.1 (10%).

DE = Destruction efficiency, (lesser of manufacturer's specified destruction efficiency and 0.99). If the gas is transported off-site for destruction, use DE = 1.

f_{Dest} = Fraction of hours the destruction device was operating (device operating hours/8760 hours per year). If the gas is destroyed in a back-up flare (or similar device) or if the gas is transported off-site for destruction, use f_{Dest} = 1.

Step 1: Determine the landfill methane generation rate. This is done using the LandGEM model based on First Order Decomposition Rate Equation below.

$$Q_{CH_4} = \sum_{i=1}^n \sum_{j=0.1}^1 kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Imperial Landfill has legacy area 1-6, which started accepting waste in 1935 and the highest gas produced was in 1979, and the area is no longer active. There is active area 7, which started accepting waste in 1988 and the highest landfill gas produced is this current year 2011.

From the LandGem Model Output:

Highest Landfill Gas for Area 7 (reporting year 2011) = 3,370 CFM

Landfill Gas for Area 1-6 (reporting year 2011) = 1,207 CFM

Total Landfill gas produced = **4,577 CFM**

Imperial Landfill assumes 50% methane.

Step 2: Determine the amount of methane collected or recovered.

The methane generation rate or methane collected in cubic meter per year (m^3/yr) =

(Landfill gas collected in ft^3/min)*(percent methane in the gas)*(conversion factor from ft^3 to m^3)

(4,577 ft^3/min)*(0.50)*($m^3/35.31 ft^3$)

= **64.81 m^3/min** or

(64.81 m^3/min)*(60 min/hr)*(8760 hr/yr)

= **34.06 x 10⁶ m^3/yr**

Step 3: Determine the collection efficiency:

The collection efficiency is assumed to be 75% by volume from EPA AP-42, Section 2, page 2.4-6

Step 4: Determine the fraction of methane oxidized

Landfill gas that is not collected passes through the landfill cover before being released to the environment. There is the potential that microbes in the soil of the landfill cover oxidize some of the methane in the gas. This oxidation reduces the amount of methane released to the environment.

The fraction oxidized is assumed to be 10% by volume, according to 40 CFR §98.343 and the October 2004 EPA- Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance (Direct Emissions from Municipal Solid Waste Landfill)

Step 5: Determine the fraction of methane vented

This is the amount of the collected gas that is vented directly to the atmosphere. It could either be through an active venting system, or in some cases gas may also be vented during scheduled startup/shut down and malfunction period.

The amount of methane vented is determined by using part of equation in the equation HH-8 above. $[1-(DE \times f_{Dest.})]$, Where DE = Destruction efficiency = 98% and $f_{Dest} = 1$ (is the default factor recommended by the equation HH-8)

$$1 - (0.98 \times 1) = 0.02 \text{ or } 2\%$$

Step 6: Calculate methane emissions:

$$\begin{aligned} \text{CH}_4 \text{ Emissions} &= \left[\frac{(\text{CH}_4 \text{ Collected} - \text{CH}_4 \text{ Collected}) \times (1 - OF)}{\text{Collection}_{\text{eff}}} \right] + (\text{CH}_4 \text{ Collected} \times \text{Vent}) - \text{eq. 1} \\ &= \left[\frac{(34.06 \times 10^6 \text{ m}^3/\text{yr}) - (34.06 \times 10^6 \text{ m}^3/\text{yr})}{0.75} \right] \times [(1 - 0.1)] + [(34.06 \times 10^6 \text{ m}^3/\text{yr} \times 0.02)] \\ &= [11.35 \times 10^6] \times [0.90] + [681,200 \text{ m}^3/\text{yr}] \\ &= \underline{\underline{10.90 \times 10^6 \text{ m}^3/\text{yr}}} \end{aligned}$$

The methane emission is converted from volumetric to mass emission rate using the density of methane. The density of methane is equal to 0.667 kilogram/cubic meter at 1 atmosphere and 59°F

Therefore, the CH₄ Emissions in metric tons =

$$[10.90 \times 10^6 \text{ m}^3/\text{yr}] \times [0.667 \text{ kg/ m}^3] \times [1 \text{ metric ton}/1000 \text{ kg}]$$

= 7,270.30 metric ton/yr of CO₂e

The highest methane emission from Imperial Landfill is 7,270.30 metric ton and it is below the reporting threshold of 25,000 metric ton of CO₂e. Therefore, there are presently no Greenhouse gas requirements at the landfill.

EMISSIONS SUMMARY:

The allowable emission summary for the Imperial Landfill is given in Table below:

Pollutant	Annual Emissions (tons/year)
Particulate Matter	292.37
PM ₁₀	104.07
NO _x	149.60
SO _x	24.49
CO	238.33
VOC	69.31
NMOC	83.7
Hydrochloric Acid	25

RECOMMENDATIONS:

All applicable Federal, State and County regulations have been addressed in the permit. The Title V renewal operating permit should be approved with the emission limitations, terms and conditions in the Title Operating Permit No. 0068.