STATE OF MICHIGAN
CIRCUIT COURT FOR THE 30TH JUDICIAL CIRCUIT
INGHAM COUNTY

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY,

Plaintiff,

v

No. 2020- 0593 -CE

HON. JUDGE WANDA M. STOKES

ADVANCED DISPOSAL SERVICES ARBOR HILLS LANDFILL, INC.,

Defendant.

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/

There is no other pending or resolved civil action arising out of the transaction or occurrence alleged in the complaint.

COMPLAINT

Plaintiff, the Michigan Department of Environment, Great Lakes, and Energy ("Plaintiff" or "EGLE"), by and through its attorneys, Dana Nessel, Attorney

General of the State of Michigan, and Neil D. Gordon and Charles A. Cavanagh, Assistant Attorneys General, state:

NATURE OF THE CASE

1. This is a civil action for injunctive relief to require Defendant Advanced Disposal Services Arbor Hills Landfill, Inc. ("Defendant") to operate the Arbor Hills Landfill in compliance with the requirements of state and federal law for air quality and solid waste management. Plaintiff also seeks injunctive relief to eliminate the emission of air contaminants from the Arbor Hills Landfill that have caused the unreasonable interference with the comfortable enjoyment of life and property. In addition, Plaintiff seeks civil fines, attorney fees, costs of surveillance and enforcement, and costs.

2. Plaintiff brings this action pursuant to Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act ("NREPA"), MCL 324.5501 *et seq.*, and Part 115, Solid Waste Management, of the NREPA, MCL 324.11501 *et seq.*

JURISDICTION AND VENUE

3. This Court has jurisdiction over the subject matter of this action pursuant to Sections 5530(1) and 11546(1) of the NREPA, MCL 324.5530(1) and MCL 324.11546, and Section 605 of the Revised Judicature Act ("RJA"), MCL 600.605. This Court has personal jurisdiction over Defendant pursuant to Section 711 of the RJA, MCL 600.711.

4. Venue in this Court is proper pursuant to Section 5530(5) of the NREPA, MCL 324.5530(5), and Section 1631(a) of the RJA, MCL 600.1631(a).

PARTIES

5. EGLE is the state department mandated to provide for the protection of the natural resources of Michigan from pollution, impairment, and destruction. MCL 324.301, MCL 324.501, and Executive Order 2019-06.

6. Executive Order 2019-06, signed by Governor Gretchen Whitmer on February 20, 2019, renamed the Michigan Department of Environmental Quality (DEQ) as EGLE, effective April 22, 2019. This Complaint uses EGLE to refer to the DEQ prior to April 22, 2019.

7. Defendant is a corporation incorporated under the laws of the State of Michigan. At all times relevant to this complaint, Defendant has owned and operated the Arbor Hills Landfill, which is located at 10690 West Six Mile Road in Salem Township, Michigan.

STATUTORY AND REGULATORY BACKGROUND

8. Michigan has enacted Part 55 of the NREPA to control air pollution in Michigan and to protect and promote the public health. Section 5512 of the NREPA, MCL 324.5512, states that EGLE shall promulgate rules for the purposes of, among other things, controlling or prohibiting air pollution and complying with the federal Clean Air Act, 42 USC 7401 *et seq*. Those rules are contained in the Michigan Air Pollution Control Rules, Mich Admin Code, R 336.1101 *et seq*.

New Source Performance Standards

9. Stationary sources of air pollution, including factories and landfills, emit a variety of air pollutants. Section 111 of the Clean Air Act, 42 USC 7411, requires the Administrator of the United States Environmental Protection Agency ("EPA") to control emissions of air pollutants from new stationary sources by, among other things, promulgating standards of performance.

10. The term "standard of performance" is defined in Section 111 of the Clean Air Act to mean "a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." 42 USC 7411(a)(1).

11. The term "new source" is defined in Section 111 of the Clean Air Act to mean "any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source." 42 USC 7411(a)(2).

12. The term "modification" is defined in Section 111 of the Clean Air Act to mean "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by source or which results in the emission of any air pollutant not previously emitted." 42 USC 7411(a)(4).

New Source Performance Standards for Municipal Solid Waste Landfills

13 EPA has promulgated General Provisions for the Standards of Performance for New Stationary Sources ("NSPS General Provisions"), 40 CFR 60.1 *et seq.*, and Standards of Performance for Municipal Solid Waste Landfills ("Landfill NSPS"), 40 CFR 60.750 *et seq.*

14. Rule 902 of the Michigan Air Pollution Control Rules, Mich Admin Code, R 336.1902, adopts by reference the NSPS General Provisions and the Landfill NSPS.

15. The Landfill NSPS apply to a "municipal solid waste landfill" that commenced construction, reconstruction or modification on or after May 30, 1991. 40 CFR 60.1(a) and 40 CFR 60.750(a).

16. The term "municipal solid waste landfill" is defined in the Landfill NSPS to mean an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. 40 CFR 60.751.

17. The NSPS General Provisions apply to the owner or operator of a municipal solid waste landfill the construction or modification of which is commenced after October 15, 1973. 40 CFR 60.1(a); 38 Fed Reg 38564 (Oct 15, 1973).

18. Municipal solid waste landfills emit air pollutants, including methane and hydrogen sulfide, that are generated by the decomposition of waste or derived from the evolution of organic compounds in the waste. *Id.*

19. Methane is extremely flammable. Methane emissions from municipal solid waste landfills present a fire danger both on-site and off-site. 61 Fed Reg 9905 (March 12, 1996).

20. Methane interacts in the air with other air pollutants to form ozone, the major ingredient of smog. 81 Fed Reg 59,332, 59340 (Aug 29, 2016); https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics. Ground-level ozone leads to serious lung and heart conditions such as asthma attacks, bronchitis, and premature death, and affects vulnerable populations such as children and the elderly. 80 Fed Reg 65,292, 65,302-317 (Oct 26, 2015).

21. Methane is also a potent greenhouse gas with a global warming potential that is 28 to 36 times greater than carbon dioxide. 81 Fed Reg 59,332, 59,337 (Aug 29, 2016). Landfills are one of the largest sources of methane emissions. *Id.* at 59,334.

22. Hydrogen sulfide is a poisonous, irritating, and flammable gas with an odor detectable by humans at low concentrations. Hydrogen sulfide emissions from landfills cause nuisance odors, create worker safety issues, and cause wear and damage to landfill gas collection and control systems. EPA, Best Management Practices to Reduce Hydrogen Sulfide and Reduced Sulfur Compound Emissions at Landfills That Dispose of Gypsum Drywall, pp 1–2, (August 2014).

23. The NSPS General Provisions require that the owner or operator of a municipal solid waste landfill shall, at all times, including periods of startup, shutdown, and malfunction, to the extent practicable, maintain and operate any

affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. 40 CFR 60.11(d).

24. The Landfill NSPS, at 40 CFR 60.752(b)(2)(i) requires each owner or operator of a municipal solid waste landfill with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters and a calculated emission rate of nonmethane organic compounds equal to or greater than 50 megagrams per year to, among other things, do the following: submit a collection and control system design plan prepared by a professional engineer to the EPA Administrator that meets the design requirements of 40 CFR 60.752(b)(2)(ii), which include the requirement to install a collection and control system that captures the gas generated within the landfill.

25. 40 CFR 60.752(b)(2)(ii) also requires that the GCCS be either an active or passive collection system. *Id.*

26. The Landfill NSPS, at 40 CFR 60.752(b)(2)(ii)(A), requires that a GCCS that is an active collection system shall:

> (1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;
>
> (2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:
>
> (i) 5 years or more if active; or
>
> (ii) 2 years or more if closed or at final grade.
>
> (3) Collect gas at a sufficient extraction rate;

(4) Be designed to minimize off-site migration of subsurface gas.

27. The Landfill NSPS defines "sufficient extraction rate" to mean a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess emissions, for the life of the blower. 40 CFR 60.751.

28. The Landfill NSPS, at 40 CFR 60.759, contains specifications for active gas collection and control systems. 40 CFR 60.759(a) states that each owner or operator of a municipal solid waste landfill shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using specific procedures. Those procedures include a certification by a professional engineer that the gas collection devices within the interior and along the perimeter areas achieve comprehensive control of surface gas emissions. The procedures also include the requirement that, subject to certain exceptions, the placement of gas collection devices shall control all gas producing areas.

29. The Landfill NSPS, at 40 CFR 60.759(b)(2), provides that the owner or operator of a municipal solid waste landfill seeking to comply with 40 CFR 60.752(b)(2)(i)(A) "shall construct the gas collection devices using the following equipment or procedures: . . . (2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. . . ."

30. The Landfill NSPS, at 40 CFR 60.753(a), states that each owner or operator of a municipal solid waste landfill with a gas collection and control system used to comply with 40 CFR 60.752(b)(2)(ii) shall "[o]perate the collection system

such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for: (1) 5 years or more if active; or (2) 2 years or more if closed or at final grade[.]"

31. The Landfill NSPS, at 40 CFR 60.753(c) states that each owner or operator of a municipal solid waste landfill with a gas collection and control system used to comply with 40 CFR 60.752(b)(2)(ii) shall operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C. 40 CFR 60.753(c) also states that each owner or operator may establish a higher operating temperature value at a particular well and that a higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

32. The Landfill NSPS, at 40 CFR 60.755(a)(1)–(6) specifies methods that, except as provided in 40 CFR 60.752((b)(2)(i)(B) (which provides for alternative methods), shall be used to determine whether the gas collection system is in compliance with 40 CFR 60.752(b)(2)(ii), including the requirement in 40 CFR 60.752(b)(2)(ii)(A)(2) to collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active or 2 years or more if closed or at final grade.

33. The Landfill NSPS, at 40 CFR 60.755(a)(5), states that, for the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for, among other things,

temperature to determine whether each well has a landfill gas temperature of less than 55 °C, as provided in 40 CFR 60.753(c).

34. 40 CFR 60.755(a)(5) also states if a well has a landfill gas temperature that exceeds 55 °C, then action shall be initiated to correct the exceedance within five calendar days and, if correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. 40 CFR 60.755(a)(5) further states an alternative compliance timeline may be submitted to the EPA Administrator for approval.

35. The Landfill NSPS, at 40 CFR 60.753(d), states that the owner or operator of a municipal solid waste landfill with a gas collection and control system shall "[o]perate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill.

36. The Landfill NSPS, at 40 CFR 60.755(c), identifies the procedures that shall be used for compliance with the surface methane operational standard of 500 parts per million in 40 CFR 60.753(d). Those procedures include implementing a program to monitor for cover integrity and implementing cover repairs as necessary on a monthly basis. 40 CFR 60.755(c)(5).

National Emission Standards for Hazardous Air Pollutants

37. Under Section 112(b)(1) of the Clean Air Act, 42 USC 7412(b)(1), Congress established a list of "hazardous air pollutants."

38. Municipal solid waste landfills emit pollutants on the list of hazardous air pollutants that Congress established. Those pollutants include vinyl chloride and benzene. 68 Fed Reg 2227, 2229 (Jan 16, 2003).

39. Vinyl chloride can adversely affect the central nervous system and has been shown to increase the risk of liver cancer in humans. Benzene is known to cause leukemia in humans. *Id.*

40. Section 112(a)(1) of the Clean Air Act, 42 USC 7412(a)(1), defines the term "major source" to mean any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any single hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.

41. Section 112(a)(2) of the Clean Air Act, 42 USC 7412(a)(2), defines the term "area source" to mean any stationary source of hazardous air pollutants that is not a major source.

42. Section 112(c) of the Clean Air Act, 42 USC 7412(c), requires the EPA Administrator to publish a list of all categories and subcategories of major sources of hazardous air pollutants.

43. Section 112(d) of the Clean Air Act, 42 USC 7412(d), requires the EPA Administrator to promulgate regulations establishing emission standards for each category or subcategory of major sources of hazardous air pollutants listed under Section 112(c).

44. EPA has published a list of major sources of hazardous air pollutants that includes municipal solid waste landfills. 57 Fed Reg 31,576 (July 16, 1992).

45. EPA has promulgated General Provisions for the National Emission Standards for Hazardous Air Pollutants for Source Categories ("NESHAP General Provisions"), 40 CFR 63.1 *et seq.*, and National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills ("Landfill NESHAP"), 40 CFR 63.1930 *et seq.*

46. Rule 902 of the Michigan Air Pollution Control Rules, Mich Admin Code, R 336.1902, adopts by reference the NESHAP General Provisions and the Landfill NESHAP.

47. The Landfill NESHAP applies to an owner or operator of a municipal solid waste landfill that has accepted waste since November 8, 1987 or has additional capacity for waste deposition and meets any of the following three criteria: (1) is a major source of hazardous air pollutants; (2) is collocated with a major source; (3) is an area source that a has design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters and has estimated uncontrolled emissions of nonmethane organic compounds equal to or greater than 50 megagrams per year as calculated according to 40 CFR 60.754(a) of the Landfill NSPS. 40 CFR 63.1935(a).

48. The Landfill NESHAP requires a person who owns or operates a municipal solid waste landfill to comply with the requirements of the NESHAP General Provisions and the Landfill NSPS. 40 CFR 63.1930(a).

49. The NESHAP General Provisions, at 40 CFR 63.6(e)(1)(i), require the owner or operator of an affected source, at all times, including periods of startup, shutdown, and malfunction, to operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practice for minimizing emissions.

Title V Renewable Operating Permits

50. Title V of the Clean Air Act, 42 USC 7661–7661f, establishes an operating program for, among other things, major sources of air pollution. The Title V permits, which are also known as "Renewable Operating Permits," or "ROPs," contain all applicable emission limitations and standards to ensure that all applicable requirements for compliance with the Clean Air Act are collected in one place.

51. A "major source" under Title V includes, among other things, any source that directly emits, or has the potential to emit, greater than 100 tons per year or more of any air pollutant, 10 tons per year or more of any single hazardous air pollutant, or 25 tons per year or more of any combination of hazardous air pollutants. 42 USC 7661(2).

52. Under 42 USC 7661a(a), it is unlawful for any person to violate any requirement of a permit issued under Title V or to operate a major source except in compliance with a permit issued by a permitting authority under Title V.

53. Pursuant to 40 CFR Part 70, EPA granted final approval to Michigan's Title V operating permit program, effective November 30, 2001. 66 Fed Reg. 62,949

(Dec 4, 2001). The Michigan administrative rules governing its Title V operating permit program are codified at Mich Admin Code, R 336.1201-1218 and R 336.1912.

54. Pursuant to its authority under Title V and the Michigan administrative rules for its Title V operating permit program, EGLE issued Defendant a Title V Renewable Operating Permit, Number MI-ROP-N2688-2011a, on January 24, 2011, which was revised on March 28, 2018. MI-ROP-N2688-2011a states that Defendant shall comply with the Landfill NSPS and the Landfill NESHAP. MI-ROP-2688-2011a, Section 2, EULANDFILL-S2, IX (Other Requirements), Conditions 5 and 6.

Rule 901 of the Part 55 Administrative Rules

55. Rule 901 of the Part 115 administrative rules, Mich Admin Code, R 336.1901, states:

> Notwithstanding the provisions of any other department rule, a person shall not cause or permit the emission of an air contaminant or water vapor in quantities that cause, alone or in reaction with other air contaminants, either of the following:
>
> > (a) Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.
> >
> > (b) Unreasonable interference with the comfortable enjoyment of life and property.

56. Section 5501(a) of the NREPA, MCL 324.5501(a), defines "air contaminant" to mean "a dust, fume, gas, mist, odor, smoke, vapor, or any combination thereof."

Part 115 of the NREPA and its Administrative Rules

57. Michigan has enacted Part 115, Solid Waste Management, of the NREPA, MCL 324.11501 *et seq.* ("Part 115" or "Part 115 of the NREPA"), to regulate the disposal of solid waste in the state.

58. "Solid waste" is defined in Part 115 to include, among other things, garbage, rubbish, incinerator ash, municipal and industrial sludges, solid commercial waste, and solid industrial waste. MCL 324.11506(1).

59. Part 115 provides that a person is required to dispose of solid waste at a disposal area licensed under Part 115 unless the person is permitted by state law or rules promulgated by EGLE to dispose of the solid waste at the site of generation. MCL 324.11512(1).

60. Part 115 of the NREPA also provides that a person shall not establish a disposal area in Michigan except as authorized by a construction permit issued by EGLE, MCL 324.11509(1), and shall not operate a disposal area in Michigan except as authorized by an operating license issued by EGLE. MCL 324.11512(2).

61. A disposal area is defined to include a "sanitary landfill," MCL 324.11503(5).

62. Part 115 of the NREPA defines a "sanitary landfill" to mean a type of disposal area consisting of one or more landfill units and the active work areas associated with them. MCL 324.11505(7). The definition also states that one type of sanitary landfill is a "type II landfill, which is a municipal solid waste landfill and includes a municipal solid waste incinerator ash landfill." *Id.*

63. EGLE has promulgated administrative rules to implement Part 115 of the NREPA. Mich Admin Code, R 299.4101 *et seq.*

64. Rule 421 of the Part 115 rules provides that "new units" at a type II landfill (defined as units that accept waste after October 9,1993, Mich Admin Code, R 299.4104(g)) shall be constructed with a composite liner and a leachate collection system (also known as a primary leachate collection system) that is designed and constructed to maintain less than a 1-foot depth of leachate over the liner, excluding the sump. Mich Admin Code, R 299.4421(1).

65. Rule 422 of the Part 115 rules states that type II landfills shall be located, designed, and constructed so that the risks posed by leakage through the composite liner are minimized. The rule further states that to do so, the composite liner shall be designed with a double liner system that is capable of detecting and collecting leakage through the primary composite liner, unless the landfill is a monitorable unit (one at which groundwater can be monitored) located over a natural soil barrier in compliance with requirements to restrict the migration of leakage from the unit. Mich Admin Code, R 299.4422(1).

66. Rule 422 also states that to meet the leakage control criteria of the rule, a type II landfill unit may contain a double liner system or equivalent system that is capable of detecting leakage through the primary liner. A double liner system shall consist of all of the following components:

(a) A primary composite liner;

(b) A secondary composite liner; and

(c) A secondary collection system or leak detection system located between the liners. [Mich Admin Code, R 299.4422(3)]

67. Rule 432(1) of the Part 115 administrative rules states that the owner and operator of a type II landfill shall remove leachate from a disposal unit as frequently as necessary to ensure that the leachate depth on the liner (that is, the primary composite liner), excluding the sump, is not more than 1 foot, except after a significant storm event. Mich Admin Code, R 299.4432(1).

68. Rule 432(2)(a) and (b) of the Part 115 administrative rules states that the owner and operator of a type II landfill shall monitor the leachate collection system and record (a) leachate depths on a schedule that assures compliance with the 1-foot depth requirement in Rule 432(1), and (b) the monthly volume of leachate pumped from all units. Mich Admin Code, R 299.4432(2)(a) and (b).

69. Rule 432(3)(a) of the Part 115 administrative rules states that the owner and operator of a sanitary landfill that contains a secondary collection system shall remove pumpable liquids in the secondary collection system sumps on a frequency that is sufficient to minimize the head on the bottom liner. Mich Admin Code, R 299.4432(3)(a).

70. Rule 432(3)(b) of the Part 115 administrative rules states that the owner and operator of a sanitary landfill that contains a secondary collection system shall during the active life (a) record in the operating record the amount of liquid removed from each system sump at least weekly and (b) calculate and record in the operating record the average daily flow rate, monthly. Mich Admin Code, R 299.4432(3)(b).

71. The Part 115 rules define "lower explosive limit" to mean the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25 degrees Celsius and atmospheric pressure. Mich Admin Code, R 299.4409(n).

72. Rule 433(1)(b) of the Part 115 rules states that the owner and operator of a type II landfill shall ensure that the concentration of methane gas is not more than the lower explosive limit at or beyond the facility property boundary. Mich Admin Code, R 299.433(1)(b).

73. Section 11514(3)(h) of the NREPA, MCL 324.11514(3)(h), states that the owner or operator of a landfill shall not permit disposal in the landfill of asbestos waste unless the landfill complies with 40 CFR 61.154. Rule 902 of the Michigan Air Pollution Control Rules, Mich Admin Code, R 336.1902, adopts by reference 40 CFR 61.154.

74. 40 CFR 61.154 states that each owner or operator of an active waste disposal site that receives asbestos-containing waste material from, among other things, facilities being demolished or renovated that are subject to 40 CFR 61.145, shall do the following:

> (a) Display warning signs at all entrances and at intervals of 100 meters (330 feet) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited;
>
> (b) Maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area.

75. Rule 433(1)(c) of the Part 115 administrative rules, Mich Admin Code, R 299.4433(1)(c), states that the owner and operator of a type II landfill shall

ensure that gases generated by the facility do not create a nuisance and are not otherwise in violation of Part 55 of the NREPA at the property boundary.

GENERAL ALLEGATIONS

76. Defendant owns and operates the Arbor Hills Landfill (Arbor Hills Landfill or Landfill). The Landfill is located in Salem Township, Washtenaw County, Michigan. More specifically, the Landfill is located between Six Mile Road on the north, Napier Road on the east, Chubb Road on the west, and, on the south, railroad tracks north of Five Mile Road.

77. The Landfill is a "sanitary landfill" and a "type II landfill" under MCL 324.11505(7).

78. The Landfill is a "municipal solid waste landfill" under 40 CFR 60.751.

79. The Landfill includes two areas: Arbor Hills East and Arbor Hills West. (2018 Operating License, attached as Ex 1.)

80. Arbor Hills East is an approximately 131-acre area that EGLE certified for final closure in 1990 and that no longer accepts municipal solid waste for disposal.

81. Arbor Hills West is an approximately 210-acre area that is active and accepts municipal solid waste for disposal.

82. EGLE has issued Solid Waste Disposal Area Operating Licenses to Defendant for the Landfill pursuant to Part 115 of the NREPA on several occasions. On September 26, 2018, EGLE issued to Defendant the most recent Solid Waste Disposal Area Operating License (2018 Operating License). (Ex 1.)

83. The 2018 Operating License authorizes Defendant to dispose of municipal solid waste in five "cells" in Arbor Hills West that are identified as Cells 1, 2, 3, 4A–E, and 5. (*Id.*)

84. The Landfill includes a gas collection and control system ("GCCS") that collects landfill gas generated from the decomposition of waste.

85. The GCCS includes gas collection wells that collect landfill gas and pipes and blowers that route the landfill gas to a gas-to-energy facility owned and operated by Arbor Hills Energy, LLC where it is combusted to run turbines and generate electricity. The gas-to-energy facility is located south of the Landfill, on the south side of the railroad tracks.

86. The GCCS also includes three flares that combust landfill gas.

87. Defendant owns and operates the GCCS.

88. Prior to February 2017, the GCCS was owned by BFI Waste Systems of North America, Inc. (BFI). On February 2, 2017, Defendant purchased the GCCS from BFI.

89. On April 28, 2016, BFI submitted to EGLE a revised GCCS Design Plan (2016 Design Plan). That plan provides, among other things, that the GCCS will be expanded as the disposal of municipal solid waste at the Landfill proceeds and that the GCCS shall be expanded as necessary to comply with the Landfill NSPS. (2016 Design Plan, attached as Ex 2, pp 4, 11.)

90. In addition, the 2016 Design Plan provides that placement of gas extraction wells in the Landfill shall address the occurrence of water within the

Landfill and that gas collection devices shall be designed so as not to allow gas into the air. (*Id.*, pp 11, 12.)

91. The 2016 Design Plan identifies a density of existing and future vertical gas extraction wells based on, among other things, the length of perforated pipe in each well through which gas enters and the radius of influence of each well.

92. The 2016 Design Plan provides that if perched liquids are observed within gas extraction wells after installation, and it is determined that the liquid level is restrictive to efficient landfill gas extraction, then the leachate level will be reduced. (*Id.*, p 13.)

93. Since February 2017, more than 100 vertical gas extraction wells at the Landfill have liquid in more than 50% of the perforated portion of the wells and a lesser number of vertical gas extraction wells have liquid in 100% of the perforated portion of the wells.

94. Since February 2017, vertical gas extraction wells at the Landfill have physical issues that limit the removal of liquid and gas, including sediment in the wells, obstructions, and pumps that are not working.

95. In addition to the Landfill, Defendant owns and operates a composting facility located north of the Landfill, on the north side of Six Mile Road. Defendant accepts yard clippings and other compostable material at the composting facility.

96. The provisions of the Landfill NSPS apply to the Arbor Hills Landfill because it is a municipal solid waste landfill that commenced construction, reconstruction, or modification on or after May 30, 1991.

97. The Landfill NSPS, the NSPS General Provisions, the Landfill NESHAP, and the NESHAP General Provisions apply to Defendant.

98. The Arbor Hills Landfill has a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters and a calculated emission rate of nonmethane organic compounds equal to or greater than 50 megagrams per year.

COUNT I

VIOLATIONS OF 40 CFR 60.752(b)(2)(ii)(A)(2) and (4), 40 CFR 60.753(a), 40 CFR 60.759(a)(3), 40 CFR 60.759(b)(2), 40 CFR 60.11(d), 40 CFR 63.1930(a), 40 CFR 63.6(e)(1)(i), MI-ROP-N2688-2011a, AND RULE 902 OF THE PART 55 RULES – GAS COLLECTION AND CONTROL SYSTEM

99. Paragraphs 1 through 98 are hereby realleged and incorporated by reference.

100. From February 2017 through October 2020, Defendant violated 40 CFR 60.752(b)(2)(ii)(A)(2)(i), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 of the Part 55 administrative rules, Mich Admin Code, R 336.1902, by failing to install an active collection and control system pursuant to the 2016 Design Plan that captures the gas generated from each active area of the Arbor Hills Landfill in which the initial solid waste has been placed for five years or more.

101. From February 2017 through October 2020, Defendant violated 40 CFR 60.752(b)(2)(ii)(A)(2)(ii), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 by failing to install an active collection and control system pursuant to the 2016 Design Plan that captures the gas generated from each closed area of the Arbor Hills Landfill in which the initial solid waste has been placed for two years or more.

102. From February 2017 through October 2020, Defendant violated 40 CFR 60.753(a)(1), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 by failing to operate a gas collection and control system such that gas is collected from each active area in the Arbor Hills Landfill in which solid waste has been placed for five years or more.

103. From February 2017 through October 2020, Defendant violated 40 CFR 60.753(a)(2), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 by failing to operate a gas collection and control system such that gas is collected from each closed area in the Arbor Hills Landfill in which solid waste has been placed for two years or more.

104. From February 2017 through October 2020, Defendant violated 40 CFR 60.759(a)(3), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 by failing to place gas collection devices that control all gas producing areas.

105. From February 2017 through October 2020, Defendant violated 40 CFR 60.759(b)(2), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 by failing to construct gas collection devices that address the occurrence of water within the Arbor Hills Landfill.

106. From February 2017 through October 2020, Defendant violated 40 CFR 60.11(d) of the NSPS General Provisions, MI-ROP-N2688-2011a, and Rule 902 by failing to maintain and operate the Landfill including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions.

107. From February 2017 through October 2020, Defendant violated 40 CFR 63.63(e)(1)(i) of the NESHAP General Provisions, MI-ROP-N2688-2011a, and Rule 902 by failing to operate and maintain the Landfill, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practice for minimizing emissions.

108. As provided in Section 5530 of the NREPA, MCL 324.5530, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each instance of violation and for each day of continued violation.

COUNT II

VIOLATIONS OF RULE 432(1) OF THE PART 115 RULES – LEACHATE LEVELS

109. Paragraphs 1 through 108 are hereby realleged and incorporated by reference.

110. From January 2018 through April 2020, Defendant violated Rule 432(1) of the Part 115 administrative rules, Mich Admin Code, R 299.4432(1), on more than 40 days by failing to remove leachate from a disposal unit at the Arbor Hills Landfill as frequently as necessary to ensure that the leachate depth on the liner, excluding the sump, is not more than one foot.

111. As provided in Section 11546 of the NREPA, MCL 324.11546, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each day of violation and for a second or subsequent violation, a civil fine of not more than $25,000 for each day of violation.

COUNT III

VIOLATIONS OF RULE 432(2)(A) AND (B) OF THE PART 115 RULES – FAILURE TO MONITOR AND RECORD LEACHATE DEPTHS AND LEACHATE VOLUME PUMPED

112. Paragraphs 1 through 111 are hereby realleged and incorporated by reference.

113. From January 2018 through November 2019, Defendant violated Rule 432(2)(a) of the Part 115 administrative rules, Mich Admin Code, R 299.4432(2)(a), on more than 55 days by failing to monitor the leachate collection system and record the leachate depths on a schedule that assures compliance with the 1-foot depth requirement in Rule 432(1).

114. From May 2018 through December 2019, Defendant violated Rule 432(2)(b) of the Part 115 administrative rules, Mich Admin Code, R 299.4432(2)(b), on more than 35 days by failing to monitor the leachate collection system and record the monthly volume of leachate pumped from all units.

115. As provided in Section 11546 of the NREPA, MCL 324.11546, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each day of violation and for a second or subsequent violation, a civil fine of not more than $25,000 for each day of violation.

COUNT IV

VIOLATIONS OF RULE 432(3)(A) AND (B) OF THE PART 115 RULES FAILURE TO REMOVE LIQUIDS IN SECONDARY COLLECTION SYSTEM AND RECORD AMOUNT OF LIQUID REMOVED

116. Paragraphs 1 through 115 are hereby realleged and incorporated by reference.

117. From January 2018 through November 2018, Defendant violated Rule 432(3)(a) of the Part 115 administrative rules, Mich Admin Code, R 299.4432(3)(a), on more than 35 days by failing to remove pumpable liquids in the secondary collection system sumps on a frequency that is sufficient to minimize the head on the bottom liner.

118. From February 2018 through December 2019, Defendant violated Rule 432(3)(b)(i) of the Part 115 administrative rules, Mich Admin Code, R 299.4432(3)(b)(i), more than 30 times by failing to record in the operating record the amount of liquid removed from each system sump at least weekly.

119. From June 2018 through February 2020, Defendant violated Rule 432(3)(b)(ii) of the Part 115 administrative rules, Mich Admin Code, R 299.4432(3)(b)(ii), more than 35 times by failing to calculate and record in the operating record the average daily flow rate, monthly.

120. As provided in Section 11546 of the NREPA, MCL 324.11546, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each day of violation and for a second or subsequent violation, a civil fine of not more than $25,000 for each day of violation.

COUNT V

VIOLATIONS OF RULE 433(1)(B) OF THE PART 115 RULES – LOWER EXPLOSIVE LIMIT

121. Paragraphs 1 through 120 are hereby realleged and incorporated by reference.

122. From February 8, 2017 through March 26, 2020, Defendant violated Rule 433(1)(b) of the Part 115 administrative rules, Mich Admin Code, R 299.433(1)(b) on more than 140 days by failing to ensure that the concentration of methane gas is not more than the lower explosive limit at or beyond the facility property boundary. Mich Admin Code, R 299.433(1)(b).

123. As provided in Section 11546 of the NREPA, MCL 324.11546, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each day of violation and for a second or subsequent violation, a civil fine of not more than $25,000 for each day of violation.

COUNT VI

VIOLATIONS OF 40 CFR 60.755(C)(5), 40 CFR 63.1930(A), MI-ROP-N2688-2011A, AND RULE 902 OF THE PART 55 RULES – FAILURE TO IMPLEMENT COVER REPAIRS

124. Paragraphs 1 through 123 are hereby realleged and incorporated by reference.

125. From January 31, 2018 to July 1, 2018, Defendant violated 40 CFR 60.755(c)(5), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 of the Part 55 administrative rules, Mich Admin Code, R 336.1902, at least five times by failing to implement cover repairs as necessary on a monthly basis.

126. As provided in Section 5530 of the NREPA, MCL 324.5530, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each instance of violation and for each day of continued violation.

COUNT VII

VIOLATIONS OF 40 CFR 60.752(B)(2)(III), 40 CFR 63.1930(A), MI-ROP-N2688-2011A, AND RULE 902 OF THE PART 55 RULES – UNCONTROLLED LANDFILL GAS

127. Paragraphs 1 through 126 are hereby realleged and incorporated by reference.

128. The Landfill NSPS, at 40 CFR 60.752(b)(2)(iiii), requires each owner or operator of a municipal solid waste landfill with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters and a calculated emission rate of nonmethane organic compounds equal to or greater than 50 megagrams per year to route all the collected gas to a control system that complies with the requirements in either 40 CFR 60.752(b)(2)(iii)(A), (B), or (C).

129. The control system requirement in 40 CFR 60.752(b)(2)(iii)(A) is "[a]n open flare designed and operated in accordance with § 60.18 excepted as noted in § 60.754(e)[.]"

130. The control system requirements in 40 CFR 60.752(b)(2)(iii)(B) include:

> A control system designed and operated to reduce [nonmethane organic compounds] by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce [nonmethane organic compounds] by 98 weight percent or reduce the outlet [nonmethane organic compounds] concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen.

131. The control system requirements in 40 CFR 60.752(b)(2)(iii)(C) include "[r]oute the collected gas to a treatment system that processes the collected gas for subsequent sale or use."

132. From February 14, 2019 to November 25, 2019, from February 7, 2020 to February 10, 2020, and on September 26, 2020, Defendant violated 40 CFR 60.753(b)(2)(iii), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 of the Part 55 administrative rules, Mich Admin Code, R 336.1902, on more than 30 days by failing to route all the collected gas from landfill gas vents to a control system that complies with the requirements in either 40 CFR 60.752(b)(2)(iii)(A), (B), or (C).

133. As provided in Section 5530 of the NREPA, MCL 324.5530, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each instance of violation and for each day of continued violation.

COUNT VIII

VIOLATIONS OF RULE 901 OF THE PART 55 ADMINISTRATIVE RULES AND RULE 433(1)(C) OF THE PART 115 ADMINISTRATIVE RULES

134. Paragraphs 1 through 133 are hereby realleged and incorporated by reference.

135. From January 2018 through November 2019, Defendant violated Rule 901 of the Part 55 administrative rules, Mich Admin Code, R 336.1901, on more than 45 days by emitting odors that caused an unreasonable interference with the comfortable enjoyment of life and property.

136. From January 2018 through November 2019, Defendant violated Rule 433(1)(c) of the Part 55 administrative rules, Mich Admin Code, R 299.4433(1)(c), on more than 45 days by failing to ensure that gases generated by the facility do not

create a nuisance and are not otherwise in violation of Part 55 of the NREPA at the property boundary.

137. As provided in Section 5530 of the NREPA, MCL 324.5530, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each instance of violation and for each day of continued violation.

138. As provided in Section 11546 of the NREPA, MCL 324.11546, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each day of violation and for a second or subsequent violation, a civil fine of not more than $25,000 for each day of violation.

COUNT IX

PUBLIC NUISANCE

139. Paragraphs 1 through 138 are hereby realleged and incorporated by reference.

140. An action or omission that unreasonably interferes with public rights constitutes a public nuisance.

141. Defendant has created a public nuisance by emitting foul odors from the Arbor Hills landfill that unreasonably interferes with the public's right to use their property.

COUNT X

VIOLATIONS OF 40 CFR 60.11(D), 40 CFR 63.6(E)(1)(I), MI-ROP-N2688-2011A, AND RULE 902 OF THEPART 55 RULES – INADEQUATE FLARING CAPACITY

142. Paragraphs 1 through 141 are hereby realleged and incorporated by reference.

143. The NSPS General Provisions, at 40 CFR 60.11(d), require Defendant, at all times, including periods of startup, shutdown, and malfunction, to the extent practicable, to maintain and operate the Landfill including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions.

144. The NESHAP General Provisions, at 40 CFR 63.6(e)(1)(i), require Defendant, at all times, including periods of startup, shutdown, and malfunction, to operate and maintain the Landfill, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

145. From November 17, 2018, until after April 4, 2019, and on September 23, 2020 and September 24, 2020, Defendant violated 40 CFR 60.11(d), 40 CFR 63.6(e)(1)(i), MI-ROP-N2688-2011a, and Rule 902 of the Part 55 administrative rules, Mich Admin Code, R 336.1902, on more than 120 days by failing to have adequate flaring capacity to flare landfill gas in the event of an outage at the gas-to-energy plant owned and operated by Arbor Hills Energy, LLC.

146. As provided in Section 5530 of the NREPA, MCL 324.5530, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each instance of violation and for each day of continued violation.

COUNT XI

VIOLATIONS OF SECTION 11514(3)(H) OF THE NREPA, 40 CFR 61.154, MI-ROP-N2688-2011A, AND RULE 902 OF THE PART 55 RULES - ASBESTOS SIGNS AND RECORDS

147. Paragraphs 1 through 146 are hereby realleged and incorporated by reference.

148. The Arbor Hills Landfill is an active waste disposal site that receives asbestos-containing waste material from facilities being demolished or renovated that are subject to 40 CFR 61.145.

149. MI-ROP-N2688-2011a requires Defendant to comply with the requirements of 40 CFR 61.154. MI-ROP-N2688-2011a, Section 1, EUASBESTOSWASTE-S1.

150. From January 18, 2019, until after April 4, 2019, Defendant violated Section 11514(3)(h) of the NREPA, MCL 324.11514(3)(h), 40 CFR 61.154, MI-ROP-N2688-2011a, and Rule 902 of the Part 55 administrative rules, Mich Admin Code, R 336.1902, on more than 75 days by receiving asbestos-containing waste material from facilities being demolished or renovated that are subject to 40 CFR 61.145 without displaying warning signs at all entrances and at intervals of 100 meters (330 feet) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited.

151. From October 2014 to June 2018, Defendant violated Section 11514(3)(h) of the NREPA, MCL 324.11514(3)(h), 40 CFR 61.154, MI-ROP-N2688-2011a, and Rule 902 of the Part 55 administrative rules, Mich Admin Code, R 336.1902, by failing to maintain records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal site on a map or diagram of the Landfill.

152. As provided in Section 5530 of the NREPA, MCL 324.5530, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each instance of violation and for each day of continued violation.

153. As provided in Section 11546 of the NREPA, MCL 324.11546, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each day of violation and for a second or subsequent violation, a civil fine of not more than $25,000 for each day of violation.

COUNT XII

VIOLATIONS OF 40 CFR 60.753(C), 40 CFR 60.755(A)(5), 40 CFR 63.1930(A), MI-ROP-N2688-2011A, AND RULE 902 OF THE PART 55 RULES – WELLS WITH TEMPERATURES EXCEEDING 55 °C

154. Paragraphs 1 through 153 are hereby realleged and incorporated by reference.

155. Temperatures greater than 55 °C at landfills may damage gas and leachate infrastructure and increase leachate volumes. A damaged gas collection and control system may lead to emissions through the landfill surface and odors,

while a damaged leachate extraction system may result in leachate seeps at the landfill surface, elevated leachate levels on the liner, and flooded gas wells.

156. From August 2017 through April 2019, Defendant violated 40 CFR 60.753(c), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 when 10 wells at the Landfill had a landfill gas temperature that exceeded 55 °C.

157. From August 2017 through April 2019, Defendant violated 40 CFR 60.755(a)(5), 40 CFR 63.1930(a), MI-ROP-N2688-2011a, and Rule 902 when 10 wells at the Landfill had a landfill gas temperature that exceeded 55 °C and Defendant failed to initiate action to correct the exceedance within five calendar days and, after Defendant failed to correct the exceedance within 15 calendar days of the first measure, it failed to expand the gas collection system to correct the exceedance within 120 days of the initial exceedance and failed to submit an alternative compliance timeline to EGLE for approval.

158. As provided in Section 5530 of the NREPA, MCL 324.5530, the violations set forth in this Count subject Defendant to injunctive relief and a civil fine of not more than $10,000 for each instance of violation and for each day of continued violation.

DEMAND FOR JUDGMENT

Plaintiff respectfully requests that this Honorable Court grant the following relief:

A. Permanently enjoin Defendant from operating the Arbor Hills Landfill except in accordance with the Landfill NSPS, 40 CFR 60.11(d), 40 CFR 63.1930(a), 40 CFR 63.6(e)(1)(i), 40 CFR 61.154, Rule 901 and Rule 902 of the Part 55 administrative rules, MI-ROP-N2688-2011a, Part 115 of the NREPA, and Rule 432 and Rule 433 of the Part 115 administrative rules;

B. Permanently enjoin Defendant from operating the Arbor Hills Landfill in a manner that creates a public nuisance;

C. Order Defendant to achieve, maintain, and demonstrate compliance with the Landfill NSPS, 40 CFR 60.11(d), 40 CFR 63.1930(a), 40 CFR 63.6(e)(1)(i), 40 CFR 61.154, Rule 901 and Rule 902 of the Part 55 administrative rules, MI-ROP-N2688-2011a, Part 115 of the NREPA, and Rule 432 and Rule 433 of the Part 115 administrative rules;

D. Order Defendant to take appropriate actions to remedy the violations asserted above of the Landfill NSPS, 40 CFR 60.11(d), 40 CFR 63.1930(a), 40 CFR 63.6(e)(1)(i), 40 CFR 61.154, MI-ROP-N2688-2011a, Rule 901 and Rule 902 of the Part 55 administrative rules, Part 115 of the NREPA, and Rule 432 and Rule 433 of the Part 115 administrative rules;

E. Order Defendant to abate the public nuisance created by its operation of the Arbor Hills Landfill;

F. Order Defendant to pay civil fines of $10,000 for each violation of the Landfill NSPS, 40 CFR 60.11(d), 40 CFR 63.1930(a), 40 CFR 63.6(e)(1)(i), 40 CFR 61.154, MI-ROP-N2688-2011a, and Rule 901 and Rule 902 of the Part 55 administrative rules and $10,000 for each day of continued violation;

G. Order Defendant to pay civil fines of $10,000 for each day of violation of Part 115 of the NREPA and for a second or subsequent violation, a civil fine of $25,000 for each day of violation;

H. Order Defendant to pay civil fines of $10,000 for each day of violation of Rule 432 and Rule 433 of the Part 115 administrative rules and for a second or subsequent violation, a civil fine of $25,000 for each day of violation;

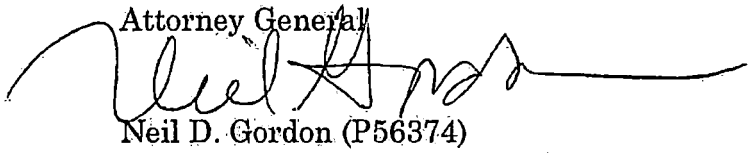
I. Order Defendant to pay reasonable attorney fees and costs of litigation resulting from Defendant's violations of the Landfill NSPS, 40 CFR 60.11(d), 40 CFR 63.1930(a), 40 CFR 63.6(e)(1)(i), 40 CFR 61.154, Rule 901 and Rule 902 of the Part 55 administrative rules, and MI-ROP-N2688-2011a;

J. Order Defendant to pay to EGLE the costs of surveillance and enforcement resulting from Defendant's violations of Part 115 of the NREPA and of Rule 432 and Rule 433 of the Part 115 administrative rules; and

K. Grant such other relief as this Court deems just and proper.

Respectfully submitted,

Dana Nessel
Attorney General



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Dated: October 23, 2020

LF: Advanced Disposal Services Arbor Hills (DEQ)/AG# 2019-0242474-A/Complaint 2020-10-23

EXHIBIT 1

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

September 26, 2018

Mr. Bob Walls, General Manager
Advanced Disposal Services Arbor Hills Landfill, Inc.
10690 West Six Mile Road
Northville, Michigan 48168-9426

Dear Mr. Walls:

SUBJECT: Application for Solid Waste Disposal Area Operating License; Advanced Disposal Services Arbor Hills Landfill, Inc.; Waste Data System Number 475946; License Number 9531

Staff of the Department of Environmental Quality (DEQ), Waste Management and Radiological Protection Division (WMRPD), has reviewed your application for a municipal solid waste landfill, known as Advanced Disposal Services Arbor Hills Landfill, Inc., located in Salem Township, Washtenaw County, Michigan. This review was conducted under the provisions of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Based upon our review of your application, your operating license is hereby granted. Enclosed is your license with operating stipulations.

Should you require further information, please contact Mr. Larry Bean, Jackson District Supervisor, WMRPD, 517-416-4375; beanl@michigan.gov; or DEQ, State Office Building, 301 East Louis Glick Highway, Jackson, Michigan 49201.

Sincerely,

for

Rhonda S. Oyer, Manager
Solid Waste Section
Waste Management and Radiological
Protection Division
517-284-6591

Enclosure
cc: Washtenaw County Public Health Department
Salem Township Clerk
Mr. Lawrence Bean/Mr. Alex Whitlow/Mr. Brett Coulter, DEQ - Jackson
Facility File

Michigan Department of Environmental Quality
Waste Management and Radiological Protection Division

SOLID WASTE DISPOSAL AREA OPERATING LICENSE

This license is issued under the provisions of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCL 324.11501 et seq., and authorizes the operation of this solid waste disposal area (Facility) in the state of Michigan. This license does not obviate the need to obtain other authorizations as may be required by state law.

FACILITY NAME: Arbor Hills West Expanded Sanitary Landfill

LICENSEE/OPERATOR: Advanced Disposal Services Arbor Hills Landfill, Inc.

FACILITY OWNER: Advanced Disposal Services Arbor Hills Landfill, Inc.

PROPERTY OWNER: Advanced Disposal Services - Arbor Hills Landfill, Inc., and Salem Township

FACILITY TYPE(S): Municipal Solid Waste Landfill

FACILITY ID NUMBER: 475946

COUNTY: Washtenaw

LICENSE NUMBER: 9531

ISSUE DATE: September 26, 2018

EXPIRATION DATE: September 26, 2023

FACILITY DESCRIPTION: The Arbor Hills West Expanded Sanitary Landfill, a municipal solid waste landfill, consists of 337.24 acres located in Section 13, T1S, R7E, Salem Township, Washtenaw County, Michigan, as identified in Attachment A and fully described in this license.

AREA AUTHORIZED FOR DISPOSAL OF SOLID WASTE: Cell 1, Cell 2, Cell 3, Cell 4A, Cell 4B, Cell 4C, Cell 4D, and Cell 5.

RESPONSIBLE PARTY: Mr. Bob Walls, General Manager
Advanced Disposal Services Arbor Hills Landfill, Inc.
10690 West Six Mile Road
Northville, Michigan 48168-9426
248-412-0704

RENEWAL OPERATING LICENSE: This License Number 9531 supersedes and replaces Solid Waste Disposal Area Operating License Number 9371 issued to Advanced Disposal Services Arbor Hills Landfill, Inc. on March 13, 2014.

This license is subject to revocation by the Director of the Michigan Department of Environmental Quality, if the Director finds that this Facility is not being constructed or operated in accordance with the approved plans, the conditions of a permit or license, Part 115, or the rules promulgated under Part 115. Failure to comply with the terms and provisions of this license may result in legal action leading to civil and/or criminal penalties pursuant to Part 115. This license shall be available through the licensee during its term and remains the property of the Director.

THIS LICENSE IS NOT TRANSFERABLE.

for

Rhonda S. Oyer, Manager, Solid Waste Section
Waste Management and Radiological Protection Division

The licensee shall comply with all terms of this license and the provisions of Part 115 and the administrative rules implementing Part 115 (Part 115 Rules). This license includes the license application and any attachments to this license.

1. The licensee shall operate the Facility in a manner that will prevent violations of any state or federal law.

2. The following portions of the Facility are authorized to receive solid waste by this license:

   ACTIVE PORTIONS NOT AT FINAL GRADE: The area(s) identified as Cell 1 (36.69 acres, Cell 2 (26.43 acres), Cell 3 (59.42 acres), Cell 4A-D (31.0 acres), and Cell 5 (42.75 acres) were authorized to receive waste by the previous license. This area's total acreage is 196.29 acres.

3. The following portions of the Facility **WILL BE** authorized to receive solid waste by this license following approval by the Michigan Department of Environmental Quality (MDEQ) of construction certification:

   UNCONSTRUCTED AREA(S) WITH FINANCIAL ASSURANCE: The area(s) identified as Cell 4E, totaling 14.22 acres, are included in the calculation of financial assurance as required by Section 11523 of Part 115. This portion(s) of the Facility shall be authorized to receive waste, as part of this license, when acceptable certification is submitted to the MDEQ, as required by Section 11516(5) of Part 115, and determined by the MDEQ to be consistent with Part 115 and the Part 115 Rules. The certification shall verify that construction of this area(s) was in accordance with the Construction Permit(s) listed in Item 8 of this license, Part 115, and the Part 115 Rules.

4. The following portions of the Facility are **NOT** authorized to receive solid waste by this license:

   CLOSED UNIT(S) OR A PORTION OF A UNIT WHERE THE FINAL COVER HAS BEEN CERTIFIED CLOSED AND ACCEPTED BY THE MDEQ: The following unit(s) and/or portion(s) are closed:

   PRE-EXISTING UNIT(S): The unit(s) identified as Arbor Hills East (131 acres) had final closure certified on November 15, 1990. An overfill was approved for part of this area. The remainder of this area that is not otherwise bonded as active area or unconstructed with financial assurance totals 85.3 acres. Once all permitted overfill has been constructed, 52 acres of Arbor Hills East will remain . This certification was reviewed and approved by the MDEQ. This area's total acreage is 85.3 acres.

5. The attached map (Attachment A) shows the Facility, the area permitted for construction (Attachment A1), monitoring points, leachate storage units, site roads, other disposal areas, and related appurtenances (Attachment A2).

6. Issuance of this license is conditioned on the accuracy of the information submitted by the Applicant in the Application for License to Operate a Solid Waste Disposal Area (Application) received by the MDEQ on June 1, 2018, and any subsequent amendments. Any material or intentional inaccuracies found in that information is grounds for the revocation or modification of this license and may be grounds for enforcement action. The licensee shall inform the MDEQ's Waste Management and Radiological Protection Division (WMRPD), Jackson District Supervisor, of any inaccuracies in the information in the Application upon discovery.

7. This license is issued based on the MDEQ's review of the Application, submitted by Advanced Disposal Services Arbor Hills Landfill, Inc., for the Arbor Hills West Expanded Sanitary Landfill, dated May 30, 2018, and revised September 20, 2018. The Application consists of the following:

   a. Application Form EQP 5507.

   b. Application fee in the amount of $22,500.

   c. Certification of construction by N/A.

   d. Waste Characterization: N/A.

e. Restrictive Covenant:

The January 18, 2010, restrictive covenant on 337.24 acres is on file at the Washtenaw County Register of Deeds recorded on March 12, 2010, as Liber 64777 pages 15. A copy is on file with the MDEQ.

f. Perpetual Care Fund Agreement, established as a standby trust account, signed by Mr. Marti Dickman, Vice President, Rick Management, on October 6, 2014, was executed by the MDEQ on December 3, 2014.

g. Financial Assurance.

i. Financial Assurance Required:

The amount of financial assurance required for this Facility was calculated based on the calculation worksheet form EQP 5507A entitled, "Form A, Financial Assurance Required," and is $26,453,182.08.

The Facility has provided financial assurance totaling $26,453,182.08, based on the requirements of Section 11523 of Part 115, consisting of a combination of the Perpetual Care Fund established under Section 11525 of Part 115, bonds, and the financial capability of the Applicant as evidenced by a financial test. The financial assurance mechanisms used by the Facility are summarized below in Items ii, iii, and iv, respectively.

ii. Financial Assurance Provided Via a Perpetual Care Fund:

The Perpetual Care Fund Agreement statement showed a balance of $2,259,095.00 in the Facility's Perpetual Care Fund as of May 21, 2018. Of this amount, the MDEQ has granted the request to use $2,259,095.00 toward the total amount of financial assurance required.

iii. Financial Assurance Provided Via Bond:

The following financial assurance has been received from the Applicant to meet the amount of financial assurance required:

Surety Bond	$24,194,087.08
Total Amount Received:	$24,194,087.08

iv. Financial Assurance Provided Via a Financial Test for a Type II Landfill: N/A.

v. Financial Assurance Updates Required:

For Type II landfills, the financial assurance cost estimates of closure and postclosure activities must be updated annually and the corresponding requisite amount of financial assurance must be adjusted annually for the costs of inflation. The corresponding financial assurance, as adjusted for inflation and other factors, is due one year from the date of this license, and each year thereafter.

vi. Other Required Financial Assurance: N/A.

8. The following documents approved with Construction Permit Number(s) 0376, 4108, 4133, and 4162 issued to the Browning Ferris Industries of North America, Inc., on October 14, 1999, Veolia ES Arbor Hills Landfill, Inc., on December 11, 2009, and Advanced Disposal Services Arbor Hills Landfill, Inc., on June 10, 2013, and October 13, 2017, respectively, are incorporated in this license by reference:

a. Engineering Plans titled "Veolia ES Arbor Hills Landfill, Inc., Arbor Hills West Expanded Sanitary Landfill – 2009 Construction Permit Application," dated July 2, 2009, and revised October 15, 2009, and November 17, 2009.

b. Binder entitled: Arbor Hills West Expanded Sanitary Landfill Part 115 Construction Permit Application, dated June 2009, containing:

   i. Executive Summary dated June 2009.

   ii. Application forms, legal description, facility map, administrative completeness checklist, letter of consistency.

   iii. Environmental Assessment dated June 2009 and revised October 2009.

   iv. Engineering Report dated June 2009 and revised October 2009.

   v. 2009 Operations Plan dated June 2009 and revised October 15, 2009.

   vi. 2009 Closure Post Closure Plan dated June 2009.

   vii. Geotechnical Engineering Report dated July 2009.

   viii. Construction Quality Assurance Plan dated July 2009.

   ix. Hydrogeo Study Checklists dated May 18, 2009.

   x. Addendum to Hydrogeologic Report, dated June 2009 and revised October 2009.

   xi. Hydrogeologic Monitoring Plan dated June 2009 and revised October 15, 2009, and November 2009.

   xii. Executive Summary prepared by Midwestern Consulting, LLC, and dated March 4, 2013.

c. Revised Engineering Plan Sheets 1, 8, 9, 10, 17, 18, 19, 22, 23, and 24 entitled: Veolia ES Arbor Hills Landfill, Inc., Arbor Hills West Expanded Sanitary Landfill, Construction Permit Modification - January 2013, dated July 2, 2009, and revised March 1, 2013.

d. Revised Engineering Plan Sheets 1, 8, 9, 10, 17, 19, and 22 entitled Advanced Disposal Services Arbor Hills Landfill, Inc., Arbor Hills West Expanded Sanitary Landfill, Construction Permit Modification - February 2017, dated March 2017 and revised August 30, 2017.

9. The following additional documents, approved since the issuance of the construction permit(s) referenced in Item 8, are incorporated in this license by reference: N/A.

10. Consent Order/Judgment Number: OWMRP Consent Order Number 115-03-02 entered on January 31, 2002, is incorporated into this license by reference.

11. The licensee shall repair any portion of the certified liner or leachate collection system that is found to be deficient or damaged during the term of this license unless determined otherwise by the MDEQ.

12. The licensee shall have repairs to any portion of the certified liner or leachate collection system recertified by a registered professional engineer in accordance with R 299.4921 of the Part 115 Rules and approved by the MDEQ before receiving waste in that portion of the certified liner or leachate collection system. The licensee shall submit the recertification to the MDEQ's WMRPD, Jackson District Office Supervisor, for review and approval.

13. The licensee shall conduct hydrogeological monitoring in accordance with the approved hydrogeological monitoring plan, dated June 2009, and revised October 15, 2009, and November 2009, titled Hydrogeological Monitoring Plan. The sampling analytical results shall be submitted to the MDEQ's WMRPD, Jackson District Office.

14. Modifications to the approved hydrogeological monitoring plan referenced in Item 13 may be approved, in writing, by the WMRPD, Jackson District Supervisor. Proposed revisions must be submitted in a format specified by the MDEQ.

15. Leachate may be recirculated if a leachate recirculation plan has been approved, in writing, by the WMRPD, Jackson District Supervisor.

16. Modifications to approved engineering plans that constitute an upgrading, as defined in R 299.4106a(l) of the Part 115 Rules, may be approved, in writing, by the WMRPD, Jackson District Supervisor.

17. Requests for alternate daily cover may be approved, in writing, by the WMRPD, Jackson District Supervisor.

18. Leakage Control Criteria:

    The active portions of the unit(s) authorized to receive waste by this license is an unmonitorable unit(s) designed with a double-liner system that is in compliance with the provisions of R 299.4422(3) of the Part 115 Rules and that is capable of detecting and collecting leakage through the primary composite liner. The action flow rate for each unit containing a leak detection system for Cell 1, Cell 2, Cell 3 and Cell 5, is 25 gallons/acre/day. Cell 4 is 5 gallons/acre/day. The response flow rate for each unit containing a leak detection system for Cell 1, Cell 2, Cell 3, and Cell 5, is 200 gallons/acre/day. Cell 4 is 25 gallons/acre/day.

19. **VARIANCES**: None.

20. **SPECIAL CONDITIONS**

    a. The licensee shall place a compacted layer of not less than six inches of earthen material, unless an exemption is granted, of suitable cover material on all exposed solid waste by the end of each working day, as required by R 299.4429(1) of the Part 115 Rules. Suitable cover shall be either uncontaminated soil or an alternate cover approved by the WMRPD, listed in Item i, below. Alternate cover shall be restricted as indicated in Item ii and applied as per the approved operational plan submitted by the licensee.

        i. Approved alternate cover shall be any of the following:

Product/Waste Material	Source	Monthly Volume
(1) Geosynthetic Cover	Variable	Variable
(2) Contaminated Soils	Variable	Variable
(3) Off-specification Compost	Variable	Variable
(4) Paper Mill Sludge	Variable	Variable

        ii. The above materials are approved for daily cover when used in the following manner:

            (1) The licensee shall use the material as daily cover only. The material cannot be used for road building or fill in other areas of the Facility's operation.

            (2) The licensee shall maintain copies of the testing performed on Class B and Class C materials in the facility operating record.

            (3) The licensee shall only stockpile material in a secure manner within the active cell.

            (4) This approval does not preclude the licensee from disposing of the material as waste in the active fill area instead of using the material as daily cover.

            (5) This approval shall immediately become void upon documentation by the MDEQ that the alternative cover is not being used in accordance with listed conditions, that the alternative cover is not providing the necessary protection, that the material no longer meets the alternative daily cover guidelines, or that the process producing the waste material has changed.

(6) If the material does not meet the guidelines from Attachment 2 of Policy and Procedure OWMRP-115-10, for nonvolatiles, the licensee shall ensure that fugitive dust emissions from this material do not occur. Acceptable methods to ensure fugitive emissions do not occur are:

(a) Implement a schedule to wet down material; or

(b) Cover the material with a tarp; or

(c) Apply an approved foam or other appropriate commercial dust control product.

(7) This approval to use alternative cover shall expire upon expiration of this operating license.

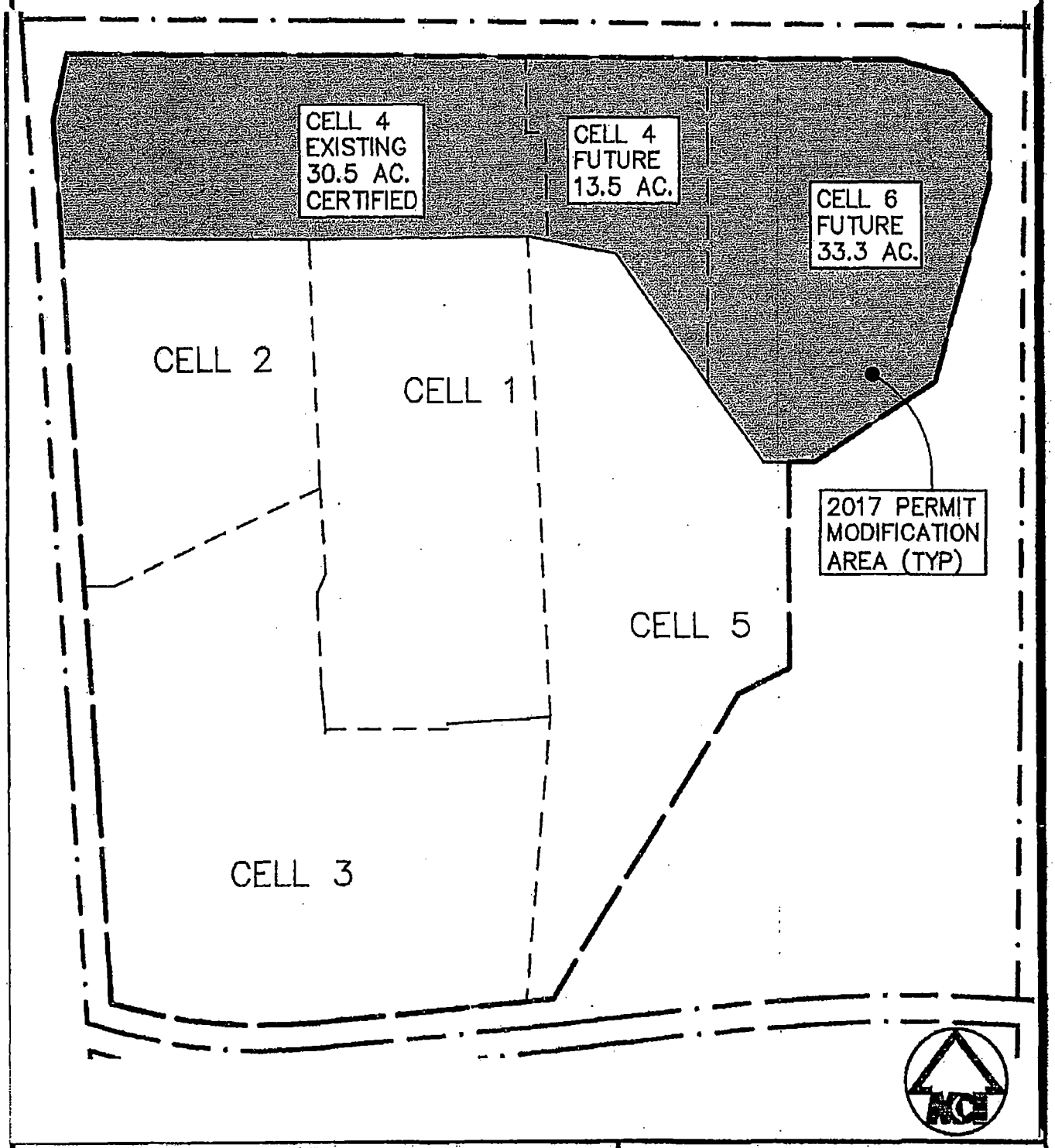
21. **TERM**: This license shall remain in effect until its expiration date, unless revoked or continued in effect, as provided by, the Administrative Procedures Act, 1969 PA 306, as amended, or unless superseded by the issuance of a subsequent license.

END OF LICENSE

ATTACHMENT A 1

ADVANCED ARBOR HILLS LANDFILL

SALEM TOWNSHIP, WASHTENAW COUNTY, MICHIGAN



MIDWESTERN CONSULTING

Civil, Environmental and Transportation Engineers
Planners, Surveyors
Landscape Architects

3815 Plaza Drive
Ann Arbor, Michigan 48108
Phone: 734.995.0200
Fax 734.995.0599

ARBOR HILLS LANDFILL, INC.
2017 PERMIT MODIFICATION BDRY

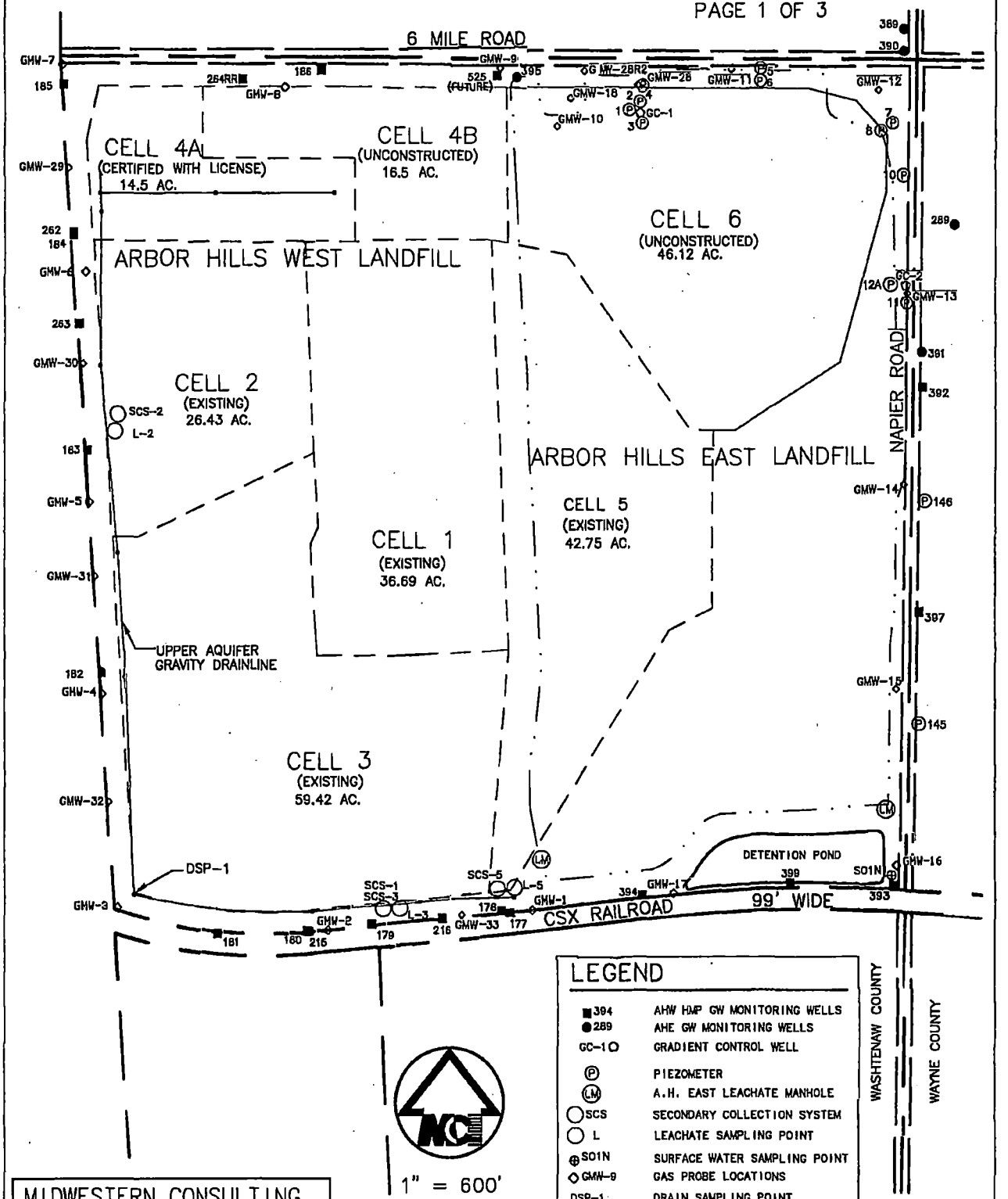
DATE: 9/22/17 JOB NO.: **09043**

NOT TO SCALE SHEET 1 OF 1

ARBOR HILLS WEST EXPANDED SANITARY LANDFILL

MONITORING LOCATIONS

Attachment A2



LEGEND

■394	AHW HMP GW MONITORING WELLS
●289	AHE GW MONITORING WELLS
GC-1 ○	GRADIENT CONTROL WELL
Ⓟ	PIEZOMETER
Ⓛⓜ	A.H. EAST LEACHATE MANHOLE
◯SCS	SECONDARY COLLECTION SYSTEM
◯ L	LEACHATE SAMPLING POINT
⊕SO1N	SURFACE WATER SAMPLING POINT
◇GMW-9	GAS PROBE LOCATIONS
DSP-1	DRAIN SAMPLING POINT
—— ——	APPROXIMATE ARBOR HILLS EAST WASTE LIMITS

MIDWESTERN CONSULTING
Civil Engineers
Environmental Engineers
Planners, Surveyors
3815 Plaza Drive
Ann Arbor, Michigan 48108
734-995-0200 Fax 734-995-0599

7/12/13

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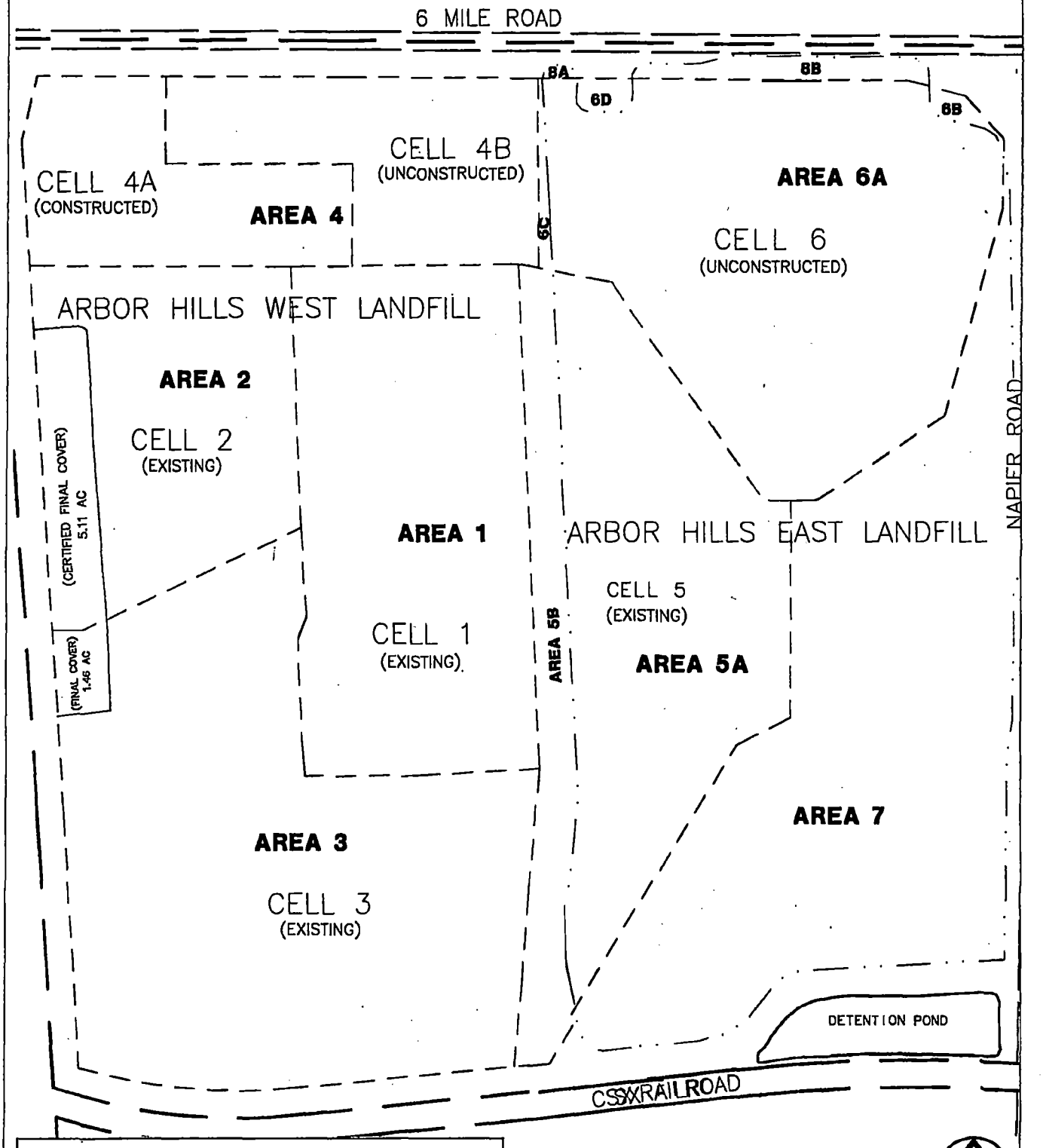
ARBOR HILLS WEST EXPANDED SANITARY LANDFILL

FACILITY AREA SUMMARY MAP



LEGEND

- SOLID WASTE DISPOSAL AREA (ARBOR HILLS WEST EXPANDED)
- APPROXIMATE ARBOR HILLS EAST WASTE LIMITS

MIDWESTERN CONSULTING
Civil Engineers
Environmental Engineers
Planners, Surveyors
3815 Plaza Drive
Ann Arbor, Michigan 48108
734-995-0200 Fax 734-995-0599

1" = 600'

7/12/13

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	Cell Acreage	Attachment A "Area" Designation		Cell Areas	AHW Permitted	AHE (existing)	Line 1a - Active Type II Area	Line 3 - Unconstructed Areas w/ FA	Line 4 - Unconstructed Area w/o FA	Line 6 - Partially Closed Areas	Line 9 - Closed Unit - Preexisting Type II
Cell 1	36.69	1	existing	36.69	36.69		36.69				
Cell 2	26.43	2	existing	21.32	26.43		21.32			5.11	
			Cell 2 - closed portion	5.11							
Cell 3	59.42	3	existing	57.96	59.42		57.96			1.46	
			Cell 3 - closed portion	1.46							
Cell 4	31.00	4	existing, partially constructed	31.00	31.00			31.00			
Cell 5	42.75	5A	overfill above AHE	33.41	42.75	33.41	42.75				
		5B	over native soil	9.34							
Cell 6 (future)	46.12	6A	overfill above AHE	44.72	46.12	44.72			1.40		44.72
		6B, 6C, 6D	over native soil	1.40							
AHE	52.90	7	no overfill, to remain	52.00		52.90					52.90
		8A,8B	future to be removed to ancillary	0.90							
				TOTAL:	242.41	131.03	158.72		1.40	6.57	97.62

Current Permitted Area: 295.31 acres (Permitted AHW plus current AHE not overfilled)
Total Property Area: 337.24 acres
Line 7 -Ancillary Area: 41.93 acres

ATTACHMENT A (Page 3 of 3)

EXHIBIT 2

VMACES NSPS (Part 60) N2688

cornerstone environmental

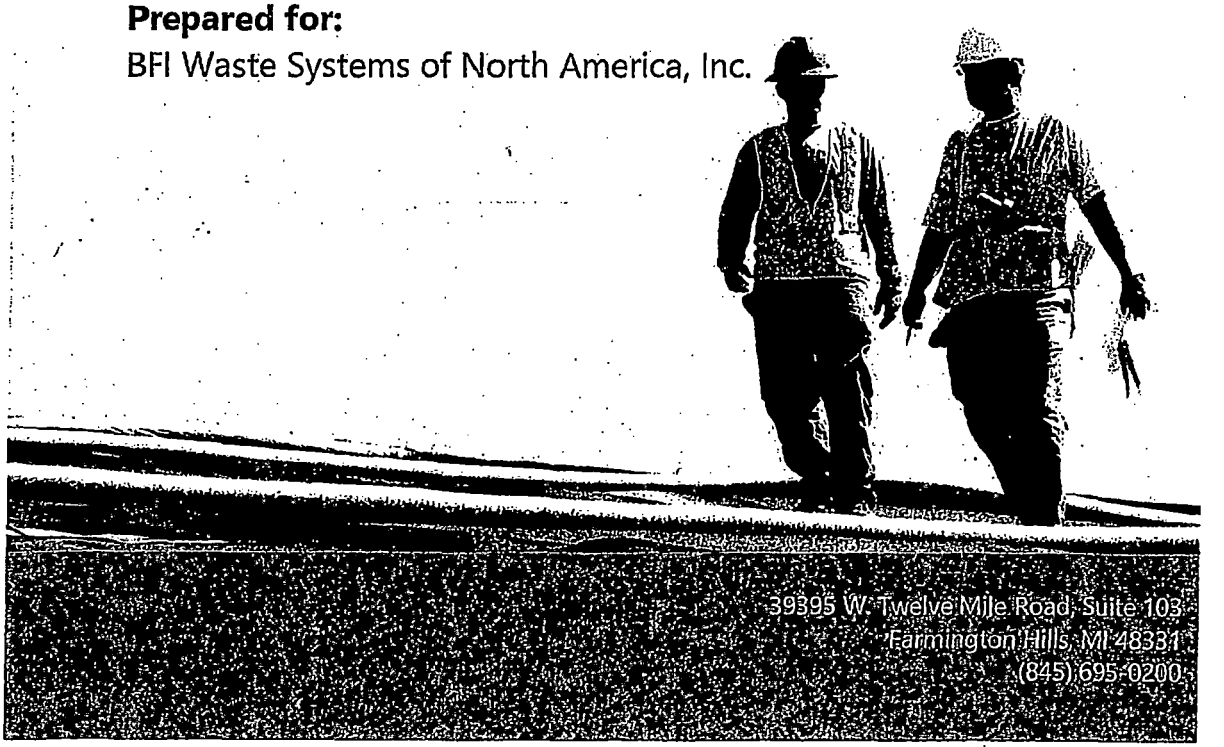
Building lifetime relationships with our clients and employees.

Arbor Hills Landfill

Landfill Gas Collection and Control System Design Plan

February 2004
Revised July 2006
Revised April 2016

Prepared for:
BFI Waste Systems of North America, Inc.



39395 W. Twelve Mile Road, Suite 103
Farmington Hills, MI 48331
(845) 695-0200

REPORT CERTIFICATION

Landfill Gas Collection and Control System Design Plan

Arbor Hills Landfill

This NSPS Design Plan report for the GCCS at the Arbor Hills Landfill has been prepared by Cornerstone Environmental Group, LLC, as authorized by BFI Waste Systems of North America, Inc. (BFI), which owns and operates the landfill gas system at Arbor Hills Landfill. The landfill is owned and operated by Advanced Disposal Services Arbor Hills Landfill, Inc.

I certify that the GCCS as described in this plan meets the design requirements specified in 40 CFR §60.759 and any alternatives pursuant to 40 CFR §60.752(b)(2). I further certify that this report was prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer.

Cornerstone Environmental Group, LLC

Thomas A. Bilgri 4/28/16

Thomas A. Bilgri, P.E.
Manager – Biogas Engineering Services
MI PE 40176

STATE OF MICHIGAN
THOMAS A. BILGRI
ENGINEER
No. 40176
LICENSED PROFESSIONAL ENGINEER

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LANDFILL GAS COLLECTION AND CONTROL SYSTEM (GCCS) DESIGN REVIEW CHECKLIST

TABLE 1 SUMMARY OF LANDFILL GAS COLLECTION AND CONTROL SYSTEM DESIGN PLAN

Regulatory Citation	*Report Reference*	*Appendix E Reference* [1]	*Regulatory Requirement*	*Implementation of Regulatory Requirement*
§60.759 (a)(1)	Report Certification	Page E-3, Section 2	Landfill gas collection and control system design plan must be certified, sealed and signed by a professional engineer.	Landfill gas collection and control system design plan has been certified, sealed and signed by a professional engineer.
	Section 4.1	Page E-3, Section 3	Design Plan must address depth of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end-use, air intrusion control, corrosion resistance, fill settlement, resistance to the refuse decomposition heat.	The Arbor Hills Landfill design plan addresses all of the requirements listed under §60.759 (a)(1).
§60.759 (a)(2)	Section 4.2	Page E-3, Section 4	Landfill gas collection devices shall be installed at a sufficient density to control surface emissions and subsurface migration of landfill gas.	The current landfill gas collection devices have been designed to control surface emissions and subsurface migration of landfill gas.
§60.759 (a)(3)(i)	Section 4.3.1	Page E-3, Section 5	Areas containing asbestos or other non-degradable materials may be excluded from coverage by the landfill gas collection and control system	No segregated, i.e. mono-fill, areas containing asbestos or non-degradable materials are known to exist at the site, therefore no areas of the landfill have been excluded from the coverage of the landfill gas collection and control system.
§60.759 (a)(3)(ii)	Section 4.3.1	Page E-3, Section 6	Areas considered to be non-productive (contributing less than 1 percent of the total non-methane organic compounds from the landfill) may be excluded from coverage of the landfill gas collection and control system.	No areas of the landfill are known to be non-productive at this time, therefore no areas of the landfill have been excluded from the coverage of the landfill gas collection and control system.
§60.759 (b)(1)	Section 4.4.1	Page E-5, Section 7	Landfill gas collection and control system components shall be constructed of PVC, HDPE or other non-porous corrosion resistant materials.	Landfill gas collection and control system components shall be constructed of PVC, HDPE or other non-porous corrosion resistant materials.

Regulatory Citation	*Report Reference*	*Appendix E Reference* [1]	*Regulatory Requirement*	*Implementation of Regulatory Requirement*
§60.759 (b)(1)	Section 4.4.1	Page E-5, Section 8	Landfill gas collection and control system components shall have suitable dimensions to convey the maximum landfill gas flow rate and withstand future settlement, overburden and traffic loads.	Landfill gas collection and control system components were designed to accommodate the maximum landfill gas flow rate and withstand future settlement, overburden and traffic loads.
	Section 4.4.1	Page E-5, Section 9	Expansion of the landfill gas collection and control system will occur as needed to meet landfill gas emissions and migration standards.	Expansion of the landfill gas collection and control system will occur as needed to meet landfill gas emissions and migration standards.
	Section 4.4.1	Page E-5, Section 10	Extraction well perforations will control head loss and air infiltration throughout the system,	The landfill gas collection elements are perforated to minimize head loss and prevent excessive air infiltration into the system.
§60.759 (b)(2)	Section 4.4.2	Page E-5, Section 11	Extraction wells must not endanger the landfill base liner and must address the occurrence of water in the landfill.	The landfill gas extraction wells are designed and installed to extend from the landfill surface to approximately 75% of the waste thickness, but no closer than ten feet to the base liner. Liquids in the refuse are addressed by the leachate and condensate management systems.
	Section 4.4.2	Page E-6, Section 12	Suitable cross-section of the well holes and trenches is required for construction and completion of the collection elements.	The vertical boreholes and horizontal trenches will be constructed with sufficient cross section to allow for the proper construction of the collection elements.
	Section 4.4.2	Page E-6, Section 13	Landfill gas collection and control system components must be designed to control air intrusion, prevent landfill gas from escaping the collection system, and prohibit refuse from entering the collection system.	Control of air intrusion and the escape of landfill gas from the system will be accomplished through the monitoring of the landfill gas collection and control system, operating the system under vacuum and continued maintenance of the landfill cover. The refuse is prohibited from entering the collection devices by gravel backfill or other approved materials places in the hole or trench separating the refuse from the landfill gas collection elements.

Regulatory Citation	*Report Reference*	*Appendix E Reference* [1]	*Regulatory Requirement*	*Implementation of Regulatory Requirement*
§60.759 (b)(2)	Section 4.4.2	Page E-6, Section 14	Gravel backfill in the extraction wells and trenches shall not obstruct pipe perforations.	Backfill of sufficient size will be used to prohibit entry or blockage of the collector perforations.
§60.759 (b)(3)	Section 4.4.3	Page E-6, Section 15	Collection device connections may be above or below ground, must include a positive closing throttling valve, necessary seals, access couplings, and at least one monitoring point.	The collection devices are connected to the collection header pipe and include a positive closing throttling valve, necessary seals, access couplings, and at least one monitoring point.
§60.759 (c)	Section 4.5.4	Page E-6, Section 16	The collection header pipes must be adequate to handle the maximum landfill gas flow rate.	The collection header pipes must be adequate to handle the maximum landfill gas flow rate.
§60.752 (b)(2)(ii)(A)(2)	Section 4.6.4	Page E-2, Section 2	Landfill gas collection shall occur in active cells with waste in place for five years or more; in closed cells with waste at final grade for two years or more.	The landfill gas collection and control system components will be installed per NSPS schedule requirements.
§60.752 (b)(2)(ii)(A)(3)	Section 4.6.4	Page E-2, Section 3	Landfill gas extraction wells shall apply a negative gage pressure to maintain a sufficient extraction rate of landfill gas without causing air infiltration.	A negative gage pressure is applied to the landfill gas collection elements via centrifugal blowers. The Arbor Hills Landfill will monitor the landfill gas collection system wellheads for static pressure and indications of air infiltration.
§60.752 (b)(2)(ii)(A)(4)	Section 4.6.4	Page E-2, Section 4	Subsurface migration of landfill gas will be controlled.	The landfill gas collection and control system shall control subsurface migration and be verified by the monitoring of perimeter monitoring stations installed at the site.

TABLE 2 - LANDFILL GAS COLLECTION AND CONTROL SYSTEM (GCCS) DESIGN REVIEW CHECKLIST

Landfill Site Name: *Arbor Hills Landfill*
Location of Landfill: *Northville, Washtenaw County, Michigan*
Landfill Owner: *Advanced Disposal Services Arbor Hills Landfill, Inc.*
Date of Submittal: *April 2016*

Goals for the GCCS: (control migration) (control emissions) (safety)
(circle all that apply, add more as appropriate)

Is the GCCS proposed to be (active) or passive? (circle one)

The proposed GCCS is active in nature and should serve to mitigate the potential for both subsurface and airborne migration, as well as the potential for accumulation in occupied structures.

---

1. Was the design certified by a PE? **60752(b)(2)(i)** (Yes) No
(circle one)

   Thomas A. Bilgri is a Registered Professional Engineer in Michigan and has certified this Design Plan as the design engineer. Please reference Report Certification in the Design Plan.

2. Was the design submitted within 12 months of the first report of the site exceeding 50 Mg/yr. of NMOC's? **60.752(b)(2)(i)** (Yes) No
(circle one)

   If no, describe circumstances: *On behalf of BFI Waste Systems of North America, Cornerstone Environmental Group, LLC has prepared this GCCS design plan to update and replace the existing GCCS design plan prepared in February 2004 and revised in July 2006 by Cornerstone Environmental Group.*

Is the GCCS planned to be operational within 30 months of the first report of the site exceeding 50 MG/yr. of NMOC's? **60.752(b)(2)(ii)** (Yes) No
(circle one)

If no, describe circumstances: *At the time of this report, an active GCCS has been constructed and is operating in the Arbor Hills East and portions of the Arbor Hills West disposal area.*

3. Does the GCCS comply with the 2 year/5 year rule? **60.752(b)(2)(ii)(A)(2)**
   (Yes) No
   (circle one)

   If no, describe circumstances: *Please Reference Section 4.6.4 of the Design Plan.*

4. What is the design life of the GCCS? **60.752(b)(2)(v)** _____
   (If less than 15 years describe why) *The design life of the GCCS includes both the operational period of the facility and the post-closure period while LFG is still being generated in quantities that require environmental control. Individual components of the GCCS will be replaced or repaired as age and usage reduce their efficiency.*

5. Is the GCCS design for the ~~ma~~ximum expected flow rates during its design life? **60.752(b)(2)(ii)(A)(1)** (Yes) No
   (circle one)

   If no, describe circumstances: *Please reference Section 4.5 of the Design Plan.*

6. Describe the measures taken to control lateral LFG migration in the design. If no measures were taken, describe why? **60.752(b)(2)(ii)(A)(4)** *The design of the GCCS uses active extraction to mitigate the potential for lateral LFG migration. This process is enhanced by the presence of both an FML base liner system as well as an FML final cap system. Please reference Section 4.1 of the Design Plan.*

7. If a passive system is planned, are the necessary liners in place? **60.752(b)(2)(ii)(B)(2)**
   Yes No
   (circle one)
   If no, describe circumstances: *Not Applicable – an active system is proposed.*

   Is adequate density of collectors planned? Refer to Section 5.1 (Yes) No
   (circle one)

   If no, describe circumstances: *Please reference Section 4.2 of the Design Plan.*

8. Is the LFG Conveyance System sized properly? Refer to Section 5.2
   (Yes) No
   (circle one)

   The LFG conveyance system is sized for the peak LFG generation rate as determined using the USEPA LandGEM V3.02. Please reference Sections 4.4.1.2 and 4.6.5 of the Design Plan.

9. Is the LFG planned to be routed to a control device? **60.752(b)(2)(iii)** (Yes) No
(circle one)

Please reference Section 4.6.5 of the Design Plan.

10. Describe the control device utility flare enclosed flare (other)
(circle one)

The control device is an existing landfill gas to energy (LFGTE) facility. There are also a backup enclosed flare and a backup utility flare in place. These devices are operated in accordance with §60.752(b)(2)(iii)(B) and (C). Please reference Section 4.6.5 of the Design Plan.

11. If the control device is a flare, does it include continuous temperature monitoring and a flow measurement device? **60.756(b) and (c)** (Yes) No
(circle one)

If no, describe circumstances: *The backup flares will maintain a continuous monitor of both the flare exhaust temperature and the inlet LFG flow rate, in accordance with §60.756. Please reference Section 4.6.5 of the Design Plan.*

12. Is the flare sized properly? Refer to section 5.3 of the student manual.
(Yes) No
(circle one)

The primary control device is the LFGTE facility. The backup flares will be operated as a supplement to the LFGTE facility. Please reference Section 4.6.5 of the Design Plan.

If a control device other than a flare is planned, describe the estimated hours and duration it will be down for maintenance per year:

During periods in which the LFGTE facility is down for maintenance, the backup flares will act as the control device(s).

13. Operational Issues **60.753(b), (c), (d), (e), (f)**
Will the GCCS be operated with a vacuum at every well? (Yes) No

The GCCS will be operated with a vacuum at each extraction point, with the exception of mitigating circumstances under §60.753(b)(1).

Will the GCCS be operated at the appropriate gas temps? (Yes) No

The GCCS is intended to operate at LFG temperatures below 55°C (131°F).

Will the GCCS be operated with minimal amounts of air? (Yes) No

The GCCS is designed to prevent excessive air infiltration. Please reference Section 4.1.10 of the Design Plan.

Will monitoring be done monthly to confirm these operational issues?
(Yes) No

Monitoring will be conducted in accordance with NSPS requirements. Please reference Section 4.2 of the Design Plan.

Will surface emissions monitoring be completed? (Yes) No

Monitoring will be conducted in accordance with NSPS requirements. Please reference Section 4.2 of the Design Plan.

Will the blower automatically be shutdown if the control device is inoperable?
(Yes) No

The blower system will automatically be shut down if the control device becomes inoperable. Please reference Section 4.6.5 of the Design Plan.

14. Does the GCCS include fittings to allow connection of additional collectors if necessary in the future? **60.756(2)** (Yes) No
(circle one)

If no, describe circumstances: *The header system will incorporate blind flanges along the transmission piping to facilitate expansion of the system. Additionally, HDPE piping can be readily modified to accept tees or other fittings necessary for system expansion.*

15. Does the wellhead for all collectors include at least one sample port and one thermometer port? **60.756(2)** (Yes) No
(circle one)

If no, describe circumstances: *The wellheads for all collectors will include at least one sample port and one thermometer port. Please reference Section 4.6.4 and Drawing No. 3 of the Design Plan.*

Reviewers Recommendations and Comments

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_____

_____

_____

_____ _____

Reviewer's Name **Date of Signature**

1 INTRODUCTION

The purpose of this document is to provide a design plan in accordance with the New Source Performance Standards (NSPS) design requirements for the gas collection and control system (GCCS) at the Arbor Hills Landfill (WDS 4759346). This plan was prepared pursuant to 40 Code of Federal Regulations (CFR) Part 60, Subpart WWW, NSPS for Municipal Solid Waste Landfills.

This GCCS Design Plan was developed as a result of the approval of a landfill expansion in 2009. This GCCS Design Plan supersedes all GCCS Design Plans previously prepared.

2 EXISTING SITE CONDITIONS

2.1 Landfill Description

The Arbor Hills Landfill is located in Northville, Michigan. The facility is owned and operated by Advanced Disposal Services Arbor Hills Landfill, Inc. (Arbor Hills). The landfill gas (LFG) collection system is owned and operated by BFI Waste Systems of North America, Inc. (BFI). The landfill began receiving refuse in 1970 and has a design capacity of approximately 64 million cubic yards of refuse.

The site consists of two areas encompassing approximately 337 acres of disposal area. Arbor Hills East, approximately 92 acres in size, is a closed and capped pre-Subtitle D disposal area, underlain by a natural clay liner and a compacted clay soil cover. Arbor Hills West, approximately 285 acres in size, is an active site, underlain by a double composite base liner system. A portion of the Arbor Hills West liner system overlays the completed western and northern slope of the Arbor Hills East disposal area, i.e. a "piggyback" - an area encompassing approximately 46 acres. The Arbor Hills West disposal area will be closed with a composite final cap system.

2.2 Landfill Gas Collection and Control System

At the time of this report, an active GCCS has been constructed and is operating in the Arbor Hills East disposal area of this facility. Portions of the active Arbor Hills West disposal area have an active GCCS installed and operating, in accordance with NSPS regulations. This section identifies both existing and proposed components for LFG management at the Arbor Hills Landfill. In conjunction with this report, a phased GCCS design will be implemented in order to comply with the NSPS regulations. The proposed design consists of vertical wells and interim horizontal trenches to extract LFG from the disposal area.

The existing vertical extraction wells have a well spacing ranging from 200 - 300 feet throughout the fill area. The proposed vertical wells will have a design spacing of approximately 200 - 250 feet.

Interim or supplemental horizontal collection trenches may also be utilized in areas that will not reach final grade within five years of initial waste deposition. Horizontal collection trenches allow extraction of LFG from areas that are not easily accessible to vertical wells. Interim or supplemental horizontal collectors may also be utilized in waste older than five years to collect LFG. Caisson wells or interim vertical extraction wells may also be installed in areas that have not yet reached final grade, providing another means for "early" extraction of LFG.

At the time of this plan, interim vertical wells have been installed in Cell 4 of the disposal area. Caisson wells and horizontal collectors have not yet been installed at this facility. Arbor Hills Landfill reserves the right to install these components should future operational concerns dictate need.

Permanent lateral and header pipes are installed generally below ground surface and typically constructed of high-density polyethylene (HDPE) pipe. Temporary piping may be installed either above or below ground surface. LFG is conveyed through this pipe network to a landfill gas to energy (LFGTE) facility, which is owned and operated by the Fortistar Methane Group (Fortistar). The LFGTE facility is comprised of three (3) European Gas Turbines (EGT) and one Solar Taurus Model 60 gas turbine for electrical generation. In the event that the LFGTE facility is off-line or running at a reduced load, LFG is routed to a backup enclosed flare and/or a backup utility flare for LFG combustion. Additional information of LFG treatment systems can be found in Section 4.6.5 of this document.

Condensate that forms in the GCCS piping is discharged to the leachate collection system (LCS) via direct connections to LCS cleanout/access risers or to condensate pump stations located around the perimeter of the disposal area. Condensate drained by gravity to the condensate pump stations is discharged via force main(s) to leachate collection and storage locations on the site, and ultimately processed with leachate. Condensate collected in condensate drains will be transported via gravity directly to the leachate collection system via leachate system access risers. The condensate will be disposed of coincidentally with landfill leachate in accordance with the requirements of the facility solid waste permit.

Additional information and drawings of the GCCS are included in Appendix C.

3 FUTURE SITE DEVELOPMENT

3.1 Landfill Development Plan

The Arbor Hills Landfill will continue waste filling operations in accordance with the solid waste permit. Installation of additional GCCS components is anticipated to be coordinated with fill development and as otherwise required by NSPS regulations regarding installation of GCCS components stipulated in §60.752(b)(2)(ii)(A)(2). Due to operational changes, the GCCS design presented in Appendix C may be altered to maintain compliance with the provisions of the NSPS and to accommodate actual field conditions at the time of construction.

3.2 Landfill Gas Control System Expansion Capabilities

The GCCS will be designed to be readily expanded as fill operations proceed. Vertical wells will typically be installed in areas that have reached final grade. Vertical wells and/or horizontal collection trenches will be installed as an interim control measure in disposal area that have been in place for more than five years, but that are not yet at final refuse grades.

Vertical extraction wells installed prior to reaching final grade will either be extended to the final grade level or abandoned and replaced. This determination will be made based upon the physical condition of the wells, their ability to provide effective LFG extraction, and field conditions at the time of final cap installation.

LFG headers will be sized to accommodate the maximum expected flow, and be fitted with flanged tees for expansion as new collectors are installed, in accordance with NSPS requirements. Additionally, the use of HDPE header piping provides for flexible and efficient connections for future expansion of the header piping system.

4 COMPLIANCE REVIEW AND EVALUATION

4.1 Compliance with §60.759(a)(1)

> §60.759(a)(1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.

The GCCS has been designed to be consistent with NSPS requirements to achieve comprehensive control of both lateral migration and surface emissions of LFG.

Issues related to compliance with §60.759(a)(1) are discussed in the following sections.

Applicable information used in the design of the GCCS is included in Appendix A (Gas Generation Rate Modeling, Radius of Influence and Well Spacing Calculations, Condensate Generation Calculations and Final Cover Uplift Calculations), Appendix B (Head Loss Analysis), Appendix C (GCCS Design Plans), Appendix D (Surface Emissions Monitoring Plan) and Appendix E (Approved Alternatives to the NSPS).

4.1.1 Control of Surface Emissions

The GCCS was designed to minimize both subsurface lateral migration and surface emissions of LFG from the landfill. System performance depends upon the installation of a satisfactory GCCS system, its proper management, and maintenance of both suitable interim cover and final cover systems. If there is a temporary exceedance in emissions it will be addressed by appropriate response, evaluating both the GCCS and final cover systems. Appropriate action will then be taken to correct the exceedance, as required by NSPS.

4.1.2 Depths of Refuse

Depths of refuse were calculated, at the time of the design of the GCCS, based upon existing topography and permit plan and record documentation of landfill liner grades. The landfill surface elevation was determined from aerial survey data at the time of design.

4.1.3 Landfill Gas Generation Rates and Flow Characteristics

In compliance with §60.752(b)(2)(ii)(A), the maximum expected LFG flow rate for the site was used for sizing the GCCS. The LFG generation rate calculations were performed using the United States Environmental Protection Agency (USEPA) Landfill Gas Emission Model

(LandGEM) (AP-42 default values - k=0.04/year and L_0=100 m^3/Mg), historical waste receipts and the permitted design capacity of the facility.

The LandGEM emissions model is a "design tool," which uses the information available to project future operating conditions. This model was developed based upon operating conditions at a cross-section of landfills within the United States, and is approved for use by the USEPA. Actual operating parameters may dictate changes in the system flow characteristics and process equipment as the system is developed. These changes will be made in accordance with §60.752.

This facility takes a variety of waste streams that are considered non-putrescible and will not contribute to the generation of LFG. Arbor Hills projects that the future rate of municipal solid waste (MSW) will be approximately 1,000,000 tons per year through closure.

Based upon this information, as well as historical projections for MSW intake, the maximum LFG generation rate for Arbor Hills Landfill was calculated to be approximately 11,000 standard cubic feet per minute (scfm). The proposed GCCS is designed for a maximum LFG extraction rate of approximately 13,000 scfm in order to develop a conservative design.

Landfill gas generation projections are provided in Appendix A.

4.1.4 Landfill Cover Properties

The landfill cover installed in the Arbor Hills East disposal area is constructed of compacted on-site soils and composted organic materials, while the final cover design in the Arbor Hills West disposal area will incorporate a composite geosynthetic/low permeability soil barrier. The primary purpose of the cover system components is to preclude precipitation infiltration that would generate additional leachate. However, the cover system design also provides a significant barrier to LFG emission and air infiltration when combined with an active LFG extraction system. The GCCS will provide components for collecting LFG or relieving pressures from LFG from beneath these layers.

4.1.5 Landfill Gas Control System Expandability

Expandability of the GCCS is achieved by installing tees with blind flanges along the transmission piping. These flanges provide planned access for expansion of the LFG transmission piping in the future. In the event that actual LFG flow rates do exceed the capacity of the system, additional GCCS components will be designed and installed in accordance with NSPS requirements.

4.1.6 Leachate and Condensate Management

Leachate management is accomplished through the use of an engineered leachate collection and management system (LCS). Leachate is pumped from the LCS for on-site treatment

and disposal. The LCS is designed according to Subtitle D standards (40 CFR§257 and §258) and is part of the Solid Waste Disposal Permit.

LFG piping grades will be maximized where practical to reduce the impact of differential settlement and promote positive condensate drainage. Transmission header and lateral piping will be sloped at a minimum of 3% within waste limits (0.5% outside waste limits) to promote condensate to flow by gravity to engineered low points in the GCCS piping, for collection of the condensate. Condensate collection pump stations or drains to LCS components are located at these low points, to collect the condensate and remove it from the transmission piping. Condensate collected in drains is discharged directly into the LCS. Areas outside the Subtitle D liner system will collect condensate in pump stations, for periodic discharge to the LCS within the Subtitle D area via a force main(s).

4.1.7 Accessibility

Accessibility to the GCCS components is achieved by installing commonly accessed components (such as wellheads and monitoring ports) on relatively flat surfaces of the landfill or near the landfill's road network. Wellheads, piping risers, valves and monitoring ports will be installed above grade, or within vaults, to maintain accessibility.

4.1.8 Compatibility with Refuse Filling Operations

At the time of this report, an active GCCS has been constructed and is operating in the Arbor Hills East and portions of the Arbor Hills West disposal areas of this facility. The proposed GCCS has been designed to integrate the existing GCCS components currently operating at the Arbor Hills Landfill.

As refuse filling operations proceed and portions of the site reach final or near-final grades, additional GCCS components will be installed. This method of installation allows GCCS components to be constructed in accordance with §60.752(b)(2)(ii)(A)(2)(*i*) and (*ii*) while minimizing interference of the GCCS with ongoing filling operations.

4.1.9 Integration with Closure End Use

Currently, the post-closure end-use for the site is unspecified and will likely be utilized as open space. Any modifications to the closure end-use must be approved by Arbor Hills and BFI personnel to evaluate their compatibility with the GCCS. Any items of concern related to maintaining and operating the GCCS will be mitigated by either altering the proposed post-closure end-use or by adjusting or modifying the GCCS in accordance with NSPS requirements.

4.1.10 Air Intrusion Control

Air intrusion is minimized by using soil backfill in the upper zone of the vertical wells and above the horizontal trench collectors, as needed. To accommodate the penetration of the geomembrane component of the final cover system in the Arbor Hills West disposal area, the geomembrane component will be snugly fitted to the pipe penetrations utilizing a "pipe boot". Potential air intrusion and LFG emissions through the cover system will be controlled through periodic monitoring and adjustment of the GCCS, in coordination with appropriate maintenance of the landfill cover system.

4.1.11 Corrosion Resistance

Corrosion resistance of the GCCS is achieved through the use of corrosion resistant materials or materials that have a corrosion resistant coating, in accordance with 40 CFR§60.759(b)(1). The primary components used in the construction of the GCCS are high-density polyethylene (HDPE) and polyvinyl chloride (PVC) piping. All HDPE piping will have a minimum rating of SDR 17. All PVC piping will have a minimum rating of SCH 40. Components will be inspected during routine GCCS monitoring for abrasion, chipping, or other potential deterioration of the components. If damage to the materials is observed that may be detrimental to the performance of the GCCS, the components will be replaced or repaired.

4.1.12 Fill Settlement

Settlement will occur due to decomposition of the refuse. To accommodate refuse settlement, the GCCS components will be designed and installed with several features to account for this settlement, including:

- LFG extraction wellheads connected to the LFG transmission piping via a flexible pipe or hose connection. This allows the LFG piping to accommodate changes in the orientation of the LFG transmission piping or LFG extraction well.
- LFG transmission piping sloped at sufficient grades (a minimum 3.0% within the waste limits, and 0.5% outside the waste limits, see Section 4.1.6) so that reasonable amounts of differential and total settlement may occur without causing pipe breakage, or disrupting the overall flow gradient of the LFG transmission piping. Alternate minimum slopes may be approved by the design engineer for specific applications.
- HDPE piping used for the construction of the header piping and transmission system. HDPE piping is flexible and absorbs differential settlement without breaking or cracking.

4.1.13 Resistance to Decomposition Heat

Resistance of the GCCS to the heat generated as a result of refuse decomposition was achieved through the use of materials tested and proven to withstand temperatures well above those typically found in landfills. The GCCS will be inspected during routine LFG system monitoring for heat damage. If heat damage of the GCCS components is observed and is believed to be detrimental to the operation of the GCCS, the cause of the elevated landfill temperature will be investigated and the GCCS will be adjusted or modified to mitigate the effects of the elevated temperatures.

4.2 Compliance with §60.759(a)(2)

§60.759(a)(2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

Per the definition stated in §60.751, "sufficient density" means "any number, spacing, and combination of collection system components. . . necessary to maintain emission and migration control as determined by measures of performance set forth in this part." Well spacing at the Arbor Hills Landfill was established using the method described in the book "Methane Generation and Recovery from Landfills, EMCON, 1982." The values developed by this method were compared to those developed by the equation from the *NSPS Background Information Document, 1991* with a more conservative EMCON value utilized for design purposes. This is consistent with spacing criteria used at other landfills and should effectively control surface emissions and subsurface migration of LFG in accordance with NSPS requirements.

Additionally, the spacing of vertical and interim horizontal extraction wells is within the guidelines defined in *Table 5-1, Summary of Suggested Collector Density, Training Course for Landfill Gas NSPS/EG Regulatory Personnel to Review GCCS Design Submittals, North Carolina State University, September, 1998.* This guidance recommends a horizontal collector spacing of 30 feet to 50 feet vertically and 150 feet to 300 feet horizontally for interim horizontal extraction wells, and a vertical well spacing of 250 feet to 300 feet in post-Subtitle D landfills with wet waste.

The proposed spacing for vertical wells for the Arbor Hills Landfill is approximately 200 - 250 feet. Arbor Hills Landfill currently conducts monthly surface emissions monitoring in accordance with NSPS requirements, and the facility shall continue to conduct surface monitoring in accordance with NSPS requirements. If the GCCS at the Arbor Hills Landfill does not meet the measures of performance set forth in the NSPS, the GCCS will be adjusted or modified in accordance with the NSPS requirements. These adjustments or modifications may include the installation of additional collection elements, cap repairs or other actions defined by field conditions at the time of monitoring.

4.3 Compliance with §60.759(a)(3)

§60.759(a)(3) The placement of gas collection devices determined in paragraph (a)(1) of this section shall control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (a)(3)(ii) of this section.

Issues related to compliance with §60.759(a)(3) are discussed in the following sections.

4.3.1 Asbestos and Non-degradable Materials

§60.759(a)(3)(i) Any segregated area of asbestos or non-degradable material may be excluded from collection if documented as provided under §60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or non-degradable material deposited in the area, and shall be provided to the Administrator upon request.

No areas have been excluded from the coverage of the GCCS as a result of the placement of asbestos or other non-degradable materials.

4.3.2 Nonproductive Areas

§60.759(a)(3)(ii) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill.

At the time of the design of the GCCS, no areas of the landfill were determined to be non-productive, therefore no areas of the landfill have been excluded from the coverage of the GCCS.

4.4 Compliance with §60.759(b)(1), (2), and (3)

Issues related to compliance with §60.759(b) are discussed in the following sections.

4.4.1 Landfill Gas Extraction Component Construction

§60.759(b)(1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other non-porous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand

planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration..

Issues related to compliance with §60.759(b)(1) are discussed in the following sections.

4.4.1.1 Materials

The GCCS components will be constructed of PVC, HDPE, fiberglass, corrosion-resistant steel, Neoprene (gaskets and seals) and other non-porous corrosion resistant materials.

4.4.1.2 Component Sizing

The LFG collection and control components will be sized for a maximum estimated extraction rate of 13,000 scfm. This accounts for the entire MSW disposal capacity, at the final grade development elevations of the landfill. Capacity of the extraction and treatment system components will be phased in as system generation and extraction rates increase.

4.4.1.3 Component Loading

The GCCS components were designed to withstand the estimated installation, static, settlement, overburden, and traffic loads. Installation loads were determined to be insignificant for GCCS components based on the installation methods used. Static loads from the vacuums applied to the GCCS components and applied loads on the GCCS were both evaluated. Vacuum loads required for the GCCS operation were compared to, and found to be less than, the allowable vacuum loads for the GCCS components. Foundations used for GCCS components were designed to handle the applied loads. The applied loads on GCCS components within the landfill, as well as settlement forces, cannot accurately be predicted due to the non-homogeneous nature of the refuse within the landfill.

The GCCS components within the landfill are consistent with those at other landfills that have been in place for extended periods of time (in excess of 15 years) and verified to withstand applied static and settlement forces. Overburden and traffic loads for the LFG transmission piping are less than the allowable loads recommended by the piping manufacturer.

4.4.1.4 System Expansion

The GCCS shall be expanded as necessary to comply with NSPS requirements. Modification of the GCCS design plan will be certified by a professional engineer, and the measures of performance of the LFG system verified as set forth in the NSPS. Arbor Hills Landfill will conduct monitoring and document compliance of the GCCS, in accordance

with NSPS requirements. If the GCCS at the Arbor Hills Landfill does not meet the measures of performance set forth in the NSPS, the GCCS will be adjusted or modified in accordance with NSPS requirements.

4.4.1.5 Component Perforation

The vertical well and interim horizontal trench collector elements will be perforated as shown on the design plans (Appendix C), to allow LFG entry without inducing head losses sufficient to impair performance across the intended extent of control. The perforation patterns used for the Arbor Hills Landfill GCCS design have been successfully used in previous LFG control applications.

4.4.1.6 Air Infiltration

The LFG collection elements were designed to prevent excessive air infiltration through the use of solid pipe and solid backfill near the ground surface for vertical LFG extraction wells and interim horizontal trenches in the perimeter slope area. Hydrated bentonite plugs and geomembrane seals will be provided around vertical well casings and interim horizontal trench access piping, where they penetrate the landfill final cover or interim cover systems. Further, air intrusion control will be accomplished through monitoring of the operational monitoring standards for the LFG collection elements in accordance with NSPS requirements. If the GCCS does not meet the operational monitoring standards, it will be adjusted or modified in accordance with NSPS requirements.

4.4.2 Landfill Gas Extraction Component Installation

§60.759(b)(2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

Issues related to compliance with §60.759(b)(2) are discussed in the following sections.

4.4.2.1 Component Placement

Depths of refuse were calculated, at the time of the design of the GCCS, based upon existing topography and permit plan and record documentation of landfill liner grades. The landfill surface elevations are determined from aerial survey data at the time of design. Vertical LFG extraction wells were designed to extend from the landfill surface to within 15 feet of

the landfill base, or to seventy-five percent of the refuse depth, whichever is the lessor. In no case will LFG extraction wells be designed to exceed 120 feet in depth.

4.4.2.2 Leachate

The occurrence of leachate within the landfill will be addressed by the leachate and condensate management systems as stated in Section 4.1.6 of this design plan. Leachate management within the portions of the landfill with a composite liner will be accomplished through the leachate collection and management system which includes a leachate drainage layer, perforated collection piping, side slope risers with liquid pumping equipment, and liquid storage and disposal systems.

For this reason, it is not expected that free liquids will be encountered during the drilling of wells for the vertical landfill gas extraction wells. If free liquids are encountered, the drilling contractor will attempt to drill through the perched zone of liquids allowing drainage into the underlying waste mass and the leachate collection system. In the event that the zone of perched liquids cannot be penetrated, the well installation may be completed at that depth or terminated. If necessary, appropriate measures will be taken to complete the well installation procedure at a nearby location.

If perched liquids are observed within the extraction wells after installation, and it is determined that the liquid level is restrictive to efficient LFG extraction, the leachate level will be reduced. This is typically accomplished by periodic pumping of the liquids using either electric or pneumatic pumping systems. Liquids removed from the well casings will be discharged to the leachate collection system.

4.4.2.3 Wells and Trenches

Vertical wells and interim horizontal trenches, constructed for LFG collection elements, are of sufficient cross-section to allow for their proper construction and completion, including centering of the pipes and placement of gravel backfill. The wells and interim trenches will be constructed under supervision of a construction quality assurance program implemented by Arbor Hills Landfill and verified to be properly constructed, as indicated on the design plans in Appendix C.

Record documentation of the well and interim trench installations will be maintained at the Arbor Hills Landfill offices.

4.4.2.4 Component Short Circuiting

LFG collection elements are designed to prevent air infiltration through the cover, refuse contamination of the collection elements, and direct venting of LFG to the atmosphere. Air intrusion control will be verified through monitoring of gas quality at the extraction components, monitoring of surface emission levels and maintenance of the landfill cover in

accordance with NSPS requirements. Separation of the collection elements from the refuse is accomplished by placing gravel backfill in the annular borehole space around extraction wells casings and the interim horizontal trench pipes, providing a filter pack between the refuse and the LFG collection elements. Direct venting of the LFG to the atmosphere is avoided by operating the GCCS under a controlled application of vacuum and the quarterly monitoring of surface emissions (see Section 4.2).

4.4.2.5 Gravel Backfill

Gravel of sufficient size is specified to prevent penetration or blockages of the LFG collector pipe perforations. Gravel (non-calcareous) to be utilized will be a nominal 1" to 3" particle size. Alternative backfill materials and sizes may be used as approved by the design engineer.

4.4.3 Landfill Gas Extraction Component Connections to LFG Transmission Piping

§60.759(b)(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other non-porous material of suitable thickness.

The collection devices are connected to the collection header pipes using lateral piping. The lateral piping will be connected to the header piping either above or below the landfill surface, as required by field conditions at the time of installation. The connector assemblies (vertical extraction wellheads) will be located above grade. These assemblies include a positive closing throttle valve, necessary seals and couplings, access ports and couplings, and a minimum of two sampling ports. The collection devices will be constructed of PVC, HDPE, fiberglass, corrosion-resistant steel, and other non-porous materials of suitable thickness. The GCCS components are designed to withstand anticipated installation, static, settlement, overburden, and traffic loads.

4.5 Compliance with §60.759(c)(1) or (2)

§60.759(c) Each owner or operator seeking to comply with §60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with §60.752(b)(2)(iii) through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

Issues related to compliance with §60.759(c) are discussed in the following sections.

4.5.1 Existing Landfill Gas Flow Rate Data

§60.759(c)(1) For existing collection systems, the flow data shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (c)(2) of this section shall be used.

At the time of this report, an active GCCS has been constructed and is operating in the Arbor Hills East and portions of the Arbor Hills West disposal area of this facility. Operating data from February 2016 indicates a LFG extraction rate of approximately 7,320 scfm (normalized to 50% CH_4) For 2016, LandGEM estimates a generation rate of approximately 10,000 scfm, which corresponds to a projected extraction rate of approximately 7,500 scfm, assuming an extraction efficiency of 75%. The extraction rate is influenced by the percentage of waste covered by an active GCCS and the extent of final cover installation, which affects the extraction efficiency. The current extraction rate is consistent with current site conditions.

Please refer to Appendix A-1 for a detailed evaluation of the LFG generation and recovery potential.

4.5.2 Future Landfill Gas Flow Rate Estimates

§60.759(c)(2) For new collection systems, the maximum flow rate shall be in accordance with §60.755(a)(1).

The maximum LFG generation rate for Arbor Hills Landfill was calculated to be approximately 11,000 standard cubic feet per minute (scfm). The proposed GCCS is designed for a maximum LFG extraction rate of approximately 13,000 scfm. Please refer to Appendix A-1 for a detailed evaluation of the LFG generation and recovery potential.

4.6 Alternatives and Compliance with §60.752(b)(2)

§60.752(b)(2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall:

Based on the NSPS method for estimating the potential maximum non-methane organic compound (NMOC) emission rate, the Arbor Hills Landfill has exceeded the 50 megagrams per year (Mg/yr) threshold and is therefore required to comply with section §60.752(b)(2) of the NSPS.

4.6.1 Submit a Design Plan

§60.752(b)(2)(I) Submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year:

On behalf of Arbor Hills Landfill, Cornerstone has prepared this GCCS Design Plan to update and replace all previous GCCS Design Plans. Arbor Hills Landfill is submitting this design plan to the Michigan Department of Environmental Quality (MDEQ), with a copy sent to the USEPA Region 5 office for approval, consistent with NSPS requirements.

4.6.2 Alternatives to the NSPS

§60.752(b)(2)(i)(B) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, record keeping or reporting provisions of §60.753 through §60.758 proposed by the owner or operator.

Alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, record keeping or reporting provisions of §60.753 through §60.758 of the NSPS are included as Appendix E of this Design Plan.

4.6.2.1 Migration Control Wells

A series of Perimeter Migration Control Wells were installed in 2005, under a Consent Order from the MDEQ. These wells were installed outside the limits of waste placement, and are intended to mitigate LFG movement beyond the limits of waste placement. As such, these extraction points are operated both intermittently (as monitoring of perimeter probes dictates the need for local operation) and aggressively (to provide immediate response to any occurrences of off-site LFG movement).

These wells, specifically PW-AS, AD, BS, BD, CS, CD, D and E (along the eastern perimeter) and PW-F, G, H, I, J, J, K, L, M and N (along the western perimeter) will not be monitored or reported under the provisions of the NSPS. The location of these wells (outside the limits of waste placement) and aggressive nature of operation dictate that these wells be generally operated under conditions of low methane quality and higher oxygen content than would be expected from an extraction point installed within the refuse mass.

In the event that additional migration extraction wells are installed at this facility, these wells will also be operated and monitored in the manner described in this section.

4.6.2.2 Positive Pressure

§60.753(b): "Operate the collection system with negative pressure at each wellhead except under the following conditions:

1. *A fire or increased well temperature.*
2. *Use of a geomembrane liner or synthetic cover. The owner or operator shall develop acceptable limits in the design plan.*

3. *A decommissioned well.*

Extraction wells located in portions of the disposal area which possess or are overlain by a geomembrane or synthetic cover, i.e. the closed portions of the Landfill, may be operated under positive pressure, in accordance with §60.753(b)(2). This variance requires the demonstration of acceptable pressure limits within the Design Plan.

Calculations of the allowable positive pressure within an extraction point located in an area overlain by a geomembrane or synthetic cover are provided in Appendix A-4. These calculations account for the mass of soil above the geomembrane or synthetic cover, and determine the uplift forces imparted by a positive pressure below the geomembrane or synthetic cover, i.e. within the waste mass.

For a design Factor of Safety equal to four (FS=4), the allowable positive pressure beneath the geomembrane or synthetic cover is 8"wc (0.29 psig), based upon the approved final cover configuration. Extraction wells operated under these pressure conditions, and located within areas overlain by a geomembrane or synthetic cover will be considered compliant with §60.753(b)(2) and will not be considered a non-compliant operating condition.

4.6.2.3 Monitoring of Collectors Below the Separatory Liner System

The Arbor Hills Landfill received an approved variance from the MDEQ (May 1, 2003) to operate the collectors beneath the liner separating Arbor Hills West from Arbor Hills East. This variance allows the Landfill to operate a series of wells in a "closed" position – the "TR" series wells (trench wells constructed beneath the Arbor Hills West liner system) and wells EW-6-13, 58, 69, 70 and 74-77 (wells that were buried during the construction of the Arbor Hills West liner system, and are operated remotely from the crest of Arbor Hills East).

Each month they will be checked for positive pressure. (Positive pressure will indicate potential landfill gas migration.) If positive pressure is detected, the well will be opened. They will be checked within 5 days to ensure that oxygen is not in excess of 5%. As soon as the well contains 5% oxygen, the well will be re-closed.

4.6.3 Specifications for Active Collection Systems

As stated in Sections 4.1 through 4.5 of this design plan, the GCCS proposed at the Arbor Hills Landfill complies with the specifications for active collection systems as stipulated in §60.759 of the NSPS. If future expansions of the GCCS are necessary, they will be designed to comply with the NSPS requirements or any approved alternatives.

4.6.4 Install a Landfill Gas Collection and Control System

§60.752(b)(2)(ii) Install a collection and control system within 18 months of the submittal of the design plan under paragraph (b)(2)(i) of this section that effectively captures the gas generated within the landfill.

§60.752(b)(2)(ii)(A)(2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:

§60.752(b)(2)(ii)(A)(2)(i) 5 years or more if active; or

§60.752(b)(2)(ii)(A)(2)(ii) 2 years or more if closed or at final grade;

The GCCS will be constructed within the prescribed schedule under §60.752(b)(2)(ii). Future expansions to the GCCS will proceed in accordance with the schedules under paragraphs (i) and (ii) of this section.

§60.752(b)(2)(ii)(A)(3) Collect gas at a sufficient extraction rate;

§60.752(b)(2)(ii)(A)(4) Be designed to minimize off-site migration of gas.

In compliance with §60.752(b)(2)(ii)(A)(3) and (4), the GCCS is designed to extract LFG at a sufficient rate so as to minimize the subsurface lateral migration and surface emissions of LFG. This is achieved by sizing and installing sufficient collection elements, transmission piping, blower(s), and LFG destruction equipment for the estimated maximum flow rate of LFG.

The GCCS is designed to collect LFG at a sufficient rate, which per the definition in §60.751 means to maintain a negative [gage] pressure (vacuum) at all wellheads without causing air infiltration. Application of a negative gage pressure and minimization of air infiltration will be verified by monitoring the static pressure and nitrogen or oxygen concentrations of the LFG at the extraction points.

Each extraction point will be monitored on a monthly basis in accordance with 40 CFR §60.753 (b) and (c). Monitoring will be performed for pressure, temperature, oxygen and/or nitrogen, at a minimum.

Verification of the GCCS's ability to minimize off-site subsurface LFG migration is achieved through the routine quarterly perimeter monitoring for combustible gases at the site.

Arbor Hills Landfill will monitor the GCCS extraction points, after installation, for static pressure and for LFG quality in accordance with NSPS requirements and will continue to monitor the perimeter LFG monitoring locations to detect the presence of off-site LFG

migration. If off-site LFG migration is detected, Arbor Hills Landfill will take the necessary actions in accordance with NSPS requirements.

4.6.5 Control Systems

§60.752(b)(2)(iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B) or (C) of this section.

The existing LFGTE facility has the capacity to combust approximately 9,000 scfm. Additional capacity will be installed as operations dictate need. The required operational performance of the treatment components are stipulated by §60.752(b)(2)(iii) which states:

> **§60.752(b)(2)(iii)(A)** An open flare designed and operated in accordance with §60.18
>
> **§60.752(b)(2)(iii)(B)** A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test, required under §60.8 using the test methods specified in §60.754(d).

§60.752(b)(2)(iii)(C) Route all collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

The LFGTE facility is the primary control device and consists of three (3) European Gas Turbines (EGT) with duct burners and one Solar Taurus Model 60 gas turbine for electrical generation. The LFGTE facility has the capacity to combust approximately 9,000 scfm.

LFG is supplied to the LFGTE facility via three fuel gas compressors. Each compressor is driven by a 1250-hp motor and can deliver approximately 3,000 scfm of LFG at a pressure of 260 psig.

In the event that the LFGTE facility is off-line, LFG is routed to one backup enclosed flare and one backup utility flare for LFG destruction. The flares at the Arbor Hills Landfill are designed to reduce the concentration of the NMOCs present in the LFG by at least 98 percent by weight or reduce outlet emissions to less than 20 ppmv (dry basis) as hexane, in accordance with §60.752(b)(2)(iii)(B). The enclosed flare was successfully tested in March 2016 at a capacity of 2,600 scfm at 50% methane. The utility flare has a rated capacity of 2,000 scfm at 50% methane.

5 LIMITATIONS

The work product included in the attached was undertaken in full conformity with generally accepted professional consulting principles and practices and to the fullest extent as allowed by law we expressly disclaim all warranties, express or implied, including warranties of merchantability or fitness for a particular purpose. The work product was completed in full conformity with the contract with our client and this document is solely for the use and reliance of our client (unless previously agreed upon that a third party could rely on the work product) and any reliance on this work product by an unapproved outside party is at such party's risk.

The work product herein (including opinions, conclusions, suggestions, etc.) was prepared based on the situations and circumstances as found at the time, location, scope and goal of our performance and thus should be relied upon and used by our client recognizing these considerations and limitations. Cornerstone shall not be liable for the consequences of any change in environmental standards, practices, or regulations following the completion of our work and there is no warrant to the veracity of information provided by third parties, or the partial utilization of this work product.