

<b>NORTH CAROLINA DIVISION OF AIR QUALITY</b>		<b>Region:</b> Washington Regional Office	
<b>Air Permit Review - 1<sup>st</sup> Time Title V</b>		<b>County:</b> Craven	
<b>Permit Issue Date:</b> XXX, 2008		<b>NC Facility ID:</b> 2500197	
		<b>Inspector's Name:</b> None	
		<b>Date of Last Inspection:</b> None	
		<b>Compliance Code:</b> None	
<b>Facility Data</b>		<b>Permit Applicability (this application only)</b>	
<b>Applicant (Facility's Name):</b> Tuscarora Long-Term Regional Landfill		<b>SIP:</b> 15A NCAC 2D .0516, .0521, .0524, .1100, .1111, & 2Q .0705, .0711, .0501(c)(1)	
<b>Facility Address:</b> Tuscarora Long-Term Regional Landfill 7400 Old Hwy 70 West Tuscarora, NC 28523		<b>NSPS:</b> 40 CFR Part 60, Subpart WWW	
<b>SIC:</b> 4953		<b>NESHAP:</b> 40 CFR Part 63, Subpart AAAA	
<b>NAICS:</b> 562212		<b>PSD:</b> N/A	
<b>Facility Classification: Before:</b> N/A <b>After:</b> Title V		<b>PSD Avoidance:</b> N/A	
<b>Fee Classification: Before:</b> N/A <b>After:</b> Title V		<b>NC Toxics:</b> Last MACT Toxics evaluation	
<b>Consultant:</b> Joyce Engineering, Inc. <b>Contact:</b> Steven Cowie <b>Phone:</b> (336) 323-0092		<b>112(r):</b> N/A	
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<b>Contact Data</b>			<b>Application Data</b>
<b>Facility Contact</b>	<b>Authorized Contact</b>	<b>Technical Contact</b>	<b>Application Number:</b> 2500197.07A
Allen Hardison Executive Director (252) 633-1564 PO Box 128 Cove City NC, 28523	Allen Hardison Executive Director (252) 633-1564 PO Box 128 Cove City NC, 28523	Allen Hardison Executive Director (252) 633-1564 PO Box 128 Cove City NC, 28523 allen@crswma.com	<b>Date Received:</b> 02/05/2007
			Revised: 08/08/2008, 08/22/2008, & 09/09/2008
			<b>Application Type:</b> New Permit
			<b>Application Schedule:</b> TV-1st Time
			<b>Existing Permit Data</b>
			<b>Existing Permit Number:</b> None
			<b>Existing Permit Issue Date:</b> None
			<b>Existing Permit Expiration Date:</b> None
<b>Review Engineer:</b> Booker Pullen		<b>Comments / Recommendations:</b>	
<b>Regional Engineer:</b> Yongcheng Chen		<b>Issue:</b> 09755T00	
<b>Review Engineer's Signature:</b>		<b>Permit Issue Date:</b> XXX, 2008	
<b>Begin Date:</b> August 13, 2008		<b>Permit Expiration Date:</b> <del>XXXXX</del> , 2013	
		Note: The gas collection and control system (gccs) has been designed by a professional engineer who is registered in the State of North Carolina to handle the amount of landfill gas that will be generated at this landfill until the gccs is required to be upgraded. Provisions have been provided to upgrade the blower and flare when the gas flow increases beyond the current capacity. A permit modification and design plan revision will be required to revise the existing system for this upgrade.	

**I. Introduction/Description:**

The Coastal Regional Solid Waste Management Authority (CRSWMA) is a partnership between Carteret, Craven and Pamlico counties. CRSWMA owns and operates the Tuscarora Landfill in Craven County, North Carolina. The landfill currently accepts both municipal solid waste and construction and demolition debris (C& D). This Subtitle D, lined municipal solid waste landfill consists of a closed portion called the Interim Regional Landfill (IRL, 20.5 acres) and Phase I which was closed in the summer 2007 (20.2 acres). The newly constructed and permitted Phase II section (16.6 acres) is the active section of the landfill. With the addition of Phase II, the design capacity of the landfill is 4,624,249 yd<sup>3</sup> (3,535,492 m<sup>3</sup>) by volume, and greater than 2.5 million Mg by mass. The total footprint area of the landfill is 106 acres with an anticipated closure date in the year 2034.

In a letter dated September 29, 2006, Joyce Engineering reported an annual NMOC emission rate estimate of 280 Mg/yr for the Tuscarora Landfill. CRSWMA opted to perform a Tier 2 test to determine the site-specific NMOC concentration, and to recalculated the annual NMOC emission rate based on the test results.

**I. Introduction/Description: (continued)**

The Tier 2 test was performed on March 22 and 23, 2007. The resulting site-specific NMOC concentration was found to be 717 ppmv as hexane. Using this concentration in the EPA LandGEM model, the annual NMOC emission rate was still greater than 50 Mg per year (50.17 Mg/year). Based on these findings, the facility (Consultant: Joyce Engineering) submitted a Title V permit application on February 5, 2007, and gas collection and control system design plan on November 2, 2007. A portion of the design plan was revised on August 8, 2008 and on August 22, 2008. The application was revised on three separate occasions (08/08/2008, 08/22/2008, & 09/09/2008).

**II. Purpose of this application (2500197.07A):**

Apply for a first time Title V permit. This facility does not currently have an air permit.

**III. Changes to existing Title V Permit: N/A**

**IV. Facility Description:**

This facility is a municipal solid waste landfill located in Craven County. This landfill accepts waste from the surrounding areas in Craven, Carteret, and Pamlico Counties. The landfill consists of a closed portion and an active portion (ES-01). Landfill gas is collected by an existing gas collection and control system which includes a treatment system. The Tuscarora Landfill owns the portion of the gas treatment system that compresses, filters (coalescing filter removing particles down to 0.3 microns) and dewateres (using a knockout pot) the landfill gas prior to the gas being sold to INGENCO, LLC (gas-to-energy facility). INGENCO Wholesale Power, LLC owns and operates a cooler to further dewater the gas to protect their generators. According to the US EPA, a knockout pot **is not** considered an adequate dewatering device. A proper dewatering device would lower the gas temperature and remove moisture from the gas. Consequently, the Tuscarora landfill does not completely own the entire gas treatment system. Therefore, according to US EPA guidance, both Tuscarora Landfill and INGENCO are responsible for the landfill gas compliance with the NSPS, Subpart WWW, §60.752(b)(iii) since they each own and control a portion of the landfill gas treatment system at this site.

**V. Statement of Compliance:**

The DAQ has reviewed the compliance status of this facility. This facility does not currently have an air permit, therefore, no inspections have been performed at this facility. The applicant has certified that the facility will be in compliance with all applicable requirements at the time of permit issuance and will continue to comply with these requirements. The applicant has also certified that the facility will be in compliance with any applicable requirements taking effect during the term of the permit and will meet such requirements on a timely basis.

**VI. Summary Of The Emission Sources at this facility:**

<b>Emission Source ID</b>	<b>Emission Source Description</b>	<b>Control Device</b>	<b>Control Device Description</b>
ES-01 NSPS, MACT	Municipal solid waste landfill	CD-GCCS1	One landfill gas collection and control system including a landfill gas treatment system (filtration, compression, and dewatering via refrigeration) in parallel with:
		CD-01	One 8" landfill gas utility flare (2000 acfm capacity)
ES-02	Tub grinder (diesel-fired, 100 horsepower)	None	None
ES-06	Compost turner (diesel-fired, 100 horsepower)	None	None

**VII. Source-by Source Evaluation:**

**A. Municipal solid waste landfill (ID Nos. ES-01) with associated control equipment:**

- **One gas collection and control system (CD-GCCS1),**
- **One 8” open landfill gas utility flare (2000 acfm capacity, CD-01)**

1. **Description:** This facility is a Municipal Solid Waste Landfill (ID No. ES-01) consisting of a closed portion and an active portion. This facility currently has a gas collection and control system (CD-GCCS) that primarily routes the landfill gas to a offsite end user (INGENCO Wholesale Power, LLC) of the landfill gas via a gas treatment system. A utility flare is located on the site of the landfill and burns the landfill gas that is not piped offsite.
2. **Applicable Regulatory Requirements for this modification:** This landfill is subject to 40 CFR Part 60, Subpart WWW and 40 CFR Part 63, Subpart AAAA.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Sulfur dioxide	<i>AOS - landfill gas routed to flare</i> 2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Visible emissions	<i>AOS - landfill gas routed to flare</i> 20 percent opacity	15A NCAC 2D .0521
Nonmethane organic compounds (NMOC)	Route landfill gas to a flare designed in accordance with 40 CFR Part 60, 60.18 (AOS)  <b>or</b>  Route the collected landfill gas through a gas treatment system that processes the gas for subsequent sale (compresses, filters, and dewaterers) (POS)	15A NCAC 2D .0524 <b>40 CFR Part 60, Subpart WWW</b>
Odororous emissions	Apply suitable odor control measures <b>“State-enforceable only”</b>	15A NCAC 2D .1806
Hazardous air pollutants	Work practice standards, startup, shutdown, and malfunction plan	15A NCAC 2D .1111 <b>40 CFR Part 63, Subpart AAAA</b>
Toxic air pollutants	Last MACT Toxic evaluation	15A NCAC 2Q .0705
	Facility wide toxics evaluation	15A NCAC 2Q .0711
	Modeled limits	15A NCAC 2D .1100

**a. 15A NCAC 2D .0516 "Sulfur Dioxide Emissions From Combustion Sources" (Utility flare, CD-01)**

Regulation Analysis:

- i. Sulfur dioxide emissions from any source of combustion that is discharged from any vent, stack, or chimney shall not exceed **2.3 pounds per million Btu heat input**. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard.

The utility flare (ID No. CD-01) is subject to this rule because it is a source of combustion and it discharges sulfur dioxide into the atmosphere due to combustion.

Potential emissions of sulfur dioxide are expected to be well below the allowable emissions when burning landfill gas because the sulfur content is negligible. Compliance is indicated.

**Testing** [15A NCAC 2Q .0508(f)]

- ii. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(4) and General Condition JJ found in Section 3 of the Permit. If the results of this test are above the limit given in Section VII. A. 2. a. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0516.

- iii. Monitoring/recordkeeping/reporting [15A NCAC 2Q .0508(f)]  
No monitoring, recordkeeping, or reporting is required for sulfur dioxide emissions from the utility flare (ID No. CD-01) when firing landfill gas.

**b. 15A NCAC 2D .0521 "Control Of Visible Emissions"**

Regulation Analysis:

- i. The flare (ID No. CD-01) was installed after July 1, 1971 is therefore subject to 15A NCAC 2D .0521(d). Per this regulation visible emissions shall not be more than **20 percent opacity** when averaged over a six-minute period except that six-minute periods averaging more than 87 percent opacity may occur not more than once in any hour nor more than four times in any 24-hour period.

Compliance is indicated with this regulation because the firing of landfill gas under normal operation will have negligible visible emissions.

Testing [15A NCAC 2D .0501(c)(8)]

- ii. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(8) and General Condition JJ found in Section 3 of the Permit. If the results of this test are above the limit given in Section VII. A. 2. b. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0521.

Monitoring [15A NCAC 2Q .0508(f)]

- iii. No monitoring, recordkeeping, or reporting is required for visible emissions from the utility flare (ID Nos. CD-01) while firing landfill gas.

**c. 15A NCAC 2D .0524, 40 CFR Part 60, Subpart WWW "New Source Performance Standards"**

Regulation Analysis

- i. The Tuscarora Landfill (ES-01) was modified after May 1, 1991, and is subject to 40 CFR Part 60, Subpart WWW. It is subject to Title V because the design capacity of the landfill is greater than 2.5 million megagrams (2.75 million tons) by mass and 2.5 million cubic meters by volume. This landfill submitted a design capacity report to the DAQ September 29, 2006 stating that the calculated NMOC emission rate from the landfill was greater than 50 Mg per year. The landfill chose to perform site specific NMOC testing to avoid having to install a gas collection and control system per 40 CFR Part 60, Subpart WWW. The Tuscarora Landfill performed Tier 2 testing on March 22, and 23, 2007. The results showed that the annual NMOC emission rate was still greater than 50 Mg per year. The facility submitted a gas collection and control design plan on November 2, 2007 and then revised portions of the initial design plan on August 8, 2008 and August 22, 2008.

**Design Capacity (by volume) of Tuscarora landfill = 4,624,249 yd (3,535,492 m<sup>3</sup>)**

**Design Capacity (by mass) of Tuscarora landfill = greater than 2.5 million Mg**

Testing [15A NCAC 2Q .0524, 40 CFR §60.754]

- ii. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0524, 40 CFR §60.754 and General Condition JJ located in Section 3 of the Permit. If the results of this test are above the limits given in 40 CFR Part 60, Subpart WWW, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0524, Subpart WWW.

- iii. Initial Performance Testing [15A NCAC 2D .0524, 40 CFR §60.757(g)]

Initial performance testing is required for this facility in accordance with 40 CFR Part 60, §60.8. Each owner or operator seeking to comply with §60.752(b)(2)(iii) shall include the following information with the initial performance test report required under 40 CFR §60.8.

- (A) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;

- (B) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;
  - (C) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;
  - (D) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;
  - (E) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and
  - (F) The provisions for the control of off-site migration.
- iv. **Standards For Air Emissions From Municipal Solid Waste Landfills** [40 CFR Part 60, §60.752]
- (A) The owner or operator of a municipal solid waste landfill having a design capacity equal to or greater than 2.5 million megagrams by mass and 2.5 million cubic meters, with a calculated NMOC emission rate equal to or greater than 50 megagrams per year, shall submit a gas collection and control system design plan prepared by a professional engineer who is registered in the State of North Carolina, within one year of the annual report that shows that NMOC emissions will exceed 50 Mg per year.
    - (1) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§60.753 through 60.758 proposed by the owner or operator.
    - (2) The collection and control system design plan shall either conform with specifications for active collection systems in §60.759 or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to §60.759.
  - (B) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner and operator shall install a collection and control system that captures the gas generated within the landfill as required by paragraphs (b)(2)(ii)(A) or (B) and (b)(2)(iii) of Subpart WWW within 30 months after the first annual report in which the emission rate equals or exceeds 50 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the emission rate is less than 50 megagrams per year, as specified in §60.757(c)(1) or 2.
    - (1) An active collection system shall:
      - (a) 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.
      - (b) Collect gas at a sufficient extraction rate and be designed to minimize off-site migration of subsurface gas.
      - (c) 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 Subpart WWW.
      - (d) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in §60.756.

- v. **Operational Standards For Collection and Control Systems** [40 CFR Part 60, §60.753]
- (A) Each owner or operator of a MSW landfill with a gas collection and control system used to comply with the provisions of §60.752(b)(2)(ii) of Subpart WWW shall:
- (1) Operate 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:
- (a) 5 years or more if active; or 2 years or more if closed or at final grade;
- (b) Operate the collection system with negative pressure at each wellhead except under the following conditions:
- (i) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in §60.757(f)(1);
- (ii) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;
- (iii) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be submitted for approval to the DAQ Regional Office;
- (c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. 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.
- (i) The nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by §60.752(b)(2)(i) of this subpart.
- (ii) Unless an alternative test method is established as allowed by §60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A or 3C except that:
- (A) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;
- (B) A data recorder is not required;
- (C) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;
- (D) A calibration error check is not required;
- (E) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

- (d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.
- (e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with §60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour; and
- (f) Operate the control or treatment system at all times when the collected gas is routed to the system.
- (g) If monitoring demonstrates that the operational requirements of this subpart are not met, corrective action shall be taken as specified in §60.755(a)(3) through (5) or §60.755(c) of this subpart. If corrective actions are taken as specified in §60.755, the monitored exceedance is not a violation of the operational requirements in this section.

vi. **Compliance Provisions** [40 CFR Part 60, §60.755]

- (A) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with §60.752(b)(2)(ii)(A)(3), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under §60.753(b). If negative pressure cannot be achieved without excess air infiltration 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 measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance shall be submitted to the DAQ Regional Office for approval.
- (B) Owners or operators are not required to expand the system as required in paragraph §60.755(a)(3) of this section during the first 180 days after gas collection system startup.
- (C) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in §60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. 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. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance shall be submitted to the Regional Office for approval.

- (D) An owner or operator seeking to demonstrate compliance with §60.752(b)(2)(ii)(A)(4) through the use of a collection system not conforming to the specifications provided in §60.759 shall provide information satisfactory to the Director as specified in §60.752(b)(2)(i)(C) demonstrating that off-site migration is being controlled.
- (E) For purposes of compliance with §60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in §60.752(b)(2)(i). Each well shall be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of 5 years or more if active; or 2 years or more if closed or at final grade.
- (F) The following procedures shall be used for compliance with the surface methane operational standard as provided in §60.753(d).
  - (1) After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.
  - (2) The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.
  - (3) Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A of 40 CFR Part 60, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.
  - (4) Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in this section shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of §60.753(d).
    - (a) The location of each monitored exceedance shall be marked and the location recorded.
    - (b) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance.
    - (c) If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph §60.755(c)(4)(v) shall be taken, and no further monitoring of that location is required until the action specified in paragraph §60.755(c)(4)(v) has been taken.
    - (d) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph §60.755(c)(4) (ii) or (iii) shall be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the actions specified in paragraph §60.755(c)(4) (iii) or (v) shall be taken.

- (e) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Director for approval.
- (G) The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.
- (H) Each owner or operator seeking to comply with the provisions in paragraph §60.755(c) of this section shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:
  - (1) The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of appendix A of 40 CFR Part 60, except that “methane” shall replace all references to VOC.
  - (2) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.
  - (3) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of 40 CFR Part 60 shall be used.
  - (4) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part shall be followed immediately before commencing a surface monitoring survey.
- (I) The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices.

**Monitoring** [40 CFR Part 60, §60.756]

- vii. If a gas collection and control system is used, the Permittee shall install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:
  - (A) Measure the gauge pressure in the gas collection header on a **monthly** basis as provided in 40 CFR §60.755(a)(3);
  - (B) Monitor nitrogen or oxygen concentration in the landfill gas on a **monthly** basis as provided in 40 CFR §60.755(a)(5);
  - (C) Monitor temperature of the landfill gas on a **monthly** basis as provided in §60.755(a)(5); and
  - (D) Monitor surface concentrations of methane along the entire perimeter of the collection area (or site-specific established spacing) for each collection area on a **quarterly basis**.
- viii. The owner or operator shall calibrate, maintain, and operate according to the manufacture’s recommendations the following equipment **when using an open flare** to comply with this Subpart:
  - (A) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.

- (B) A device that records flow to or bypass of the flare. The owner or operator shall either:
  - (1) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or
  - (2) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least **once every month** to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.
- ix. The owner or operator shall calibrate, maintain, and operate according to the manufacturer's recommendations the following equipment **when using an enclosed combustor** to comply with this Subpart:
  - (A) A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of  $\pm 1$  percent of the temperature being measured expressed in degrees Celsius or  $\pm 0.5$  °C, whichever is greater.
  - (B) A device that records flow to or bypass of the control device. The Permittee shall either install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or secure the bypass valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least **once every month** to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.
- x. The owner or operator, who is seeking to install a collection system that does not meet the specifications in 40 CFR §60.759, or seeking to monitor alternative parameters to those required by 40 CFR §60.753 through §60.756, shall provide information satisfactory to the EPA as provided in §60.752(b)(2)(i)(B) and (C) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures.

**Recordkeeping** [40 CFR Part 60, §60.758]

- xi. Except as provided in §60.752(b)(2)(i)(B), each owner or operator of an MSW landfill subject to the provisions of §60.752(b) shall keep for at least 5 years up-to-date, readily accessible, on-site records of the design capacity report which triggered §60.752(b), the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.
- xii. Except as provided in §60.752(b)(2)(i)(B), each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed below in this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.
  - (A) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.752(b)(2)(ii):
    - (1) The maximum expected gas generation flow rate as calculated in §60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator.
    - (2) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in §60.759(a)(1).

- (B) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.752(b)(2)(iii)(A) through use of an open flare, the flare type (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in §60.18; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent.
- (C) Except as provided in §60.752(b)(2)(i)(B), each owner or operator of a controlled landfill subject to the provisions of this subpart shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in §60.756 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.
- (D) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under §60.756.
- (E) Each owner or operator seeking to comply with the provisions of this subpart by use of an open flare shall keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under §60.756(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.
- (F) Except as provided in §60.752(b)(2)(i)(B), each owner or operator subject to the provisions of this subpart shall keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.
- (G) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under §60.755(b).
- (H) Each owner or operator subject to the provisions of this subpart shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in §60.759(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in §60.759(a)(3)(ii).
- (I) Except as provided in §60.752(b)(2)(i)(B), each owner or operator subject to the provisions of this subpart shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in §60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .0524 if these records are not maintained.

**Reporting** [40 CFR Part 60, §60.757]

- xiii. The Permittee shall submit the initial annual report within 180 days of the installation and start-up of the collection and control system, and shall include the initial performance test report required under 40 CFR §60.8.
- xiv. The Permittee shall submit annual reports of the recorded information for the gas collection and control system as follows:
  - (A) Value and length of time for exceedance of applicable parameters monitored under 40 CFR §60.756(a), (b), (c), and (d).
  - (B) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified in 40 CFR §60.756.
  - (C) Description and duration of all periods when the control device was not operating for a period exceeding one hour and length of time the control device was not operating.
  - (D) All periods when the collection system was not operating in excess of 5 days.
  - (E) The location of each exceedance of the 500 parts per million methane concentration and the concentration recorded at each location for which an exceedance was recorded in the previous month.
  - (F) The date of installation and the location of each well or collection system expansion added in accordance with 40 CFR §60.755(a)(3), (b), and (c)(4).
- xv. The Permittee shall submit a **summary report** of monitoring and recordkeeping activities by January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

**d. 15A NCAC 2D .1806 "Control And Prohibition Of Odorous Emissions" (State-enforceable only)**

The Permittee shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary.

**e. 15A NCAC 2D .1111, 40 CFR Part 63, Subpart AAAA: National Emission Standards for Hazardous Air Pollutants, Municipal Solid Waste Landfills (including control system)**

- One municipal solid waste landfill (ES-01)
- One utility-type flare (2000 acfm) installed on a gas collection system including gas treatment system

**Applicability**

- i. Tuscarora Long-term Regional Landfill (ID No. ES-01) shall comply with all requirements of 15A NCAC 2D .1111 "Maximum Achievable Control Technology" and 40 CFR Part 63, Subpart AAAA "National Emission Standards for Hazardous Air Pollutants, Municipal Solid Waste Landfills" [40 CFR, §63.1935]

**Definitions and Nomenclature** [40 CFR, §63.1990]

- ii. For the purpose of this permit condition, the definitions and nomenclature contained in 40 CFR, 63. §1990 shall apply.

**REGULATED POLLUTANTS** [40 CFR, §63.2]

- iii. Hazardous Air Pollutant (HAP) means any air pollutant listed in or pursuant to section 112(b) of the Clean Air Act. [40 CFR §63.2]

**40 CFR Part 63 Subpart A "GENERAL PROVISIONS"**

- iv. The Permittee shall comply with the requirements of 40 CFR, §63 Subpart A "General Provisions" according to the applicability of Subpart A to such sources as identified in 40 CFR Part 63, Subpart AAAA, §63.1935.

**Compliance dates** [40 CFR Part 63, §63.1945]

- v. The Permittee (BFI Waste Systems of America) is an **existing affected area source** in accordance with 40 CFR Part 63, §63.1935 (a)(3). An area source is by definition a landfill that is not major due to the annual emission rate of HAPs, but one that has greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters (m<sup>3</sup>) and has estimated uncontrolled emissions equal to or greater than 50 megagrams per year (Mg/yr) NMOC emissions. This facility shall be in compliance with this regulation by the date this landfill is required to install a collection and control system in accordance with 40 CFR §60.752(b)(2) of the New Source Performance Standards, Subpart WWW. [§ 63.1945]

**Monitoring** [40 CFR Part 63, §63.1955 and §63.1960]

- vi. Compliance with this Subpart (AAAA) is determined in accordance with the New Source Performance Subpart WWW, including performance testing, monitoring of the collection system, continuous parameter monitor, and other credible evidence. In addition, continuous parameter monitoring data, collected under 40 CFR §60.756(c)(1) and (d) of Subpart WWW, are used to demonstrate compliance with the operating conditions for control systems.

The Permittee shall develop and implement a written Start-Up/Shutdown/Malfunction (SSM) plan according to the provision in 40 CFR 63.6(e)(3). A copy of the SSM shall be maintained on site.

Deviation means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

- (A) fails to meet any requirement or obligation established by this subpart, including, but not limited to, any emissions limitation (including any operating limit) or work practice standard;
- (B) fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit;
- (C) fails to meet any emission limitation, (including any operating limit), or work practice standard in this subpart during SSM, regardless of whether or not such failure is permitted by this subpart; or
- (D) fails to write, develop, implement, or maintain a copy of the SSM plan.

If a deviation occurs, the Permittee has failed to meet the control device operating conditions describe in this subpart and have deviated from the requirements of this subpart.

**Recordkeeping/Reporting Requirements** [40 CFR Part 63, §63.1980]

- vii. Keep records and reports as specified in the general provisions of 40 CFR Part 60, and in Subpart WWW, except the annual report described in 40 CFR §60.757(f) shall be submitted every 6 months.

If actions taken during a startup, shutdown, and malfunction plan are consistent with the procedures in the startup, shutdown, and malfunction plan, this information shall be included in a semi-annual startup, shutdown, and malfunction plan report. Any time an action taken during a startup, shutdown and malfunction plan is not consistent with the startup, shutdown and malfunction plan, the source shall report actions taken within **2 working days** after commencing such action, followed by a letter **7 days** after the event.

f. Toxic Air pollutants - STATE ENFORCEABLE ONLY

**State-Enforceable Only**

a. **15A NCAC 2Q .0705 “EXISTING FACILITIES AND SIC CALLS”**

For sources at a facility subject to a MACT standard, a permit application shall be required demonstrating compliance with the 15A NCAC 2D .1100 by the same deadline that the facility is required to comply with the last MACT, excluding the MACT for combustion sources, as outlined in 15A NCAC 2D .0705.

The Tuscarora Long-Term Regional Landfill is subject to compliance with the landfill MACT in accordance with 40 CFR Part 63, Subpart AAAAA when it is required to install its gas collection and control system per 40 CFR Part 60, §60.752(b)(2).

The toxic evaluation was submitted to the DAQ on February 5, 2007 with application 2500197.07A. The Division of Air Quality Analysis Branch performed the modeling analysis in accordance with the current policy for landfills listed in the DAQ memo dated December 12, 2005. Twenty-nine North Carolina toxics were evaluated for the Tuscarora Long-Term Regional Landfill, and seven toxic air pollutants {acrylonitrile, benzene, hydrogen chloride, hydrogen sulfide, methyl mercaptan, methylene chloride and vinyl chloride} were shown to be greater than the TPERs listed in 15A NCAC 2Q .0711.

**Toxic Air Pollutant Emission Rate Calculation Methodology:**

- The maximum **methane gas** generation rate for the landfill area was estimated using the U.S. EPA LANDGEM program (<http://www.epa.gov/ttn/catc/dir1/landgem-v302.xls>) and will occur approximately in the year 2034 at an estimated rate of  $2.81 \times 10^7$  **cubic meters (CH<sub>4</sub>) per year**.

**Landfill gas emissions**

- 98% control efficiency is claimed for flare (CD-01)
- 75% of landfill gas is collected by the gas collection/extraction system (CD-GCCS1)
- 25% of the generated landfill gas is considered fugitive

The mass emissions of toxic air pollutant constituents found in landfill gas were calculated for the entire landfill area based on the maximum methane generation rate for the landfill through to closure in the year 2034. The worse case scenario was used to calculate the toxic emissions from the landfill using 75% collection of landfill gas by the gas extraction system, and 98% control efficiency of the flare for all the constituents in the landfill gas. 25% of the landfill gas is considered to be fugitive. The average sampled constituent concentrations, as determined by the AP-42 factors, are listed in Table 2 below. These concentrations were used to calculate the emission rates of specific toxic air pollutants as listed in Table 3. The emissions rates were then compared to the TPERs listed in the State Regulations in Section 15A NCAC 2D .0711 to find out if any toxic air pollutants were required to be included in a facility wide toxic modeling exercise.

Table 2 {Concentrations from AP-42, Section 2.4}

Constituent	Molecular Weight (AP-42)	AP-42 (ppmv)
1,1,1-Trichloroethane (Methyl chloroform)	133.41 grams/gmole	0.48 ppmv
1,1,2,2-Tetrachloroethane	167.85 grams/gmole	1.11 ppmv
1,1-Dichloroethene (Vinylidene chloride)	96.94 grams/gmole	0.20 ppmv
1,2-Dichloroethane (Ethylene dichloride)	98.96 grams/gmole	0.41 ppmv
Acrylonitrile	53.06 grams/gmole	6.33 ppmv
Benzene	78.11 grams/gmole	1.91 ppmv
Carbon disulfide	76.13 grams/gmole	0.58 ppmv
Carbon tetrachloride	153.84 grams/gmole	0.004 ppmv
Chlorobenzene	112.56 grams/gmole	0.250 ppmv
Chloroform	119.39 grams/gmole	0.03 ppmv
Dichlorobenzene	147.0 grams/gmole	0.210 ppmv
Dichlorodifluoromethane	120.91 grams/gmole	15.7 ppmv
Dichlorofluoromethane	102.92 grams/gmole	2.62 ppmv
Dichloromethane (Methylene chloride)	84.94 grams/gmole	14.3 ppmv
Ethylene dibromide	187.88 grams/gmole	0.001 ppmv
Ethyl mercaptan (Ethanethiol)	62.13 grams/gmole	2.28 ppmv
Hydrogen sulfide	34.08 grams/gmole	35.5 ppmv
Hydrogen chloride	36.47 grams/gmole	42.0 ppmv
Mercury	200.61 grams/gmole	2.92E-04 ppmv
Methyl ethyl ketone	72.11 grams/gmole	7.09 ppmv
Methyl isobutyl ketone	100.16 grams/gmole	1.87 ppmv
Methyl mercaptan	48.11 grams/gmole	2.49 ppmv
n-hexane	86.18 grams/gmole	6.57 ppmv
Perchloroethylene (Tetrachloroethene)	165.83 grams/gmole	3.73 ppmv
Toluene	92.13 grams/gmole	39.3 ppmv
Trichlorofluoromethane	137.38 grams/gmole	0.76 ppmv
Trichloroethylene (Trichloroethene)	131.40 grams/gmole	2.82 ppmv
Vinyl chloride	62.50 grams/gmole	7.34 ppmv
Xylenes	106.16 grams/gmole	12.1 ppmv

The following equation from AP-42, fifth edition, Section 2.4.4.1 “Emissions”, Revised November 1998, was used to calculate the **volumetric** emission rate of individual toxic air pollutants in the methane gas.

$$Q_p = 2.0 \times Q_{CH_4} \left( \frac{C_p}{1 \times 10^6} \right)$$

**Where:**

$Q_p$  = Emission rate of pollutants, m<sup>3</sup>/yr

$Q_{CH_4}$  = Methane generation rate, m<sup>3</sup>/yr

$C_p$  = concentration of pollutant in the Waste Industries Air Coalition (WIAC) report

Multiplication factor = 2.0 (Assumes approximately 50 percent of landfill gas is methane (CH<sub>4</sub>) and that 50 percent is CO<sub>2</sub>, N<sub>2</sub>, and other constituents)

The following equation from AP-42, fifth edition, Section 2.4.4.1 “Emissions”, Revised November 1998, was used to calculate the uncontrolled **mass** emission rate individual toxic air pollutants present in methane gas.

$$UM_p = Q_p (m^3 / yr) \left[ \frac{MW (g / gmole) \times (1 atmosphere)}{\left( \frac{8.205 \times 10^{-5} m^3 - atmosphere}{gmol^{-0} K} \right) \times \frac{1000 g}{kg} \times (273 + 25^0 C)^0 K} \right]$$

**Where:**

- UM<sub>p</sub> = Uncontrolled mass emissions of pollutants, kg/yr
- MW<sub>p</sub> = Molecular weight of pollutant, g/gmol
- Q<sub>p</sub> = Emission rate of pollutant, m<sup>3</sup>/yr
- T<sup>0</sup> = 25<sup>0</sup> C (77<sup>0</sup> F), recommended by AP-42 for landfill gas temperature if temperature is unknown

The following equation from AP-42, fifth edition, Section 2.4.4.1 “Emissions”, Revised November 1998, is used to calculate the **acrylonitrile** volumetric flow rate (m<sup>3</sup>/yr) as part of the methane gas generation from the landfill.

$$Q_{acrylonitrile} = 2.0 \times Q_{CH_4} \left( \frac{C_p}{1 \times 10^6} \right)$$

**Where:**

- Q<sub>p</sub> = Emission rate of acrylonitrile, m<sup>3</sup>/yr
- Q<sub>CH<sub>4</sub></sub> = 2.81 x 10<sup>7</sup> m<sup>3</sup>/year (maximum methane generation rate in 2034)
- C<sub>p</sub> = 6.33 ppmv (AP-42 acrylonitrile concentration)

Multiplication factor = 2.0 (from application, assumes that approximately 50 percent of landfill gas is CH<sub>4</sub> and 50 percent is CO<sub>2</sub>, N<sub>2</sub>, and other constituents)

$$Q_{acrylonitrile} = 2.0 \times \left( \frac{2.81 \times 10^7 m^3}{year} \right) \times \left( \frac{6.33 parts}{1 \times 10^6} \right) = \frac{355.75 m^3}{year}$$

The following equation from AP-42, fifth edition, Section 2.4.4.1 “Emissions”, Revised November 1998, was used to calculate the uncontrolled **mass** emission rate of **acrylonitrile** present in the methane gas.

$$UM_{acrylonitrile} = \frac{355.75 m^3}{year} \times \left[ \frac{\{53.06 g acrylonitrile / gmole\} \times 1 atmosphere}{\left( \frac{8.205 \times 10^{-5} m^3 - atmosphere}{gmol^{-0} K} \right) \times \frac{1000 g}{kg} \times (273 + 25^0 C)^0 K} \right] \times \frac{2.205 lbs}{kg} = \frac{1702.26 lbs acrylonitrile}{year}$$

The total acrylonitrile mass emission rate has been calculated to be 1213.38 lbs per year uncontrolled. The collection efficiency (75%) of the gas collection system was taken into consideration for this toxics evaluation, as well as the destruction efficiency (98%) of the flare. Fugitive emissions of gas from the landfill are modeled as 25% of the gas generated by the landfill. The total emission rate = fugitive plus the emissions from flare.

$$1702.26 \text{ lbs/yr} \times 0.25 \text{ (fugitive)} + \{1702.26 \times 0.75 \text{ (collection eff.)} \times (1-0.98) \text{ (controlled)}\} = 451.1 \text{ lbs/year}$$

The threshold TPER amount for **acrylonitrile** is **10.0 lbs per year**. The calculated emission rate for acrylonitrile (459.61) is greater than the TPER listed in 15A NCAC 2Q .0711 and will have to be modeled for compliance with the National Ambient Air Quality Standards.

All of the other toxic air pollutants present in the landfill gas were calculated using the same methodology as above and have been placed in Table 3 below, along with their respective TPER thresholds. The calculated emissions rates from the application were used unless they were lower than the rates calculated in this review.

**Calculation for Hydrogen Chloride emission from the combustion process in the flare:**

**The following example calculation is for the emission of hydrogen chloride (HCl) created from the combustion of landfill gas in a flare generated at the facility. The calculation method used is from AP-42, Section 2.4.4.2 – Controlled Emissions.**

Hydrochloric acid (HCl) is formed when chlorinated compounds in landfill gas are combusted in control equipment. The best methods to estimate emissions are mass balance methods using site-specific data on total chloride [expressed in ppmv as the chloride ion (Cl<sup>-</sup>)].

$$Q_{Cl^-} = 2.0 \times Q_{CH_4} \left( \frac{C_{Cl^-}}{1 \times 10^6} \right) \quad (\text{Equation 3, AP-42, Section 2.4.4.2})$$

- Q<sub>Cl<sup>-</sup></sub> = Emission rate of chloride ions, m<sup>3</sup>/yr
- Q<sub>CH<sub>4</sub></sub> = 2.81 x 10<sup>7</sup> m<sup>3</sup>/yr (maximum amount 1 year after closure calculated by the US EPA LANDGEM software)
- C<sub>Cl<sup>-</sup></sub> = concentration of chloride ions (42.0 ppmv, AP-42 default value when concentration not known)
- Multiplication factor = 2.00 assumes 50% landfill gas is methane

$$Q_{Cl^-} = 2.0 \times 2.81 \times 10^7 \frac{m^3}{year} \left( \frac{42.0 \text{ parts } Cl^-}{1 \times 10^6} \right) = \frac{2360.4 m^3}{year}$$

The uncontrolled mass emissions of chloride ions present in the methane were found in the following manner using Equation 4, AP-42, Section 2.4.4.2.

**Where:**

- UM<sub>Cl<sup>-</sup></sub> = Uncontrolled mass emissions of chloride ions, kg/yr
- MW<sub>Cl<sup>-</sup></sub> = Molecular weight of chloride ions (35.45 g/mol)
- Q<sub>Cl<sup>-</sup></sub> = Emission rate of chloride ions, (2360.4 m<sup>3</sup>/yr)
- T<sup>0</sup> = 25<sup>0</sup> C (77<sup>0</sup> F), recommended by AP-42 for landfill gas temperature if temperature is unknown

$$UM_{Cl^-} = \frac{2360.4 m^3}{year} \times \left[ \frac{35.45 \text{ g / gmole} \times 1 \text{ atmosphere}}{\left( \frac{8.205 \times 10^{-5} m^3 - \text{atmosphere}}{gmol \cdot ^0 K} \right) \times \frac{1000 \text{ g}}{kg} \times (273 + 25^0 C) ^0 K} \right] \times \frac{2.205 \text{ lbs}}{kg} \times \frac{\text{tons}}{2000 \text{ lbs}} = \frac{3.77 \text{ tons } (Cl^-)}{year}$$

The mass emissions of hydrochloric acid (HCl) created by the flare combustion of chloride ions is found by using Equation 10 of AP-42, Section 2.4.4.2.

**Where:**

- CM<sub>HCl</sub> = Controlled mass emissions of hydrogen chloride, kg/yr
- UM<sub>cl<sup>-</sup></sub> = Uncontrolled mass emission of chloride ions (2.7 tons/year)
- η<sub>col</sub> = LFG collection system capture efficiency (75%)
- 1.03 = Ratio of molecular weight of HCL to CL<sup>-</sup>
- η<sub>col</sub> = Control efficiency of flare for chlorinated hydrocarbons (98%)

$$CM_{HCl} = UM_{cl^-} \times \left(\frac{\eta_{col}}{100}\right) \times 1.03 \times \left(\frac{\eta_{cnt}}{100}\right) \times \frac{year}{8760\ hours} \times \frac{2000\ lbs}{ton}$$

$$CM_{HCl} = \frac{3.77\ tons}{year} \times (0.75) \times 1.03 \times (0.98) \times \frac{1\ year}{8760\ hrs} \times \frac{2000\ lbs}{ton} = \frac{0.652\ lbs}{hour}$$

The hydrogen chloride emissions from the landfill flare were calculated using a collection efficiency of 75% for the gas collection system and a 98% combustion efficiency of all of the landfill gas entering the flare. The mass emission rate was calculated to be 0.47 lbs HCl/hr). The threshold TPER amount for hydrogen chloride is **0.18** lbs/hr. Therefore, the calculated emission rate of **0.652 is higher** than the TPER listed in 15A NCAC 2Q .0711 and will have to be modeled for compliance with the National Ambient Air Quality Standards.

**Table 3** {The toxic air pollutant emissions from the Tuscarora Long-Term Regional Landfill have been summarized in this table using 98% flare efficiency, 75% gas collection system efficiency and 25% fugitive emissions}

Constituent	Threshold (lbs/yr)	Emission Rate (lbs/yr)	Threshold (lbs/day)	Emission Rate (lbs/day)	Threshold (lbs/hr)	Emission Rate (lbs/hr)	Threshold Exceedance (Yes/No)
1,1,1-Trichloroethane (Methyl chloroform)	-----	-----	250	0.239	64	0.01	No
1,1,2,2-Tetrachloroethane	430	251.61	-----	-----	-----	-----	No
1,1-Dichloroethene (Vinylidene chloride)	-----	-----	2.5	0.0724	-----	-----	No
1,2-Dichloroethane (Ethylene dichloride)	260	55.29	-----	-----	-----	-----	No
<b>Acrylonitrile</b>	<b>10</b>	<b>455.54</b>	-----	-----	-----	-----	<b>Yes</b>
<b>Benzene</b>	<b>8.1</b>	<b>202.25</b>	-----	-----	-----	-----	<b>Yes</b>
Carbon disulfide	-----	-----	3.9	0.165	-----	-----	No
Carbon tetrachloride	460	0.84	-----	-----	-----	-----	No
Chlorobenzene	-----	-----	46	0.105	-----	-----	No
Chloroform	290	4.88	-----	-----	-----	-----	No
p-Dichlorobenzene	-----	-----	-----	-----	16.8	0.0048	No
Dichlorodifluoromethane	-----	-----	5200	7.22	-----	-----	No
Dichlorofluoromethane	-----	-----	10	0.998	-----	-----	No
<b>Dichloromethane (Methylene chloride)</b>	<b>1600</b>	<b>1620.54</b>	-----	-----	0.39	0.185	<b>Yes</b>

-Continued on the next page-

**Table 3** {The toxic air pollutant emissions from the Tuscarora Long-Term Regional Landfill have been summarized in this table using 98% flare efficiency, 75% gas collection system efficiency and 25% fugitive emissions} –Continued-

Constituent	Threshold (lbs/yr)	Emission Rate (lbs/yr)	Threshold (lbs/day)	Emission Rate (lbs/day)	Threshold (lbs/hr)	Emission Rate (lbs/hr)	Threshold Exceedance (Yes/No)
Ethyl mercaptan (Ethanethiol)	-----	-----	-----	-----	0.025	0.022	No
Ethylene dibromide	27	0.26	-----	-----	-----	-----	No
<b>Hydrogen sulfide</b>	-----	-----	<b>1.7</b>	<b>4.58</b>	-----	-----	<b>Yes</b>
<b>Hydrogen chloride **</b>	-----	-----	-----	-----	<b>0.18</b>	<b>0.652</b>	<b>Yes</b>
Mercury	-----	-----	0.013	2.2E-04	-----	-----	No
Methyl ethyl ketone	-----	-----	78	1.91	22.4	0.0796	No
Methyl isobutyl ketone	-----	-----	52	0.711	7.6	0.0296	No
<b>Methyl mercaptan</b>	-----	-----	-----	-----	<b>0.013</b>	<b>0.0187</b>	<b>Yes</b>
n-Hexane	-----	-----	23	2.12	-----	-----	
Perchloroethylene (Tetrachloroethene)	13000	836.15	-----	-----	-----	-----	No
Toluene	-----	-----	98	13.4	14.4	0.559	No
Trichloroethylene (Trichloroethene)	4000	501.39	-----	-----	-----	-----	No
Trichlorofluoromethane	-----	-----	-----	-----	140	0.016	No
<b>Vinyl chloride</b>	<b>26</b>	<b>621.76</b>	-----	-----	-----	-----	<b>Yes</b>
Xylenes	-----	-----	57	4.76	16.4	0.198	No

\*\* Pollutant formed by the combustion process of landfill gas in the flare (CD-01)

**g. Toxic modeling::**

Current policy at the DAQ Air Quality Analysis Group is that if a landfill desires, the State will model the emissions from the landfill gas collection system, fugitive emissions, flares and any other equipment for compliance using EPA approved screening, and if applicable, refined modeling.

The following information was supplied:

- A. location of landfill: Cove City, Craven County, North Carolina
- B. Area source (landfill), flare (CD-01)
- C. Pollution emissions rates for each source (see table below)
- D. Site map identifying emissions sources and property boundaries

The following pollutants will be modeled because their emissions are greater than their respective TPER threshold limits.

- Acrylonitrile
- Benzene
- Hydrogen sulfide
- Hydrogen chloride
- Methyl mercaptan
- Vinyl chloride
- Methylene chloride (Dichloromethane)

Emission rates from the landfill are based on 75% collection efficiency of the gas collection system (CD-GCCS1), 98% destruction efficiency of the flare (CD-01), and 25% fugitive emissions and a maximum generation rate over the life of the landfill @  $2.81 \times 10^7$  m<sup>3</sup>/year.

**Note:** the emissions from the sources (ES-02, ES-06, IES-05) burning unadulterated fuel (diesel) will not be included in the model per current DAQ policy.

Modeled emission rates for Tuscarora Long-Term Regional Landfill

Pollutant	Flare Emission Rate (CD-01) @ 75% capture efficiency @ 98% destruction efficiency	Landfill Emissions (ES-01) @ 25% fugitive emissions	Calculated Total Rate
Acrylonitrile	25.785 lbs/yr	429.76 lbs/yr	455.54 lbs/yr
Benzene	11.45 lbs/yr	190.80 lbs/yr	202.25 lbs/yr
Hydrogen sulfide	0.259 lbs/day	4.32 lbs/day	4.58 lbs/day
Hydrogen chloride *	0.652 lbs/hr	-----	0.652 lbs/hr
Methyl mercaptan	0.001 lbs/hr	0.0177 lbs/hr	0.0187 lbs/hr
Methylene chloride	91.73 lbs/yr	1528.81 lbs/yr	1620.54 lbs/yr
Vinyl chloride	35.19 lbs/yr	586.57 lbs/yr	621.76 lbs/yr

\* Created by landfill gas combustion in the flare

**DAQ Air Quality Analysis Branch Comments (Toxics memo dated September 10, 2008, from Mark Yoder, Meteorologist):**

In accordance with the information and procedures given in the memorandum for Dispersion Modeling Analyses for Landfills, dated December 12, 2005, the Tuscarora Long-Term Regional Landfill was found to be consistent with those facilities in the Air Quality Analysis Branch landfill-modeling database that have demonstrated compliance with the applicable AALs and is expected to model in compliance. No further analysis is required.

**STATE-ONLY REQUIREMENT:**

Pursuant to 15A NCAC 2D .1100 and in accordance with the approved application for an air toxic compliance demonstration, Sampson County Disposal LLC Landfill shall not exceed the following toxic air pollutant emission rates, **requested by the applicant (2500197.07A):**

Pollutant	Averaging Period	Modeled emissions Rate
Acrylonitrile	Annual	455.54 lbs/yr
Benzene	Annual	202.25 lbs/yr
Hydrogen sulfide	24-hour	4.58 lbs/day
Hydrogen chloride *	1-hour	0.652 lbs/hr
Methyl mercaptan	1-hour	0.0187 lbs/hr
Methylene chloride (Dichloromethane)	Annual	1620.54 lbs/yr
Vinyl chloride	Annual	621.76 lbs/yr

\* Emissions created during the combustion process in the flare

The toxic air pollutants, listed in Table 3 of this review, represent the maximum emission rates from the landfill (year 2037). Those toxic air pollutants that do not exceed the listed TPER threshold limits, will be placed in the body of the permit as a “not to exceed limit”. For the calculation of combustion toxics (HCl) generated by the flare, 75% of the landfill gas generated by the landfill was collected by the gas extraction system, and 98% of the gas that went through the flare was combusted which generated HCl.

Therefore, since the TPERs were not exceeded by those air toxic pollutants that are not being modeled, and the landfill must operate in compliance with both NSPS (Subpart WWW), and MACT (Subpart AAAA). The DAQ believes that the gas collection and control system capture efficiency, and flare efficiency will be adequate to keep this facility in compliance with toxic air pollutant emissions through the life of this landfill.

No monitoring, recordkeeping or reporting will be required in the permit. However, the Permittee shall maintain records of operational information demonstrating that the toxic air pollutant emissions do not exceed the emission rates that require a permit (TPERs).

**B. Tub grinder (diesel fuel-fired, 500 hp, ID No. ES-02)  
Compost turner (diesel-fired, 100 hp, ID No. ES-06)  
Screen (diesel fuel-fired, 25 hp, ID No. IES-05)**

**Description:**

1. The Tuscarora landfill receives both municipal solid waste and yard waste materials. The yard waste material is fed into the grinder which turns the branches and wood into a mulch-like material. This grinder began operation at the facility in 1994. The screening operation is used to remove trash, dirt, and other small debris from the branches prior to them being fed into the grinder.

The screening operation (IES-05) with the 25 hp diesel fuel engine was installed in 1998.

The compost turning operation (ES-06) with the 100 hp diesel fuel-fired engine was installed in 1997.

**2. Applicable Regulatory Requirements:**

The tub grinder (ES-02), the screening operation (IES-05), and the compost turner (ES-06) engines **are not subject** to the requirements of the Rice MACT, Subpart ZZZZ, or the notification requirements in Subpart A because they are each “by definition” existing engines located at an area source (landfill) of HAPs that were installed at the site prior to June 12, 2006. [40 CFR §63.6590 (b)(3)]

The tub grinder (ES-02), the screening operation (IES-05), and the compost turner (ES-06) engines **are not subject** to the requirements of NSPS, Subpart IIII because they each are “by definition” existing engines located at an area source (landfill) of HAPs that commenced construction (ordered by the owner) prior to July 11, 2005. [40 CFR 60.4200(a)(2)]

Table of Regulated Pollutants, Limits and Standards

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate	$E = 4.10 (P)^{0.67}$ (For process weight rates $\leq 60,000$ lbs per hour)  Where P = process weight rate (tons/hr) E = allowable emission rate for PM (lbs/hr)	15A NCAC 2D .0515
Sulfur dioxide	2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Visible emissions	20 percent opacity	15A NCAC 2D .0521

**a. 15A NCAC 2D .0515: Particulates From Miscellaneous Industrial Processes**

- i. Emissions of particulate matter from tub grinder (ES-02) shall not exceed an allowable emission rate as calculated by the following equation: [15A NCAC 2D .0515(a)]

$$E = 4.10 \times P^{0.67} \leq 60,000 \text{ lbs per hour}$$

$$E = 55.0 (P)^{0.11} - 40 \text{ (For process weight rates } > 60,000 \text{ lbs per hour)}$$

Where: E = allowable emission rate in pounds per hour  
P = process weight in tons per hour

Liquid and gaseous fuels and combustion air are not considered as part of the process weight.

**The tub grinder is expected to be in compliance with this regulation based on the large weight quantity (in tons per hour) that can be placed into the tub grinder and the size of the chips and particulate that will be produced by this process.**

**Testing [15A NCAC 2D .0501 (c)(3)]**

- ii. If emissions testing is required, the testing shall be performed in accordance with General Condition JJ. If the results of this test are above the limit given in Section VII. B. 2. a. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0515.

**Monitoring/Recordkeeping [15A NCAC 2Q .0508(f)]**

- iii. No monitoring, recordkeeping or reporting is required.

**b. 15A NCAC 2D .0516 "Sulfur Dioxide Emissions From Combustion Sources"**

Regulation Analysis:

- i. Sulfur dioxide emissions from these sources (ES-02, ES-06, IES-05) that is discharged from any vent, stack, or chimney shall not exceed **2.3 pounds per million Btu heat input**. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard.

These sources are subject to this rule because it is a source of combustion and it discharges sulfur dioxide into the atmosphere due to combustion.

Potential emissions of sulfur dioxide are expected to be below the allowable emission rate when firing diesel fuel (0.5% sulfur by weight). Compliance is indicated.

**Testing [15A NCAC 2Q .0508(f)]**

- ii. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(4) and General Condition JJ found in Section 3 of the Permit. If the results of this test are above the limit given in Section VII. B. 2. b. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0516.

- iii. Monitoring/recordkeeping/reporting [15A NCAC 2Q .0508(f)]

No monitoring, recordkeeping, or reporting is required for sulfur dioxide emissions from these combustion sources when burning diesel fuel.

**c. 15A NCAC 2D .0521 "Control Of Visible Emissions"**

Regulation Analysis:

- i. Tub grinder (ES-02) was installed after July 1, 1971 and is therefore subject to 15A NCAC 2D .0521(d). Per this regulation visible emissions shall not be more than **20 percent opacity** when averaged over a six-minute period except that six-minute periods averaging more than 87 percent opacity may occur not more than once in any hour nor more than four times in any 24-hour period.

Compliance is expected with this regulation from both the firing of diesel fuel in the engine and the PM emissions from the tub grinder.

**Testing [15A NCAC 2D .0501(c)(8)]**

- ii. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .0501(c)(8) and General Condition JJ found in Section 3 of the Permit. If the results of this test are above the limit given in Section VII. B. 2. c. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0521.

**Monitoring [15A NCAC 2Q .0508(f)]**

- iii. No monitoring, recordkeeping, or reporting is required.

**IX. Insignificant Activities:**

The following insignificant activities will be added to the cover letter of the permit in accordance with 15A NCAC 2Q .0503(8).

- A. Leachate lagoon (10,800 gallons per day, IES-03)
- B. Diesel fuel storage tank (1000 gallon capacity, IES-04A)
- C. Gasoline storage tank (500 gallon capacity, IES-04B)
- D. Stationary equipment (screen with 25 hp diesel engine, IES-05)

**X.** A Professional Engineers Seal is required for the gas collection and control system that was submitted in association with this permit modification. Mr. Evan E. Andrews, PE, a registered engineer in the State of North Carolina, sealed and certified compliance with this NSPS, on October 30, 2007 for the initial design plan and he sealed the revised portions of the design plan on August 7, 2008.

**XI.** A consistency determination **is not required** for this permit modification because no new sources are being added at the facility. The facility is requesting a Title V permit because of NSPS, Subpart WWW requirements. However, a zoning consistency determination was included with the application received by the Division of Air Quality on February 5, 2007. The Craven County Planning Department (Jason Frederick) stated that they received a copy of the air permit application and that there are no applicable zoning and subdivision ordinances for this facility at this time.

**XII.** An application fee **is not required** because this facility is required by NSPS, Subpart WWW to obtain an air permit after reaching a certain size and capacity at the facility.

**XIII.** The appropriate number of copies of the application were received by the DAQ on February 5, 2007.

**XIV.** The application did contain the Reduction and Recycling Form.

**XV.** The application **was** signed by an authorized official as defined by 15A NCAC 2Q .0304(j).

**XVI. Public Notice**

A thirty-day public notice **is required** for this one-step Significant Modification.

**Public notice:** The 30 day public notice period was from \_\_\_\_ through \_\_\_\_\_. \_\_\_\_ public comments were received for this permit application.

**EPA 45-Day review Period:** The US EPA 45-day review period was from \_\_ 2008 through \_\_\_\_\_, 2008. The USEPA \_\_\_\_ have any comments on this modification.

**XVII. NonAttainment:**

Craven County is not designated as nonattainment for the eight-hour ozone standard. .

**XVIII. Prevention of Significant Deterioration (PSD)**

This facility is a minor source for PSD. The modifications in this permit will not increase emissions into the atmosphere. The purpose of this modification request is to comply with 40 CFR Part 60, WWW and obtain a Title V air permit due to the size of the landfill (volume and mass). Therefore, PSD does not apply.

**XIX.** A gas collection and control system was submitted to the DAQ with application 250000197.07A. The DAQ approved design plan with stipulations that the facility apply for a permit modification when the gas collection and control system is required to be updated. The current blowers and flare do not have the capacity to extract and control the maximum amount of landfill gas that is estimated to be produced by the landfill in the latter phases (Phase IV, V, VI, and VII) of the landfill. The system has been designed adequately for Phases I, II, and III. The landfill is currently filling waste in Phase II of the project. Tuscarora Long-Term Regional Landfill was sent an approval letter for the gas collection and control design plan on September 3, 2008.

**XX.** This facility is not subject to 15A NCAC 2Q .0508(g) "Prevention of Accidental Releases" because it does not store chemicals that are subject to this regulation in quantities great enough to cross the threshold limits.

**XXI. Recommendations**

This modification, issued under section 15A NCAC 2Q .0501(c)(1) to the Coastal Regional Solid Waste Management Authority (CRSWMA) located in Cove City, Craven County, North Carolina, has been reviewed by the DAQ to determine compliance with all procedures and requirements. The Washington Regional Office did not comment on the initial application, but did make comments on the draft permit. The DAQ has determined that this facility is complying or will achieve compliance as specified in the permit with all applicable requirements. The Washington Regional Office concurs.

**Issue permit No. 09755T00**