Waste Management of New Hampshire, Inc.
Turnkey Recycling & Environmental Enterprise
90 Rochester Neck Road
P.O. Box 7065
Gonic, NH 03839

Final NOx RACT ORDER
August 26, 2002
Revised August 11, 2011
Revised April 27, 2012
ARD-01-001

A. Introduction

This revised NOx RACT Order is issued by the New Hampshire Department of Environmental Services, Air Resources Division, to Waste Management of New Hampshire, Inc., pursuant to RSA 125-C.

B. Parties

1. The New Hampshire Department of Environmental Services, Air Resources Division (DES), is a duly constituted administrative agency of the State of New Hampshire having its principal offices at 29 Hazen Drive, Concord, NH 03302-0095, telephone number (603) 271-1370.

2. Waste Management of New Hampshire, Inc. (WMNH) is a Connecticut corporation, having a mailing address of 4 Liberty Lane, Hampton, NH 03842.

C. Statements of Fact and Law

1. WMNH owns and operates the Turnkey Recycling and Environmental Enterprise (TREE) facility, which encompasses an area of approximately 1,248 acres of land located to the north and south of Rochester Neck Road in Rochester, New Hampshire.

2. TREE (the Facility) is an integrated solid waste management facility, which is permitted to operate as such by DES.

3. Operations at the Facility currently include the maintenance of two closed municipal solid waste landfills (MSWLFs) as well as the management of an active MSWLF, a materials recovery facility (MRF), a leachate treatment plant, landfill gas collection and control systems, and two landfill gas-to-energy plants.

4. The active MSWLF is identified as the TLR-III Refuse Disposal Facility and is operated on land located at 90 Rochester Neck Road in Rochester, New Hampshire.

5. The Facility has several emission control devices – including engines, turbines, and flares – that combust landfill gas collected from the two closed landfills and one active landfill. Exhaust gases from these devices contain oxides of nitrogen (NOx).

6. Effective May 20, 1994, DES adopted Part Env-A 1211 *Nitrogen Oxides (NOx*) of the New Hampshire Code of Administrative Rules, which established procedures for meeting the requirements of Reasonably Available Control Technology (RACT) for NOx, including schedules for compliance. Effective October 31, 2010, DES adopted Env-A 1300 *Nitrogen Oxides (NOx) Reasonably Available Control Technology (RACT)* which replaced Env-A 1211.Pursuant to Env-A 1314, *Miscellaneous Stationary Sources*, WMNH is required to obtain a RACT order from the department in accordance

with Env-A 1316. In addition, WMHH must comply with Env-A 905 *NOx Emission Statement Recordkeeping Requirements* and Env-A 909 *NOx Emission Statement Reporting Requirements*.

7. Pursuant to Env-A 1316.04(c), the facility is required to submit the previous calendar year NOx emissions for each device covered by the RACT Order. Actual NOx Emissions for calendar year 2009 were reported as 81.104 tons including emissions from insignificant activities. Reported NOx emissions from Flare 2, 3 and 5 were 56, 4, and 284 pounds respectively. The flares are used only when combustion of the landfill gas in energy recovery systems are not available.

8. WMNH filed a "Compliance Schedule and RACT Evaluation for NOx Emissions" dated September 19, 1994.

9. At the time of the filing of the "Compliance Schedule and RACT Evaluation for NOx Emissions", WMNH operated only one flare (Flare No. 1) but had proposed to install an additional flare (Flare No. 2). WMNH installed Flare No. 2 in 1995.

10. In the "Compliance Schedule and RACT Evaluation for NOx Emissions," WMNH estimated that the NOx emission rate for Flare No. 1 was 2.39 pounds per hour (lb/hr) and proposed an emission rate of 2.86 lb/hr for Flare No. 2.

11. In 1997, WMNH altered the operation of the blower that is used to move landfill gas to Flare No. 1. This alteration increased the flow capacity to Flare No. 1 from 1,270 standard cubic feet per minute (scfm) to 1,400 scfm. By increasing potential gas flow to this flare, the maximum gross heat input to Flare No. 1 increased from 38 million British Thermal Units per hour (MMBtu/hr) to 41.9 MMBtu/hr, based on a lower heating value (LHV) of 500 Btu/scf for landfill gas. As a result of this change, the estimated NOx emission rate for Flare No. 1 increased to 2.86 lb/hr, matching that of Flare No. 2.

12. On May 18, 1998, DES issued amended permits for Flare No. 1 (PO-B-2545) and Flare No. 2 (PO-B-1927). Each permit specified a maximum gross heat input of 41.9 MMBtu and a NOx emission limitation of 2.9 lb/hr for its respective device.

13. WMNH filed a permit application dated June 15, 2000, to construct an enclosed, or ultra-low-emissions, flare (Flare No. 3) for the purpose of increasing the Facility's landfill gas control capacity.

14. WMNH filed a permit application dated May 29, 2001, to install up to 10 passive "candlestick" flares. WMNH subsequently withdrew this permit application on April 23, 2002.

15. DES issued a permit (TP-B-0482) dated November 11, 2001, for Flare No. 3. The permitted maximum gross heat input of 115.5 MMBtu/hr was based on a flow rate of 3,500 scfm at a higher heating value (HHV) of 550 Btu/scf for landfill gas. The NOx emission limitation was set at 2.9 lb/hr, based on an emission rate of 0.025 lb/MMBtu (equivalent to 13.8 lb/MMscf).

16. On April 23, 2002, WMNH filed a permit application for portable Flare No. 4. DES issued a permit (TP-B-0487) dated August 22, 2002, for portable Flare No. 4. The permitted maximum gross heat input of 26.4 MMBtu/hr was based on a flow rate of 800 scfm at a higher heating value (HHV) of 550 Btu/scf for landfill gas. The NOx emission limitation was set at 1.8 lb/hr based on an emission rate of 0.068 lb/MMBtu (equivalent to 37.4 lb/MMscf).

17. On August 26, 2002, DES issued a NOx RACT Order setting a NOx limit of 2.9 lb/hr for each of Flares No. 1, No. 2, No. 3, and 1.8 lb/hr for Flare 4 consistent with previously established permit limits.

18. DES issued an amended permit (TP-B-0482) on January 6, 2003, for Flare No. 3. The revision was made after field performance tests in July 2002 demonstrated that higher flow rates could be achieved without exceeding emission limits established in the original permit. The permitted maximum gross heat input was revised to 128.7 MMBtu/hr, corresponding to an increase in the maximum flow rate to 3,900 scfm. While the NOx emission limitation was held at 2.9 lb/hr, the effective emission rate was reduced from 13.8 to 12.3 lb/MMscf as a result of the higher flow rate.

19. WMNH filed a permit application dated November 17, 2005, to add two more flares for the purpose of increasing the Facility's landfill gas control capacity. The application was filed as a requirement of a Consent Decree between WMNH and the State of New Hampshire as approved by the Strafford County Superior Court on March 1, 2006. The Consent Decree required the addition of an open flare (Flare No. 5) and an ultra-low-emissions flare (Flare No. 6). The application also proposed the permanent removal from service of Flare No. 4 and the reassignment of Flare No. 1 to backup status.

20. WMNH submitted a permit application dated April 27, 2006, to establish short-term emission limits and annual emission caps for certain pollutants and certain control devices at the Facility. This application was filed as a requirement of the Consent Decree. In the application, WMNH requested an increase in the hourly NOx emission limit to 3.37 lb/hr for each of Flare No. 1 (as backup) and Flare No. 2, based on an increased flow rating of 1,495 scfm, corresponding to a gross heat input of 49.5 MMBtu/hr, and an emission factor of 37.4 lb/MMscf. The latter value is approximately equivalent to the USEPA emission factor of 0.068 lb/MMBtu for landfill gas at an HHV of 550 Btu/scf.

21. On September 12, 2006, DES issued a Temporary Permit (TP-B-0525) providing for the construction and operation of Flare No. 5 and Flare No. 6. The permit also designated Flare No. 1 as a backup device to be used only when another permitted control device at the Facility was not able to operate.

22. Flare No. 5 has a permitted maximum capacity of 3,200 scfm, corresponding to a gross heat input of 105.6 MMBtu/hr at an HHV of 550 BTU/scf for landfill gas. The hourly NOx emission limitation for this device was set at 7.2 lb/hr, based on an emission rate of 0.068 lb/MMBtu (equivalent to 37.4 lb/MMscf).

23. Originally, Flare No. 6 was permitted at a maximum capacity of 3,500 scfm, corresponding to a gross heat input of 115.5 MMBtu/hr at an HHV of 550 BTU/scf for landfill gas. The hourly NOx emission limitation for this device was set at 2.9 lb/hr, based on an emission rate of 0.025 lb/MMBtu (equivalent to 13.8 lb/MMscf).

24. In June 2007, field performance tests of Flare No. 6 demonstrated that this device was capable of meeting established emission limitations: Actual emission rates of NOx (and CO) were less than permitted maximum levels. On the basis of these results, WMNH filed a permit application dated October 1, 2007, seeking to increase the permitted maximum flow rate for Flare No. 6 from 3,500 scfm to 4,000 scfm with no change in the permitted maximum hourly emission rates. The increased flow rate is equivalent to a maximum gross heat of input of 132.0 MMBtu/hr at an HHV of 550 BTU/scf for landfill gas.

25. An amended temporary permit (TP-B-0525) for Flare No. 6 was issued by DES on September 11, 2008 to increase the permitted maximum flow rate from 3,500 scfm to 4,000 scfm. The permit retained the previously established short-term NOx limit of 2.9 lb/hr, based on a NOx emission rate of 0.0219 lb/MMBtu (equivalent to 12.0 lb/MMscf).

26. WMNH discontinued the operation of Flare No. 6 in July 2008 in order to make additional space available within the area previously developed as the North Flare Station. The creation of this additional space served to accommodate the installation of process equipment associated with the construction and operation of the Landfill Gas Processing Facility (LGPF) owned by the University of New Hampshire (UNH). According to WMNH, Flare No. 6 was dismantled at this time by completely disconnecting both combustion air and landfill gas supply piping. The Air Permit for Flare No. 6 remained valid until the issuance of TP-0065.

27. The amended temporary permit (FP-T-0168) issued by DES on September 11, 2008 set a short-term NOx limit of 3.4 lb/hr for each of Flare No. 1 (as backup) and Flare No. 2, based on a permitted maximum flow capacity of 1,500 scfm for each device.

28. WMNH has claimed that it is not possible to reduce NOx emissions from the open flares and therefore has proposed no controls or modifications to the open flares as RACT. WMNH has stated that because combustion occurs in the open with flares of this type, staging of combustion is not feasible. WMNH has further stated that even if staged combustion was feasible, it would not likely achieve additional reductions in NOx emissions because the flame temperature is relatively low.

29. WMNH contacted two leading flare vendors, John Zink Company and NOA, Inc., to research the feasibility of add-on NOx control technology. Neither vendor was aware of any installation where add-on NOx controls had been applied to either open or enclosed flares.

30. A search by WMNH of the USEPA Best Available Control Technology/Lowest Achievable Emission Rate (BACT/LAER) Information System database failed to reveal the use of add-on NOx control technology on flares.

31. In 2009, the University of New Hampshire (UNH) began commercial operation of the landfill gas treatment system and pipeline to provide fuel to generate power at UNH's Durham campus. UNH's landfill gas usage greatly reduced the usage of flares at the TREE facility.

32. WMNH submitted a permit application received by DES on June 22, 2010 for the installation of a Leachate Concentrator system. WMNH also submitted a permit application received by DES on August 23, 2010 for the expansion of TLR-III (Phases 9-14). These applications proposed the removal of Flare No. 1 and Flare No. 6. Flare No. 3 was retained in the permit to allow WMNH to have sufficient flaring capacity for the landfill gas independent of UNH. Based on current gas generation, gas collection and gas control capacity provided by available combustion devices, including WMNH turbines and engines, Flare 3 is not currently needed.

33. DES has used a combination of EPA-published emission factors and manufacturer's performance standards for NOx emissions in the preparation of this NOx RACT Order. These NOx emission rate values, expressed in units of either lb/MMscf or lb/MMBtu, as follows:

    a. For open flares, an emission rate of 0.068 lb/MMBtu, equal to USEPA's emission factor for industrial flares as listed in Table 13.5-1 of *Compilation of Air Pollutant Emission Factors*, AP-42, 5th Edition. This emission rate is equivalent to 37.4 lb NOx/MMscf at a HHV of 550 Btu/scf for landfill gas.

    b. For ultra-low emission (ULE) or pre-mix type enclosed flares, an emission rate of 0.025 lb NOx/MMBtu, equal to the manufacturer's performance guarantee for Flare No. 3. This emission rate is equivalent to 13.8 lb/MMscf at a HHV of 550 Btu/scf for landfill gas.

34. On July 18, 2011, WMNH submitted a request for an amendment to the NOx RACT Order to revise the testing requirements for the enclosed flares. Stack testing cannot be conducted on open flares to verify emission rates. Periodic stack testing can be performed on enclosed flares to verify emission rates. Env-A 800 requires stack testing every three years to verify compliance with NOx RACT requirements.

35. WMNH control device capacity in conjunction with the landfill gas treatment system and control device capacity at UNH currently exceeds the actual amount of landfill gas generated and collected. Currently, WMNH does not need the flaring capacity to control the landfill gas. Instead WMNH sells the landfill gas to UNH and also uses the landfill gas in its turbines and engines to generate electricity. To maintain the ability to control the landfill gas in the future with the flares if necessary, WMNH keeps the flares on-site. At the time that WMNH needs to use Flare 3 or any ULE or pre-mix enclosed flare, WMNH will bring such flare into full operation and conduct testing within 120 days of operating.

D. Order

On the basis of the above statements and facts of law, DES hereby orders WMNH as follows:

1. Comply with a performance standard of 37.4 lb of NOx/MMscf for Flare No. 2, Flare No. 5, and any future open flare, assuming 0.068 lb NOx/MMBtu and a HHV of 550 Btu/scf for landfill gas.

2. Comply with a performance standard of 13.8 lb of NOx/MMscf for Flare No. 3, and any future ultra-low emission (ULE) or pre-mix type enclosed flare, assuming 0.025 lb NOx/MMBtu and a HHV of 550 Btu/scf for landfill gas.

3. Operate at all times that landfill gas is routed to the device and maintain (when device is operating) Flare Nos. 2, 3, 5, and any future flares in accordance with the manufacturer's specifications.

4. Maintain at the facility, and make available for review by DES and/or EPA upon request, a copy of the manufacturer's specifications for each installed flare.

5. Conduct an initial compliance stack test for any new future ULE or pre-mix type enclosed flare by the earlier of 60 days of achieving maximum production rate or within 180 days of startup to demonstrate compliance with the performance standard in Item D.2. above.

6. Except as provided in Item D. 7, conduct periodic performance testing on Flare No. 3 and any future ULE or pre-mix type enclosed flare at least every three years or within 12 calendar quarters after the date of the last NOx RACT stack test, in accordance with Env-A 800 to demonstrate compliance with the performance standard in Item D. 2 above.

7. If Flare 3 or any ULE or pre-mix type enclosed flare has not operated during the 120 days prior to the end of the quarter in which periodic testing must be performed, conduct testing within 120 days after the date on which the flare is operated. WMNH shall notify DES to determine if additional air permitting requirements are applicable prior to making the flare operational and conducting such delayed testing.

8. Maintain records indicating the days on which Flare 3 and each ULE or pre-mix enclosed flare operated.

9. Along with the Semi-Annual Permit Deviation and Monitoring report, submit a summary of the operating day records for Flare 3 and each ULE or pre-mix enclosed flare for receipt by DES by January 31 and July 31 of each calendar year.

10. Maintain up-to-date records of any manufacturer-specified or manufacturer-recommended maintenance performed on each flare.

11. Comply with the recordkeeping and reporting requirements of Chapter Env-A 900 of the New Hampshire Code of Administrative Rules.

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