
Anheuser-Busch, LLC
221 Daniel Webster Highway
Merrimack, NH 03054

FINAL NOx RACT ORDER
ARD-05-001
Issued May 9, 2005
Amended January 17, 2018

A. Introduction

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

B. Parties

1. The New Hampshire Department of Environmental Services, Air Resources Division (the department), is a duly constituted administrative agency of the State of New Hampshire having its principal offices at 29 Hazen Drive, Concord, NH 03301, telephone number (603) 271-1370.
2. Anheuser-Busch, LLC, (formerly known as Anheuser-Busch, Inc.), is a Missouri corporation, registered with the NH Secretary of State, and has a mailing address of 221 Daniel Webster Highway, Merrimack, NH 03054.

C. Statements of Fact and Law

1. Anheuser-Busch Commercial Strategy, LLC owns and Anheuser-Busch, LLC (Anheuser-Busch) operates a beer manufacturing facility located at the Merrimack address listed above.
2. During the construction of this facility in 1969-1970, Anheuser-Busch installed three boilers capable of firing No.6 fuel oil or natural gas. These boilers all have design heat input ratings of 138 MMBtu/hr when firing fuel oil and 142 MMBtu/hr when firing natural gas, and are identified by the department as EU01, EU02 and EU03. (These boilers may occasionally burn a limited amount of on-site generated specification used oil that is blended with the fuel oil for combustion to provide steam for the brewing process.)
3. Effective May 20, 1994, the department 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.¹
4. The combined theoretical potential emissions from all devices and processes located at the stationary source exceed 50 tons per calendar year.
5. The facility's boilers meet the definition of industrial boilers in Env-A 1305 (previously Env-A 1211), are capable of firing fuel oil or natural gas at heat input rates exceeding 100 MMBtu/hr, and were installed prior to December 31, 1989. By meeting these applicability criteria, the boilers are subject to NOx RACT requirements for industrial boilers.

¹ Effective October 31, 2010, the department adopted Part Env-A 1300 *Nitrogen Oxides (NOx) Reasonably Available Control Technology (RACT)* which replaced Part Env-A 1211.

6. Anheuser-Busch filed a NOx RACT Compliance Schedule with the department dated September 12, 1994, indicating it planned on installing new low NOx burners (LNB) for firing fuel oil in each of the three boilers pursuant to ~~Env-A 1305.10~~ (previously Env-A 1211.05(d)). Installation of the LNB was completed on October 10, 1995.
7. Compliance testing of the three LNB-equipped boilers was performed on October 11, 1995. Based on the stack test results, the department evaluated the technology and determined that the equipment met the technical component requirements of a commercially available LNB and set boiler NOx emission limits of 0.40 lb/MMBtu while firing fuel oil at a maximum sulfur content of 1.0 percent and 0.25 lb/MMBtu while firing natural gas.
8. The department received a permit application from Anheuser-Busch on January 10, 2005, for the installation and operation of a wastewater treatment system, referred to as the Bio Energy Recovery System or "BERS", which included a backup flare for combustion of biogas generated by the system. The BERS reduces biological oxygen demand of the facility's process wastewater sent to the Town of Merrimack's wastewater treatment plant. The BERS includes anaerobic reactors, with collection and treatment of biogas (largely methane with the remainder being mostly carbon dioxide and small amounts of hydrogen sulfide) generated in the reactors. The primary means of treatment of the biogas is combustion with natural gas or fuel oil in the boilers, with a flare installed as a backup biogas combustion device in case the boilers are unavailable for service.
9. In that the facility was subject to NOx RACT requirements, Anheuser-Busch submitted a NOx RACT Order application in accordance with Part Env-A 1316 *NOx RACT Orders* (previously Env-A 1211.18, *Procedure for Issuance of a RACT Order*) on February 7, 2005 for the installation and operation of the flare in accordance with Env-A 1314.01 (previously Env-A 1211.14), *Emission Standards and Control Options for Miscellaneous Stationary Sources* and also requested an alternative NOx RACT emission limit for the boilers for the co-firing of biogas in accordance with Env-A 1315.03 (previously Env-A 1211.15), *Alternative RACT Emission Limits*.
10. The flare functions as a backup control device to control hydrogen sulfide emissions when the boilers are not operating.

Flares often serve as backup control devices for engines, boilers, turbines, or process heaters that fire waste gas. NOx emissions from flares are typically lower than the NOx emissions from the primary control devices. This is especially true with open flares, where the combustion occurs in the open and overall combustion temperatures would be expected to be lower than in most enclosed combustion devices. Furthermore, because of the design of open flares, the typical combustion controls applied to other combustion devices, such as staged combustion, are not feasible. Therefore, there are no technically feasible NOx control technologies for open flares.

Emissions from open flares cannot be tested with conventional testing methods because the combustion occurs in the open. Therefore, NOx emissions from the flare are based on USEPA AP-42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, Section 13.5, *Industrial Flares* (12/16) Table 13.5-1, which indicates a NOx emission factor of 0.068 lb/MMBtu for industrial flares.

Anheuser-Busch's proposed NOx RACT emission limit for the flare is the AP-42 NOx emission rate of 0.068 lb/MMBtu.

11. Env-A 1305.13(b) (previously Env-A 1211.05(d)(3)b. and c.) specifies a NO_x emission limit of 0.25 lb/MMBtu based on a 24-hour calendar day average for a boiler firing gas, or any combination of oil and gas. The LNB installed on the facility's boilers had NO_x emission rates between 0.35 and 0.40 lb/MMBtu when firing fuel oil per 1995 stack testing results.
12. The biogas, considered to be functionally equivalent to natural gas, was assumed to generate NO_x emissions no higher than 0.25 lb/MMBtu. The biogas is contemporaneously fired, or co-fired, as a supplemental fuel with either primary fuel (fuel oil or natural gas), and typically comprises about 10 to 15% of the total fuel being co-fired on a heat input basis (expected average of 11 MMBtu/hr). The facility's boilers, therefore, could not meet the NO_x RACT emission limit of 0.25 lb/MMBtu when co-firing fuel oil with biogas. To the extent that the biogas displaces oil, there was an expected NO_x reduction of approximately 0.15 lb/MMBtu of biogas fired, but at the low firing rate of biogas, this lower NO_x emission rate would reduce the overall NO_x emissions on a lb/MMBtu basis only slightly. Furthermore, the biogas firing rate varies somewhat, and the exact ratio of oil to biogas firing at any given time is not predictable.

Add-on NO_x control technologies, such as ammonia or urea injection, would render the use of the biogas for a supplemental fuel as economically infeasible. The firing of biogas in the boiler is a beneficial use of the byproduct (biogas) from the wastewater treatment process. Use of biogas will reduce NO_x and sulfur dioxide (SO₂) emissions to the extent that the biogas displaces oil firing in the boilers and will reduce consumption of non-renewable fossil fuels to the extent that both natural gas and oil firing is displaced by biogas firing in the boilers.

13. The NO_x RACT Order issued by the department on May 9, 2005 required the facility to meet the following alternative NO_x RACT emission limits for co-firing of biogas with primary fuels in the boilers equipped with LNB:
 - NO_x emissions, when firing natural gas or co-firing a combination of natural gas and biogas, shall be limited to less than or equal to 0.25 lb/MMBtu on a 24-hour calendar day average;
 - NO_x emissions, when firing oil or co-firing a combination of oil and biogas, shall be limited to less than or equal to 0.40 lb/MMBtu on a 24-hour calendar day average; and
 - With the exception of pilot gas to light off the boilers, natural gas and oil shall not be co-fired in the boilers.
14. The NO_x RACT Order issued by the department on May 9, 2005 also required periodic NO_x RACT testing of the boilers for No. 6 fuel oil only; No. 6 fuel oil and biogas; natural gas only; and natural gas and biogas and annual tune-ups for each boiler, separately for fuel oil alone and natural gas alone.
15. The BERS system started operation in 2006, producing biogas to be fired in the boilers through dedicated spuds in the burner. Emissions testing of the boilers while co-firing #6 fuel oil and biogas and also co-firing of natural gas and biogas began in October 2006 and results demonstrated compliance with the NO_x limits in TP-BP-0695.

16. The department received a permit application from Anheuser-Busch on August 11, 2008, for the reduction of the sulfur content in fuel oil. The department issued TP-0013 on October 7, 2009 which established a sulfur content limit of 0.3 percent for blended fuel oil. The reduction in sulfur content would likely also reduce the fuel-bound nitrogen content in the fuel oil.
17. Emission testing of the boilers was performed again in 2009 and results demonstrated compliance with the NOx limits in TP-BP-0695.
18. Anheuser-Busch notified the department that EU01 was shut down on November 1, 2011.
19. Emission testing of EU02 and EU03 was performed in 2012 and 2015 with results demonstrating compliance with the NOx limits in TP-BP-0695.
20. The frequency of the NOx RACT boiler stack testing had previously been based on a three-year cycle of boiler testing for the three operating boilers which called for testing of a different boiler every year.
21. In Anheuser-Busch's Title V renewal application received by the department on July 28, 2016 (Application #16-0122), Anheuser-Busch requested relief from the department regarding the number of fuels required to be burned in order to satisfy the NOx RACT stack testing and annual tune-up requirements in the original NOx RACT Order, as issued May 9, 2005. Specifically, Anheuser-Busch requested that NOx RACT stack testing of each boiler (EU02 and EU03) and the boiler tune-ups be conducted while firing the primary fuel(s) combusted in that boiler in the previous 12-months.
22. The department subsequently reviewed all nineteen NOx RACT stack test results for the boilers as conducted under this NOx RACT Order from 2009 to 2015. Test results show that NOx emissions decrease by an average of 4 percent when co-firing biogas with natural gas, as compared to firing natural gas alone. Test results also show an average increase of 3 percent when co-firing biogas with fuel oil, as compared to firing fuel oil alone. Further, the test results, regardless of the fuel or fuels fired, showed little variation by boiler or by the year of testing. Finally, the test results, when compared to the existing NOx limits, provide a working margin.
23. A review of the facility's records for the last 5 calendar years supports Anheuser-Busch's position that the boilers' heat was provided by natural gas or co-firing natural gas and facility-generated biogas, with fuel oil providing less than 1 percent of the total heat input to the boilers. The fuel oil consumed in 2012 and 2015 reflects the NOx RACT emission testing and annual NOx tune-ups while operating on fuel oil. In the five-year period reviewed, fuel oil was burned only to carry out annual NOx tune-ups and 3-year NOx testing requirements of the current NOx RACT Order and air permit.
24. In 2016, biogas provided less than 9 percent of the heat input to the EU01 and EU02.

D. Order

Based upon the above findings and determinations, the department hereby orders Anheuser-Busch as follows:

1. Comply with a NOx emission limit of less than or equal to 0.068 lb NOx/MMBtu, for the flare.

2. Maintain at the facility and make available for review by NHDES and/or EPA upon request a copy of the manufacturer's maintenance specifications for the flare.
3. Inspect the flare before May 1st of each year to verify that the flare continues to be operated in accordance with the manufacturer's specifications for the operation of the flare.
4. Maintain records of any manufacturer-specified maintenance conducted on the flare.
5. Comply with the monitoring requirements in Permit TV-0044, including, but not limited to:
 - Monitor and record the monthly biogas fed to the flare; and
 - Monitor and record the hours of operation of the flare on a monthly basis.
6. Comply with a NO_x emission limit of less than or equal to 0.40 lb NO_x/MMBtu on a 24-hour calendar day average and use of the existing, department approved, low NO_x burners, when firing oil or co-firing oil and biogas in the boilers.
7. Comply with a NO_x emission limit of less than or equal to 0.25 lb NO_x/MMBtu on a 24-hour calendar day average, when firing natural gas or co-firing natural gas and biogas in the boilers.
8. With the exception of pilot gas to light off the boilers, natural gas and oil shall not be co-fired in any of the boilers.
9. Conduct annual performance tune-ups for each boiler (EU02 and EU03) while burning the primary fuel that provided the majority of the heat input to the boiler in the 12 months prior to the tune-up in accordance with Env-A 1305.
10. Conduct NO_x RACT stack testing of each boiler (EU02 and EU03) every three years, or within 12 calendar quarters, as required in Env-A 803. Testing of the two boilers does not need to be performed in the same calendar year as long as the facility complies with the three-year requirement for each boiler.
11. Perform NO_x RACT stack testing of each boiler (EU02 and EU03) in accordance with Env-A 800 using the primary fuel that provided the majority of the heat input to each boiler in the 36 months preceding the test and co-firing biogas.
12. In addition to #11, perform NO_x RACT stack testing for any boiler combusting more than 240 hours per calendar year of a boiler's other primary fuel. Anheuser-Busch must notify the department in writing within one month of exceeding this operating threshold. Testing must occur within 180 days of exceeding the hour threshold or within 36 months of the most recent test on the other primary fuel, whichever is later, must include co-firing of biogas, and must be performed in accordance with Env-A 800.

13. Comply with the monitoring requirements in Permit TV-0044, including, but not limited to:

- Monitor ~~and record~~ the type and amount of fuel burned in each of the boilers on a monthly basis;
- Monitor and record the hours of operation of each boiler burning each permitted fuel type to indicate when #12 above is triggered; and
- Keep records of boiler tune-ups in accordance with Env-A 1300.

14. Comply with the recordkeeping and reporting requirements of Env-A 900.

Please address any correspondence and communication in reference to this Order to:

Mr. John McCutcheon
NHDES, Air Resources Division
Stationary Source Management Bureau
P.O. Box 95
Concord, NH 03302-0095
(603) 271-1370



Craig A. Wright, Director
Department of Environmental Services
Air Resources Division

ec: Timothy Drew, PIP Office
Bob McConnell, USEPA
Michael North, GZA GeoEnvironmental, Inc.
cc: Town of Merrimack