

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 RENNER BOULEVARD
LENEXA, KANSAS 66219**

BEFORE THE ADMINISTRATOR

In the Matter of:)
)
 Big Ox Energy – Siouxland, LLC) **Docket No. CAA-07-2019-0122**
)
 Respondent)
)

ADMINISTRATIVE COMPLIANCE ORDER

PRELIMINARY STATEMENT

1. This Administrative Compliance Order (“Order”) is issued under the authority vested in the Administrator of the U.S. Environmental Protection Agency (“EPA”) by Section 113 (a)(3) of the Clean Air Act (the “Act”), 42 U.S.C. § 7413(a)(3).
2. On the EPA’s behalf, Mark A. Smith, Director of the Air and Waste Management Division, is delegated the authority to issue this Order under Section 113(a) of the Act.
3. Respondent is Big Ox Energy-Siouxland, LLC, a corporation doing business in the State of Nebraska. Respondent is a “person” as defined in Section 302(e) of the Act.

STATUTORY AND REGULATORY BACKGROUND

4. In response to growing public concern and awareness of the threats posed by accidental release of extremely hazardous substances, Congress amended the CAA in 1990 to include the accidental release provisions found in Section 112(r), 42 U.S.C. § 7412(r). The objective of Section 112(r) of the CAA, 42 U.S.C. § 7412(r), is to prevent the accidental release, and to minimize the consequence of any such release, of any substance listed pursuant to Section 112(r)(3) of the CAA, 42 U.S.C. § 7412(r)(3), or any other extremely hazardous substance.
5. Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1), commonly referred to as the General Duty Clause, is designed to impose a general duty on owners and operators to operate a safe facility free of accidental releases that threaten life or property by taking all feasible actions that are available to reduce hazards which are known to exist at the facility or which have been identified for similar facilities in the same industrial group. S. Rep. No. 228, 101st Cong., 1st Sess. 208 (1989).

6. Specifically, Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1), sets forth that owners and operators of stationary sources producing, processing, handling or storing substances listed pursuant to Section 112(r)(3), 42 U.S.C. § 7412(r)(3), or any other extremely hazardous substance, have a general duty in the same manner and the same extent as the Occupational Safety and Health Act, 29 U.S.C. § 654 *et. seq.*, to identify hazards which may result from accidental releases using appropriate hazard assessment techniques, to design and maintain a safe facility, taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur.

7. Pursuant to Section 112(r)(3), 42 U.S.C. § 7412(r)(3), EPA promulgated a list of substances, which in the case of an accidental release, are known to cause or may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment. This list is codified at 40 C.F.R. § 68.130.

8. Section 302(e) of the CAA, 42 U.S.C. § 7602(e), defines “person” to include any individual, corporation, partnership, association, State, municipality, political subdivision of a State, and any agency department, or instrumentality of the United States and any officer, agent, or employee thereof.

9. Section 112(r)(2)(C) of the CAA, 42 U.S.C. § 7412(r)(2)(C), defines “stationary source” as any buildings, structures, equipment, installations or substance-emitting stationary activities which belong to the same industrial group, which are located on one or more contiguous properties, which are under the control of the same person (or persons under common control), and from which an accidental release may occur.

10. Section 112(r)(2)(B) of the CAA, 42 U.S.C. § 7412(r)(2)(B), defines “regulated substance” as a substance listed pursuant to Section 112(r)(3) of the CAA, 42 U.S.C. § 7412(r)(3).

11. Section 112(r)(2)(A) of the CAA, 42 U.S.C. § 7412(r)(2)(A), and 40 C.F.R. § 68.3 define “accidental release” as an unanticipated emission of a regulated substance or other extremely hazardous substance into the ambient air from a stationary source.

12. Section 113(a)(3) of the CAA, 42 U.S.C. § 7413(a)(3), grants the Administrator the authority to make a finding of violation of a requirement or prohibition of Title I, which includes Section 112(r), and upon such a finding, to issue an order requiring a person to comply with such requirement or prohibition.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

13. Respondent is, and at all times referred to herein was, a “person” as defined by Section 302(e) of the CAA, 42 U.S.C. § 7602(e).

14. Respondent is the owner or operator of the biogas production facility located at 1616 D Avenue, Dakota City, Nebraska (the “Facility”).

15. The Facility is a “stationary source” as defined by Section 112(r)(2)(C) of the CAA, 42 U.S.C. § 7412(r)(2)(C).

16. Respondent operates biodigester systems at the Facility that process biomass waste streams to produce biogas. At certain points in the production process, the biogas produced contains a mixture of methane, hydrogen sulfide, and carbon dioxide. As a result, Respondent produces, processes, handles and/or stores biogas, methane and hydrogen sulfide at the Facility.

17. Biogas is a flammable mixture of 50-80% methane, 20-50% carbon dioxide, and water vapor with small quantities of hydrogen sulfide and other gas.

18. Methane is a colorless odorless gas. It is easily ignited. The vapors are lighter than air. Under prolonged exposure to fire or intense heat, containers of methane may rupture violently and rocket. It is used in making other chemicals and as a constituent of the fuel, natural gas. It has a lower explosive limit (“LEL”) of 5.0%. It is a National Fire Protection Association 704 classification 4 (the highest possible classification) substance that burns readily and rapidly or completely vaporizes at atmospheric pressure and normal ambient temperature.

19. Hydrogen Sulfide (H₂S) is a colorless gas having a strong odor of rotten eggs that is very toxic by inhalation. H₂S fatigues the sense of smell, which cannot be counted on to warn of the continued presence of the gas. Prolonged exposure of closed containers to heat may result in their violent rupturing and rocketing. It has an LEL of 4.3%. The level at which it is immediately dangerous to health and life (“IDLH”) is 100 parts per million (“ppm”). It has National Fire Protection Association 704 classifications of 4 (the highest possible classification) for both toxicity and flammability.

20. Biogas, methane, and hydrogen sulfide are regulated substances and/or extremely hazardous substances pursuant to Section 112(r)(2)(B) of the CAA, 42 U.S.C. § 7412(r)(2)(B).

21. Respondent is subject to the requirements of Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1), because it is the owner and operator of a stationary source that is producing, processing, handling or storing substances listed pursuant to Section 112(r)(3), 42 U.S.C. § 7412(r)(3) and/or extremely hazardous substances pursuant to Section 112(r)(2)(B) of the CAA, 42 U.S.C. § 7412(r)(2)(B).

22. On July 3, 2018, EPA issued a Clean Air Act Section 114 Information Request to Big Ox. The Information Request asked for process flow diagrams, P&IDs and equipment layouts for the facility. (7/3/18 Information Request, Question 2). The Information Request asked Big Ox to identify and describe how all gas streams are monitored for total reduced sulfur and/or hydrogen sulfide. This included all emissions via vents, pressure relief valves and stacks. (7/3/18 Information Request, Question 3). The Information Request also asked for all periods when anaerobic digestion biogas has been emitted directly to the atmosphere since the facility began operation. (7/3/18 Information Request, Question 16).

23. On October 10, 2018, the Nebraska Department of Environmental Quality conducted an inspection. The NDEQ found that Big Ox was using a straight pipe to bypass the flare and vent biogas directly into the atmosphere.

24. On November 7, 2018, the NDEQ issued Big Ox a notice of violation stating that Big Ox failed to seek a permit for the flare bypass.

25. On November 12-13, 2018, EPA conducted an inspection. EPA noted the flare bypass exhaust on the north part of the gas skid, approximately 10 feet off the ground and under a larger biogas pipe. The vent line was open, with a steel blind hanging from the bottom two bolts of the end flange. EPA asked a Big Ox gas skid operator how the vent line was utilized. A Big Ox employee told EPA that when the gas skid starts, it needs a certain pressure in the stripper column, and to achieve this pressure, the flare bypass must be opened. EPA asked if a standard operating procedure (SOP) had been established relating to the flare bypass exhaust. The operator responded affirmatively, but said that he did not have the SOP available at that time. A handwritten log was kept by Big Ox gas skid operators that showed time periods, dates, and biogas parameters at times when the flare bypass exhaust was utilized. The first entry in the log was dated September 12, 2018. The EPA inspector observed that more than twenty (20) occurrences of use of the bypass appeared to have been logged.

26. The inspector issued a Notice of Potential Violation during the inspection for failure to design and maintain a safe facility by not maintaining “as-built” drawings, having no formalized management of change program, not preventing exposure of employee to hydrogen sulfide, and not controlling methane and hydrogen sulfide in and outside of the receiving bay as required by Section 112(r)(1) of the CAA.

27. Recognized and generally accepted engineering practices call for venting to a safe location. These include but are not limited to the following:

- a. The 2006 International Fuel Gas Code section 416.5.5 Vents states, “The discharge stacks, vents and outlet parts of all pressure-relieving and pressure-limiting devices shall be located so that gas is safely discharged to the outdoors”;
- b. The American National Standards Institute / American Petroleum Institute Standard 521 Pressure-relieving and Depressuring Systems Section 4.4 Recommended minimum relief system design content states “...bellows vent to safe location...”;
- c. The American Petroleum Institute Standard 2000 Venting Atmospheric and Low-Pressure Storage Tanks Nonrefrigerated and Refrigerated Section 4.5.3.1 states that “Discharge piping from the relief devices or common discharge headers shall be installed to: a. Lead to a safe location” and
- d. The American Petroleum Institute Standard 520, Part I Sizing, Selection, and Installation of Pressure-Relieving Devices— Part I—Sizing and Selection section 2.2.1.3.2 states “...If the valve is located where atmospheric venting

would present a hazard or is not permitted by environmental regulations, the vent should be piped to a safe location...”.

28. EPA used Areal Locations of Hazardous Atmospheres (ALOHA[®]) to analyze potential risk of the use of this flare bypass. EPA used the National Oceanic and Atmospheric Administration weather data for 12/18/2018 at Sioux City, Sioux Gateway Airport, and the data received from Big Ox August 2, 2018, in response to a July 3, 2018, CAA section 114 information request.

29. The dry media scrubber and biogas cleanup skid are specified to process 1600 standard cubic feet per minute (“SCFM”) of biogas flow at 2300 ppm H₂S concentration (incoming biogas). A concentration of 2300 ppm H₂S is equivalent to 0.23% of the biogas by volume and 3.68 SCFM based on 1600 SCFM. Methane is about 70% of this stream (1120 SCFM). EPA used a 15-minute release time from recollection of the average release time seen documented during the November inspection. Using these inputs in the ALOHA model resulted in a 48-yard zone where H₂S concentrations of above 100 ppm (the IDLH) may be present and 44-yard zone where the LEL of methane (5%) may be present. The 48 and 44-yard zones encompass the road to the facility, but no other off-site receptors. Both zones encompass the gas skid control room with an operator present during operation of the gas skid. This analysis shows that the flare bypass does not vent to a “safe location” as required by industry standards.

30. On December 19, 2018, EPA sent email correspondence to Big Ox stating that a plan to address the unpermitted flare bypass should be submitted to EPA by January 7, 2019.

31. To date, Big Ox has not submitted a permit revision to NDEQ.

32. To date, Big Ox has not submitted a plan to EPA to address the unpermitted flare bypass.

33. On January 28, 2019, EPA received notification from NDEQ that there was a digester overflow event on January 25, 2019. The estimated release was approximately 60,000-80,000 gallons of material. This follows a foaming event that occurred from May 31, 2018 to June 13, 2018 that released approximately 500,000 gallons of material. The root cause analysis of the May 2018 event demonstrated that the digester mixers were not operational or not being properly maintained. The State noted that H₂S and methane were released in the 2018 overflow event. Because the digester overflows in January 2019 and May 2018 are similar events, EPA believes that biogas, including methane and H₂S, was released during both the May 2018 and January 28, 2019, digester overflows.

34. Big Ox recognized the hazard of anaerobic digester overflow in its May 4, 2017, hazard analysis document, provided to EPA, and identified controls, including supervisory control and data acquisition system monitoring. Big Ox has not indicated whether this system was used or online during the January 2019 digester overflow event.

35. Multiple documents from various sources, including industry groups, have examined the control of anaerobic digester overflow and foaming and concluded that overflows of this nature can be avoided or greatly reduced in a properly designed and maintained digester. These include but are not limited to the following:

- a. Design and Operational Considerations to Avoid Excessive Anaerobic Digester Foaming, by Neil Massart of Black & Veatch, Robert Bates of Louisville and Jefferson County Metropolitan Sewer District, Blair Corning, of South Adams County Water and Sanitation District, and Gary Neun of Black & Veatch, 2006 Water Environment Federation's Annual Technical Exhibition and Conference
- b. The effect of organic loading rate on foam initiation during mesophilic anaerobic digestion of municipal wastewater sludge, by Nafsika Ganidi, Sean Tyrrel, Elise Cartmell, Bioresource Technology 102 (2011) 6637–6643
- c. Digester Foaming Problems and Solutions by Tom Wilson, Ph. D., BCEE May 15, 2013 presentation, given at a Central States Water Environment Association
- d. Anaerobic Digestion and Co-Digestion Optimization, by Todd Williams, PE, BCEE and Tim Shea, PE, PhD, BCEE of CH2M HILL, Inc presentation, at the Ohio Water Environment Association Biosolids Conference in Columbus, OH, December 5, 2013
- e. Anaerobic digester foaming in full-scale cylindrical digesters – Effects of organic loading rate, feed characteristics, and mixing by Bhargavi Subramanian, by Krishna R. Pagilla, of the Department of Civil, Architectural, and Environmental Engineering, Illinois Institute of Technology, Chicago, IL 60616, USA, Bioresource Technology 159 (2014) 182–192
- f. Design of the Bio-digester for Biogas Production: A Review by Ishmael M Ramatsa, Esther T. Akinlabi, Daniel M. Madyira, Robert Huberts in the Proceedings of the World Congress on Engineering and Computer Science 2014 Vol II, WCECS 2014, 22-24, October 2014, San Francisco, USA
- g. Foam formation in a downstream digester of a cascade running full-scale biogas plant: Influence of fat, oil and grease addition and abundance of the filamentous bacterium, by Microthrix parvicella T. Lienen, A. Kleyböcker, W. Verstraete, H. Würdemann Bioresource Technology 153 (2014) 1–7
- h. Digester Overflows Causes, Control Measures, and A Case Study, by Timothy G. Shea, Ph.D., PE, BCEE, of Dewberry, presented at the 2017 VWEA Education Seminar on May 11, 2017.

36. The unanticipated emission of methane, H₂S, and/or biogas into ambient air from the facility constitutes an accidental release as defined by Section 112(r)(2)(a) of the CAA, 42 U.S.C. § 7412(r)(2)(A).

37. To date, Big Ox has failed to design and maintain a safe facility as it produces, processes, handles, and/or stores hydrogen sulfide, methane, and biogas to avoid overflows and bypass events that may result in toxic, flammable, or explosive conditions.

FINDINGS OF VIOLATIONS

38. The facts stated in Paragraphs 1 through 37 above are herein incorporated.

39. Based on the information available to EPA, EPA has determined that Respondent failed to comply with its general duty, pursuant to Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1), and such failure is a violation of Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1).

ORDER FOR COMPLIANCE

40. Based upon the Findings of Fact and Conclusion of Law, and Findings of Violations set forth above, and pursuant to the authority of Section 113(a)(3)(B) of the CAA, 42 U.S.C. § 7413(a)(3)(B), Respondent is hereby ORDERED to take the actions described below.

41. Respondent shall take whatever actions are necessary to correct the violations cited above and comply with the requirements of Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1), in order to prevent any further releases of hydrogen sulfide, methane or biogas from the flare bypass and the digesters, and to minimize the consequences of any release that does occur.

42. *Compliance Plan.* Within five (5) days of the effective date of this Order, Respondent must submit a plan describing how the facility intends to comply with the obligations of CAA § 112(r)(1). The plan must specifically describe how Respondent plans to alter the design and maintenance of the Facility to be safe, specifically as relates to the unpermitted flare bypass and the digester cited above. It must also describe the measures the facility is taking to prevent further releases. EPA will review and may provide comments on the plan. Respondent shall complete implementation of all corrective measures no later than fifteen (15) days after the effective date of this Order, unless EPA approves a written request for extension.

43. Respondent must provide documentation of completion of these compliance actions to EPA within thirty (30) days of the effective date of this Order. All documentation shall be submitted as directed below.

Submissions

44. All submissions to EPA required by this Order shall contain the following certification signed by an officer of the Respondent:

I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment. (Signature)

45. All submissions to EPA required by this Order shall be sent to:

Dave Hensley
Chemical & Oil Release Prevention Branch
United States Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219.

46. All documents submitted by Respondent to EPA in the course of implementing this Order shall be available to the public unless identified as confidential by Respondent pursuant to 40 C.F.R. Part 2, Subpart B, and determined by EPA to merit treatment as confidential business information in accordance with applicable law.

General Provisions

47. Any violation of this Order may result in a judicial action for an injunction or civil penalties of up to \$97,229 per day per violation, or civil administrative action for penalties of up to \$46,192 per day per violation, or both, as provided in Sections 113(b)(2) and 113(d)(1) of the Act, 42 U.S.C. §§ 7413(b)(2) and 7413(d)(1) (respectively), as well as criminal sanctions as provided in Section 113(c) of the Act, 42 U.S.C. § 7413(c). The EPA may use any information submitted under this Order in an administrative, civil, or criminal action.

48. Nothing in this Order shall relieve Respondent of the duty to comply with all applicable provisions of the Act or other federal, state or local laws or statutes, nor shall it restrict the EPA's authority to seek compliance with any applicable laws or regulations, nor shall it be construed to be a ruling on, or a determination of, any issue related to any federal, state, or local permit.

49. Nothing herein shall be construed to limit the power of the EPA to undertake any action against Respondent or any person in response to conditions that may present an imminent and substantial endangerment to the public health, welfare, or the environment.

50. The provisions of this Order shall apply to and be binding upon Respondent and its officers, directors, employees, agents, trustees, servants, authorized representatives, successors, and assigns. From the Effective Date of this Order until the Termination Date as set out in Paragraph 54, below, Respondent must give written notice and a copy of this Order to any successors in interest prior to any transfer of ownership or control of any portion of or interest in the Big Ox Energy—Siouxland facility. Simultaneously with such notice, Respondent shall

provide written notice of such transfer, assignment, or delegation to EPA. In the event of any such transfer, assignment or delegation, Respondent shall not be released from the obligations or liabilities of this Order unless the EPA has provided written approval of the release of said obligations or liabilities.

51. Nothing in this Order shall limit EPA’s right to obtain access to, and/or inspect the Facility, and/or to request additional information from Respondent pursuant to the authority of Section 114 of the CAA, 42 U.S.C. § 7414.

52. Unless otherwise stated, all time periods stated herein shall be calculated in calendar days from such date.

Judicial Review

53. Respondent may seek federal judicial review of this Order pursuant to Section 307(b)(1) of the CAA, 42 U.S.C. § 7607(b)(1).

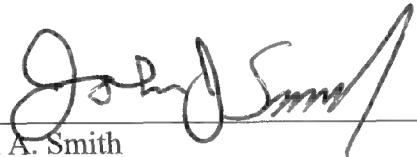
Termination

54. This Order shall terminate on the earlier of the following (the “Termination Date”); at which point Respondent shall operate in compliance with the Act:

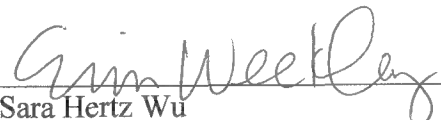
- a. one year after the Effective Date of this Order;
- b. the effective date of any determination by the EPA that Respondent has achieved compliance with all the terms of this Order; or
- c. immediately upon receipt by Respondent of notice from the EPA finding that an imminent and substantial endangerment to public health, welfare, or the environment has occurred.

U.S. ENVIRONMENTAL PROTECTION AGENCY

Date: 2/12/19

for 

Mark A. Smith
Director
Air and Waste Management Division
U.S. Environmental Protection Agency, Region 7

for 

Sara Hertz Wu
Senior Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 7

CERTIFICATE OF SERVICE

I certify that on the date noted below I hand delivered the original and one true copy of this Administrative Order for Compliance to the Regional Hearing Clerk, United States Environmental Protection Agency, Region 7, 11201 Renner Boulevard, Lenexa, Kansas 66219.

I further certify that on the date noted below, I sent by certified mail, return receipt requested, a true and correct copy of the signed original Order for Compliance, to:

Northwest Registered Agent Service, Inc.
Big Ox Energy – Siouxland, LLC
530 S. 13th Street, Suite 100
Lincoln, Nebraska 68508


Name

2/12/19
Date