

STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF

NORDIC AQUAFARMS, INC

Belfast and Northport
Waldo County, Maine

A-1146-71-A-N
L-28319-26-A-N
L-28319-TG-B-N
L-28319-4E-C-N
L-28319-L6-D-N
L-28319-TW-E-N
W-009200-6F-A-N

) APPLICATION FOR AIR EMISSION, SITE
) LOCATION OF DEVELOPMENT,
) NATURAL RESOURCES PROTECTION
) ACT, and MAINE POLLUTANT
) DISCHARGE ELIMINATION
) SYSTEM/WASTE DISCHARGE LICENSES
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PRE-FILED WRITTEN TESTIMONY OF MICHAEL LANNAN

1. I am Michael Lannan, an environmental engineer with experience in all aspects of air quality management, including air permitting, compliance assessments, control technology evaluations and air pollution control designs, dispersion modeling and air monitoring. I have provided air quality, odor control, noise abatement, and dust solutions for municipalities, industries, and government agencies since during my co-operative education days at Northeastern University three decades ago when I was working for a large engineering firm in the air quality group of their planning and permitting division (See Addendum A).

2. This is my 18th year at Tech Environmental, and I have been the president of Tech Environmental for the past five years. Tech Environmental is a consulting firm that specializes in helping facilities, neighbors of facilities, and regulators navigate the permitting process with respect to environmental concerns, and with a special emphasis on nuisance potential. Tech Environmental has offices on Front Street in Belfast, in Waitsfield, Vermont, and in Waltham, Massachusetts.

3. Tech Environmental was retained by Upstream Watch to perform technical reviews of Nordic Aquafarms’ Site Law of Development Act (SLODA) and Chapter 115 Minor New Source applications, specific to federal, state, and local permitting concerns of air, noise, odor, traffic, and solid waste.

4. Between October 2019 and January 2020, Tech Environmental was contracted to review several hundred pages of Nordic Aquafarms’ application materials and responses to Requests for Information (RFIs), perform emissions estimates of the proposed Nordic Aquafarms construction and operations for the Clean Air Act’s (CAA) criteria pollutants, perform dispersion modeling for the criteria pollutants, evaluate the specifications for the Caterpillar 3516C specified engines for emissions performance, review Nordic Aquafarm’s Best Available Control Technology (BACT) analysis in their Chapter 115 application, and review Maine Department of Environmental Protection’s (MaineDEP’s) dispersion modeling.

SLODA Application Section 21 – Air Emissions

5. The focus for this testimony centers on the review of Nordic Aquafarms' Chapter 115 application. However, before one can review the specific application, one must examine the full air permitting requirements to determine whether the application, as submitted, includes all the project air permitting concerns that may be related to this application.
6. The proponent has accepted that it triggers air permitting thresholds by submitting a Chapter 115 air application.
7. Nordic Aquafarms has the potential to emit a major source of air pollution, or possibly even a PSD source based upon the application emissions, without a synthetic minor. This is an important understanding that is discussed throughout this testimony.
8. Nordic Aquafarms has elected to restrict emissions to qualify for the Chapter 115 application process by proposing a synthetic minor. What does this mean? It means that if it can restrict its potential to emit to below the major source thresholds then it can be considered a synthetic minor source. It does not become a true minor source, but it qualifies for the general permitting pathway of a minor source nevertheless.
9. The facility cannot further restrict its operations to require no permitting because it exceeds at least one the four criteria in 06-096 Chapter 115(1)(B)(2)(a) of 10 MMBTU/hr (See Exhibit 13-A). The proposed power capacity is several times the minimum minor source permitting threshold, so this is not a small "minor" source.
10. Please note that there is a distinct difference between what size or type of emission source is considered in 06-096 Chapter 115(1)(B)(2) for establishing the permitting threshold assessment and the actual permitting requirements once the permitting threshold has been established. As described in Chapter 115(1)(B), "Once a source requires an air emission license, all emissions units which emit regulated pollutants at the source must be included in the license..." with some exceptions provided in Appendix B (See Exhibit 13-A).
11. The SLODA permitting requirements, if followed properly, should identify all emission sources, so that one may determine whether the individual emission units identified are included or excluded as per Appendix B (See Exhibit 13-A).
12. The synthetic minor proposed will restrict hours of operation via a maximum fuel usage. The fuel usage will be 900,000 gallons per year (See Exhibit 13-D). The bulk storage facility permitting exemption threshold in Section 1(C) of Chapter 115 (See Exhibit 13-A) is 39,000 gallons or the project is subject to 06-096 CMR 111 and must include the required information in the Chapter 115 Application. The tank size and location has not been provided. The application says TBD but estimates 25,000 gallons; however, that is simply too small as it would only provide about 24 hours of operations. If there is a storm and no fuel can be delivered, then their entire plant would be shut down. It is typically acceptable to have at least a long-weekend's worth of fuel, or more desirably a week's worth of fuel storage on-site. Based upon their application, this would equate to about 160,000 gallons. The application cannot be processed further without the tank capacities and specifications. An improperly

sized tank could very well be a fatal flaw in the entire emergency operations process. Essentially, the tank must exceed the permitting threshold or after about 40 hours the fuel will be completely exhausted, and therefore the storage tank is an air permitted source. No such information has been provided in Section G of the Chapter 115 permit application form (See Exhibit 13-E), as required.

13. Similarly, all HVAC process equipment that will be used to remove regulated pollutants (odor/hydrogen sulfide), is not exempt (See Appendix B(A)(9) of Exhibit 13-A). All of the HVAC equipment should be included in Section E of the Chapter 115 permit application form for stack data and either in Section D or Section H for hydrogen sulfide (Exhibit 13-E). While one may think that the hydrogen sulfide emission rate may be very low, at 200,000 pounds of fillet a day and 7.7 million gallons of wastewater discharged and even more being continually cleaned, it is extremely likely that a facility of this size will trigger the very low 200 pound reporting threshold (Exhibit 13-A). These items must be included in the application.

14. According to Part II, Section 21 of MaineDEP's Site Location of Development 38 M.R.S.A SS 481-490 permit application guidance (Exhibit 13-B), the minimum submissions required to satisfy Section 21 of the SLODA application include providing "a narrative identifying all point source and non-point source air emissions deriving from the development, including but not limited to stacks, unpaved roads or areas and vehicular traffic. For point sources, include a summary of emission components showing types and amounts of particulate matter (particles) and gaseous components." This narrative and these calculations should have been provided and included well before a determination could be made that a Chapter 115 synthetic minor application was possible.

15. Review of Section 21 of Nordic Aquafarms SLODA application found that the proponent provided a half-page of text for the discussion portion of the Section (See Exhibit 13-C). The entire text reads:

Nordic Aquafarms plans to construct a central utilities plant that will provide electrical and heating to its proposed aquaculture facility. The proposed fuel burning equipment is regulated by Maine Department of Environmental Protection Chapter 115. Plant electrical needs will mainly be supplied by the local utility; however, Nordic Aquafarms will supplement this with a 14 MW reciprocating engine bank, consisting of eight 2-MW Diesel Engines (one will serve as a back-up). Potential combustion related air emissions will be limited by fuel usage caps to ensure that potential emissions remain below the "major" source thresholds.

The proposed engine sets that will each meet manufacturer mandated Tier 4 standards using state-of-the-art air pollution controls, which include Selective Catalytic Reduction, Oxidation Catalyst, and a Particulate Filter. The proposed boilers will be small package units fueled by inherently clean burning propane gas.

*An application for a New "Minor" Source Air Emission License has been prepared and is included as **Appendix 21-A**.*

*Additionally, Nordic Aquafarms will be subject to Standard Condition 4, which addresses ongoing fugitive dust. This condition is written into every Chapter 115 license issued by the Bureau of Air Quality. Included as **Appendix 21-B** is a fugitive dust standard operating practice (SOP) developed to comply with this standard.*

16. The requirement to identify all point sources is not satisfied by the Section 21 text.
17. The requirement to identify all non-point sources is not satisfied by the Section 21 text.
18. The requirement to include gaseous and particulate emission amounts is not satisfied by the Section 21 text.
19. The Minor New Source Air Emission License application (See Exhibit 13-D) and corresponding Air Emission License Application form (See Exhibit 13-E) in Appendix 21-A of the SLODA application provide the only information pertaining to the eight generators and corresponding gaseous emission components.
20. The SLODA air quality section does not include a general discussion of all emission sources and whether they are excluded or included with respect to Chapter 1115, Appendix B. If it had there would be no need to include it in the Chapter 115 license application. Since it was not, this discussion must be included in the Chapter 115 application or the air permit application is incomplete.
21. Although Nordic Aquafarms has elected to take an operating restriction to be a synthetic minor source, this does not change the facility's obligations to demonstrate their ability to comply with the CAA.
22. The proposed fuel restriction only reduces the facility's major source potential impacts with respect to long-term impact criteria, but does not address the facility's major source potential impacts with respect to short-term impact criteria, or short-term criteria with averaging periods that extend over multiple years.
23. The Minor New Source License application (See Exhibit 13-D) and Air Emissions License Application Form (See Exhibit 13-E) do not propose any testing, monitoring, recordkeeping and reporting that would be used to demonstrate and assure compliance with their fuel restrictions.
24. The Minor New Source License application identifies the eight proposed engines as Caterpillar 3516C Tier 4F or equivalent (See Exhibit 13-D).
25. Table 2-1 of the application presents emission factors of 0.79 pounds per million british thermal units (lbs/MMbtu) for NO_x (See Exhibit 13-D).
26. The Minor New Source License Application (See Exhibit 13-D) and Air Emission License Application Form (See Exhibit 13-E) does not provide any information pertaining to the boilers mentioned in the Section 21 text.
27. The Air Emission License Application Form (See Exhibit 13-E), presents in Section E proposed stack heights of 45 feet above ground level (AGL).
28. The Air Emission License Application Form (See Exhibit 13-E), presents in Section E an exit temperature of 490 Fahrenheit (F).

29. The Air Emission License Application Form (See Exhibit 13-E), presents in Section E an exhaust flow rate of 15,000 actual cubic feet per minute (acfm).

30. Per the requirements of Section 590(2) of Title 38 (See Exhibit 13-F), pertaining to applications for air emission licenses, states that *the department shall grant the license and may impose appropriate and reasonable conditions as necessary to secure compliance with ambient air quality standards if the department finds that the proposed emission will: A. Receive the best practical treatment; B. Not violate or be controlled so as not to violate applicable emission standards; and C. Either alone or in conjunction with existing emissions, not violate or be controlled so as not to violate applicable ambient air quality standards.*

31. The Minor New Source License application (See Exhibit 13-D) and Air Emissions License Application Form (See Exhibit 13-E) do not make any statement pertaining to the facility's ability to comply with the CAA or the National Ambient Air Quality Standards (NAAQS).

32. Subpart B in Section 3 of MaineDEP's Site Location of Development 38 M.R.S.A SS 481-490 permit application guidance (Exhibit 13-B), pertaining to the SLODA application review, states: *in review of an application, the burden is on the applicant to prove that the development will not have an adverse environmental impact. It is not up to the department to prove that a development will have an adverse environmental impact.*

33. The SLODA application (See Exhibit 13-C) and attached Minor New Source License application (See Exhibit 13-D) and Air Emissions License Application Form (See Exhibit 13-E) do not prove that the development will not have an adverse environmental impact on air quality.

Response to July 18, 2019 RFI (Exhibit 13-G)

34. On August 14, 2019, three months after the SLODA and Minor New Source License applications were submitted, Nordic Aquafarms provided new elevation drawings depicting rooftop penthouses that are between 10 and 15 feet above previously-discussed rooftop heights (See Exhibit 13-G).

35. Attachment F of the response to the July 18, 2019 RFI provides the elevation drawings with rooftop penthouses (See Exhibit 13-G).

- The top of the penthouse on Building 1 is 45 feet AGL
- The top of the penthouse on Building 2 is 45 feet AGL.
- Although the height is not provided, using the scale, it is evident that the top of the penthouse on Building 3 is approximately 36 feet AGL.
- Although the height is not provided, using the scale, it is evident that the top of the penthouse on Building 4 is approximately 48 feet AGL.
- Elevation data was not provided for Building 6.

November 19, 2019 Response to November 8, 2019 Comments (Exhibit 13-H)

36. On November 19, 2019, six months after the SLODA and Minor New Source License applications were submitted, in response to an RFI from MaineDEP, Nordic Aquafarms provided entirely new stack parameters, emissions data, exhaust data, and building dimensions (See Exhibit 13-H).

37. Comment 4 reads: *A scaled plot plan schematic of the facility that shows the following:*

- a. the location of all stacks, buildings, and other structures (e.g., tanks, towers, etc.);*
- b. the base elevation and height above ground level for each stack, building and other structure;*
- c. a north arrow;*
- d. an accurate scale ruler;*
- e. the facility property boundary; and*
- f. any areas likely to be fenced surrounding the facility.*

38. Nordic Aquafarms' response to Comment 4 reads: *A scaled plot plan schematic which shows each of these items is attached as Attachment A.*

- The scaled plot plan presents a height of 33 - 37 feet AGL for Building 1. The height presented here is 8 to 12 feet shorter than the top of the penthouse discussed in the application.
- The scaled plot plan presents a height of 34.5 feet AGL for Building 2. The height presented here is 10.5 feet shorter than the top of the penthouse discussed in Item 30.
- The scaled plot plan presents a height of 31 feet AGL for Building 3. The height presented here is approximately 5 feet shorter than that presented in Item 31.
- The scaled plot plan only presents a height for Building 5, and not for Building 4.
- The scaled plot plan now suggests four chimneys that will each encompass two stacks.
- The scaled plot plan does not present any areas that are likely to be fenced, as requested in Comment 4. Only a property line is provided.

39. Building downwash is affected by any rooftop structures, so mechanical penthouses need to be considered to determine impacts to air quality.

40. Comment 1 reads: *A complete listing of all stationary fuel burning equipment to be installed on-site, including the type of equipment, maximum rated heat input capacity of each unit, and the type and quantity of fuel burned in each unit.*

41. Nordic Aquafarms' response to Comment 1 reads: *All stationary heaters will be electric and will not emit air pollutants. Nordic understands that we mention in the SLODA application that there could be propane heaters, but our intention now is to only install electric heater other than*

the eight diesel engines. Heat pumps, using excess heat from the fish farm water, will provide the majority of process and space heating.

42. Nordic Aquafarms response to Comment 1 changes one of the few pieces of information that was provided in the Section 21 text of the SLODA application.

43. MaineDEP's Comment 2 requested: *Unique identification of each stack and which unit or units exhaust through it, and maximum volumetric flow rate and exhaust temperature from each stack.*

44. Nordic Aquafarms response to Comment 2 reads: *There will be eight identical stacks installed to serve the eight engines. Provided below are the stack parameters requested along with updated short term and annual emission rates for the engines. Caterpillar has provided us with refined emission factors. This detail documents significantly lower NO_x emissions.*

45. In response to Comment 2, the proposed generators are now proposed to have an exhaust temperature of 375 F. The temperature presented herein is 115 degrees F less than the temperature discussed in the application.

46. In response to Comment 2, the proposed generators are now proposed to have an exhaust flow rate of 16,586 acfm. The exhaust rate presented herein is 1,586 acfm more than the exhaust flow rate discussed in the application.

47. In response to Comment 2, the proposed generators are now proposed to have a NO_x emission factor of 0.21 lbs/MMbtu. The NO_x emission factor presented in the application of 0.58 lbs/MMbtu, is more than double the NO_x emission factor now proposed. Previously, a general assumption was made, but now every bit of flexibility in the emission factor has been removed.

48. In response to Comment 3, the proposed generators are now proposed to have a stack height of 67.5 feet. The stack height presented here is 22.5 feet, or 50%, higher than the stack height discussed in the application.

49. These changes have impacts that ripple through the original BACT analysis in the Minor New Source License application, the facility's dispersion characteristics, the visual impact analysis, the noise analysis, to name a few. None of which have been updated in the SLODA or Minor New Source License applications to represent these changes.

50. If not every, then nearly every, piece of information submitted in Section 21 of the SLODA application is out-of-date. Although specific modeling parameters were requested and provided, the changes that resulted differ greatly from those presented in the application forms (Exhibit 13-E). Similarly the text, tables, and discussion in the air permit application have significantly changed.

51. In Section 2(D) of Chapter 115 (See Exhibit 13-A) it reads: *After an application has been filed, if the Department determines that the applicant submits significant new or additional*

information or substantially modifies its application at any time after acceptance of the application as complete, the applicant shall provide additional notice to interested persons who have commented on that application. The Department may also require additional public notice and may extend the time to submit requests for a public hearing or for the Board to assume jurisdiction.

52. On November 19, 2019 the entire Chapter 115 application was changed. This action should have required Nordic Aquafarms to submit a new application, which should have then given the public the opportunity to learn of these changes, and comment on these changes. Yet no such process occurred.

Caterpillar-Provided 3516C Tier 4F Generator and Clean Emissions Module Specifications

53. On December 16, 2019, Tech Environmental received specifications from MiltonCat for the Caterpillar 3516C Tier 4F generators (Exhibits I and J) that are specified as the generators, or equal, that will be used at the proposed Nordic Aquafarms facility.

54. The 3516C Tier 4F specifications include the Clean Emissions Module (CEM) that contains a selective catalytic reduction (SCR) catalyst with diesel exhaust fluid (DEF) injection, an ammonia oxidation catalyst (AMOX), and a diesel oxidation catalyst (DOC).

55. These control technologies and engine model match those proposed in Nordic Aquafarms Minor New Source application as equals.

56. Nearly every piece of information submitted in the Minor New Source License application (Exhibit 13-D) and the Air Emission License Application Form (Exhibit 13-E) are out-of-date. The Form, which was originally very vague to begin with, is no longer even remotely complete. If time had been spent to update the forms correctly, maybe some of the errors or omissions made when providing the data to MaineDEP for modeling might not have occurred.

57. The 3516C specifications provide an "Engine Outlet Wet Exhaust Gas Volumetric Flow Rate" of 16,301.3 cubic feet per minute (cfm) at an "Engine Outlet Temp" of 920.6 F (See Exhibit 13-I).

58. The original proposed exhaust flow rate of 15,000 acfm at 490 F (See Exhibit 13-E)), and the recently proposed exhaust flow rate of 16,586 acfm at 375 F (See Exhibit 13-H) are in conflict with the manufacturer-specified 16,301.3 cfm flow rate at 920.6 F (See Exhibit 13-I).

59. Using this engine and these air pollution controls, and then using heat recovery to reduce the exhaust temperature to 375 F, the actual exhaust flow rate is approximately 10,000 cfm, not 16,586 cfm. This essentially means that the previous model runs artificially diluted the emissions, lessening the actual results.

60. If Section B2 of the forms (Exhibit 13-E) had been updated as well, the maximum allowable power rating may have been examined in more detail. Under Ratings Definitions of the 3516C diesel generator set specifications (See Exhibit 13-J), the mission critical rating limits peak demand operation of 100% of rated power for no more than 5% of the operating time. Average power output must be 85% of mission critical rating.

61. Operating at 85% load is a reasonable condition for preventing unnecessary wear on the generators. For the same reason that vehicles have a redline on their tachometers to indicate to the driver not to maintain a high revolutions per minute (rpm) operation for an extended period, a generator is also not meant to be operated at its redline. It is not sustainable without irreparable damage to parts caused by overheating, which will cause increased emissions.

62. At 85% load, the facility's proposed 14 MW of peak shaving capability, would only equate to 11.9 MW.

63. It is reasonable to assume that the facility will use all eight generators at 85% (including the generator that is proposed for back-up use), when their electricity demands must require at least 12 MW or they would have only proposed six duty engines, and two standby engines to meet their minimum requirements.

64. The potential to emit must be evaluated at eight engines running at 100% or there must be specific operating restrictions proposed to meet their 14 MW of power at a loading of less than 100%.

MaineDEP Dispersion Modeling Summary

65. MaineDEP provided to Tech Environmental the air dispersion modeling files used to determine whether Nordic Aquafarms could comply with the NAAQS, using the modified emissions and stack parameters discussed in Items 34 through 53.

66. The analysis used AERMOD version 19191; 1988 through 1992 surface meteorological data from Bucksport, Maine and upper air meteorological data from Gray, Maine; rural land use, and incorporated downwash effects from buildings (See Exhibit 13-K).

67. The EPA's Tier II Ambient Ratio Method (ARM2) minimum and maximum nitrogen oxides (NO_x) to nitrogen dioxide (NO₂) conversion ratios of 0.5 and 0.9 were used.

68. The analysis incorporated the hourly NO₂ modeled facility impacts to 2016/2017 ambient background concentrations from Presque Isle of 39 micrograms per cubic meter (µg/m³).

69. Unfortunately, the inconsistent information provided by Nordic Aquafarms made this exercise especially tedious and susceptible to errors. A dispersion modeling analysis is only as accurate as the facility data that is provided.

70. The modeling used a flow rate of 16,586 cfm at a temperature of 375 F.

71. Based on Caterpillar-provided specifications for the same engine and control technologies, this is not representative of the actual flow rate at a temperature of 375 F. The reduction of volume from the loss of heat would reduce the flow rate to approximately 10,000 cfm.

72. Unfortunately, since no engine specifications have been provided by Nordic Aquafarms it is impossible to determine what is truly representative of the facility's proposed operating conditions.

73. The modeling incorporates a fenceline boundary, despite no fencing information being presented in the scaled plot plan from the November 8, 2019 RFI (See Exhibit 13-H), as had been requested.

74. It is important when considering potential impacts of an hourly ambient air quality threshold, to consider whether a member of the public could gain access to an area that would potentially exceed an hourly health threshold.

75. In the case of hourly NO₂, it is very possible, or even likely, that without a fixed barrier between the proposed facility and the surrounding trails and recreational areas, someone could wander onto the property and become unknowingly exposed to NO₂ concentrations above EPA's health threshold. At the trails, one may actually have a higher respiratory rate and therefore be more susceptible to NO₂ exposure during periods of elevated activity.

76. In this circumstance, limiting receptor locations to areas beyond the property boundary does not address the exposure potential to those who have used this wooded area as a walking trail for many years. The public needs to be protected from impacts to their health while enjoying activities that have never before threatened their health.

77. Receptors must be placed within the property boundary if the public can unknowingly gain access. For example, Nordic plans an education center where the public can have free access to all areas of the site except for the area between Buildings 1 and 2. The only area that should be excluded from having receptors are the buildings and the area between Building 1 and 2.

78. The modeling uses the building heights presented in the scaled plot plan from the November 8, 2019 RFI (See Exhibit 13-H). As stated previously, these heights do not incorporate the heights of mechanical penthouses, which will have significant effect on building downwash.

- Building 1 was represented with a height of 33 feet.
- Building 2 was represented with a height of 34.5 feet.
- Building 3 was represented with a height of 31 feet.
- Building 4 was represented with a height of 43 feet.
- Building 5 was represented with a height of 43 feet.
- Building 7 was represented with a height of 34 feet.

79. It is apparent from the elevation plans provided in Attachment F of Nordic Aquafarms' response to the July 18, 2019 RFI (See Exhibit 13-G), that the mechanical penthouses on the top of each module of Buildings 1 and 2 are almost 100 feet wide and over 300 feet long.

80. A dispersion modeling analysis would never be considered accurate if it disregarded the impacts of six 300-foot by 100-foot buildings.

81. Simply because these structures seem small compared to the 336,669 square-foot buildings that they are on top of does not make their effects on dispersion and downwash insignificant.

82. The modeling also does not account for the effect of downwash caused by the four sizeable chimneys within close proximity to one another. Downwash effects are not limited to strictly buildings, any protruding impervious structure will cause wind to bend, chimneys included.

83. In this analysis, and with all eight generators running, MaineDEP's modeling predicts an hourly NO₂ impact beyond the property line of 140.55 µg/m³ (See Exhibit 13-L).

84. Including background, the impact with all eight generators running is 179.55 µg/m³, which is 8.45 µg/m³ below the 1-hour NO₂ NAAQS, or put another way only 5% from the maximum allowed. (See Exhibit 13-L).

85. With seven generators running, MaineDEP's modeling predicts an hourly NO₂ impact beyond the property line of 123.34 µg/m³ (See Exhibit 13-K).

86. Including background, the impact with all eight generators running is 162.34 µg/m³, which is 25.66 µg/m³ below the 1-hour NO₂ NAAQS (See Exhibit 13-K).

Tech Environmental Dispersion Modeling

87. Tech Environmental used MaineDEP's air dispersion modeling files to perform an air dispersion analysis of the proposed facility.

88. The analysis changed only four things:

- The flow rate was adjusted to 10,028 cfm to account for the loss of volume from heat recovery. This also adjusted the exit velocity from the stack.
- The building heights were adjusted to match the heights of the penthouses as presented in Nordic Aquafarms' response to the July 18, 2019 RFI.
- Four chimneys that each encompass two stacks were added to account for downwash effects. The chimneys were given a height of 62.5 feet AGL (five feet below the stack tips).
- Receptors were added on site to account for the potential for exceedances at and within the property boundary where the public can access.

89. The results of the air dispersion analysis predicts that the facility could well exceed the hourly NO₂ NAAQS as it is currently proposed.

90. The maximum predicted 1-hour NO₂ impacts is provided in Exhibit 13-O.

91. Nordic Aquafarms has yet to prove that the proposed facility will not exceed the CAA.

Providing new applications that incorporate the most-recent facility information with sufficient supporting materials would be a good start to this process.

92. To really appreciate how significant the impact to air quality will be from the proposed facility, you have to consider how many increments of the existing background concentration of hourly NO₂ (39 µg/m³) the facility will increase.

93. With eight engines running, the facility will double the existing hourly NO₂ background concentrations throughout a significant portion of Northport and Belfast. Three times over background will still encompass many residential areas of the two towns, four times over background will affect the immediate area, and five times over background will impact the walking trail and other areas with public access (Exhibit 13-P).

Maine's PM_{2.5} State Implementation Plan (SIP) Requirements

94. Chapter 115 of Maine's Regulations (Exhibit 13-A) originates from Maine's State Implementation Plan (SIP), as required by the CAA, which requires each state to develop a plan to achieve, maintain, and enforce the NAAQS. The SIP is submitted to the EPA, who review and solicit public comment, before ultimately deciding whether to approve or disapprove the SIP. If approved, the SIP become federally-enforceable. If a state fails to submit an SIP, or the SIP does not fully comply with the NAAQS, the EPA will develop a Federal Implementation Plan, which gives the EPA jurisdiction over enforcing the NAAQS.

95. In June 2011, a petition for rulemaking filed by the Sierra Club stated that many current SIPs have provisions that the EPA previously-approved, which provide exemptions to emissions standards for emissions sources during periods of startup, shutdown and malfunction (SSM). The petition argued that these provisions do not require facilities to meet the Tier requirements in the CAA and therefore cannot be allowed (See Exhibit 13-M).

96. These blanket statewide SSM exemptions are intended to provide temporary relief on an emission rate per power basis from their New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements, but they did not allow exceedances of the National Ambient Air Quality Standards.

97. This exceedance is especially significant with respect to particulate matter (PM) emissions. The NAAQS have unique ambient standards for particulate matter with diameters less than 10 micrometers (PM₁₀) and particulate matter with diameters less than 2.5 micrometers (PM_{2.5}). During low combustion temperatures, such as during SSM operations, PM₁₀ and PM_{2.5} are produced in significantly higher concentrations than during continuous operations. In fact, because of the SSM provisions in the SIP and the significant swing in PM emissions from SSM operations, many facilities were no longer being permitted with numerical limits of PM.

98. However, following the petition for rulemaking by the Sierra Club, the EPA issued a final action in 2015 that required several states, including Maine, to revise their SIPs to correct the SSM provisions and ensure that they are fully consistent with the NAAQS concerning SSM operations (See Exhibit 13-M).

99. For most facilities, their ability to comply with the NAAQS during SSM operations are not a large concern, because they do not often startup or shutdown or it is a small fraction of the operating time. However some facilities, like the one Nordic Aquafarms' has proposed, would operate with frequent startups and shutdowns such as for peak shaving, and with being very near the allowable threshold it simply does not take much start-up or shutdown time to cause an exceedance. Please note that if NO₂ is only 5% of the limit, five percent of an hour is only three minutes. So for very tight pollutants (i.e. pollutant very near the ambient limit with the background and source) SSM can cause localized NAAQS exceedances.

100. An argument can be made that malfunction is not a predictable emission concern, but start up and shutdown are. Obviously with a fuel restriction that restricts operations to approximately 10% of the time, the engines will need to be sparingly cycled on an off, creating many startup/shutdown periods. The potential emissions during these periods would be much higher than those presented in the Minor New Source application (Exhibit 13-D) and in their response to the November 8, 2019 RFI (Exhibit 13-H).

Construction Phase and Operations Phase Overlap Compliance with NAAQS

101. The potential PM₁₀ and PM_{2.5} impacts from SSM operations is especially important when considering the period of time that Nordic Aquafarms proposes to be in operations of Phase 1 while also constructing Phase 2.

102. Compliance with the 24-hour PM_{2.5} and PM₁₀ NAAQS is determined by averaging the 24-hour impacts over three years (Exhibit 13-N).

103. Therefore, the cumulative impacts from a year of simultaneous construction and operations, followed by several years of full operations with frequent startups and shutdowns needs to be considered to determine whether the proposed facility can comply with the 24-hour PM_{2.5} and PM₁₀ NAAQS.

104. NO₂ also must be considered during the overlap of Phase 1 and construction of Phase 2. There will be many pieces of off-road construction equipment on-site emitting NO₂ that, combined with the engine exhausts, could create an even higher potential impact.

105. There is no evaluation for this critical period with operations of Phase 1 occurring with the power plant operational, while additional construction NO₂ emissions are occurring from. It was not evaluated, or even discussed, in this application. As a result it is my professional opinion that this project cannot be approved for air quality.

106. As a result of this analysis of the available information, it is my professional opinion that the proponent has not adequately provided the necessary air permitting analyses to receive an air permit.

107. As a result of this analysis of the available information, it is my professional opinion that the proponent has not adequately completed the necessary air permitting applications to receive an air permit.

108. As a result of this analysis of the available information, it is my professional opinion that the proponent has not demonstrated that it will not exceed the National Ambient Air Quality Standards.

109. As a result of this analysis of the available information, it is my professional opinion that the proponent has not provided adequate consideration to incorporate the odor sources that include hazardous air pollutants, and that may, at a minimum, exceed the air toxics reporting thresholds.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Date:

Printed Name:

Title:

Parties Assisting:

Name:

Address:

Signature: _____

Name:

Address:

Signature: _____