

STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION
IN THE MATTER OF

NORDIC AQUAFARMS, INC
Belfast and Northport
Waldo County, Maine

) APPLICATION FOR AIR EMISSION, SITE
) LOCATION OF DEVELOPMENT,
) NATURAL RESOURCES PROTECTION
) ACT, and MAINE POLLUTANT
) DISCHARGE ELIMINATION
) SYSTEM/WASTE DISCHARGE LICENSES
)
)

PRE-FILED REBUTTAL TESTIMONY OF CATHAL DINNEEN

As an applicant for Maine Site Location of Development Act (SLODA) approval, Nordic Aquafarms, Inc. (“Nordic”) is required to present information demonstrating adequate measures for controlling odors that the proposed project may produce.

Chapter 375, of the Department’s Rules at Section 17 identifies the relevant requirements for this demonstration.

This section reads:

17. Adequate Provisions for the Control of Odors

A. Standard. The applicant shall make adequate provision for controlling odors.

B. Submissions. The application for approval of any development likely to be the source of offensive odors shall include evidence that affirmatively demonstrates that the applicant has made adequate provision for the control of odors, including, but not limited to, the following information:

- (1) the identification of any sources of odors from the development;
- (2) an estimation of the area which would be affected by the odor, based on experience in dealing with the material or process used in the development, or similar materials or processes; or
- (3) proposed systems for enclosure of odor-producing materials and processes, and proposed uses of technology to control, reduce or eliminate odors.

Nordic's SLODA application met these requirements. Mr. Lannan's Direct Testimony argues that Nordic's SLODA submissions do not meet the SLODA statutory and Chapter 375 requirements. This testimony rebuts his testimony. Below, Mr. Lannan's assertions are presented in *italics* with Nordic's rebuttal in plain face font.

1. Mr. Lannan asserts that a facility odor control plan is required to comply with SLODA requirements: *In summary, there is no facility odor control plan and there is no demonstration that the facility could meet the requirement of "Adequate Provisions for the Control of Odors" based upon the application.*
2. There is no requirement for preparation and submission of an operational facility odor control plan in advance of construction. Nordic may prepare such a plan in the future, but doing so at this point in time makes no sense. What the rules require is identification of odor sources, or estimation of the impacted area or systems and technology to be implemented to control, reduce or eliminate these odors. This information is provided in Section 22 of the SLODA application (Nordic Exhibit 32) and attachments thereto which document the availability and experience of partners in addressing odor associated with materials transported to and from the project. Nordic Exhibit 18.
3. A copy of SLODA Application Section 22 is attached as Nordic Exhibit 32. The first paragraph identifies potential sources of odor and estimates the impacted areas (building interiors) as required by both Section 17(B)(1)-(2). As explained in my direct testimony, the balance of pages 1 through page 2 of Section 22 details the systems Nordic anticipates using to control, reduce or eliminate odors potentially generated by these sources, as required by Section 17(B)(3). Relevant experience in working with these materials is provided in Section 22.6 on page 3 and Nordic Exhibit 18 as required by Section 17(B)(2). Thus, though the relevant regulations require submission of these materials in the alternative, Nordic has submitted all information relevant to odors and odor control that is listed in the regulations.
4. Mr. Lannan also testifies that: *This is further compounded by a very distinct local odor ordinance in the City of Belfast that has not been considered as well.*

Belfast Zoning Sec. 102-1127 and Sec. 102-1258 Odors.

No land use or establishment shall be permitted to produce noxious or harmful odors perceptible beyond the lot lines, either at ground or habitable elevation.

There is no discussion about odor potential, odor control, and whether residual odor will be "perceptible beyond the lot lines".

5. While these provisions of local ordinance are not standards applied by the Department of Environmental Protection as part of its SLODA application review process, Nordic considered and accounted for local requirements in its applications at the local level. Nordic's applications are pending before the City of Belfast Planning Board.

6. Mr. Lannan testifies that: *They essentially suggest that a facility that will produce 200,000 pounds of fish product per day, will maintain proper odor control through “free will”. It reads [quoting Nordic’s submission]: “Modern fish production facilities capture and store byproduct streams in airtight and/or cooled storage, to protect their economic value. Odor in the seafood industry generally emanates from waste exposure to air; with the result of also destroying the value of potential byproducts. In our case, that would lead to economic losses.”*

Suggesting that odor control will be sufficient because the fish byproducts have economic value is like saying Hannaford’s supermarket fish section will prevent the fish from spoiling, because the fish have economic value and they would prefer to never have to dispose of it without selling it. The value may be an incentive, but economic drivers cannot “will away” natural biological decomposition mechanisms. Economic consideration is simply not an odor control plan, or Adequate Provisions for the Control of Odors.

7. Nordic does not and did not submit this language as an odor control plan. This language provides context for Nordic’s submission of the odor control information required by SLODA and its implementing regulations.
8. Mr. Lannan goes on to argue that the list of potential sources of odor Nordic submitted is “*extremely incomplete*”. His testimony includes a longer list. The list proposed by Mr. Lannan is included below. Some items on this list were included in the list submitted by Nordic originally. Other items, though not included verbatim in the original list can logically be considered accounted for by items included therein. Other items proposed as missing by Mr. Lannan are not considered sources of odor per se, so much as pathways through which offensive odors could pass if the described practices and equipment were not employed. Mr. Lannan’s list is reconciled against Nordic’s submission below with Nordic’s discussion printed in **bold**.
9. *This list from the application is extremely incomplete, and should include at least:*
 1. *Ensilage of mortalities*
Included in Nordic’s submission (Nordic Exhibit 32, at subsection 22.0 line item 1).
 2. *HVAC equipment at each and in every building*
HVAC equipment is not a source of offensive odor. However, HVAC infrastructure and its role in Nordic’s proposed odor control were discussed in my prefiled direct testimony.
 3. *Chemical and fuel deliveries and charging of tanks or vessels with these materials*
Not a source of offensive odor for the proposed facility.
 4. *Fish hatchery and associated activities*
The hatchery is not considered a potential source of offensive odors, nor are each of its associated activities. This facility may at times contain limited volumes of materials that are potential sources of offensive odors. However,

such materials will not be stored in a manner that presents a significant risk of offensive odors. These materials are the same as the sources of odor listed in section 22.0 of Nordic Exhibit 32.

5. *Smolt operations and associated activities*
The smolt operations are not a potential source of offensive odors, nor are each of all associated activities. Smolt operations and associated activities may, at times, include items or activities from the listed potential odor sources (such as ensilage of mortalities) that are potential sources of offensive odors. However, such materials will be handled and managed in the manner described in the application.
6. *Fish harvesting, slaughtering, and fileting operations*
Included in Nordic's submission (Nordic Exhibit 32, at subsection 22.0 line item 2).
7. *Wastewater treatment pumping operations*
Included in Nordic's submission (Nordic Exhibit 32, at subsection 22.0 line item 3)
8. *Storage of Fresh Feed and Spoiled Feed*
Included in Nordic's submission (Nordic Exhibit 32, at subsection 22.0 line item 4)
9. *Wastewater treatment operations*
Accounted for as stated under #7 above.
10. *Water treatment operations*
Accounted for as stated under #7 above.
11. *Wastewater residuals handling, storage, and disposal operations*
Accounted for as stated under #7 above.
12. *Water treatment residuals handling, storage, and disposal operations*
Accounted for as stated under #7 above.
13. *Fish harvesting waste handling, storage, and disposal operations*
Accounted for as stated under #6 above.
14. *Doorways and garage doors that must remain open at times for operations*
Not a source of offensive odor. Building apertures are a potential odor pathway that must be managed and controlled as discussed in my prefiled direct testimony.
15. *Power plant operations and exhaust stacks*
Not a source of offensive odor. Nordic's Application for a Chapter 115 Minor Source Air Emissions license ensures compliance with this SLODA standard.
16. *All other exhaust stacks (including the odor control systems exhausts)*
Not a source of offensive odor. While Nordic's HVAC systems will have outlets, which will be managed to avoid offensive odors as discussed in my prefiled direct testimony, these are not stacks. The only exhaust stacks present on site are those provided for the power generation system addressed under #15 above.

10. Mr. Lannan also claims that:

For Odor Control to be successful, it must consider, quantify, and design for:

- a. *Cover/ Containment*
- b. *Ventilation*
- c. *Control Technologies*
- d. *Dispersion*

11. While Nordic agrees that these are important considerations to control odor in operations, SLODA does not require this level of detail for permitting.

12. Mr. Lannan also claims that: *but with a ventilation discussion there is no understanding with respect to leakage or buildup of odor. It is simply not possible to enclose very, very large exposed tanks, agitate them, and not ventilate the headspace.*

The result would be condensation, biological slime, and unsafe conditions. I have seen this directly in wastewater plants that have attempted to “solve” their odor problems strictly through containment. It is not an odor control strategy.

13. Of course, as discussed in my prefiled direct testimony and Nordic Exhibit 32 at Section 22.1 and 22.4, ventilation is an important part of operations. Nordic’s HVAC system will be designed and operated to avoid offensive odors. The rebuttal testimony of Simon Dunn and David Noyes further addresses operation of the HVAC system with regard to ventilation.

14. Mr. Lannan states: *Furthermore, this facility will be processing 200,000 pounds of fish as day. Doors will continue to be open and closed, and if there is inadequate ventilation staff typically props open the doors for “fresh air” regardless of company policy, simply enclosing buildings does not account for the needs of normal use.*

15. HVAC systems will be designed to ensure adequate ventilation using proven air treatment technologies. There will not be circumstances where doors or other apertures are propped open.

16. Mr. Lannan testifies that: *If Best Managing Practices had been considered, the facility would have acknowledged its odor potential.*

17. All potential sources of odor are listed as required by the SLODA statute and rules.

18. Mr. Lannan testifies : *While it is impossible to determine the odor potential from the applications as submitted, it is important to recognize that all aspects of this facility will have odor potential. While the wastewater and waste sludge will have obvious odors that have not been defined, it is important to note that the fish from beginning to end will have a myriad of potential odors that are compounded based on material age and storage quantities.*

In Attachment A, pages 60-61 of the book Odors in the Food Industry, Edited by Xavier Nicolay and published in 2006 as part of ISEKI Food Integrating Safety and Environment Knowledge into Food Studies towards European Sustainable Development series. SEKI Food is a thematic network on food studies, funded by the European Union. As one can see there are many different fish odors present in fresh fish, spoiled fish, oxidized fish, fish processing, and general environmental odors from fish. None of these have been considered.

19. Nordic agrees that fish, like other living things that become food, can have odors- as noted in the referenced book. As discussed in detail in the application and in my testimony, Nordic identified the sources, mechanisms for managing or eliminating and its experience in handling fish and the potential for odors in full compliance with SLODA. Nordic respectfully argues that it has identified potential sources of offensive odors, described measures for preventing, and containing offensive odors, and stated that (and how) the facility will be designed to prevent the detection of odors outside of the facility.
20. Mr. Lannan goes on to state: *Again, to suggest the facility will not generate odor potential, simply because the building are enclosed and the fish are fresh, does not take into account so many considerations that are necessary to demonstrate compliance below the perception of odor.*
21. Nordic's SLODA submissions comply with each and every odor submission requirement listed in Chapter 375 Section 17 of the Department's Rules. Key sources of potential odors have been identified, and Nordic has committed to the implementation of mitigating measures to address all applicable requirements.

[INTENTIONALLY LEFT BLANK]

Dated: January 15, 2020

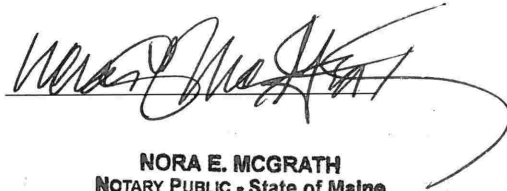
By. C. Dinneen
Cathal Dinneen, Nordic Aquafarms, Inc.

STATE OF MAINE
County of Cumberland, ss.

January 15, 2020

Personally appeared the above-named Cathal Dineen and made oath as to the truth of the foregoing pre-filed testimony.

Before me,



NORA E. MCGRATH
NOTARY PUBLIC - State of Maine
My Commission Expires
February 27, 2026

22.0 ODORS

The Belfast salmon farm will not generate noticeable odors. Modern fish production facilities capture and store byproduct streams in airtight and/or cooled storage, to protect their economic value. Odor in the seafood industry generally emanates from waste exposure to air; with the result of also destroying the value of potential byproducts. In our case, that would lead to economic losses.

Potential sources of odor in land-based aquaculture include:

1. Ensilage of mortalities;
2. Fish processing;
3. The Waste Water Treatment Plant; and
4. To a lesser extent, feed storage.

The following steps will be taken to avoid odors at each of these points.

22.1 Universally

Basic mechanisms for odor control throughout the facility:

1. Sealed enclosure in tanks;
2. Chilling or freezing;
3. Regular out-shipment to off-take partners; and
4. Air treatment systems.

All processes with the potential for creating odors will take place in completely enclosed buildings. Nordic will partner with established recycling and disposal professionals with years of experience in odor control. We have obtained capacity to serve letters from multiple companies for each of these byproduct streams. Through consultation with these partners we will install proven equipment at key areas to ensure additional odor control. We will employ air filtration that may include carbon, biofilters, wet scrubbers, and media.

22.2 Ensilage of Mortalities

Even with well-designed life support systems and husbandry practices, mortalities are a natural part of any farming operation. Mortalities will be removed and tank-stored in a weak organic acid solution to maintain a pH below 4. This is a common means of preserving these materials in air-sealed containers for out-shipment. Following preservation, mortalities will be properly disposed of offsite through one of our professional recycling and disposal partners.



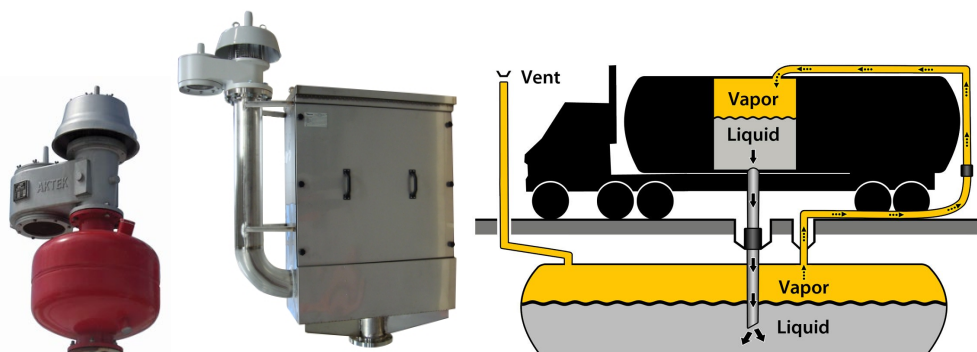
Examples of commercially available fish ensilage systems

22.3 Fish Processing

After processing, residual fish parts, or byproducts, will immediately be stored in insulated, food grade containers for regular out-shipment to offtake partners. Byproducts will be frozen to prevent spoilage. These materials will be processed into secondary products, such as bait, pet food, and human supplements. Recycling for these uses requires that materials be handled and stored in a manner that prevents spoilage, and the associated odor. Reuse retains the value of these byproducts. We have received a capacity to serve letter from a company with a history of providing these services for other salmon and seafood processors in greater New England (**Appendix 22-A**). This company has demonstrated their competency and professionalism over the 57 years they have been in operation.

22.4 Filtrate

Organic material removed by our water filtration systems will be regularly removed from the facility by a partner with demonstrated experience in the transportation, disposal and odor control of similar materials. Materials filtered from the water will be immediately pumped into and stored in sealed tanks until they are outshipped in tank trucks. Filtrate will not be exposed to air, therefore fermentation and resulting odors will not develop. Nordic has received letters of capacity to serve from reputable partners with years of experience (**Appendix 22-B**). These partners have demonstrated their ability to remove odiferous materials from holding tanks in urban settings without releasing odors.



Examples of common odor control filters for tankers and basic recovery method that will be employed to reduce ventilation of air during pumping out of tanks

22.5 Feed

Feed silos will be stored inside fish rearing buildings. There will be no storage of fish feed outdoors. Given the high cost of fish feed, Nordic will manage this resource carefully and will not store more than a week's supply at the time. Thus, we anticipate no odors from fish feed.

22.6 Nordic Aquafarm's Supporting Experience

Sashimi Royal, an Aquaculture Stewardship Council certified facility, is Nordic's sister company and has been producing Yellowtail kingfish in a similar recirculating aquaculture system facility for over two years without complaints of odor. Key staff have 30 years of experience in the fish farming industry and extensive experience in such operations. Our engineering team in Denmark (Nordic DK) is among the most experienced farm designers in the industry and have designed many facilities in the past two decades with waste processing solutions.

Current employees of Nordic have firsthand experience managing recirculating aquaculture systems and these waste streams:

- Cathal Dineen, Production Director
 - Production Director, Fredrikstad Seafoods (Nordic subsidiary)
 - Production Lead, Kuterra RAS salmon farm in British Columbia
- David Noyes, Chief Technology Officer
 - Operations Manager and Systems Lead RAS Yellowtail Kingfish, Black Sea Bass farm in Maine
 - Laboratory assistant, RAS Atlantic Salmon, Arctic char, Lumpfish USDA ARS National Cold Water Marine Aquaculture Center in Maine
 - Research assistant Aquaculture Research institute and University of Maine Animal Health Lab, University of Maine, multiple RAS systems and species
- Erik Heim, President
 - Developer, executive and chairperson in a number of land-based operations internationally.
 - Extensive work with environmental solutions and in setting high standards in modern facilities

In Maine, we are working with environmental consulting companies and vendors to ensure high environmental standards. In future US organizational build-up, additional specialist staff will be hired in Maine.