

April 2, 2020

Cynthia S. Bertocci  
Executive Analyst  
Board of Environmental Protection  
17 State House Station  
Augusta, Maine 04333-0017

Ref. 4518

***Re: Nordic Aquafarms Air Dispersion Modeling Update Remaining Deficiencies***

Dear Cindy:

As you know, it has long been a concern of Upstream Watch and other intervenors that Nordic Aquafarms has circumvented their burden to prove that the proposed Belfast facility would not degrade air quality beyond that allowed by the Clean Air Act. To date, the proponent has not provided any finite equipment details or dispersion modeling that proves compliance with the Clean Air Act as their written testimony proclaims:

*“13. In summary Nordic’s project:*

- The project is “minor” and proposes state of the art air emission controls;*
- Meets all applicable Clean Air Act requirements, including Chapter 115 licensing standards;*
- Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards; and*
- DEP Regulation Chapter 115 requires implementation of “Best Management Practices” to address miscellaneous potential fugitive emission sources including construction and operation activities.”*

We were therefore relieved at the end of the Licensing Hearing when an additional air dispersion modeling analysis was briefly mentioned by DEP. This mention was carried over into Procedural Order #11, Item 6, which stated:

*A. Air modeling. At the request of Department staff, the record remains open to allow staff to complete further dispersion modeling to estimate ambient air concentrations from Nordic’s proposed project based on additional information submitted at the hearing. The parties will have an opportunity to comment on the Department’s modeling. The deadline for comment will be set at a future time.*

In an attempt to be proactive, a letter was sent to DEP on February 24, 2020, requesting a discussion of which “*additional information submitted at the hearing*” would be included, since much additional information had been discussed. Our goal of this discussion was to sit down with DEP, the Applicant, and concerned Intervenors, prior to the revised modeling, to clearly and concisely discuss what of the testimony statements, rebuttal testimony, and Q&A from the hearing, would be included in any dispersion modeling revision, to streamline the revised modeling process and give credence to their above proclamations. Unfortunately, it was decided in Procedural Order #12 that any comment on the scope of the dispersion modeling revision prior to DEP performing modeling was premature.

Of specific concern to Upstream Watch are the proponent’s assertions that:

1. Nordic’s project...meets **all** applicable Clean Air Act requirements.
2. Nordic’s project...demonstrates compliance with **all** applicable ambient air quality standards.

Please note the Applicant did not simply proclaim in their testimony that the engines alone would meet the criteria, but the Applicant’s **project** would, as required by the Clean Air Act. Although combustion equipment are used for establishing the permitting pathway (minor versus major source), they are not the only emission sources that need to be included in order to prove compliance with the Clean Air Act. Item 10 in my written testimony provides regulatory background for this requirement:

**“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).”

Although the Clean Air Act allows individual states some leeway for exempting incremental increases from certain equipment or processes that would typically be considered de minimis with respect to impacting the local or regional airshed as part of their State Implementation Plan (SIP), this SIP flexibility does not allow a facility to exceed the safe and allowable National Ambient Air Quality Standards (NAAQS).

Therefore, it was our expectation, based on Procedural Order #11, Item 6A, that this dispersion modeling revision would address all sources for all NAAQS compounds, and other state or EPA-defined hazardous compounds of concern, that can easily exceed state public health thresholds off-site in the absence of design considerations. So, we were surprised to find, upon receiving the revised dispersion modeling, that the revision did not attempt to address the Project-wide emissions. As such, the dispersion modeling is insufficient to demonstrate the proponent’s burden of proof with respect to air quality compliance, and their proclamations in items 1 and 2 above are still not factual.

## The Dispersion Modeling Does Not Consider All Sources

Although the emission study and dispersion modeling compliance demonstration did include all NAAQS pollutants, it only considered emissions from the generators. Focusing only on the stationary sources does not satisfy the requirements for both primary sources (stationary sources that fall under Chapter 115 permitting) and secondary emissions defined by DEP 06-096 Chapter 100 as:

*“139. Secondary emissions. “Secondary emissions” means emissions which occur as a result of the construction or operation of a source or modification, but do not come from the source or modification itself. Secondary emissions must be specific, well defined, quantifiable, and impact the same general areas as the source or modification which causes the secondary emissions. Secondary emissions include, but are not limited to: (1) emissions from any offsite support facility which would not be constructed or increase its emissions except as a result of the construction or operation of the source or modification; (2) emissions from ships, trains, trucks or other mobile sources associated with the new source or modification.”*

In order for the Applicant to prove that the project “Meets all applicable Clean Air Act requirements”, the secondary emissions must be estimated and included in the modeling. The Applicant must estimate the impacts from project-wide emissions from construction, operations, and maintenance for all facilities, as all three of these activities emit regulated air pollutants, whether they are stationary sources, or combustion sources, or otherwise.

As described in our testimony, mobile sources are both combustion and non-combustion related. Many fugitive dust emissions have specific, well-defined and quantifiable, respirable emission impacts from truck wheel traffic, moving of material on-site, loading and unloading of construction and waste materials, etc. In many cases a well-developed Best Management Practices plan for mitigating fugitive construction dust may be assumed to demonstrate compliance with respirable dust during construction, but not in all cases, and definitely not for this application. In other cases a commitment to Tier 2 construction mobile engines or better may be sufficient for limiting respirable particulate or nitrogen oxides, but not in all cases. Tech Environmental was able to develop some very rudimentary dispersion modeling scenarios that quickly suggested an exceedance of the Clean Air Act off-site with elementary earth-handling procedures. In the absence of an emission estimate and modeling study, and refined construction sequencing, there is more than enough construction-related activities to suggest that dust and ozone-related emissions would exceed the Clean Air Act ambient thresholds at residential and protected areas near the facility.

Unless all potential sources discussed at the hearing that included air pollution control, and therefore are clearly not exempt from Chapter 115, Appendix B, are estimated and included in the modeling then the statement made by the Applicant “Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards.” cannot be considered valid.

In order for the Applicant to suggest that it “Meets all applicable Clean Air Act requirements” a construction emission compliance demonstration study is necessary. While including it now, in an EPA-approved dispersion modeling exercise that was being revised as a result of the needs discussed in the hearing testimony, is still possible and ultimately is still the simplest way to demonstrate the

Applicant's burden of proof, the Applicant could have completed some other modeling or analysis instead, but it is too late for that as the record is closed for all but this dispersion modeling revision.

If this modeling topic (i.e. the record) is closed as is, without this facility-wide air modeling demonstration, then the proclaimed compliance by the Applicant, and reiterated at the meeting with respect to ambient air quality and the Clean Air Act, cannot be considered factual, and the permit must be denied, as a result.

## **The Dispersion Modeling Does Not Consider Actual Generator Operating Scenarios**

The proposed generator ratings have never been discussed. Those would typically be provided from the Applicant, to their air quality consultant, so that it can be included in a modeling protocol. Providing a table of emission factors in a letter response, does not demonstrate that the potential emissions are representative. Appropriate emission documentation that matches the proposed control technologies, silencers, etc. has not been provided by the Applicant. Therefore, it is unclear what post-combustion measures have been accounted for in the dispersion modeling analysis. Although it makes sense that DEP opted to use data directly from the manufacturer, since the applicant has only provided conflicting information, this is not enough to determine whether the *"Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards."*

For example, the original application form presented an actual flow rate of 15,000 cubic feet per minute (CFM) at a temperature of 490 F, but their November 19, 2019 RFI response presented an actual flow rate of 16,586 CFM at a temperature of 375 F, while the manufacturer of their specified generator presents a flow rate of 16,586 CFM at a temperature of 920 F. Properly representing the combustion parameters of the generators is vital to determining compliance with the Clean Air Act. Please have the proponent provide a complete application update with all of the current design information and its effect on other areas of the applications, before BEP closes the comment period for this modeling. Without that, it is not possible to definitively determine whether *"Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards."*

During the hearing there was concern raised regarding the cumulative emissions when the power plant would be running while Phase 2 is being constructed and Phase 1 is operational. After reviewing the transcript, initially there was a hypothetical discussion of potentially less than eight engines being installed in Phase 1 with the rationale that less back-up power would be necessary, but the Applicant has already said that even with seven engines, it must run in a reduced operations mode, so as much back-up power as possible would be desired. During the hearing, there was no commitment from the Applicant to run fewer than all seven duty engines during start-up, so one must assume they are all being used. Please note that the Applicant has repeatedly claimed that **everything** on-site will be run off of electricity, including the heaters, ventilation, process controls, air pollution control system, etc., so as much power as possible is necessary, at all times. In fact, from the hearing transcript, after the discussion of possibly installing fewer than eight engines initially, the Applicant discussed concerns about maintaining reliability and flexibility during Phase 2 construction, as justification for the entire generator plant being installed as part of Phase 1. Nowhere in their application is there mention of less than the full power plant being installed in Phase 1. Furthermore, since the power plant facility is being installed predominately for peak shaving as the Applicant's application and testimony indicate, all eight engines will likely be installed to maximize that goal. A scenario of Phase 2 construction occurring

concurrently with 100% future generator operation is reasonable, and must be modeled to determine whether “Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards.”

As identified in DEP’s revised dispersion modeling memorandum, the location of the maximum predicted impact is very near to, and thus is clearly influenced by, Building 2, yet this building is not part of this phase of construction, and will not even exist during Phase 1 operations. Building 2 is part of Phase 2. Phase 2 may not be installed for a number of years, if at all, after Phase 1. This Applicant would not be the first to propose a multiphase plan with obvious and clear intentions to complete all phases, and then not complete all the phases of construction as planned. In fact, it would not be the first facility that Nordic has proposed this way and then put Phase 2 on indefinite hold. According to Nordic Aquafarms CEO Bernt Olav Røttingsnes in an article titled “You can buy a land-based facility, but it will fail tomorrow if you do not have the right people”, in SalmonBusiness by Stian Olsen – 3, March, 2020, **“Røttingsnes has previously told SalmonBusiness that construction phase 2 in Fredrikstad has been put on hold because the company is concentrating its USA sites.”** There is currently no plan for Phase 2 to be completed at Nordic Aquafarm’s facility in Fredrikstad, so unless Phase 1 of this proposed facility is also modeled separately, it does not represent the actual start-up and possible final operating condition, and one cannot state “Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards.”

Furthermore, per the plan provided in the November 19, 2019 letters, the fences are now located very near the proposed locations, but the revised dispersion modeling still excludes areas that the public can access. For example the fence to the east is shown going through the electrical substation. It should go from building 1 to the intermediate building and then to building 2. Similar discrepancies are present in the fence location on the west side. These receptors are important because they are near to Buildings 3, 4 and 5 which were not properly represented with rooftop penthouses, as depicted in the Applicant’s plans. Two of these three building penthouses are fairly close to the stacks and will influence the dispersion modeling results. These edits should be made, and the model rerun and offered again for comments before an assumption that “Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards.” could be considered complete for the engine plant alone.

Moreover, per the plan provided in the November 19, 2019 letters, there clearly are significantly-sized pieces of equipment outdoors that may or may not have an impact on downwash. Please note that EPA downwash concerns are not limited simply to downwash from nearby buildings. This is why EPA requires downwash to be considered from “nearby structures” and not simply buildings. Structures include HVAC and industrial equipment and the height of any structure is determined by its highest point. This includes nearby buildings, doghouses, rooftop equipment, or any equipment that is not 2.5 times lower than the stack height. For example, eight pieces of equipment that definitely will influence downwash and are not included in this revised modeling are the cooling towers for the generators themselves, shown on the plan provided. Again, no specific equipment information has been provided during multiple RFI requests.

This is still the case, despite repeated requests from DEP for equipment design information. In fact, in the Applicant’s air modeling letter provided to DEP to supply requested modeling data, Nordic’s

response to a very specific equipment request for structure information implied that the plan included structure heights and dimensions. Instead of providing the heights of the buildings along with any protruding rooftop features and equipment, only corners of the buildings had height information. Furthermore, there is a very large bulk tank arrangement shown in the downwash influence zone. Bulk vessels are often built very tall, but no information has been provided on the size of these several tanks. Eventually a tank height is cost-limited because the added structural cost to prevent wind shear effects becomes more than the costs saved from reducing the number of systems, but it is our experience with scrubber vessels that wind limitations does not occur until a vessel is at least 60 to 80 feet tall, or more if one increases the diameter. Typically, a farm of this size would prefer tall tanks to minimize the footprint and the number of systems (i.e. system complexity), so these bulk tanks may very well impact the power plant emissions as well. Without any tank sizing data provided, the model must be rerun with worst-case tank heights and offered again for comments before an assumption that *“Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards.”* could be considered complete for the generator plant alone.

Unfortunately, the dimensions of many of the exterior pieces of equipment nearby, including the eight generator cooling towers and doghouses are unknown and more importantly their proposed location on the roof are not dimensioned. If they had been dimensioned, as requested by Jane Gilbert in her data request, then it would be reasonable for DEP to use tiers in their dispersion modeling at this time. Many of the previous requests for air quality, odor and sound sources could have provided this information as well but the Applicant sidestepped the actual information requests by electing to provide incomplete verbal responses instead of the equipment data requested directly. This permitting approach is now unfortunate for the Applicant, as the actual dimensions and actual locations of the equipment on or near buildings do influence a dispersion models results, and since the Applicant did not elect to perform its own dispersion modeling with its own design information or assumptions, the only way for DEP to conservatively-perform dispersion modeling for buildings with doghouses or rooftop equipment, is to assume that the controlling structure is a block with the maximum height of equipment shown uniformly for the building.

Of course, all of this could have been avoided had the Applicant’s design team simply completed the modeling prior to the hearing and then submitted it to DEP with their own design assumptions for review. The applicant understood that DEP was considering modeling for this application, but chose not to perform modeling of their own. The model should be rerun again, but only with the spatial and equipment information provided on the record to date, unless the record is fully reopened for this application and new design information is provided for all to review. Without specific equipment data and dimensions, the model must be rerun with worst-case building heights and offered again for comments before an assumption that *“Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards.”* could be considered complete for the generator plant alone.

Lastly, there is no discussion or emission assumptions for increased impacts from the disproportionate number of start-up/shut-down emission increases, when compared to emergency or continuous sources. Regardless of whether SSM emissions are considered exempt in Maine’s SIP for Tier 4 compliance considerations (i.e. lbs/MMBTU factors), they will clearly contribute to definable increases in emissions (i.e. pounds/hour and less vertical velocity/buoyancy) and must be included for sources that will, by

design, operate very intermittently. This added impact is even more of a concern for a facility that has proposed to install the absolute minimum stack heights possible to try to claim they are “chimneys”, rather than industrial stacks. The spatial distribution of the existing modeling results provided by DEP clearly shows that the stack release heights are too low to project emissions high enough into the air to clear the local area around the site. This has a far reaching effect on local background conditions in the Northport/Belfast airshed area. The frequent and cooler-temperature start-up and shutdown emissions in this proposed application will disproportionately increase the maximum emissions in close proximity to the source. The model must be rerun with consideration for start-up shutdown emissions included and offered again for comments before an assumption that “*Air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards.*” could be considered complete for the generator plant alone.

## **The Dispersion Modeling Does Not Demonstrate Clean Air Act Compliance**

Despite being a synthetic minor, further analysis is required to demonstrate compliance. This is not because anyone is suggesting that this Applicant be held to a higher standard than other applicants in Maine, but it is simply required because (1) as currently designed, the proposed combustion emissions are going to consume most of the short-term allowable limits for some compounds for a very large radius around the facility, (2) the construction project is gigantic with respect to its proximity to residential areas and protected areas, and (3) there are multiple large scale construction and operations that will occur simultaneously throughout the site.

This proposed project would include many major utilities, all of which have fugitive, mobile, and stationary emissions that may, or may not, typically be considered insignificant independently for a smaller project, or for a more rural project, or for a project with more buffer between itself and its residential neighbors, or a project with more suitable soils, or a project at a brownfield site that that some historical existing “no build” emissions already. If one takes the amount of unsuitable soil to be removed and backfilled as an example to evaluate, the material to be excavated has increased dramatically from the original estimates without any proposed changes in schedule. This task alone will drastically increase PM<sub>10</sub> and PM<sub>2.5</sub> emissions from excavation, dropping the materials in piles and trucks, wind erosion, truck exhaust emissions, truck fugitive dust emissions. Therefore, it is very possible that construction sequencing limitations are likely needed to achieve continual compliance with the Clean Air Act, even though they are typically not required for a smaller project, or a project that has more than the minimum zoning buffer to the property line.

A project of this complexity that, under the best operating conditions, is already predicted, based on the previous DEP modeling, to quadruple the ambient 1-hour NO<sub>2</sub> concentrations in the area and consume at least 85% of the allowable ambient NO<sub>2</sub> emissions from the power plant alone, (and maybe more after the other building doghouses are included in the next modeling revision) needs to be evaluated holistically.

A project of this scope, with this many individual industrial processes and continuous 24-7 utility needs, with a half a billion dollars’ worth of construction activities, must include all the potential construction, operations, and maintenances conditions for each proposed phase of construction and operation in its modeling demonstration, so that DEP and the public can be assured that the project “*Meets all applicable Clean Air Act requirements*”, as the Applicant has claimed.

The Applicant can continue to discuss how dispersion modeling is not required for a minor source in Maine all they want, but in the end, the Applicant must comply with the federal Clean Air Act. **The NAAQS are based on exposure, and simply put, the effects of a criteria pollutant on one's health is not less significant because it originated from a minor source versus a major source, from a stationary source versus a secondary emission source, from a construction activity versus an operations activity, or from a combustion source versus a non-combustion source.** They all must be included in any modeling demonstration, or the demonstration is not complete.

Please let me know if DEP would be amenable to a pre-modeling meeting prior to any additional revised modeling and updated dispersion modeling submission to the listserv.

Thank you for your time.

Sincerely,

TECH ENVIRONMENTAL, INC.



Michael T. Lannan, P.E.  
President