NAF Odor Potential Review

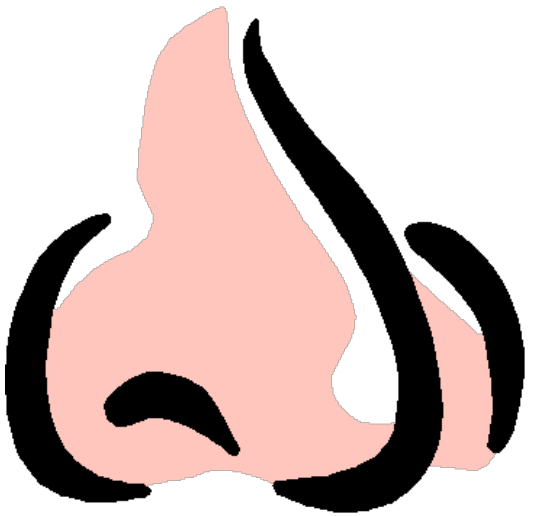
On behalf of Upstream Watch

What is Odor?

- "Odor" is the perception caused by stimulated olfactory nerves
- An "Odorant" is a chemical which stimulates the olfactory system
- Odor typically results from many odorants and is additive
- The perception is both physical and mental (physiological)
- The perception varies by individual
- Odor perception is all about odor loading which is combination of concentration and amount of material

How is Odor Measured and Quantified?

- Two Approaches:
  - Compound-Specific or Total Odor
- Odor Criteria
  - Concentration
  - Intensity
  - Character
  - Hedonic Tone
- Odor Sensitivity



Belfast Operational Odor Limits versus State Odor Limits?

- 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.

- Chapter 375: NO ADVERSE ENVIRONMENTAL EFFECT STANDARDS OF THE SITE LOCATION OF DEVELOPMENT ACT
  - 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.

Has the Proponent Considered the Odor Potential?

- In the SLODA Application Section 22.0 titled: ODORS
  - "All processes with the potential for creating odors will take place in completely enclosed buildings….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.
    - **For Odor Control to be successful, it must include:**
      - **Cover/ Containment**
      - **Ventilation**
      - **Control Technologies**
      - **Dispersion**
    - **Two of these parameters are mentioned above, but there is no demonstration of how they will prevent odors "perceptible beyond the lot lines"**

Has the Proponent Considered the Odor Potential?

- For Odor Control to be successful, each design component must be well thought out, specified, and described in detail:
  - Cover/ Containment
    - There is no discussion how containment will be maintained while breeding, producing, slaughtering, packaging and shipping 200,000 pounds of salmon a day
  - Ventilation
    - There is no discussion of odor control ventilation
    - There is no such thing as "no ventilation", without mechanical ventilation there will be breathing losses
  - Control Technologies
    - Simply listing control technologies is not a demonstration. Each area will have different odor control needs
  - Dispersion
    - All the odor control technologies listed above have residual odor. There is no discussion about whether residual odor will be "perceptible beyond the lot lines"

UPSTREAM WATCH

Has the Proponent Considered the Odor Potential?

- In the SLODA Application Section 22.0 titled: ODORS It states that "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"
  - **This List is extremely incomplete, and should include at least….**
    1. **Ensilage of mortalities**
    2. **HVAC equipment at each and in every building**
    3. **Chemical and fuel deliveries and charging of tanks or vessels with these materials**
    4. **Fish hatchery and associated activities**
    5. **Smolt operations and associated activities**
    6. **Fish harvesting, slaughtering, and fileting operations**
    7. **Wastewater treatment pumping operations**
    8. **Storage of Fresh Feed and Spoiled Feed**
    9. **Wastewater treatment operations**
    10. **Water treatment operations**
    11. **Wastewater residuals handling, storage, and disposal operations**
    12. **Water treatment residuals handling, storage, and disposal operations**
    13. **Fish harvesting waste handling, storage, and disposal operations**
    14. **Power plant operations**
    15. **All power plant and exhaust stacks**

NAF Solid Waste Review

On behalf of Upstream Watch

What is Solid Waste?

- Sec 90-42 (b) 18 Solid Waste Management
- 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.
- Chapter 375: NO ADVERSE ENVIRONMENTAL EFFECT STANDARDS OF THE SITE LOCATION OF DEVELOPMENT ACT
  - 16. Adequate Provision for Solid Waste Disposal
    - A. Standard. The applicant shall make adequate provision for solid waste disposal. All solid waste will be disposed of in a manner which ensures that:
      - (1) No unreasonable adverse effects on the natural environment will result;
      - (2) Public health, safety, and welfare will not be adversely affected; and
      - (3) The wastes will not combine with other wastes, water, or other natural or man-made substances to create additional harmful effects to the natural environment or the public health, safety, and welfare.

UPSTREAM WATCH

What is Solid Waste?

- Below is Table 1 solid waste generation from SLODA Chapter 18:

TABLE 18-1
Solid Waste Quantities and Schedule

Type	Estimated Quantities	Schedule
Construction		
Construction & Demolition Debris	90 cubic yards/day	August 2019-August 2020, 2024-2025
Land Clearing Debris (timber)	5,433 cubic yards (1,146 cords)	August 2019-August 2020, 2024-2025
Land Clearing Debris (brush & stumps)	TBD (+ 34 acres of clearing)	August 2019-August 2020, 2024-2025
Land Clearbing Debris (soil)	20,000 cubic yards	August 2019-August 2020, 2024-2025
Land Clearing Debris (rock)	14,000 cubic yards	August 2019-August 2020, 2024-2025
Universal Waste	5 cubic yards/week	August 2019-August 2020, 2024-2025
Special Waste (asbestos insulation)	100 cubic feet vermiculite insulation	August 2019-August 2020
Special Waste (asbestos roofing)	800 square feet asphalt roofing	August 2019-August 2020
Special Waste (PAH-impacted soils)	20 cubic yards	August 2019-August 2020, 2024-2025
Belfast Bay Sediment	15,000 cubic yards	August 2019-August 2020
Operation		
Filtrate (WWTP)	250 cubic yards/day (wet @ 20%DM)	Slow increase to 50% volume from August 2020-August 2021
Irone Slough (IWTP)	22 cubic yards/day (wet @ 3%DM)	Slow increase to 50% volume from August 2020-August 2021
Salmon Processing Solids (heads, guts, mortalities, etc.)	22 cubic yards/day	Slow increase to 50% volume from August 2020-August 2021
Salmon Processing Grease (Fat Trap)	1.5 cubic yards/week	Slow increase to 50% volume from August 2020-August 2021
Municipal Solid Waste	60 cubic yards/week	Slow increase to 50% volume from August 2020-August 2021
Universal Waste	2 cubic yards /week	Slow increase to 50% volume from August 2020-August 2021
Recyclable Products	60 cubic yards/week	Slow increase to 50% volume from August 2020-August 2021

Notes:
WWTP = wastewater treatment plant
IWTP = intake water treatment plant
DM = dry matter

1. **This table needs updating, as the construction numbers discussed at the public meeting were very different and**
2. **This table cannot be converted to odor potential directly.**

What is Solid Waste?

- In Table 1, it lists **20,000 cubic yards** of soils to be removed. Nordic has provided a table of depths to which each plot or area of land will need to be excavated, ranging from 8' deep to 20' deep, based on multiple soil borings. Excavated soil from these areas would be removed from the site.
  - Phase 1, with an average excavation height of 14 feet and an approximate construction limit area for the building and around the building of approximately 900,000 square feet, that equates to more than **450,000 cubic yards** of dense clay soil. One can get about 10 yards in a typical on-road dump truck or about 20 yards in a tractor trailer of a dense soil material such as clay before reaching the weight limit, so **this corresponds to approximately 50,000 to 90,000 trip ends for soil hauling alone**
  - Of course Belfast could elect to provide a waiver for weight, however only to a certain limit **at the expense of safety and added wear and tear on the roadways**

What is Solid Waste?

- A second example of an update necessary in Table 1 is the fish waste. Table 1 estimates **22 cubic yards a day**. The proponent has discussed approximately 200,000 pounds of fillet per day at the public meetings. With maximum waste expected at 25% to 50% waste (for guts, heads, tails and bones). (https://www.chefs-resources.com/seafood/salmon-yields/) Even if one suggests that the 200,000 pounds per day is fish weight and not fillet weight, that corresponds to approximately 40,000 to 80,000 pounds per day of fish waste. At 135 pounds of organic food waste per cubic yard, the total fish waste would be approximately 250 to 500 cubic yards per day. (https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf)

UPSTREAM WATCH

What is Solid Waste?

- And more important with respect to odor, there is zero discussion of average and maximum on-site storage of waste material during normal and upset conditions.
  - For example:
    - There will be up to 30,000,000 pounds of fish waste created per year. How large is the storage area for these crates? How specifically will this be managed?
    - There will be 35,000 tons of water and wastewater sludge (referred to as filtrate) created based on the MEPDES waste removal assumptions in Attachment 2. Where will it be stored? Will different sludges be mixed? How is the wastewater 20% solids setpoint met? Small changes can result in significantly more sludge
- Maximum solid waste storage quantities should be updated and resubmitted, and then proposed as permit limits

UPSTREAM WATCH

Has the Proponent Actively Considered the Odor Potential during Normal and Upset Conditions?

- In the SLODA Application Section 22.0 titled: 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."
    - **To suggest the facility will not generate odor potential, simply because there are economic drivers to not allow material to spoil, does not demonstrate compliance below the perception of odor**
    - **Unfortunately, odor nuisance potential is directly related to odor loading and this facility will create 200,000 pounds of fillet, 100,000 pounds of fish waste, 7.7 million gallons of wastewater, tons of wastewater sludge, all per day, so the odor loading can be high even if the odor concentration is kept to a manageable level for a fish food processing plant.**

Has the Proponent Actively Considered the Odor Potential during Normal and Upset Conditions?

- The proponent has not actively considered the odor potential to emit or the controlled during normal conditions
- The proponent has not actively considered the odor potential to emit or the controlled during upset conditions
- A quantitative dispersion model of odor should be developed and the assumptions included as permit limits
- Given the size and throughput of this facility, odor control must be included everywhere unless a quantitative odor control study is performed to demonstrate that it is not necessary in a particular area

Questions?