

Re: Planning Board Meeting 9/4/19

Public Hearing

Tue 9/3/2019 2:10 PM

To: donna short <dscampc321@gmail.com>

Dear Ms. Bruskin

I have received your email and will provide copies of such to the Planning Board.

Wayne

From: donna short <dscampc321@gmail.com>

Sent: Tuesday, September 3, 2019 1:50 PM

To: Public Hearing <public@cityofbelfast.org>

Subject: Planning Board Meeting 9/4/19

I am sorry I am unable to attend the Planning Board meeting this week, as Stormwater management is a difficult and extensive issue to have to review in a 2-hour session. However, I remain very involved in reviewing this process and application. I am very concerned that the runoff could pollute Little River, and that the temperature of the Bay could be affected--thus affecting our marine life, especially the lobsters, if the runoff temperature is not handled by the storm management plan.

Again, I imagine you will need to ask for technical assistance to review this complex matter. I would. I just wanted to support you in asking for appropriate time to review such dense material and I hope you receive objective technical advice from experts who understand the implications of storm water potential problems. None of us know, however, what climate change will bring--making it even more important, in my opinion, to ask Nordic for a surety bond in case of emergency clean up caused by environmental changes. Thank you for your attention and your work and your review of these critical issues. Sincerely, Meredith Bruskin, 338-5089

INFORMATION FOR THE BELFAST PLANNING BOARD

From: Holly Faubel & David Sprague

9/4/19

RE: Nordics response to information from Public Hearing, dated Aug 22nd

REV 1 - submitted 9/9/2019

We are taking the opportunity to address some issues raised during the Public Hearing before the Belfast Planning Board. Our comments are in italics in red text, underlined and slightly larger font. Nordics comments are in quotes in black text.

"1. Macro picture for salmon industry remains strong"

The Market for salmon, either from land based RAS facilities or net pens are continuing to act as they have always acted. When a glut of salmon appears on the spot market, the price for salmon drops. This occurred back in the mid-1990s to the point where operators of farms (net pen or land based) went out of business or sold their licenses to larger operators at a steep discount. Distributors of salmon experienced the same impact. Today there is a glut of salmon on the market.

The spot price of salmon can be impacted by weather, disease outbreaks, or farms (sea or land) going bankrupt. It is also affected by trends in consumers taste in terms of seasonality (demand is often lower in the summer and picks up in winter) and trends due to advertising, "wild salmon is good, farmed salmon is suspect" or "the best fish to eat for a healthy or eco-friendly meal is X" .

When distributors or operators , or farmers make claims like "we will deliver a higher quality product at 20% above the spot price" then that sets an expectation that can be difficult to meet.

This following was published in the trade journal "SALMON BUSINESS" on Sept. 6 2019:

"There are too much fish. Now it's the customers who have the power. There is nothing more to say than that," says a salmon trader to SalmonBusiness.

“3-4 kroner (€ 0.3-0.4) down from last Friday. A lot of fish is being frozen. Inventories are getting larger. There will soon be no more room in the freezer stores in Norway,” he says, before adding: “And then the feeding is also high.”

Every Friday after lunch, SalmonBusiness report spot prices for salmon. These are fish to be delivered the following week. We contact several links in the value chain, including farmers, exporters and importers, and always have at least five independent sources, although not all sources are necessarily displayed in print. We vary the sources we use and do not use the same sources each time.”

“NAF has documented more experience in designing, constructing, operating, and improving the largest tank systems around than anyone else in the industry. “

We can understand why NAF would like for the Planning Board to believe that, but frankly there are other operators out there with as much if not more experience than NAF in regard to Land Based Aquaculture. We would be happy to share that information with the Belfast Planning Board. As NAF has previously stated this isn't a new industry. However, it is a rapidly evolving one. Tank size is not the most critical feature in an operation. Indeed larger tanks can often lead to problems when it comes to disease outbreaks, water imbalance or equipment failures as entire stocks may be lost in a catastrophic event rendering the farm at risk for failure or even bankruptcy.

“We own the three largest RAS tanks in the world. The starting point for the European operation was a Kruger AS licensed design. We have added vast improvements to these designs and leveraged our experience to move beyond these. The proposed project in Maine is not based on any third-party licensed designs, nor are most other RAS projects in the industry.”

Kruger and Veolia both provided licensed equipment to NAF as was reported in many industry trade publications. We can make those press reports available to the Belfast Planning Board. All of that information is based on public statements in trade papers many of which were based on Interviews with that NAF representatives. Most RAS projects utilize equipment that they have purchased and are licensed to operate. Again there is documentation that is easy to provide to the Planning Board.

“Few, if any, companies in this segment match the experience base NAF has assembled across these disciplines. No other proposed RAS project in Maine can show such experience and capability. NAF is the company in Maine with the longest history in the commercial RAS segment, and the only company leveraging Norwegian industry experience• We are the only RAS grow-out company internationally with 3 commercial scale farms in our portfolio.”

There are many companies out there who have experience in multiple commercial scale farms, some of whom operate in Norway and some elsewhere. But as NAF has previously stated, this is not a “contest”. If the BPB wishes to do an evaluation materials can be provided. Aquabana would certainly be one company who is “in Maine” and their principles are very seasoned and have been operating operation for many many years, in fact some of their principles were involved in helping to bring up the first facilities that NAF invested in. Likewise Whole Oceans has a team onboard who have experience in RAS Aquaculture

“We have produced one of the most comprehensive permit application packages internationally for a RAS farm build-out in Maine.”

We have only reviewed one other set of permit application packages, that for Whole Oceans, which consisted of over 400 pages for the first and second revision. While different in nature, our requests for operations manuals, schedules, quarantine facilities/procedures, and the like were based on the detailed review of Whole Oceans package.

“3. Scale and scaling

Internationally we are seeing newcomers in the industry with no active projects announcing 5,000, 10,000, and 20,000 metric ton facilities. In our experience, a moderate size farm should always be the first step as there is a learning curve involved and need to build capabilities before scaling up. NAF has done both, and more.”

NAF is permitting for long-term expansion in Belfast. We are laying the foundation for growth and expansion over several phases. The proposed scaling is a natural step up for our company. The first construction step in Maine involves construction of 3X our current capacity. This is a moderate expansion rate compared to many other projects. The risk of going from 3,000 to 10,000 metric tons capacity as is representative of our first step in Maine, is much lower than going from zero capacity directly to large scale. When we take

on the following expansion phases in Belfast, the relative up-scaling level will be even more moderate. It is relevant to note that we are not building the whole facility in one step.”

Our experience in going from R&D to a full facility that can be licensed as a turn key operation, while not in aquaculture does point a gradual phase up. Which is why we urge the Planning Board to wait for the facility in Fredrikstad to reach first fish harvest before granting a permit.

Even the Fredrickstadt facility will not incorporate all of the facility aspects that NAF proposes to first bring up in Belfast. However, it would show they can achieve grow-out in their new tanks system design, which to date is unproven. Reaching “turn key” operation was one of the points that NAF stressed in several trade publications.

While it is true that NAF will be operating in phases, once the site is so drastically excavated its value is forever diminished. So operating in phases does not address the risk to this valuable scenic property. It will be forever altered in such a damatic fashion that its value and re-use should NAF experience operational problems in even the early parts of Phase 1 will be unrecoverable.

"4. InterAqua Advance (IAA) Staff

"AA was one of the early vendors in the RAS industry with several decades of projects behind them with delivery of facilities to the largest seafood producers in the industry. Their design and installation staff were and remain highly respected in the industry. Their RAS systems continue to operate today across the industry. The design team was of no fault when the owner put the company in a bankruptcy position in 2018. Rather they were highly frustrated by the commercial decisions made. When we moved in to hire their senior design staff, our reference checks confirmed high satisfaction with them from respected seafood producers. These persons have been involved with NAF over the past two years. We have since then added additional staff to the team, in addition to the engineering resources we have in Norway and the US. We know of no other RAS company that has a complete internal multi-disciplinary design team with such a track-record of delivering quality facilities. Other companies proposing facilities in Maine have only a fraction of the design and installation experience we hold. That does not discount that they also can deliver good projects."

We outlined what happened to IAA in previous documents. We can go into more detail if the Planning Board wishes as it does go to technical ability. We believe there are many companies like Aquabana, Kingfish Zeeland, and others who are proposing facilities in Maine who have as much if not more experience in the industry. If the Planning Board finds it useful we can provide that information

"5. Patents

"The issue of patents brought up by interested parties is irrelevant. It was unclear what the purpose of the topic was. Most RAS farms hold no patents, and the proposed NAF project in Belfast does not require any external patent rights."

Patents are in fact highly useful, which is why we assumed NAF filed for them. Intellectual Property is a valuable part of any companies bottom line and is often used to assess a company's financial position by investors. Many companies such as Atlantic Sapphire rely on their patent position not only as a measure of their financial position, but also as a measure of their ability to establish and hold a marketplace advantage. That is why companies file not only in the country in which they wish to operate first but also internationally.

"IAA never had an infringement suit, as claimed. IAA had a dispute in the past that was resolved without further complications or any lawsuit. It is not uncommon that such issues

emerge in various technology industries. Regardless, that history has no relevance to Nordic Aquafarms today, nor to the proposed Belfast project.”

We never indicated that there was an infringement suit. Only that there were pointers to an issue of possible patent infringement. Indeed most companies try to resolve patent disputes either through private mediation or mediation services provided through the World Intellectual Property Organization (WIPO). Often those mediated resolutions include a non-disclosure agreement as part of the mediated settlement. Companies take their patent positions very seriously as it can affect their bottom line. It is clear from the patent filings that were made by IAA that there were significant issues which arose as the patents were being reviewed as part of a transfer to Nordic. We can go into this in more detail with the Planning Board if requested.

“References to licensed RAS 2020 Kruger designs that we have used in our first stage build-out in Europe are irrelevant. These were implemented in collaboration with license holder Kruger AS in the Nordic facilities. The RAS2020 design had a range of flaws that our company as the first buyer of these addressed and amended in Denmark, and further improved on in Norway. NAF has moved on with a different design approach and is no longer investing in new RAS 2020 designs. Our tank designs are developed in-house with no relevance to other licenses or patents.”

The first buyer of the RAS 2020 may have been in Switzerland, or in Denmark. Veolia is still marketing that system in Europe and the US and they can best speak to the viability of their system.

“ 6. Insurance

All NAF facilities are fully financed and insured. All other facilities in this segment that we know of are also fully insured. Insurance is obviously a requirement from investors. NAF would not be investing millions of USD in Belfast if there was a risk of not obtaining insurance covers. President Erik Heim has held executive positions in large insurance companies earlier in his career and is well connected in the insurance market. Atlantic Sapphire that is two years ahead of Nordic Aquafarms in the U.S., has full insurance for much larger facility under development.”

We believe Mr. Heim has a good understanding of risk management, which is why we urged the City and Planning Board to ask NAF to indemnify the City and it's Planning Board. We provided an example provided to the City attorney at the first Planning Board Meeting we attended. We can print that document out if needed for the Planning Board to review if the City attorney has not already reviewed it with you and provided an explanation as to why he feels it is not a good practice to follow or needed.

“In the past two years there has been a wave of new land-based facility announcements, many from parties with no prior experience. It is correct that some insurance carriers have pushed back on providing covers given that they perceive many of these newcomers to lack experience. Other carriers may limit their focus to net pen operations, as a larger industry segment.

There are, however, insurance carriers that insure RAS companies with a track-record such as Nordic Aquafarms. Insured facilities is proof of that. As with other experienced producers, we see little risk related to attaining insurance covers in the future given our track-record to date. In our case, we have a clean history with no major incidents, and thus a favorable risk profile.

Willis Tower Watson, a global insurance company, is our broker with deep experience in aquaculture. They have insured our production in Norway. Obtaining covers for the Maine operation will involve risk review sessions and a tender process with our broker and carriers, as with any business. This process will be finalized when permits have been clarified.

Environmental risk in our operation is generally not significant compared to a range of other industries. Gaining appropriate covers is not considered a high risk.

Insurance covers related to construction will be similar as with other process facilities.”

We believe the operative question before the board is to request that all insurance coverage for this facility be in place prior to the start of excavation of this site which will cover not only construction but operation. Our research has shown most

insurance companies will not take on this high of a risk and if Willis Tower Watson will cover the facility proposed BEFORE excavation begins, they should provide proof of that in writing. This should go beyond a Letter of Intent from WTW which might state "we will review the matter later".

"7. Business disruption risks

General statements were made about human error and failure of systems. Comments need to be more specific to motivate useful answers. The facility design limits external risk related to human error. We do not see how a human error event would have any significant external impacts as there are redundancies in all critical systems, and the farm will be comprised of modular independent systems that encapsulate risk. Human error could cause internal activity disruptions if not mitigated through internal procedures and quality systems. However, we produce fish and do not carry the larger event risks related to some other industries. That includes escape risk - the proposed facility is designed to be escape proof."

There are numerous examples of risks from the various gases used, the various chemicals used, hardware failures and software failures. Once the construction documents are finalized and shared specifics can be evaluated, as organizations like OSHA and others will need to be involved.

So the question before the Board is when will those construction documents be made available?

That needs to happen prior to any site permit is granted as those reviews are key to risk evaluation.

“8. Operations manual

This would be bioplans, quality systems, and related procedures. These are company intellectual property and is not public material. It would be the same for almost any company. Quality systems and operating procedures are developed by staff with decades Of experience in farnjng (farming) salmon, and in operating RAS systems. Relevant points from these are addressed in our various application packages.”

The request was for a schedule for producing those manuals at a minimum. Given the chemicals and electrical systems where water is present there will need to be copies available for first responders.

“9. Yellowtail Kingfish

When NAF invested in Yellowtail Kingfish production, no one had commercial scale experience with the species in RAS. Claims that this is an easy fish are misleading. The brood stock and hatchery activities are much more complex than salmon, while the grow-out phase can be easier with the proper experience. The total infrastructure required to farm this fish is, however, to a large extent the same as for salmon. Thus, facility experience related to kingfish production has a high relevance to salmon RAS operations. As for salmon, we have staff with decades of salmon experience. Our salmon production in Norway is proceeding with very low mortality levels and strong fish growth performance.”

The term “easy” was being used in regard to Yellowtail being a warm water fish which makes RAS grow-out “easier” due to the reduced need for cooling the RAS waters as opposed to salmon who prefer cold water.

“10. Bioreactors/MBBR

Our design team has designed and installed bioreactors/MBBR for many years with excellent performance. The technology is running in many RAS facilities today.

Many different MMBR systems are in use today, but self cleaning MMBR systems are quite costly and there are many operators who have chosen to illiminate them for simpler configurations

"11. Best available technology on discharge

Our discharge standard exceeds or meets all Maine DEP standards. Discharge consideration is the subject of the MEPDES application."

Maine DEP and Maine DMR are now looking at these standards as they have been found lacking regarding protecting the public's waters.

"When compared to other large-scale operations, NAF is "best in class" on discharge treatment. "

In fact, other large scale operations such as those already in use by AquaMaof, and and Sustainable Blue far exceed what NAF is proposing.

"The highly regarded CLF, GRMI and the Atlantic Salmon Federation have written recommendations supporting our discharge treatment after independent reviews (found on the Belfast city web page)."

The discharge of NAF's effluent that was reviewed by the parties above was lacking in sufficient detail such that even NAF's contractors commented on this matter during other public sessions reviews which are documented. The data and preliminary studies that the above organizations reviewed was insufficient to allow proper review and analysis. Further studies, which are ongoing, will be needed to accurately assess the complex currents, tidal movements, upwelling, and seasonal temperature changes that show with precision how the effluent will travel. The "blue dot" study that NAF provided to date, was a "snapshot" and did not show the ongoing daily effluent stream that was continuing to be discharged behind this "snapshot" view. Therefore the GRMI, CLF and ASF "recommendations" are incomplete at best, and likely irrelevant due to these insufficiencies.

"Our treatment standards can be compared with other RAS MEPDES applications in Maine. Many other discharge permits are representative of the normal discharge treatment standards. We believe the whole industry will be pushed towards increased treatment standards as such technology is available. NAF has made a choice to be at the forefront of this development."

That is good to hear, as those technologies are available today, in use, and available to NAF. And those discharge treatment standards are already changing. This is why a site permit should not be granted until NAF either licenses these

technologies or shows to the Planning Board that they have incorporated them into their design for Phase 1 & Phase 2.

“The microfiltration NAF is applying among other treatment systems, represents the highest treatment standard in the commercial scale salmon industry by a large margin. No large-scale producers we know of have discharge treatment systems that address potential bacteria and virus risk in the discharge at the level NAF is applying. While the main strategy to manage pathogens is prevention of intake of these into the system, we have still added protection measures for receiving waters beyond what is common in the industry.”

This is incorrect. Many large scale producers are today using advanced applications of Ozone which is the only treatment option for addressing viral risk and complete bacterial disinfection. UV treatment does not effectively kill virus's and the .4/.5 micron filtration that NAF has shown is far too large to capture virus or even some bacteria. We are happy to review this with the Planning Board at any time.

“Zero-discharge solutions have only been established on small scale, never on large commercial scale. The risks of attempting this on larger scale are significant or require a completely different, business model that cannot achieve large-scale fish production today. ”

The above statement is incorrect. Today zero-discharge is being utilized in a production facility in Canada. This facility ships salmon into the United States for sale. Also zero discharge is being used in Europe, Israel and elsewhere. These are all commercial operations and these technologies scale to produce any amount of fish desired. In fact the stated number of tons of fish that NAF desires to produce have been reviewed and it has been confirmed by two different companies that as long as their technologies and equipment are incorporated at the design phase there is no issue in achieving these volumes.

“None of the proposed RAS farms in Maine are based on zero discharge. There are no commercial scale zero discharge RAS farms in Norway or Europe.

None of the large-scale producers have zero discharge, and have a significantly higher discharge of nutrients per pound of fish compared to NordicAquafarms. Maine would not achieve any material growth in RAS farms with a zero-discharge requirement.”

The above statement is incorrect. There are large scale producers, like 8F/AquaMaof that have better discharge rates per pound of fish in operation today. Documentation can be supplied to the Planning Board if desired.

“One approach for zero discharge is aquaponics where plants absorb nutrients. These projects are to a much larger extent vegetable producers, than fish producers. As an example, Superior Fresh in the US produces 100 metric tons of fish, much smaller volumes than large aquaculture producers. The Belfast project would require several hundred acres to pursue such a model. NAF has a centralized nutrient removal approach as most RAS facilities, where nutrients are filtered out and recycled for reuse in the by-products industry.”

The above statement is incomplete and incorrect. Superior Fresh technology can produce larger quantities of fish as per market demand. Its aquaculture can be utilized in a vertical as well as horizontal configuration as others have. Additionally there are operators use algae to remove nutrients.

“One existing farm in North-America claiming zero discharge is also only doing 100 metric tons. Scaling such an approach up to large-scale RAS is high risk.”

The above statement is incorrect, there are farms in North America who use zero discharge today There is no risk for scaling to higher volumes as it simply requires adding on more modules.

“Requiring NAF to go even further beyond the rest of the industry and other projects in Maine on treatment would involve applying vastly different environmental standards to applicants.”

The industry is already there and other projects in Maine can and will meet those standards as per DEP reviews.

“Claims that we are discharging "untreated" water are obviously not correct. In fact, none of the external peer reviews done have raised material concerns regarding the impact of our proposed residual nutrient discharge.”

Many with significant RAS experience would differ with the above statements. We are happy to provide input to the Planning Board on our discussions when the time is right.

“12. UV treatment systems

The question here relates to a scenario where there are pathogens in the RAS system. Preemptive measures keeping pathogens out of the system are the most important. The bay would be the primary source. NAF still employs the highest protection standards for receiving waters in the industry with a multi-stage treatment system for the proposed project.

Ultraviolet light (or UV) is commonly used in aquaculture to neutralize pathogens (bacteria and viruses) that can grow in water. The ability to inactivate bacteria and viruses in water using Ultraviolet (UV) light has been well documented. A large body of research has been published supporting this¹. As a result, using UV light now an industry standard in aquaculture. Such research has also led to the identification of specific parameters for how to best use UV light to sterilize water in fish farms. In some cases, this has even led to minimum thresholds being set by regulatory bodies.

When it comes to treating water with UV, two key parameters are dosage and wavelength. Dosage of UV light is measured in millijoules/square centimeter (denoted mJ/cm²), while wavelength is measured in nanometers (denoted nm).

In Norway, where recirculating aquaculture systems (RAS) are widely used, a regulatory agency (Norwegian Veterinary Authority) dictates a minimum UV dose of 25 mJ/cm . We have committed to using at least 10 times this dosage for treating our discharge in Belfast, Maine. The use generally neutralizes 99 percent of relevant pathogens. Any bacteria are removed in the prior step of microfiltration, while virus would be neutralized in the UV stage. It's effectiveness is increased when combined with microfiltration.

Ozone is also used for water treatment in the proposed facility.”

■ **See our previous comments regarding Ozone and UV treatment. We can provide detail on the use of UV if the Planning Board requests it.**

To be continued: Items #13 - # 16 will be addressed in subsequent comments

Re: Planning Board NAF storm-water management

Public Hearing

Fri 9/6/2019 11:33 AM

To: schlueter.erica@gmail.com <schlueter.erica@gmail.com>

Dear Ms. Schlueter

These issues were not discussed at the meeting. I will provide your comments to the Board so that they can consider your concerns.

Wayne

From: schlueter.erica@gmail.com <schlueter.erica@gmail.com>

Sent: Friday, September 6, 2019 11:10 AM

To: Public Hearing <public@cityofbelfast.org>

Subject: Planning Board NAF storm-water management

Dear Planning Board,

I had to leave the meeting on 9/4 before it was over so perhaps this was discussed. There was discussion how the green roofs would function with snow ice and rain. But nothing about draught/lack of rain? If the soil gets dried out and there is a down pour the water will run off the roof and not be absorbed by the dry soil? Perhaps the greenery is in containers that would keep/contain the water from running off? I'm having trouble recalling the design. Will NAF be watering the green roofs? I saw no information about built in sprinklers. Also will they be using pesticides/herbicides/fertilizers? There was no mention of those. Ages ago at a city council meeting it was mentioned perhaps the City of Belfast could restrict what chemicals could be used on lawns I don't know if any regulations were put in place. So moving forward in the permitting, due to the proximity to streams and the ocean, will there be restriction on the types of chemicals, if any, NAF can use on the green roofs or lawns? My apologies if this was discussed after I left, or this is something to be discussed at a later meeting.

Thank you again for all your time work and thoughtfulness.

Erica Schlueter

Belfast