STATE OF MAINE

MAINE BOARD OF ENVIRONMENTAL PROTECTION
AND
DEPARTMENT OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF
NORDIC AQUAFARMS, INC.

APPLICATIONS FOR ATLANTIC SALMON LAND-BASED AQUACULTURE FACILITY

HEARING - DAY 3
THURSDAY - FEBRUARY 13, 2020

PRESIDING OFFICER: ROBERT DUCHESNE

Reported by Robin J. Dostie, a Notary Public and court reporter in and for the State of Maine, on February 13, 2020, at the University of Maine Hutchinson Center, 80 Belmont Avenue, Belfast, Maine, commencing at 8:00 a.m.

BOARD MEMBERS PRESENT:
MARK DRAPER
SUSAN LESSARD
JAMES PARKER
STEVEN PELLETIER
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DEP & STAFF PRESENT:
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CINDY BERTOCCI, EXECUTIVE ANALYST, BEP
RUTH ANN BURKE, ADMINISTRATIVE ASSISTANT, BEP

PARTIES

Applicant:

Nordic Aquafarms, Inc.

Joanna B. Tourangeau, Esq. (Attorney for Applicant)
Drummond Woodsum
84 Marginal Way
Suite 600
Portland, ME 04101-2480
Phone: (207) 253-0567
jtourangeau@dwmlaw.com

David M. Kallin, Esq.
Drummond Woodsum
84 Marginal Way
Suite 600
Portland, ME 04101-2480
Phone: (207) 253-0567
dkallin@dwmlaw.com

Intervenors:

Upstream Watch & Northport Village Corporation

Kristin Racine, Esq.
Curtis Thaxter
One Canal Plaza, Ste. 1000
Portland, ME 04101
Phone: (207) 774-9000
kracine@curtisthaxter.com

Michael Lannan
Tech Environmental
33A Front Street
Belfast, ME 04915
Phone: (207) 323-4850
mlannan@techenv.com

Gulf of Maine Research Institute

Donald W. Perkins, Jr.
350 Commercial Street
Portland, ME 04101
Phone: (207) 772-2321
don@gmri.org

PARTIES

Intervenors (cont.):

Maine Lobstering Union, Wayne Canning & David Black Jeffrey Mabee & Judith Grace

Kim Ervin Tucker, Esq.
48 Harbour Pointe Drive
Lincolnville, Maine 04849
Phone: (202)841-5439
k.ervitucker@gmail.com

Eleanor Daniels & Donna Broderick
95 Sirota Drive
Searsmont, ME 04973
Phone: (207) 322-6464
ellie@greenstore.com
dl_broderick@hotmail.com

Lawrence Reichard
6 Congress Street #406
Belfast, ME 04915
Phone: (207) 322-1043
lreichard@gmail.com

The Fish Are Okay

Diane Hunt Braybrook
#1 Delemos Street
Belfast ME 04915
Phone: (207) 930-5979
dbraybrook@yahoo.com

Anne Saggese
4 West Waldo Road
Belfast ME 04915
Phone: (207) 322-0651
sweethenrys@gmail.com

PARTIES

Intervenors (cont.):

University of New England

Charles E. Tilburg, Ph.D.
University of New England
Director of School of Marine Programs
11 Hills Beach Road
Biddeford, ME 04005
Phone: (207) 602-2422
ctilburg@une.edu

INDEX PAGE

INDEX PAGE

INDEX PAGE

INDEX PAGE

TRANSCRIPT OF PROCEEDINGS

MR. DUCHESNE: Start moving toward your seats. Considering the snow this morning I think we've done well.

Good morning. I now call to order this session of the public hearing on Nordic Aquafarms applications for Site Location of Development, Natural Resources Protection Act, Air Emissions and Waste Discharge permits. My name is Robert Duchesne. I am a member of the Board of Environmental Protection and I am the Presiding Officer of this hearing. Members of the Board here today are Mark Draper, Susan Lessard of Bucksport, James Parker of Veazie, Steve Pelletier of Yarmouth and Robert Sanford of Gorham.

Other persons present, Peggy Bensinger, Assistant Attorney General and Counsel for the Board; Cindy Bertocci, the Board's Executive Analyst; ruth Ann Burke, the Board's Administrative Assistant; Jerry Reid, the Commissioner of the Department; DEP staff Nick Livesay; Beth Callahan; Kevin Martin; Dawn Hallowell and Dr. John Hopeck. Other staff may be in the room and wandering in and out. Our Court Reporter is Robin Dostie of Dostie Reporting Service. Be kind had to her.

This is day three of the hearing. Today, we'll begin with Upstream's witness Dr. Podolsky and then move to Nordic's waste witnesses on stormwater and erosion and sedimentation control. We plan to break at around 12:30 for lunch. If there are any members of the public here today that would like to ask a question of a witness that you believe was not covered you must submit your question to me in writing. Paper is available on the side table for this purpose. I will review the question, make a determination as to its relevance and ask the question most importantly if there is time to do so. We are under some time constraints, but what we can squeeze in we will. I would ask that question be given to Ruth Ann. She will then forward it to the head of the table here.

At this time, I ask all persons testifying who have not already been sworn in to stand and raise their right hand. Do you affirm that the testimony you are about to give is the whole truth and nothing but the truth?

(Witnesses affirm.)

MR. DUCHESNE: Thank you. Are there any questions before we begin? I would point out that the proceedings are on the web. You can go to

maine.gov.dep/bep and at the bottom of that page you would find a link that gets you the audio for this proceeding today.

So without further adieu, I call Mr. Podolsky up.

RICHARD PODOLSKY: Good morning. Can you hear me all right?

MR. DUCHESNE: Yes. Would you prefer to stand or sit?

RICHARD PODOLSKY: I think I'll -- I'll stand if you can all hear me. Thank you very much.

AUDIENCE MEMBER: We can't hear him.

RICHARD PODOLSKY: It's a pleasure for me to be here. I just found out yesterday that I was going to be asked to give an oral presentation and to be cross-examined, so I haven't had as much time to prepare as I might like, but I -- maybe that's a good thing. I'm very happy to be here. I'm really -- I've been thrilled to be part of this process. I've been watching this project very closely living nearby and respect enormously what the Board does, what the Department does and what everybody in the room is doing and all of the stakeholders.

Just a little bit about myself. I live in Camden, Maine. I came to Maine in the late '70s. I

lived in Bremen, Maine and I taught at the Audubon Camp in Maine. It's an ecology and ornithology camp. I worked on Project Puffin for 11 summers out on the outer islands. And even though I'm originally from New York, I fell in love with the State of Maine and decided this is the place I wanted to be. My background, I have a Bachelor's in Biological Conservation from Madison, Wisconsin, the University of Wisconsin, I have a Master's in Marine Ecology from Rutgers and I have a Ph.D. in Wildlife Ecology from the University of Michigan in Ann Arbor.

When I came to Maine, I worked at the Island Institute for seven years and then in 1990 I started a consulting practice and I've been consulting for the last 30 years and I think that gives me a rare and hopefully useful insight into the process here. Almost all of my consulting is guided by environmental standards that have to be met by projects. I've had an opportunity to work on almost 200 different kinds of projects, among those, 80 windpower projects and that's a specialty of mine. Along the way, I worked on the Exxon Valdez oil spill for three years. I worked on the Deep Water Horizon oil spill for two years. I worked on the Keystone XL Pipeline for a year-and-a-half and during that time

managed around 20 other Ph.D. scientists that were doing environmental work. I've done environmental impact statement and environmental assessments at numerous national seashores. Most of my projects I do the actual field work and design the studies and do the actual field work. About two-thirds of the projects I work on that is my role and I specialize in doing kind of logistically complex projects. Those are the ones I like and -- but a third of projects are what I call due diligence where I'm given a stack of reports like you have in front of you and with the idea that -- to determine their sufficiency in terms of what it is the project is about. So I do a lot of the same kind of work that you're doing now evaluating projects and science that's done by other folks. So that's really the role that I'm playing here.

My role on the Nordic Aquafarm I was asked to provide Upstream Watch with an independent scientific review of project documents that related to natural resources and fishery and prepare a written testimony, which I have done and is in -- in the file. Directly to look at and evaluate the sufficiency of the pre-filed testimony on natural resources by Adele Fiorillo and -- and on fisheries

by Tyler Parent. So when -- when you look at -- or when you see the testimony, I go into some considerable detail and I'd like to profile those for you now and then make myself available for answering any questions.

I want to just give a general background statement that says the following; the way I approach all of this environmental work that I've done is that my expectation is that the amount of science and field work is commensurate with the ambitiousness or the scope of the project. In other words, if a project is very simple, somebody, you know, maybe they're on the border of a small wetland and they want to put a garage up you wouldn't burden that kind of an applicant with a very ambitious set of environmental regulations. So all of this stuff scales. The bigger, the more ambitious the project, the more personally that I -- I raise my expectations and I expect there to be the amount of science and especially field work commensurate with the project. So right away as an overarching statement I'd like to say that the when I looked at the file and I not only read the direct testimony that I just mentioned on natural resources, but because so many other aspects of the project, in particular water and some other

aspects impact the natural resources I looked broadly across the whole file and overall I felt like this looked like the kind of work that would be done during the survey stage. For example, we had testimony yesterday from Elizabeth Ransom that there was a process of filtering and site selection. This -- the level of work that is represented in these files I think is consistent with what you would do for all of those to get to do a survey level. This is not in my opinion the level of research that you would expect for half a billion dollar project with the -- with the footprint that this project has.

And I want to also talk about that. This project has impacts -- intent impacts over a relatively small area and this -- this raised the bar for me. It wasn't just a dollar amount of the project, although that is a staggering amount of money that is being prepared to be spent here, it's the fact that the project has air impact, upland impact, wetland impact, shoreline, intertidal, subtidal, water -- and water column and I just think with a project that is as ambitious as that and as impactful as that we should -- we should have a file that has a lot more in this than we do and that's been my -- my concern all along for this project.

The natural resource studies that I provided rebuttal testimony are a good place for me to exemplify that. For example, the natural resource assessment done associated with the wetland project, there was only -- for all of the wildlife habitat value there was really only one -- what I was able to determine was one partial day of field work. There were two days for benthic sampling and one day of a bathymetric surveying. Let me just frame this in another way. Most of us are familiar -- if you're in Penobscot Bay you're familiar with the three turbines -- wind turbines out on Vinalhaven. For that project, that was just a $14 million project and about the same acreage. I think it was 70 acres, this is a 54 acre campus. For that project, that $14 million project, which is 1/35 of the value of this project we conducted two-and-a-half years of surveys three times a week at the site. We did a year of survey at a reference site so we had a comparison for a total of almost 3,000 hours. This was all before the permit. This was in the pre-construction permitting phase of the project. After the project was approved, we did another year of intense surveys around the turbines to monitor them and that was the end of my association with the project. We turned

that work over to Fox Island and they're -- I don't know what the status of that part is now, but my point here is that there was a $14 million project and we did -- we did thousands of hours of observations. And I it tell you when we went to present our results even though we had that volume of data we were so nervous about this project being approved, we were on tenterhooks over that. So I'm not happy with this -- the filing as it is here. You can't do natural resource surveys and just present online data. These are -- these are called secondary or tertiary sources. I use eBird all of the time, Christmas Bird Count data is readily available. Very valuable. They didn't even use that data. There is also Breeding Bird Atlas data, which is enormously -- enormously potentially valuable. Hawk migration data. So there is a lot of online -- additional online data services, but in no way a project of this scope with the price tag on this project with the footprint that this project has presented to the community, there is no way that that's sufficient for looking at wildlife impact.

Having said that, the data that they presented indicates -- raises some real flags for me. There is over 20 species of bird that are either of

special concern species or have some sort of, you know, pre-endangered or threatened status. We also have most of the bats in Maine are protected and need to be protected and need our protection and there were no bat surveys -- direct bat surveys done, so I was troubled by that. That raised a flag for me. I kept going -- you know, I kept looking for, okay, you know, well, where is -- let me -- I kept turning pages waiting to -- where the data was and it never appeared because it isn't in the file. We need that in the file. Why? You cannot determine a project's impact. It's a data informed process. We need that information and in this case the information that we were provided raises some real flags. There was some real things -- there was some species of special concern that were in that dataset.

Similarly, the other -- so I had that problem, the lack of biological surveys and field surveys that -- that just amazed me. The other thing that I found disquieting was the failure to treat the thermal and chemical -- the discharge as a permanent impact. Now, this is important, like what -- how do you decide what's permanent and what's not? Well, if it's there and it's having an impact, I agree there is some debate how big the area is that the discharge

will indeed impact. I understand that there is a special section of the hearing just to look at that and I implore you to really look at that very carefully because that is a permanent feature. And I was surprised especially in the fisheries direct testimony that that was just not even addressed. Usually you -- when you have an impact you're at least obligated to consider it and then determine if its negligible, it doesn't even warrant analysis, so I didn't even see that, and if they had tried to say that this was not a permanent impact. So that -- that bothered me about it and I don't think I have much more to add. I might have some closing comments.

MR. DUCHESNE: Now would be the time.

RICHARD PODOLSKY: Okay. I want to make this clear, I've worked on over 30 fish farms, mostly -- 20 of them in Canada, 10 here in the United States. I know about aquaculture and I am in favor of aquaculture. I am in favor of resource-based economies here in Maine. I live in Rockport. I live in Camden right now, lead boat trips -- bird watching boat trips out of Camden Harbor quite -- not quite to the Little River, the wind is usually not good enough, but we get to the Ducktrap and turn around.

But I care enormously about this place and I want there to be great resource-based jobs, but at the same time I really want this done environmentally -- in an environmentally sound way.

The last thing I'll say before I make myself available for questions, you know, while our environmental laws -- there is an attempt to dilute our environmental laws at the national level. To try to vacate or weaken the NEPA laws and our wetland laws, I want, you know, I want to see Maine strengthen their environmental laws and do it in a way that is business-friendly and I think that's possible. So I know how hard you all work and try to get all of these things right. And with that, I'll open myself up for any questions or cross.

MR. DUCHESNE: Well, thank you. Those first questions would come, I believe, from Nordic in cross-examination. Yes, at this point you can --

MS. TOURANGEAU: I'm coming.

MR. DUCHESNE: -- sit down, I think, and she can take the podium.

MS. TOURANGEAU: Good morning, Dr. Podolsky. Thank you for being here. How many natural resources reports have you done?

RICHARD PODOLSKY: Over 150.

MS. TOURANGEAU: Did you read the natural resources report that was prepared by Normandeau?

RICHARD PODOLSKY: I did.

MS. TOURANGEAU: Great. Did all of the reports that you did include project specific avian surveys?

RICHARD PODOLSKY: Not all of them. My strength is in ornithology.

MS. TOURANGEAU: Mmm Hmm.

RICHARD PODOLSKY: I'd say about half of the projects I've worked on have been bird related very much so and maybe a little bit more than that. I've done too many projects to be sure of that, but I've had a lot of exposure to other species as well, but birds are my thing.

MS. TOURANGEAU: Great. Did all of those reports include project specific herpetofauna surveys?

RICHARD PODOLSKY: No, I wouldn't say all of them, but I've done a lot of field surveys for herpetofauna.

MS. TOURANGEAU: You're much better at saying it than I am. Did all of the reports that you've done include project-specific bat studies?

RICHARD PODOLSKY: Not all of them. But

that I know -- I just -- in the last 10 years I've been doing more bat work because people figure that, well, they're birds, they fly, and so you would do the bats too, so I've really learned a lot of that biology and I've done about a dozen very specific bat surveys and I know all of the methodologies and the equipment. You need special sensors and detectors to bird -- do bat work properly. And just as a little bit of an aside, I can attest to the fact that the habitat over the woodlands are -- are very amendable woodlands. Mature woodlands are very good for bat over wintering, so there is good -- there is good bat habitat and I would definitely like to see what species are actually there.

MS. TOURANGEAU: Mmm Hmm. And is that why -- is it -- doing a project specific bat study, is that how you would also address kind of project work windows to ensure that that -- the presence of that habitat is addressed by only doing construction when the species would not be present?

RICHARD PODOLSKY: That wouldn't be really enough because we do have bats that are over winter. I think there might have been a mistake in testimony that said they're -- that they leave, but most of them don't actually. We have a few migratory bats,

but a good bat survey would a -- put quite a few detectors so we can hear bats during their breeding and feeding season and then it would include some surveys of habitat suitability. You really want to look for like over mature white pines where the bark is coming free and things like that because they'll get -- their hibernacular will be in those crevices.

MS. TOURANGEAU: Mmm Hmm. And did all of the natural resources reports that you did include project specific fisheries studies?

RICHARD PODOLSKY: No. No, they didn't all include that, but it -- but a lot of the work I do -- I usually -- I am not an ichthyologist, so I don't do the fish work myself. It's not my specialty, but I have managed ichthyologists on projects. I did a big project in West Virginia on mountaintop removal and fish are very sensitive to the outflows from those types of places and I work very closely with the fish biologist on that, but, no, I don't do fish personally.

MS. TOURANGEAU: Isn't it true that the need for project specific biological surveys is determined based on a combination of preliminary assessment of the likelihood of a species presence and the anticipated project impacts?

RICHARD PODOLSKY: Yes, I think that captures it. I would agree with that.

MS. TOURANGEAU: Isn't it also true that the decision whether to do a project specific study is based on consultation with state and federal agencies?

RICHARD PODOLSKY: Yes, that's always a component.

MS. TOURANGEAU: Are you aware that there were 16 days of field study?

RICHARD PODOLSKY: I am aware of that and I think nine of them were devoted to wetland delineation and the rest to everything else. But, as I mentioned, I just mentioned a project that was 1/35 the size of this project and we did 500 days of surveys just for birds on that project. We also did PRPs, they don't -- you don't need to do as many days because...

MS. TOURANGEAU: And by 1/35 of the size, you're not looking at the criteria for whether a project-specific study is necessary, you're talking about cost?

RICHARD PODOLSKY: Yeah, just the scope. I mean, I think the -- the numerical value, I think, is a window into the project. It's a surrogate for how

ambitious the project is.

MS. TOURANGEAU: So are you saying that the project cost is actually what determines how many project specific surveys you need to do?

RICHARD PODOLSKY: No, I wouldn't say that. It really should work backwards from the actual impact. And, again, this is an intense -- this project will have intense impact in a very small area to both uplands and wetlands. It's a very unique -- this is a very unique project. The only thing I think it comes close to are the power plants that discharge water as a cool -- that have permit for discharging warm water, so this is kind of like that because, in fact, there is going to be a power plant on this project, but there will also be a cement plant and fish growing out -- grow-out facility, so that's -- I would look at it that way. Like, so you might even therefore ask yourself if this was a small power plant that was asking to send cooling water out into receiving native waters would the environmental work be sufficient to permit that to allow you to really understand all of the impact and in that case, like in this case, I would say no.

MS. TOURANGEAU: Would you say that the impact there would be primarily to fisheries?

RICHARD PODOLSKY: Well, there is air impact usually. I mean, I have done power plant -- a fair bit of power plant work and the thermal features of those discharge waters from power plants are not unlike the one that's proposed here.

MS. TOURANGEAU: Okay.

RICHARD PODOLSKY: I did -- I did some actual specific research on that and there would be -- it's not even so much fisheries because, you know, fish, you know, mature adult fish, it won't be so much an issue there. I -- in my testimony you'll see that I mostly talk about a more subtle food chain and trophic impact of the -- of the thermal feature, but I know that that's not in the scope of this right now.

MS. TOURANGEAU: Yup.

RICHARD PODOLSKY: There is -- there will be a special session on discharge water --

MS. TOURANGEAU: Yup.

RICHARD PODOLSKY: -- and I'll be very interested to see if some of the nuances that I tried to integrate into my written testimony finds its way there.

MS. TOURANGEAU: Are you aware that the field work spanned all four seasons?

RICHARD PODOLSKY: I do know that. I think I know that their -- most of the wetland surveys were -- I think there was some March work, there was some June, there was some July work, there was some December work, but, you know, the total -- I added up because I was amazed at this and I just wanted to see it for myself. I was very careful. I went back through and added up the total number of field days devoted to this project and I have never seen as an ambitious a project --

MS. TOURANGEAU: And by ambitious you're talking cost?

RICHARD PODOLSKY: And impact together. -- with such little work, field work performed.

MS. TOURANGEAU: You spoke a little bit about other aquaculture projects, are you aware that aquaculture and water is exempt from NRPA?

RICHARD PODOLSKY: Is exempt from?

MS. TOURANGEAU: NRPA, the Natural Resources Protection Act.

RICHARD PODOLSKY: I am not aware of that, but I do know that Maine is perceived as favorable to aquaculture and I know why. And I think that what you just said, if that is indeed true, I don't -- I didn't know that, but I know that, you know, they

say, oh, well we're coming and you've got such clean, clear water, cold, clear water, but I think another aspect of that is there are some aspects of our laws right now that are favorable and I understand that. And I am in favor of aquaculture. Good aquaculture, clean aquaculture sited in the right locations and using the appropriate technology, but, yes, I think I agree with what you just said.

MS. TOURANGEAU: You testified that the temperatures in the bay will be increased 15 to 20 degrees Fahrenheit over 700 to 1,500 football fields?

RICHARD PODOLSKY: I was just -- that statement comes from the maps that Nordic has showing the thermal anomaly and how it changes in four seasons both in the -- I just wanted -- I was curious so I brought that over that into -- that data over into a GIS. I wanted to see how big that anomaly that they said, but I understand that there will be a hot spot in the middle closest to where the discharge occurs and that like a bullseye out from there it will reduce. But, again, that may be something we want to preserve for the discharge, but I'm concerned about that. I listened to Dr. Pettigrew yesterday. I know about ecological modeling. I have -- I just am really looking forward to the discharge part of

the hearing because that -- I think it's very, very important. There is some nuances there. But, yes, the temperature differential will average what I said in my report. I downloaded it and looked at the data. I think it's a little disingenuous to say, oh, there will be some number of days in the summer where it will actually be cooler. That is -- will be very rare. I didn't actually run that number, but it's going to be less than, I'll just back of the envelope, it's going to be less than 20 days of the year where the actual water is cold -- cooler than ambient. And by the way, even if it was to be cooler, there is an ecological implication of introducing that thermal boundary difference. It just has kind of -- it's still not something you want and I didn't --

MS. TOURANGEAU: Okay. I've got some questions on that, so we'll get there.

RICHARD PODOLSKY: Yeah. Oh, good.

MS. TOURANGEAU: Are you aware that the discharge will range from 18 to 15 degrees year-round?

RICHARD PODOLSKY: Yes, I am aware of that.

MS. TOURANGEAU: Are you aware that the daily tide alone in this area is more than a thousand

times bigger than Nordic's daily discharge?

RICHARD PODOLSKY: I -- I am aware that that's a number that's been put out there. I think one has to be careful when you're thinking about the discharge and its fate and transport, what number you decide to put in the denominator, in other words, what are you dividing it by. Some of the testimony uses the entire volume of Penobscot Bay as if that was going to be passing directly over the discharge as a way to make the number incontestably small. I would just say I'm going to let the discharge hearing take care of that. But I am happy -- anything that's in my testimony on that matter I am happy to ask (sic) a question for right now.

MS. TOURANGEAU: Yup. Are you aware that within a 200 foot radius of the outfall the temperature difference between the discharge in the bay is only .3 degrees centigrade?

RICHARD PODOLSKY: That may be true. I know that that's been asserted. I do know that the temperature is going to actually decline very, very rapidly, I know that, but there are other aspects of it. It is permanent meaning every day that 7.7 million gallons of water that for over 300 days of the year will be considerably warmer than ambient.

MS. TOURANGEAU: .3 degrees centigrade.
RICHARD PODOLSKY: Pardon me?
MS. TOURANGEAU: .3 degrees centigrade.
RICHARD PODOLSKY: Well, we'll learn -- in the -- when the discharge -- you'll be -- at that distance, yes, but I'm talking about at the discharge itself relevant to receiving waters.
MS. TOURANGEAU: Are you aware that the Atlantic States Marine Fisheries Commission considers 12 to 18 degrees optimal or lobster recruitment?
RICHARD PODOLSKY: I am not aware of that particular fact. But I do know this about that, we have a couple of species in Maine that are textbook examples of species for which -- for whom which very small single digit degree changes in temperature are enough to have them move. The American lobster is one of them. The other one is -- remember the Maine shrimp we used to have? They are allegedly gone from our waters because of very small changes just from warming of the bay or warming of the oceans. So a lobster -- I don't -- wouldn't want to claim to be a lobster biologist because they're very complex species with very different needs of recruitment, but I wouldn't disagree that this -- that that's true.
MS. TOURANGEAU: Are you aware that the

discharge salinity will be 20 to 25 parts per trillion year-round?

RICHARD PODOLSKY: I wasn't -- I don't -- I didn't -- I don't remember that number. What -- what is the receiving waters at the discharge on average?

MS. RACINE: I just would object to the extent that this doesn't deal with the pre-filed testimony. I understand that we went a bit into the thermal aspects because Dr. Podolsky touched on that, but I don't know if he touched on the salinity of the water.

RICHARD PODOLSKY: I did not. I didn't touch on salinity.

MS. TOURANGEAU: You didn't touch on salinity but you did touch on the impacts of the discharge, its temperature and its other qualities to --

MR. DUCHESNE: Yes, I did note the objection. I do think it's close enough to be relevant that I can allow the question to go forward. If it strays too much further I would expect another objection.

MS. TOURANGEAU: And you can just say no if it wasn't in --

RICHARD PODOLSKY: I am not aware of what

you said. I don't recall what the salinity of the discharge waters was going to. I know it's a mix of fresh water from the three sources and I don't know the salinity of it. It didn't come up as a factor for me and I don't know what the salinity is at that receiving station.

MS. TOURANGEAU: Are you aware that lobster are documented to prefer this salinity?

RICHARD PODOLSKY: I don't know anything about that. They don't have -- lobsters don't have --

MS. BENSINGER: Hold on.

MR. DUCHESNE: I believe when the microphone is working we're about to hear an objection.

MS. RACINE: Objection, Again, to the salinity, I think...

MR. DUCHESNE: And it's also he would appear to be exceeding the bounds of what his expertise is on the testimony that was pre-filed, so.

MS. TOURANGEAU: The pre-filed testimony did include extensive comments on impacts of the discharge to fisheries.

RICHARD PODOLSKY: Okay. Then can I --

MS. RACINE: But perhaps --

MR. DUCHESNE: But not on salinity as I

recall.

MS. RACINE: Salinity directly related to lobster.

RICHARD PODOLSKY: I can -- I will --

MR. DUCHESNE: Right.

RICHARD PODOLSKY: -- repeat one thing that I did say in my testimony about lobsters that I think may be relevant and -- and it was really more of a question. Around the edges of this thermal feature plankton will have a chance of suffering some sort of thermal or lethal stress. There may be permanently around some -- at some distance plankton, which are the base of the food chain, phytoplankton and zooplankton, they may parish because of that change in temperature that is way beyond their capacity and in so doing they will fall from the water column and either collect on the bottom or they will be kept in suspension, but they'll be dead phytoplankton. And I worry and raise that with regards to lobsters because some of these plankton before they die they may have taken up some of the chemical, so I do talk about that in my testimony, but I do it just as a raising of a question that I did not see addressed because the thermal feature was not treated as a permanent impact to come back to that point. So I felt it was

necessary for me to just do kind of an ah-ha section and say this is something that we're thinking about in terms of trophic ecology. This could be happening. And I spoke to a scientist who studies shallow water thermal plumes. Everybody knows the deep Atlantic thermal plumes that are so famous. Well, I was surprised to learn -- well, I was looking for a natural example because there always is one of how this feature, this thermal discharge, if there was any corollary or a surrogate in the natural world and indeed there are. We have lots of shallow water thermal plumes and I spoke to a scientist who studies this and he says, you know what's worse, the heat is less of an issue. The plankton and the mortality around in the water column in the vicinity that is a permanent feature and he goes, that, you want to be concerned about and I -- and I am.

MS. TOURANGEAU: Are you aware that Maine's Department of Marine Resources commented that this project as proposed should not result in significant adverse impact to marine resources?

RICHARD PODOLSKY: I think -- I think I am aware that that's been said.

MS. TOURANGEAU: Okay. Do you have experience in assessing fish passage?

RICHARD PODOLSKY: Fish?
MS. TOURANGEAU: Passage.
RICHARD PODOLSKY: No. No.
MS. TOURANGEAU: What is the basis for your statement regarding the potential limits on migratory fish to navigate around water in the range of 15 to 18 degrees centigrade?
RICHARD PODOLSKY: I just raised the question. I don't know how our endangered Atlantic salmon, which are struggling to make a recovery, I cannot speak directly to their use or how this feature in that part of Belfast Bay -- of the southern end of Belfast Bay, I can't speak with any real authority. I just -- again, what I did here is to just comment on and provide a peer review, but because, again, on the fisheries the thermal feature was not even addressed and treated as a permanent project feature that needs to be analyzed and discussed. In the absence that -- nature abhors a vacuum, so in the -- in the absence of that treatment, I filled it with some fairly informed and reasonable questions. That was my goal.
MS. TOURANGEAU: You have described your work as an independent peer review?
RICHARD PODOLSKY: Yes.

MS. TOURANGEAU: Are you testifying here today on behalf of a party to these proceedings?

RICHARD PODOLSKY: I am, but as far as their position with regards to the project, I -- I made it very clear to them and I do to all my clients, I -- I do a scientific review. This -- this rebuttal testimony, if Nordic had asked me like lots of companies do, you know, how -- you know, how good is this, how are we doing here, you know. We did that for the Keystone XL Pipeline. We didn't -- we were hired to do a third-party review of the EIS. The state department cared so much they were like let's bring in these other guys to read over the EIS and tell us how we did, so that's what I did. And it wouldn't have mattered who the party was, I would have happily have sat down with Nordic and said, you know, the same -- same report.

MS. TOURANGEAU: Do you think this project is aptly compared to the Keystone project?

RICHARD PODOLSKY: Not at all, no. They're very different, but...

MS. TOURANGEAU: Thank you.

MR. DUCHESNE: Board questions and staff questions. Mr. Parker.

MR. PARKER: This will be a simple one for

you to answer probably. You suggested that they didn't provide adequate research time to the bird life and stuff on this particular site and then you talked about a wind turbine out on the island that you spent like 500 days or something reviewing. My -- and I'm just a layman, but when I sit back and I listen to what's going on, one of the primary concerns with siting wind turbines was the wind turbine's physical effect on birds migrating through the area, how many birds going to be killed because they were drawn into the plumes. It seems to me that that would take a much longer time to determine because you've got different species at different times and you've got to maybe look at a couple of seasons. Is what you're saying a real comparison to what was done here?

RICHARD PODOLSKY: I think it -- I do think it is for the following reason -- actually, wind turbines you -- we know how they perform in the environment. We've had -- there are so many that have been put up in every region of the country that it's well-known and in spite of that we still do this kind of work and so, yeah, I do think it's a comparison. In fact, this project is way more ambitious, but we know bird -- a turbine -- get

killed in the neighborhood of like two to seven birds per turbine per year and the assessment that we did on Vinalhaven showed that we were a little bit below -- below that number. This project is so much more impactful. There are even opportunities on this project to kill more birds than a wind turbine by far. Air handlers on top of buildings -- and I haven't really looked -- this is a separate thing that I've done. I did the avian assessment for the four towers that replaced the World Trade Center in New York. Talk about big structures that kill many birds. And one of the things that I found through my work with architecture in addition to glass -- collision with glass and turbine blades, the air handling equipment on the top of buildings is a real entrap -- it causes death by entrapment, so I haven't even looked at the roof layout plans to see what the impact is, but there are other avian concerns around this project that I did not address in my testimony. But, yes, to answer your question very straightforward, I think that there is -- it is a fair comparison. This project is way more ambitious than a wind -- than a small wind turbine project on a -- built on an abandoned quarry. I mean, here we're talking about a power plant, a fish plant,

well, everything we're talking about and in one of the most pristine touched stone habitats in Belfast. You -- I wasn't here, but I did list in to some of the compelling testimony. And on the Vinalhaven project we did a public survey three years before -- before we even started this ambitious bird survey we went out to the public and asked every person that we could get an answer from and we had 98 percent approval for that project from the -- there were only six folks in opposition and I think 4 or 500 in favor of that project. That's also something that would be nice to do in an early scoping exercise is figure out a way to really find out the temperature of the community in a quantitative so we really know how people feel, it's not just by emotion or whatever.

MR. DUCHESNE: Mr. Pelletier.

MR. PELLETIER: Hi, Mr. Podolsky. I have a few questions, but just to follow-up first on Mr. Parker's comment about Vinalhaven. If I recall, that was three turbines, it wasn't reviewed by DEP, it was one of the earlier wind projects in Maine before they really had an understanding of collision impacts. You also had nesting Eagles within a half a mile, if I remember, of the project here.

RICHARD PODOLSKY: Not a half a mile, but we

had a lot of Eagles in that area, yes.

MR. PELLETIER: That's correct. And so that wasn't just migratory birds, but you had resident Eagles living within very close proximity to this project and -- and because it wasn't required -- they weren't at that time required, if I recall correctly, there wasn't a DEP process for that review, that there was kind of an extra high anxiety about the collision impacts on that project. So I'm not -- I'm kind of in the same boat here wondering, you know, about trying to compare two projects together like that. So if I shift over to here and I'm looking at the avian impacts here, for instance, was there something in particular -- is there a particular type of upland habitat here that may -- that the loss of that might have at some sort of population level impact on terrestrial birds?

RICHARD PODOLSKY: I don't think it would be very -- it would be difficult unless we knew that there was an endangered species on the site and we don't because there is not sufficient data to say whether or not this project is going to run afoul of the Endangered Species Act. I think we know -- we know that there are no Eagles there, so that's somewhat of a comfort and Peregrine Falcon is still a

listed species that's not there, but I would say with the number -- 21 species of bird that either fall into special concern category -- I mean, these are all on-ramps to becoming threatened and threatened is an on-ramp to becoming endangered. And this raised -- this raised a flag for me, but, again, without actual real surveys on the location, I cannot say. But to answer your question, Steve, because I know where you're going, I think it would be hard at 54 acres to find some bird that -- where impact to them on that site would cause a population level impact.

MR. PELLETIER: That's not -- let's not worry about the population. I'm looking for a particular habitat feature on that property that may suggest that there is a species of particular concern. And I understand that a lot of those species are migratory species that stop over. We're on a coastal place, you see that, but is there something about this particular habitat that's unusual or that can't be found anywhere within this close proximity never mind up and down the coast of Maine?

RICHARD PODOLSKY: It is a very unique spot, I will just say that. I cannot -- in terms of the

proximity of intertidal stream, sheets of water in the form of the two reservoirs, woodland and some field habitat, I actually -- when I read the eBird report and then of course I'm very familiar with that area and have hiked it plenty, I consider it a biodiversity hot spot, but I really -- I didn't really want to raise that because that's not something that was regulatorily driven. The other thing that I think is I think it is a significant scenic resource. Many years ago, but I remember the project, we did a scenic inventory on Islesboro. It was so important. It gave the community a chance to decide what they loved and what was important to them. Again, I understand that this is not a regulatory feature, but I would say this, that little pocket area up there with the tight mix of habitats that I just mentioned all close together raises a flag for me. To me, it says this is a special place and I do believe the DNR has listed it as a special wildlife habitat, but I haven't confirmed that in the -- on their data -- on their site.

MR. PELLETIER: I'd like to just stay within -- I understand that it's -- it's unique in that aspect where there is a number of different types of habitats in close proximity that are all

working together, but individually when you're looking to do an assessment of those things and I break each one of those down I'm looking for some special feature that I'm not going to find on the landscape that's going to harbor particularly a species of concern and that's my question there. That's my point to that and I don't want to go back and forth because this is more of a beer or coffee discussion, but that's -- I'm looking for a special feature on that property including the tidal wetlands that I'm not going to find in other places just to move on.

RICHARD PODOLSKY: Yes, we can move on. I don't -- there is -- there is nothing absolutely unique to that site.

MR. PELLETIER: Thank you.

RICHARD PODOLSKY: If that's what you're trying to get me to say, I won't disagree. You can find similar habitats in other places --

MR. PELLETIER: Yup.

RICHARD PODOLSKY: -- but I --

MR. PELLETIER: We've been talking about -- bats have been coming up over the last couple of days too and you mentioned the fact that there might be over wintering habitat for bats on -- on the

property. Could you elaborate a little bit on that?

RICHARD PODOLSKY: Just that I know that when bats choose to over winter in New England, mature forests with in particular some senescent trees that are on the way out, some of the bark has peeled away, and in particular white pines, they are -- we don't have a survey protocol for bats here in Maine that really quantifies this aspect, but in California when we do projects there, if they're -- we have to check a box that says we look for peeling bark off of trees. So, yes, there is the chance, but my main point in -- with regards to bats as it is with birds is that when you have this many indicators that something could be there that are of conservation concern and have regulatory expectations, when you -- when you have the kind of data that these preliminary surveys have they tell you go and get more data. Go and do an actual bat survey or --

MR. PELLETIER: And that's what -- that's why I want to stay -- that's my point is there -- is there some special feature about the habitats on this -- in this project area that are unique that allow -- that would -- that would, first of all, spark an interest by the agencies to say, yes, go do

these surveys --

RICHARD PODOLSKY: Old growth.

MR. PELLETIER: -- and then when they do they -- as somebody who is doing these surveys that I should be focused on these things.

RICHARD PODOLSKY: Yes.

MR. PELLETIER: In the pine that are out there, are those pine not something similar that we're finding up and down this whole region?

RICHARD PODOLSKY: No. You can find similar old -- old white pines in other locations.

MR. PELLETIER: This property has been described as old growth and we know that it's not.

RICHARD PODOLSKY: No, it's a regrowth.

MR. PELLETIER: It's a regrowth. And we know that, you know, it's a nice -- it's a nice piece of woodland by some -- with riparian habitat right by some nice waterways. That's -- that's what it is. It's nice. And it provides good recreational opportunities and nice aesthetics, but, again, I'm looking for special individual habitat components. And the bat protocol that we have in Maine, not in California, California is a whole different -- it's a Mediterranean climate, it's a different type of situation than we have here. We're not likely to

find non-migratory species here. The migratory species, I mean, we've spent a lot of time in Maine looking for hibernaculate in the wintertime and there is very few places and I grant you that 400 years ago we had chestnuts and much, much larger trees that may create better thermal barrier, but I -- but I don't know that we've got the -- that kind of habitat here. And so that the protocols for bats allow us to look at -- if we do a harvest in the winter it shouldn't be a problem, but not -- any comments about that?

RICHARD PODOLSKY: Only that there was enough in the report, teaser information that led me to believe that, okay, a bonafide bat survey is warranted just in the same way that I feel both on upland birds, shore birds and -- and water birds, sea ducks in particular, I -- I think that what's here is all -- points towards we need those data to evaluate the project.

MR. PELLETIER: All right. Thank you. And just final question. I did notice in your testimony that you talked about biologically active plume covering one or more square miles of Belfast Bay and I am just -- I am assuming that one or more square miles, the basis to that was similar to the football field discussion you just had?

RICHARD PODOLSKY: It is. It's related to that, but it's also related to this feature which was missed and that is in slack water the thermal discharge will chimney to the surface and on strong southwest wind it will be blown in the summer towards Belfast Harbor. Now, how far the anomaly and how we want to define what constitutes a biologically or ecologically relevant anomaly, but I believe that in slack water hot water rises like hot air and I'm -- hopefully I'm not guilty of this in my question answering.

(Laughter.)

RICHARD PODOLSKY: But in slack water when there is no tidal movement it will chimney to the surface and we have strong southwest winds in the summer and it will drag that warm surface water and, again, if you believe like I do that the edges of that thermal feature will have an impact on food chain impact you should be concerned. And similarly in the winter during slack water the discharge will chimney to the surface and our northwest winds will blow it to the south towards Northport. Again, how far south, I don't know, but if you look at Nordic's own maps for the anomaly those -- I relied on those.

MR. PELLETIER: Thank you.

RICHARD PODOLSKY: You're very welcome.

MR. DUCHESNE: Mr. Sanford.

MR. SANFORD: Thank you. So I see this as kind of three issues that has arisen here and the first you addressed the most apparently. One is sufficiency of background studies; two is whether or not there is an irrevocable commitment of significant resources, which were addressed by two Board members in their questions; and the third one is whether or not things are mitigatable through permit conditions or project modifications or such. And so I'd like to know if you think whether or not if there was -- if the study confirmed what you think it might suggest, do you think that there are mitigative factors that could render impacts less significant or do you think this is -- there is just simply too much?

RICHARD PODOLSKY: My -- thank you for that question. My written rebuttal testimony did not address anything having to do with mitigation, so I'm happy to take a stab at that, but it would -- it's not something that I really analyzed or thought through very much. This is -- that begs the question what other available technologies are there for growing salmon. I am not crazy personally about the discharge feature of this project and I wish there

was another -- I wish that was not part of the project. So a short answer is as far as mitigation, I would find another technique. I remember years ago I was introduced to a crazy group down in Massachusetts called the New Alchemy Institute, John Todd, and they came up with ways of growing fish. He was kind of a disciple of Steward Brand and the Whole Earth Catalogue and they're just like fish -- fish hippies, I guess, but there were -- they found ways to reuse that. And I understand that there are facilities that take -- that discharge water is -- could be valuable it could it could run a hydroponic, but, again, I don't -- I don't want to claim -- try to redesign Nordic's project, but I'm a little underwhelmed by the technology. I think there's been -- I've heard since I was in college of other ways to grow fish and -- and derive more benefit and I would roof to see Belfast host something like that, but I didn't really analyze for mitigation.

MR. SANFORD: So we've heard some testimony that indicates the technology is state-of-the-art, do you think it's not?

RICHARD PODOLSKY: I'm not really qualified to really say that. I am very familiar with pen aquaculture for salmon culture and I have this, you

know, this state that is very familiar with the environmental ups and downs of that and I'm pretty well versed in that. As far as indoor salmon facilities, I think that's, you know, that would have been -- it would be nice to have a white paper on that as part of an initial package that analyzes, you know, the whole -- all of the technologies that are available and give the community and the State of Maine a chance to make sure we're getting the best. Somebody said earlier, I was just so pleased to hear it, that we are -- this project will define the future in many ways and I know it kind of -- it does bother me a little bit. I'd be lying if I didn't say, well, everyone is rushing here because of our cold, clean water and then what they want to do in their process is actually put back in warm effluent. The logic of that and the irony of that I find a little disquieting.

MR. DUCHESNE: Mr. Martin.

MR. MARTIN: A couple of questions. I just wanted to clarify and I think we got some of this answered in cross, but your position on the thermal anomaly is limited more towards the discharge and I guess the effect on the food chain potentially of the thermal discharge not necessarily and I reference

this -- and referenced this in Mr. Parent's testimony yesterday regarding migration of the fish or adult fish through the thermal plume; is that correct?

RICHARD PODOLSKY: That is correct. I don't have a real strong opinion. Again, adult fish -- I think I agree with Mr. Parent on that that probably if they, you know, encountered something they can, you know, it's not going to be -- we don't know how big it's going to be and hopefully in the discharge session we'll be able to get our arms round that, but I -- my sense is and, again, I'm not an ichthyologist, but my sense is, you know, maybe adult fish, you know, they're -- you're going to be able to, you know, school around, but.

MR. MARTIN: Sure. Thank you.

RICHARD PODOLSKY: Yes.

MR. MARTIN: And my second question is kind of regarding our NRPA impacts here and this was touched on a little bit before with Board member questions. So it seems like you're -- you've kind of referenced that maybe they haven't identified particular impacts or something along those lines under NRPA, but I guess my question is to the extent they have identified them and understanding that the burden is on the applicant here, is there a

particular impact that has been identified that you feel either hasn't been minimized or it's unreasonable in some way? And I think we got in that direction before and it was kind of steered towards the discharge technology, but I'm looking here from a NRPA perspective and looking at resources that need to be protected. Is there anything about the project that's been proposed thus far that doesn't meet that particular aspect?

RICHARD PODOLSKY: I don't know that for sure because that's, you know, you folks have your check boxes and what constitutes sufficiency. I won't bring up the thermal feature again. Again, my main issue there is that it wasn't treated as a permanent impact. I think it needs to be or at least I think we need to be told why it's not a permanent feature of the project. But the other one that I do have a little bit of concern about, but I don't know that it reaches a threshold or break point for the Board is the wetlands, some of which were considered to be significant wetlands and there -- I think, there were -- I read the reports. I know -- I think there were 13 individual wetlands and it went back and they had to be redelineated. I don't know what the current laws are right now in Maine but it's a

lot of the footprint of that 54 acres. I think it's some 34 acres are going to be eliminated and in those there are some number of wetlands. I know there is some mitigation that has been proposed as there has to be, but that's the only other one that really jumps out at me. The other one is that we may -- the project may actually be -- has a chance of bumping up into the Endangered Species Act. It's -- I can't -- we cannot rule that out. We would need more data. Maybe not three years of data like we did in the wind power project, but certainly a good solid full year breeding bird survey to find out what -- what is there. We've got so many species that are on the on-ramp to -- and also it's been in the news lately, we've lost 3 billion birds. I know that's not -- has not translated down into regulatory reality yet, but I'd like to think Maine -- we want to be better than other states and be preemptive, but that's just an aside. I am also concerned about our water birds are declining tremendously, our eiders and scoters and our sea ducks as a group are really reduced and, honestly, I don't -- I haven't been convinced what the reason is. I'm hoping it's not something local, that it's just on their breeding grounds, but we have -- our -- we have so much -- so fewer sea ducks

and I don't want to see them lose any habitat. When you drive up from Camden to Belfast there is two hot spots for sea ducks, one is the Ducktrap River and I implore you to take the little turn down Howe Point Road and park down there, you will have one of the big --

MR. MARTIN: Dr. Podolsky, I don't mean to cut you off, but I want to stick --

RICHARD PODOLSKY: Sorry. I'm giving birding tips.

MR. MARTIN: I just want to stick to where we have to analyze this under the standard, so. And you touched on this a little bit, I guess, if you're viewing kind of how the parcel is taken out by the project and particular impacts --

RICHARD PODOLSKY: Yes.

MR. MARTIN: -- and is this something we can consider. Is there either -- any comment that you have regarding potentially that alternative analysis that was touched on by Ms. Ransom yesterday or are there particular aspects of the scoring system that you have any comment? I guess at this point we're obviously going to make this determination in conjunction with the Board, is there anything here that you would like to add in terms of information

where the purpose here is we're keeping our eyes open and we're trying to glean information on specific topics and do you have any comments on those?

RICHARD PODOLSKY: Yes. I was underwhelmed by the discussion and what I read on the alternatives analysis. I don't consider it a valid alternatives analysis. I didn't buy it. I think there are other sights. I think that this type of technology especially as it is presented is -- would be far better suited in some other location, a brownfield location. I found it like in inexplicable that the site is featured as so high when the actual water that the fish need is much warmer -- they are actually grown in much warmer water, so I don't know why this -- that's just is a question I have, so, yeah, I think that there -- I would have liked to have seen more alternatives really investigated.

MR. MARTIN: Thank you. And it sounds like it was more towards the broader perspective and I asked Ms. Ransom those questions yesterday regarding brownfield, is there anything on the narrower perspective, meaning parcel-specific, and natural resources-specific on the parcel location or, you know, particular impacts, function of habitat, anything along those lines that you'd like to comment

on?

RICHARD PODOLSKY: Well, just what my testimony says that there is good indications that there are species of birds, bats, waterfowl that may be significant. There is possible -- again, we don't know about the herpetofauna there because there really was -- the survey was canceled and not rescheduled and you really need a thorough full biological survey of a project of this magnitude.

MR. MARTIN: Right and we've heard that. I hate to interrupt you again, but the impacts that have been identified, I guess that's what I'm looking for, is they have identified some impacts of some particular aspects and I've stated this before and I understand the burden is on the applicant here, but is there anything you would have to add regarding those particular impacts that are -- either haven't been minimized, avoided or outright unreasonable?

RICHARD PODOLSKY: Yeah, just the ones that are in my testimony.

MR. MARTIN: Thank you.

MR. DUCHESNE: Thank you. I do have some questions as well. Probably no big surprise, this has been fascinating for me because I was in the Legislature for 12 years and NRPA was like my

favorite law. I spent more time trying to improve that and defend that as possible, so when we talk NRPA I get excited, forgive me. Now, you are familiar with the site?

RICHARD PODOLSKY: The site?

MR. DUCHESNE: The site itself?

RICHARD PODOLSKY: Yes, I am.

MR. DUCHESNE: Yeah, okay. I shared in my questioning yesterday some of the same concerns that I think I heard from you and I want to confirm that I did hear that. Birds, bats, reptiles, amphibians, the report basically says we didn't look, but we did a habitat assessment and here is what we think. Did you read it the same way?

RICHARD PODOLSKY: Yes, I did. I agree with all of your comments and then some, yup.

MR. DUCHESNE: Yeah. But the report also basically concedes that a lot of the species we might be concerned about are actually there. I think they conceded that all eight bat species could potentially be there.

RICHARD PODOLSKY: Yeah.

MR. DUCHESNE: They listed a number of birds that are on global lists that could be there. The one thing they said probably isn't there is a number

of amphibians, I think, that would not be in that habitat and furthermore if there are no vernal pools some of the other species would probably not be there. Did you disagree with any part of that?

RICHARD PODOLSKY: I did not disagree with that. And I also, if may add, habitat suitability, we always do that and if it sounds good and it sounds like something that should be done, but habitat suitability is just kind of like doing a census where all you do is count houses but you don't know anything about who is in the house, you just know there is a house there and somebody could be there. So I do a lot of habitat suitability. When you're doing kind of very minimal work you rely a lot on habitat suitability, you say, well, this is a really high quality habitat for this species, but on this you actually go and look for the species that are there. It would be akin to doing a census by just counting buildings and that's -- it doesn't tell you very much about who is living there.

MR. DUCHESNE: Mmm Hmm. Yup. And as a consultant I guess you've probably advised on a lot of NRPA permits and you know how NRPA works?

RICHARD PODOLSKY: Yes.

MR. DUCHESNE: So significant wildlife

habitat would be a NRPA issue for the Board to consider, did you -- and building on what Mr. Martin's questions were about on specific habitats, what impact to significant wildlife habitat would actually trigger requirements under NRPA that would require avoid, minimize, mitigate or even compensate, did you in your review see anything on let's say vernal pools that would trigger?

RICHARD PODOLSKY: No. There was -- in fact, there was -- that's actually my point is that I didn't see sufficient biological work to allow me to even approach such a determination, but what I did see was enough to tell me we need to have more information. That is the crux of my testimony.

MR. DUCHESNE: Okay. Inland wading bird and waterfowl habitat, I think you mentioned you didn't know if the Lower Reservoir would flag a IF&W as potential habitat. I believe it is marked on --

RICHARD PODOLSKY: Did I say that in my testimony?

MR. DUCHESNE: I think you actually said DMR had not flagged it, but it would have been IF&W flagging it.

RICHARD PODOLSKY: I thought both of the upper -- Reservoir 1 and Reservoir 2 were so

designated, but.

MR. DUCHESNE: I suspect they are.

RICHARD PODOLSKY: Yeah.

MR. DUCHESNE: They are designated that way.

RICHARD PODOLSKY: I thought so.

MR. DUCHESNE: The question I'm trying to get to is did you read anything in the application that indicates they're going to be causing impacts in that wetland that would trigger NRPA? And I'm referencing the fact that there is a 250 foot buffer zone under shoreland zoning, but did you see anything in the application that would trigger NRPA concerns?

RICHARD PODOLSKY: I don't think I did, but I really would like to recheck that to be sure.

MR. DUCHESNE: I think there was some talk in our questioning yesterday that maybe there would be some significant wildlife habitat in the tidal zone, but what the applicant was asserting is they're going to avoid problems by doing everything in the winter when shore birds and wading birds aren't there, did that raise any flags?

RICHARD PODOLSKY: Only to the extent that we really don't -- the only birds that are down there in the winter and they're probably not very common are like purple sandpipers and -- and I understand

from the construction plan that there is going to be sediment sheeting around, so I don't think we would be too worried about the sea ducks which do congregate down there at times and at certain tides in very good numbers. But, no, I wasn't -- in fact, I generally don't focus very much on construction impacts in my work. They're mostly short-term and they just don't really rise very high and so a lot of the testimony that made a very big deal of, oh, how low the impact is going to be during construction. I actually personally consider that a level of obfuscation, you know, because there are bigger fish to fry literally on this and -- and the construction -- I think it only makes sense, yes, you do the construction when you're going to have the least possible impact, but -- but I don't think it's something that we need to worry a whole lot about and I don't worry about it.

MR. DUCHESNE: Okay. My eyebrows just raised when you talked about there being potential endangered species involved and I didn't catch what species you might be referring to specifically.

RICHARD PODOLSKY: I don't really know. I mean, there is -- I was just struck by how many species of special concern that the eBird -- just the

eBird data alone indicated and I just would be concerned that there may be some other species that -- that may indicate -- that would certainly warrant taking a greater look, but I don't want to guess at what those may be, but.

MR. DUCHESNE: I think you may be echoing one of me questions yesterday when we were discussing how valuable eBird is a tool when you have no real control over who is doing the input or when that input is happening in building this database. So, for instance, if there are a lot of eBird reports on Perkins Road that are happening in the winter, where are the bobolinks at that time of year?

RICHARD PODOLSKY: Yeah. They're in Argentina.

MR. DUCHESNE: Argentina. So that data doesn't really coach you much on --

RICHARD PODOLSKY: No.

MR. DUCHESNE: Okay.

RICHARD PODOLSKY: No, that's exactly right.

MR. DUCHESNE: Bats. There are really serious issues with bats in the state and really globally.

RICHARD PODOLSKY: Yes.

MR. DUCHESNE: But there is no regulatory standard that I am aware, any anything that's enforceable, anything we can write into a permit. Are you aware of anything that I'm not?

RICHARD PODOLSKY: Well, here is the thing, the -- somebody mentioned yesterday that the biggest threats to bats, and I didn't disagree with this, is the white nose syndrome, which is believed to be a cave disease brought from Europe to New York State in around 2006 and it is spreading very, very rapidly. I think Maine about 10 years -- it first appeared in Maine about 10 years ago and it is radiating out from central New York area'ish and it is right to the Mississippi River now and all the way up to last Newfoundland had it, so everybody is trying to catch up from a regulatory standpoint. We don't have laws in place that are commensurate with the threats that we know are occurring with bats and -- but they have been given protected status. I -- any project should -- I think any big, you know, big projects such as this should do -- and know what the bats are in that area.

MR. DUCHESNE: Protected status under what regulatory regime? I'm not clear.

RICHARD PODOLSKY: I think they're both at

the state and federal level. The northern long-eared bat is, I think, endangered in the State of Maine level, threatened nationally and the rest of them are threatened species that are here, the eight species we have in Maine. Maybe the red bat has not been -- I don't know.

MR. DUCHESNE: Yeah.

RICHARD PODOLSKY: Yeah.

MR. DUCHESNE: Okay. Fine. We can get -- I'll probably explore that later, but I'm not clear what the regulatory protections are for bats. There is a concession, I think, from the report itself that all of the bats are potentially there.

RICHARD PODOLSKY: Yes, I read that with interest.

MR. DUCHESNE: Mmm Hmm. Great. Any other questions? Seeing none, we can go to cross-examination by Nordic. Oh, and by the way, Ms. Daniels had asked, I think, for time for questions and what we're trying to do is confine that during the period when cross-examination is going on between the parties, so once we get into the Board questions it becomes a little difficult to got back and catch up, which is why I was not able to really honor the request this time. So if we can go to

cross-examination.

MS. RACINE: Redirect.

MR. DUCHESNE: Redirect. I beg your pardon. I got all excited. I find we can really advance the schedule a lot if we just skip parts.

(Laughter.)

MS. RACINE: I can't say I blame you. Briefly. Dr. Podolsky, you were talking a little bit -- I think you were asked about the features on the site individually whether they were unique. Can you speak to the site as a whole in terms of the wildlife features or not just wildlife, but the habitat as a whole -- taking the ecosystem as a whole, in other words, not any particular feature. Can you speak to whether it has any special kind of significance?

RICHARD PODOLSKY: I -- I did touch on that when I mentioned that I personally consider it a biodiversity hotspot because of its mix of habitats, but I colored that with the idea that it's -- that's not something that is regulatory relevant as far as I understand the criteria. But so I would only be able to speak in a very general way from just bird watching and hiking on the site and along the shore there. It is a particularly beautiful place. It

has -- what I look for when I go into -- any on my -- just for enjoyment, I want to have fresh water, salt water, intertidal, uplands, woodlands, wetlands, fields and that little 54 acres is a gem.

MS. RACINE: So I think that's my question. If any individual feature isn't necessarily unique, is it in your opinion the combination thereof?

RICHARD PODOLSKY: Yes, it's the collective.

MS. RACINE: Do you have any opinion as to whether if the -- the lights or the lighting of this facility would have any effect on birds or in general?

MS. TOURANGEAU: Objection. Lighting is not a relevant criteria under NRPA and it goes beyond the scope of any pre-filed testimony.

MR. DUCHESNE: It does go beyond the scope of pre-filed testimony.

MS. RACINE: Okay. I'll move on. In terms of wetlands, especially wetlands of special significance, in your opinion what's the impact of that in terms of -- or the significance of those wetlands and wildlife?

RICHARD PODOLSKY: Well, to the species and the critters that are in them they're everything, of course. I'm not really up on and willing to testify

to how much harm you can do to wetlands in Maine right now. I know that the big ones are protected. The last time I worked on this was when we did some satellite -- early satellite imaging on the coast of Maine and we found out that a third of the state's wetlands are in packages of less than an acre in size. In other words, a lot of our wetland resources and the ecological services that they provide are in wetlands that are small enough to be eliminated without even a permit. That -- I wasn't happy to learn that and I'm very concerned about wetlands now because of the -- at the national federal level we are right now facing significant reduction in wetland stream protection. But --

MS. RACINE: Oh, sorry. Just to follow-up, I think that you have identified for the Board some things you would like to have seen. Do you have some concrete suggestions as to what could be done to get that information so that the Board had more information? Do you have some -- are there some concrete things that could be done to supply that data?

RICHARD PODOLSKY: Yes, I would recommend full biological surveys on the site in all four seasons at least for a year really thorough --

thoroughly to figure out how -- how important this site is and what biological species this site supports because of the footprint of the project being 34 of the 54 acres and its general perception in the community as being high valued. I also would like to see a proper treatment of the discharge as a permanent impact. It's an under water chimney. It's as if there was on land all of a sudden in your neighborhood was a chimney spewing 24/7 every day and so that's permanent. Now, again, you may say it's small, it's going to be tidaled away and don't be -- you know, so but I -- I would not -- I would like to see that. So those -- those two things, true biological surveys, treat the thermal feature as a permanent impact and analyze it as such.

MS. RACINE: Thank you.

MR. DUCHESNE: Recross.

MS. TOURANGEAU: I'm going to wave.

MR. DUCHESNE: Great. Thank you. Is everybody done with Mr. Podolsky? Thank you very much.

RICHARD PODOLSKY: Thank you.

MR. DUCHESNE: We're going to stormwater, E&S and then we'll be going to Nordic. We'll take a five minute break while we change the room.

(Break.)

MR. DUCHESNE: I believe we have most of our -- all of our table up and most of the parties in the room now and we can proceed with stormwater and E&S and you may go ahead.

MAUREEN MCGLONE: Good morning, Presiding Officer Duchesne, Board members and members of DEP staff. My name is Maureen McGlone. I'm a professional engineer in the State of Maine. I hold a Bachelor of Science degree in Civil Engineering from Worcester Polytechnic Institute and I have over 30 years experience as a civil and environmental engineer. My civil and environmental design engineering experience includes, but is not limited to, site layout and grading, roadway layout and design, stormwater analysis and treatment sewer and water line layout and design, construction administration and oversight. I've been involved in a variety of projects for many different clients throughout the years including commercial and residential developers, the chemical and petrochemical industries, manufacturing facilities, the pulp and paper industries, municipalities and several -- several governmental agencies.

In 2018, as a member of the Ransom team, I

was asked to participate in the conceptual layout of the proposed Nordic Aquafarms facility in Belfast, Maine. The conceptual layout was to be prepared within the parameters of the zoning ordinance for the City of Belfast. I was asked to provide stormwater management for the proposed development in compliance with Chapter 500 of the Maine Stormwater Management Law and ultimately to provide Section 12 of the Site Location of Development permit application. As a part of this effort, I prepared the stormwater management report for the project, which is included as Nordic Exhibit 15.

The topography of the undeveloped site slopes generally from north to south/southwest into Reservoir Number 1. Groundwater in the area also appears to flow from the north to south across the site towards the reservoir. The site slopes steepen closer to the southern boundary and within the 250 foot buffer with fingers of notable rivulets, drainage channels and ravines exiting into the reservoir. The reservoir is controlled by a dam located just west of Route 1 and outlets into Belfast Bay. There is considerable area upgradient of the site which also drains to the south of the reservoir. The proposed grading of the site generally maintains

the pre-development flow pattern from the north to south/southwest. To accommodate the function of the buildings and associated access, the center of the site has less significant grade change while the northern and southern portions of site include steeper slopes to match the existing grade at the 40 foot no disturbance buffer at the site boundary.

The following proposed stormwater management strategies were used to design the guide; divert runoff from areas upgradient of the site around the proposed development to avoid upgradient runoff to on-site stormwater treatment measures, the runoff volume from upgradient areas that are not diverted need to be considered in the on-site treatment measures; provide treatment for 95 percent of the new impervious surfaces and 80 percent of the developed area of the property in compliance with the General Standards of Chapter 500, treatment to be local to where stormwater occurs to minimize the relative size of treatment structures and ultimately reduce site disturbance; to avoid stormwater discharge from the impervious portions of the site towards Reservoir Number 1 to minimize phosphorous export.

So to address diversion of upgradient runoff, a stormwater channel has been proposed for

the new developed area of the site and down gradient of the 40 foot buffer adjacent to the northern property boundary to divert stormwater from off-site areas around the proposed development. To provide treatment of stormwater to comply with the General Standards of Chapter 500 Stormwater Best Management Practices identified in MaineDEP's Stormwater Manual were referenced. The BMPs chosen for this site to meet the water quality objectives include subsurface sand filters, which is a filtration BMP discussed in Maine's Stormwater Management Manual, Volume 3, also known as the Technical Design Manual within Chapter 7.3 Subsurface Sand Filters. We also considered grass underdrained soil filters, also a water filtration BMP, which is discussed in the Technical Manual in Chapter 7.1. We utilized manmade pervious paver systems, another filtration BMP discussed in the Technical Manual within Chapter 7.7. And green roof systems, a filtration BMP discussed in the Technical Manual within Chapter 7.6.

As designed, treatment measures provide treatment of approximately 96 percent of all new impervious surfaces and approximately 84 percent of the developed area, which exceeds the required 95 percent and 80 percent of the General Standards of

Chapter 500.

To avoid stormwater discharge to the reservoir, a closed system using structures and piping is utilized to collect and transport treated stormwater as well as flows from larger volume storms to discharge below the dam. This allows for a waiver of the Flooding Standard, Chapter 500, reducing the need for large retention structures and reducing the project impacts. Thank you.

ANDREW JOHNSTON: Good morning, Presiding Officer Duchesne, Board members and members of the Department staff. My name is Andrew David Johnston. I'm a Professional Civil Engineer and Principal at Atlantic Resource Consultants. And I'll refer to Atlantic Resource Consultants as ARC from here on in. I hold a Bachelor's degree in Civil Engineering from Brighton Polytechnic University and a Master's degree in Coastal Zone Management from the University of Ulster. I have over 25 years of engineering experience with a focus on land development projects and water quality improvement projects. I've worked on the design of large public works projects throughout the south of England to improve water quality off the coast of England. When I moved to the United States, I then served as both a design

engineer and head of the Site/Civil Department for an engineering company and now the owner of a small engineering company. I have been living and working in Maine for 15 years and planned, designed and permitted large scale development projects in the healthcare, corrections, commercial, residential, industrial and education sectors. I am a licensed Professional Engineer in the State of Maine. I'm also licensed in the states of New Hampshire, New York, Connecticut, Rhode Island and Massachusetts. I am a Chartered Professional Engineer, Chartered Water and Environmental Manager, a Chartered Environmentalist in the United Kingdom.

Our role in this project as ARC was to assess the soil conditions and the earthwork requirements for the Nordic Aquifer (sic) Farms project and to design a soil erosion and sediment control plan that will protect both the site and the downstream resources from potential detrimental sedimentation during construction. I'm very familiar with the types of soils that were encountered during the subsurface investigations on this site and the challenges associated with doing major work -- major earthwork activities in those conditions having previously been involved in projects of a similar

scale and in similar conditions.

The soil erosion and sediment control plan that we developed includes detailed construction phasing plans, project specific construction methodologies and best management practices that will minimize soil exposure, manage the potential risks associated with soil erosion and capture and treat any runoff or dewatering effluent from the construction activities at the site. Implementation of the plan will minimize erosion of soil materials from the site and protect the downstream resources and receiving waters from unreasonable sedimentation. The soil erosion and sediment control plan that was developed for Nordic was developed specifically to meet all of the local, state and federal requirements and guidelines for erosion and sediment -- sedimentation control and was based on good engineering practice. Particular attention has been paid, as I mentioned, to construction sequencing and earthwork methodology both due to the scale of the project and the sensitivity of the downstream resources. The plan uses several key strategies to control sedimentation from the site; first, seek proactive planning to divert water around the site, both groundwater and surface water, to minimize the

potential for dewatering activities during the excavation of the site; design to capture, treatment and controlled discharge of any runoff or groundwater from the excavation activities at the site; and a regime of regular inspection, maintenance, evaluation and adaptation of protective measures to ensure that protection is provided throughout construction activities.

ARC has developed a range of best management practices that are included in the plan. These include perimeter controls that will be installed in the site as soon as the areas of work are accessible providing immediate protection of the downstream resources; diversion best management practices which will be installed as I mentioned to divert the runoff around the work area and minimize the dewatering load; cover best management practices which will be installed to achieve rapid stabilization of any work areas at the site; and treatment best management practices which will capture, treat, filter and discharge any water from the work area.

There is also a very heavy focus in the plan on inspection and maintenance which we see as a key item for soil erosion and sedimentation control. That part of the report is very detailed, inspection

criteria, inspection frequency, reporting requirements and keeping of records related to those reporting requirements.

In summary, the soil erosion and sedimentation control plan that we have developed for the site is designed to meet local, state and federal requirements of soil erosion and sedimentation control and is designed specifically to protect downstream resources and receiving waters from detrimental sedimentation during construction.

MR. DUCHESNE: Great. Thank you very much. We can go to cross by Upstream.

MS. RACINE: Good morning. Miss McGlone, could you describe how much water that exists on the site now will go back into the ground after construction?

MAUREEN MCGLONE: You're going to have to elaborate on that a little bit more in terms of --

MS. RACINE: So with the stormwater management system there is a certain amount of water that just falls naturally on a site now, I imagine, just because it's unencumbered by any sort of project, but after construction is completed the -- you are describing a myriad of different ways that the water will be diverted off-site, so I guess my

question is do we have any assessment of what percentage of water that would just fall on the site naturally now will be diverted? Do we have any percentage or how much will go back into the ground and has there been any assessment done on that?

MAUREEN MCGLONE: Well, the percentage of water that falls on the site now will continue to fall on the site. I guess what you're probably trying to ask is how much are we --

MS. RACINE: How much will stay after construction?

MAUREEN MCGLONE: It's going to go into a treatment system and it will be carried away from the site.

MS. RACINE: Okay.

MAUREEN MCGLONE: Currently, in -- in the undeveloped -- in the undeveloped condition it falls on the site and stormwater runs off.

MS. RACINE: Although some -- and I understand that some runs off and runs into the reservoir and --

MAUREEN MCGLONE: Mmm Hmm. Yup.

MS. RACINE: -- and -- yup. But some of it stays, I imagine.

MAUREEN MCGLONE: Okay. I think maybe what

you're referring to is --

MS. RACINE: Infiltration.

MAUREEN MCGLONE: Okay. Thank you. And if I'm not mistaken, those were questions that were posed of both Dr. Mobile and Mr. Neilson the other day.

MS. RACINE: Yes, everyone has had to hear a lot from me, yes.

MAUREEN MCGLONE: Okay. And if -- and if I'm also not mistaken their testimony alluded to the fact that the geology of the site doesn't allow or it's minimal impact on the infiltration. When we did a high intensity soil survey out there we found that the hydrologic groups for soils were hydrologic group C and D. Also those so -- those are not soils that are prone to infiltration and I would -- I would stand by Dr. Mobile's and Dr. Neilson's testimony for infiltration.

MS. RACINE: Sure. So I -- I think the question though is it doesn't sound to me as if there will be no effect. I understand that we think that there is minimal discharge although it was -- I understand that the testimony was the primary source of recharge was precipitation and leakage from the Lower Reservoir. That being said, it was

testified -- that they did testify that -- that was -- that was overall a minimal percentage, but I guess my question is has any assessment been done of what the difference will be between when the site is not developed and when the site is developed in terms of water that will remain on -- on the site or won't once all these impervious surfaces and all these basins taking the water away in a way that didn't happen by natural course before it was developed. Has there been any assessment of what that...

MAUREEN MCGLONE: I apologize, I'm very confused by your statement.

MS. RACINE: Okay. So as the site is undeveloped now I understand that stormwater because of the natural features of the land does get carried away and some of it --

MAUREEN MCGLONE: Yes.

MS. RACINE: -- may infiltrate although to a smaller degree because of --

MAUREEN MCGLONE: Yes.

MS. RACINE: -- the features the land. That being said, can you not say that when the -- after construction that there will be an effect upon that infiltration or the amount?

MAUREEN MCGLONE: It will be a minimal

impact.

MS. RACINE: And has the impact been assessed whether it's minimal or not?

MAUREEN MCGLONE: When I look at stormwater calculations I am looking at stormwater runoff. There is a minimal effect in stormwater runoff.

MS. RACINE: So is it your testimony, no, that effect has not been assessed?

MAUREEN MCGLONE: That was not my job to assess it.

MS. RACINE: Okay. Do you know if it was someone's job?

MS. TOURANGEAU: Objection.

MR. DUCHESNE: What's the objection?

MS. TOURANGEAU: The objection is I think what we're talking about is infiltration and recharge when Ms. McGlone's pre-filed and direct -- direct and rebuttal testimony is on stormwater.

MR. DUCHESNE: I believe that's correct, so.

MS. RACINE: I would just respond and say that Chapter 500 on stormwater management speaks -- specifically speaks to infiltration as something that should be considered and that I think stormwater plays directly into how much water is going back into the site that as an ecosystem that depends upon, you

know, water going back.

MR. DUCHESNE: I think you win this one. You may proceed.

MS. RACINE: Okay. How much water is going to be diverted from the site through natural processes and not from the impervious surfaces?

MAUREEN MCGLONE: Diverted from the site?

MS. RACINE: Yes. Can you just -- perhaps if you want to just describe again for us how the water will be diverted.

MAUREEN MCGLONE: Are we talking about upstream or are we talking upgradient and -- and what do you mean by diverting? Diverting to me means physical channels and piping.

MS. RACINE: So if you could describe the physical channels and piping versus the natural diversion that will still occur post-construction.

MAUREEN MCGLONE: We're providing a diversion on the northern boundary of the site, a diversion channel to capture upgradient runoff that normally would come across the site. If it comes across the site, the treated portion of the site, we then need to treat it. We are capturing it and diverting it around per Chapter 500.

MS. RACINE: Okay. And could you describe

the features for stormwater management on the roofs of some of the buildings?

MAUREEN MCGLONE: Sure. They're grass roof systems. They're in what -- they are called intensive systems meaning that they're -- in this case, they're in the neighborhood of 6 to 8 inches depending on which roof you're on. Those intensive systems have -- are multi-layered where there is filtration media as well as a drainage media and there is an organic matter that allows grasses and potentially shrubs and -- and trees to grow.

MS. RACINE: So tell me a little bit more about how those organic features are supposed to function and what their role is.

MAUREEN MCGLONE: It's a filtration system very similar to the other filtration systems. It's a soil media that is -- it's the same type of soil media that we would use in our -- in our grass underdrain soils and it allows the water to filter through and filter out pollutants and thermal effects.

MS. RACINE: How did -- and is that open to the air? Is it -- is it open, is it enclosed, these biological features? Is it just open? There is no covering, in other words?

MAUREEN MCGLONE: No.

MS. RACINE: Okay. I was just wondering in the winter if there is any effect on the cold temperatures or at a certain point where those biological features are no longer effective filters.

MAUREEN MCGLONE: Right. Okay. I think what you're -- what you're asking is when the plant life goes dormant does -- do the filters still function and --

MS. RACINE: Yes.

MAUREEN MCGLONE: Okay. I -- in terms of these filtering systems the plant life is kind of an added bonus, if you will. The filtering --

MS. RACINE: A redundancy perhaps?

MAUREEN MCGLONE: No.

MS. RACINE: Okay.

MAUREEN MCGLONE: It's an added bonus.

MS. RACINE: Okay.

MAUREEN MCGLONE: Because what happens in -- in other times of the year is that plant life will be able to provide evapotranspiration, all right, which gets rid of more of the stormwater than is required. In the case of a filter system, we are required to look at the one inch on top of an impervious surface and .4 inches on the landscape surface. In this

point -- in this case, we evaluated the roof systems regardless of the fact that they were going to be green as an impervious surface, so we provided enough storage capacity and treatment capacity to handle that roof runoff through the filter system itself with disregard to the fact that we have an extra added bonus of evapotranspiration.

MS. RACINE: The evapotranspiration system, is that to mimic what happens naturally when --

MAUREEN MCGLONE: Yes.

MS. RACINE: -- it's not developed? So that, I guess, gets back to my point about --

MAUREEN MCGLONE: It flows.

MS. RACINE: -- the water that is coming onto the site and staying on the site and the evapotranspiration which would happen if there wasn't these 10 buildings there, so it sounds to me that these biological features help in mimicking the evapotranspiration that would have naturally happened should they not be there, is that a correct statement?

MAUREEN MCGLONE: Okay.

MS. RACINE: So was any analysis done with how much of the evapotranspiration of these biological features on the roofs will mimic what

naturally occurs right now?

MAUREEN MCGLONE: No.

MS. RACINE: Mr. Johnston, you have stated in your direct that you are very familiar with challenges associated with major earthwork construction in these types of conditions having previously been involved in projects of similar scale in comparable conditions. I'm just curious, I think you're well aware that there is quite a bit of soil excavation that's planned for this project. Could you speak to whether you have ever dealt with anything of this scale and some of the challenges that you may run into in removing this amount of soil in this and I think the plan is two to three acres at time if I'm not mistaken.

ANDREW JOHNSTON: Yes, perhaps I can give two or three examples of -- of what I was referencing when I say similar scale projects and I'll do them from different time scales. Actually, almost 20 years ago I designed and permitted two golf course projects in Rhode Island and just by way of reference the disturbed area in those projects was about 180 acres each in respect to this project which actually has a disturbed area I believe of 37.9 acres, just under 40 acres, so I would reference that as being in

similar size. Also, when I was in Rhode Island I did a resort development which was in four phases, but disturbed over 100 acres of land. More recently and the folks here may be more familiar with the Maine General Regional Hospital in Augusta, that was a similar disturbed area to this site.

MS. RACINE: And we're talking about surface areas excavated, were they the same depths?

ANDREW JOHNSON: I know that portions of those sites did have major excavations. The golf course project had an excavated pond on it which was 18 feet keep, as I recall. The coastal resort development that I did in Rhode Island was actually a very complex project. It had some brownfield features to it, so there was a lot of excavation of both clean and dirty soil from that site and replacement of soils. And similarly with Maine General Regional Hospital you'll see the cuts and fills that occurred on that site, you'll appreciate how the topography had to be managed to effectively lead that project.

MS. RACINE: Do you have an estimation in your expertise how long it's going to take to do that excavation? Is there any plan in place for that for this project?

ANDREW JOHNSTON: I can tell you there is a plan in place. It's going to be largely driven by the overall project schedule, so what we were careful to do in the soil erosion and sediment control plan and actually what you'll see in that plan is a series of phased soil erosion and sedimentation control plans and there are nine specific phases that we broke the project into. There will be nine consecutive phases of excavation and stabilization and the reason for doing that was to that we could effectively manage what area is open at any given time and keep that to an absolute minimum so that we're dealing with less water on the site than you would be if you're opening up a large area at one period of time.

MS. RACINE: And that's part of diverting much of this -- well, either the -- the upgradient or the stormwater, correct, because you're basically digging large dirt pits I imagine it's very important to make sure that this diversion is occurring around where you're digging; is that right?

ANDREW JOHNSTON: Yeah, again, you'll see in the soil erosion and sedimentation control plan in each phase we show where these diversion areas are going. The one that Maureen mentioned, which will

end up being a permanent feature is at the north end of the site and that's designed to divert the water coming from upgradient down onto the site, around the site and then refeed it into the channels south of the site.

MS. RACINE: And I imagine --

ANDREW JOHNSTON: There was -- sorry.

MS. RACINE: No, no, please finish.

ANDREW JOHNSTON: There are similar temporary features throughout the site where we try to do the same thing, which is to manage the water and divert it out and around from the excavation area to minimize that contact between the native soils and the water.

MS. RACINE: I imagine that your plan and your concerns are two-fold, one is to divert the water from a large dirt pit and to also make sure that sediment as you're digging it up doesn't get into that water and then go into the river and the reservoirs.

ANDREW JOHNSTON: That's correct. There are two phases, so what we're trying to do is divert the clean water that's coming down towards the site and any groundwater around the perimeter of the excavations we're trying to divert that before it

gets into the work area so there is no contact and that there is no sediment into the water and then drain and filter any areas within the excavated area.

MS. RACINE: Can you speak a little bit more about that sediment control once you're excavating and doing the work in terms of ensuring that sediment doesn't go into any of the natural resources including the river or the reservoir?

ANDREW JOHNSTON: I'll try and answer that briefly. As I said, there are a -- there are a number of measures we're taking. As well as the diversion measures, we have underdrains that will be running throughout the excavation and they are covered in a -- in a sand filter blanket so if any sediment runoff gets into that area or tries to get into the drains is filtered before it gets there. We also have temporary sediment basins and perimeter controls at the foot of the site to capture any excess sediment before it gets into those natural resources.

MS. RACINE: I think I understood from your testimony that a big part of the plan particularly given the scale, the timing and all of these measures that you have described that would be put in place are going to depend on reporting but also somebody

overseeing this. I imagine that there will be contractors used for this work. What's the plan to make sure -- I mean, in other words, who is enforcing all of this? I understand you have a plan, but who is going to enforce this?

ANDREW JOHNSTON: Well, you're going to have several levels of enforcement. Firstly from the owner's perspective there will be a construction team and the ownership team that will be reporting and reviewing the site conditions and reporting on a daily basis and that's very important to maintain the function of these systems and to make sure that anything unusual that you come across is addressed very rapidly. There are other reporting requirements, which you'll see in the Maine Construction General Permit, so there will be a specific soil erosion and sediment control inspector on the site who has to do the weekly inspections, the post-rainfall inspections and do all of the reporting and keep that material available on-site for review. It is very likely under this permit that MaineDEP will require a third-party inspector on the site for soil erosion and sediment control. That will be an independent person that is hired by the Department to do essentially what is the same function as what the

owner and contractor will be doing and providing their own reporting but directly to the Department. My understanding from the City of Belfast Planning Board process is the City of Belfast will also hire their own inspector to come and review the construction for those periodic inspections.

MS. RACINE: And that third-party that would be hired, are they feet on the ground every day or is that a weekly thing or?

ANDREW JOHNSTON: There are specific requirements in the Maine General Permit for when those inspections are done. At a very minimum it's weekly permits, after every quarter inch of rainfall there is a post-rainfall inspection as well. And, again, that's supplementing from the Department's perspective. It's really supplementing what the folks -- the actual construction team and the ownership team will be doing on-site. So that's a more general perspective of inspections.

MS. RACINE: Ms. McGlone, you work for Ransom Consulting; is that correct?

MAUREEN MCGLONE: I do.

MS. RACINE: Do you have any -- were you part of the Ransom team when the well tests were being done on-site?

MAUREEN MCGLONE: Yes.

MS. RACINE: Were you aware that there was some water and sediment that resulted from those tests?

MAUREEN MCGLONE: No.

MS. RACINE: Are you aware of any of the measures that were taken to ensure that sediment did not -- was not discharged into the Little River during those tests?

MAUREEN MCGLONE: I was not involved in the testing.

MS. TOURANGEAU: So I'm going to object because this goes outside the scope of the stormwater testimony and pre-filed direct and rebuttal testimony.

MS. RACINE: Okay.

MR. DUCHESNE: Great. I would sustain.

MS. RACINE: Presiding Officer Duchesne, what I will say is that on that topic about erosion control we do have some information that came to light after testimony from I understand a different member of that company yesterday that directly contradicts what was said. I understand that person is not here now and I'm faced with -- I could petition for that witness to be recalled or I could

make an offer of proof, but I just -- I just defer to you as to what would be best course of action.

MR. DUCHESNE: What was your section option?

MS. RACINE: I could make an offer of proof.

MR. DUCHESNE: I'm sensitive to the request and I think you have grounds for feeling that way, so I would like to entertain it. Could you state what the problem is and give Ms. Tourangeau an opportunity respond to it and because I think maybe the petition is probably going to be the way to go.

MS. TOURANGEAU: Do we want to do this in sidebar?

MS. RACINE: Yes.

MS. BENSINGER: Sure.

MR. DUCHESNE: Yeah, sure come on up.

MS. BENSINGER: Do you want to wait until -- well...

MR. DUCHESNE: Let's finish on --

MS. TOURANGEAU: Do you want to finish with stormwater and then we'll take a quick break?

MS. BENSINGER: Yeah, let's do that.

MS. DOSTIE: Excuse me, may we have a quick break? I have a family emergency at home and I need to make a phone call.

MS. BENSINGER: Oh, sure.

MR. DUCHESNE: Let's take a break.

(Break.)

MR. DUCHESNE: You may proceed.

MS. RACINE: Thank you. At this time, I petition for the recall of a witness from yesterday's panel, Miss Ransom.

MR. DUCHESNE: And we will allow it without objection.

MS. TOURANGEAU: No objection.

MR. DUCHESNE: No objection. You may go ahead. I just remind you you are still sworn in.

ELIZABETH RANSOM: Yes.

MS. RACINE: Miss Ransom, yesterday in response to Attorney Bensinger's question about soil and erosion measures taken during pump tests of some of the wells drilled on-site you responded that sediment bags were used to prevent any of that sediment erosion going into some of the surrounding resources such as the Little River.

ELIZABETH RANSOM: That's correct. I did say that and I -- I did have a slight misspeak there. We did use sediment bags during the actual drilling of the well, so during drilling initially you tend to bring up a lot of fines especially in the rough type that's out there. So in the case of the actual

drilling of those wells we were using sediment bags so that we didn't discharge sediment to nearby water features, which is something you would potentially expect out of those conditions. When we actually did the pump test, the pump test you're -- you're removing water that's quite clear. It's what you would, you know, be ultimately pumping out for the water supply for a project so you wouldn't expect to see those fines in the water. But we did throughout the process of doing the drilling and pump testing we made contact with DEP representatives and made several visits out to the site and they referred Ransom also to Gregg Wood to make sure there would be no additional testing or mitigation measures required during the pump testing and we were asked to, you know, slow down the volume of water by, you know, if we were discharging directly into a stream using a method like a tarp to just make sure that we weren't causing additional harm from that process. So I -- I apologize, I do think that I kind of confused things a little bit yesterday, but to set it straight we used sediment bags during the initial drilling of the wells and we used, you know, other methods like a tarp.

MS. RACINE: So would you be surprised to

learn that two former DEP employees who were walking the trail that abuts the property on March 29, 2018 witnessed at least three instances of silt laden groundwater crossing the trail and heading to the Little River during the time you were doing those pump tests?

ELIZABETH RANSOM: Not entirely. I mean, even with the use of mechanisms to slow sedimentation down and I believe March would actually -- March 2018 would probably be during the drilling itself, so even with the use of sediment bags, you know, there are going to be a certain amount of fines that they can certainly still occur.

MS. RACINE: So you wouldn't dispute that they witnessed that that that could have occurred or may have occurred?

ELIZABETH RANSOM: I wasn't on-site during all of the drilling and testing, but it's certainly possible. I mean, we certainly see a number of fines just from natural rainfall that come down those streams. It's something we've observed on many site visits. I accompanied Normandeau and DEP out to the site on numerous occasions and I certainly -- even just a little bit of rainfall, they are a silt bottom stream and it won't take much, so, no, that would not

surprise me.

MS. RACINE: So even when you're taking the measures that we're speaking about here it's possible that -- and of course I understand that you're saying that sometimes that naturally happens, but --

ELIZABETH RANSOM: Yes.

MS. RACINE: -- certainly when you're going to be on-site that's going to be amplified by the activities on-site, so it's fair to say even taking those measurements you can expect that this might -- this may occur?

ELIZABETH RANSOM: With an increased flow of a stream as a silty bottom it's -- it's quite possible for additional silt to be moving through a stream, yes.

MS. RACINE: Okay. Thank you.

ELIZABETH RANSOM: Mmm Hmm.

MR. DUCHESNE: I believe that's the end of our -- are you -- you weren't done?

MS. RACINE: I'm done.

MR. DUCHESNE: Okay. Let me just -- I want to make sure Ms. Daniels has no questions.

MS. DANIELS: Thank you. I have no questions.

MR. DUCHESNE: Great. In that case, we can

go to Board and staff questions. Ms. Callahan.

MS. CALLAHAN: Good morning. A lot of my questions have already been touched on already, but I just wanted to just bring to all together for more clarity. And my first question is for Ms. McGlone, would you just elaborate on what is BMP specifically and just provide us a generalization of how treatment measures function to filter stormwater.

MAUREEN MCGLONE: Okay. BMP is best management practices. It's not the end all be all. It is the best we can provide. What was the second part of the question, I'm sorry? My mind is really little today.

MS. CALLAHAN: Just a generalization of how those BMPs work.

MAUREEN MCGLONE: Okay. In particular for this site we used all filtration BMPs. And so for the filtration BMPs what that means is there is an engineered media that is used as a layer where that -- like I had mentioned that treatment volume, which is the first inch, the first .4 inches off the impervious surface and off of the landscape surface will filter down through. It's a mixture typically of organics and it's -- it's a more porous and open gradation that allows for any pollutants that might

be in there to sort of fill the pores as well as provide a 24 to 48 hour detention time, if you will, that also allows for reduction in thermal effect.

MS. CALLAHAN: Thank you. So my next questions are for Mr. Johnston. Miss Racine dropped the two acre number and so I just want a little bit of elaboration on that and you're familiar with that. So the erosion control phasing plan references an 80,000 square foot building area of soil disturbance at given time. Would you just elaborate on what that means?

ANDREW JOHNSTON: Yes, what that means is and this goes to one of the governing factors in the soil erosion and sedimentation control plan that we've developed. We're always treading a fine line on these large projects because what you'll be told by any contractor who -- earthwork contractor who goes to a site like this is he wants to get as much area open as he can because then he can get the work done quicker. Our approach to that is -- is one of risk management which our experience on sites similar to this tells us that we really need to keep the open area of excavation to a minimum that is practical without having too much of a detrimental impact on the schedule for the project. There are -- there are

two factors to managing this risk. Essentially one is the severity of the risk and one is the duration of the risk, so what we're trying to do is balance the need for efficiency and construction with limits on the open area so that we can control -- we know and we're confident that we can control the dewatering activities and the runoff from that open area. By way of definition for an open area, an open area can be cleared but not grubbed so there will be undergrowth on the site and that is considered stable. And, again, at the other end once the excavation is complete, once we've put down fabric and, again, this is -- this is one of our methodologies for this project specific, once the excavation of the unwanted material is complete there will be a geotextile fabric put down and then the excavated material would be replaced with granular barrow. Now, As soon as you get to a point where you have the granular barrow material that has very little fines in it that effectively stabilizes the site from a soil erosion perspective so there are the two ends of it. Cleared but not grubbed is considered stable, once we have gravel in place that is considered stable and what we're trying to do is narrow the window between those two cover conditions

and limit what is exposed in active excavation to 80,000 square feet.

MS. CALLAHAN: So it is -- it's very common for the Department to require a third-party inspector to monitor construction of a development in order to the terms of a permit. If a permit were to be granted, would Nordic be amenable to the requirement of a third-party inspector during construction, one that's approved by the Department?

MAUREEN MCGLONE: They say yes.

(Laughter.)

MR. DUCHESNE: Good choice.

MS. CALLAHAN: Thank you. I'm done.

MR. DUCHESNE: Other questions? Mr. Martin.

MR. MARTIN: So the record is -- has a voluminous kind of additions to it through our stormwater technical memos from our technical engineer. Can you do perhaps the audience and the Board members a favor and summarizing any evolutions of the project or what changes might have been made over time since the application was submitted?

ANDREW JOHNSTON: Would you like to go first on that?

MR. MARTIN: Briefly.

MAUREEN MCGLONE: So from the stormwater

perspective we've -- we've met with the Department staff multiple times and from the initial inspection to -- or the initial application to where we are now there haven't been many changes in -- in the stormwater piece. There have been a lot of clarifications. We've made some revisions to pipe sizing. We've made some revisions to elevations maybe on catch basins on some of our structures. We've made some revisions to -- probably the biggest is we've made some revisions to the diversion channel in that the latest -- I guess maybe I should point to things, right. Is that where we are in this? Which one is the... So this diversion channel up here, initially when we had off-site stormwater it comes from -- from this location here, from over in here and also from over in here and it's sort of -- there is a portion that comes onto the site and eventually makes its way into this area here. It's identified as Stream 9. We took and evaluated -- we had analysis points at this location here where there is -- where there is already the beginning of Stream 9 and also some interim analysis points along here. We provided the -- the diversion channel along this upper boundary and essentially we collected some of the water that would normally show up in -- in the

stream further down. And, sorry, I feel like my volume is changing. So what we did in the last iteration as a suggestion from staff was to provide this diversion channel with multiple sort of containment areas so that we're now able to take -- instead of diverting it all to one location, we're looking at three different locations where we're collecting it and bringing it around along with Mr. Johnston's design channel.

ANDREW JOHNSTON: I will just add one thing from the soil and erosion sedimentation control perspective. We had a number of very minor changes and technical changes to some of the best management practices, for example, adding valves to the outlet of the sedimentation basins. There was one helpful suggestion from staff and that was on the use of flocculence. We were a little reluctant to suggest that and that's based on my personal experience I've never had really very good success with the use of flocculence. What they tend to do is -- is allow the very fine material, the silt clay fracture material in sedimentation ponds to conglomerate and they drop out of the water column more quickly. And so I've had limited success with it, but staff recommended that we do that and Nordic has agreed to that to

take -- to do some trials, some lab-based trials to see what would be the most effective floccing and then potentially employ that on the site.

MR. MARTIN: Thank you. And you can use the map again or I would invite you to use the map for this for our visual purposes. Could you describe generally how stream watering interacts with rewatering -- it interacts with the stormwater system? To phrase it more directly, where is the loss? The southern portion of the parcel has rewatered streams, can you describe where that water is coming from to the extent that it interacts with --

ANDREW JOHNSTON: This -- sorry. This diversion trench that Maureen was referring to up at the top of the point here as well as it being a channel that has an underdrain in it and that's to cutoff the groundwater that's coming down the site towards the excavation area. There are also a series of underdrains that I referred to in my testimony that will be draining the excavation area underneath the buildings during construction. All of those systems reconnect at the bottom of the site to these areas where plunge pools -- rip rap plunge pools will be constructed what will then become the head waters

of the remaining channels. So that water that is diverted around the site in those underdrains will come out at these three locations here to try and mimic what happens on the site as exists now.

MR. MARTIN: Is that process or are those methods effective?

ANDREW JOHNSTON: That's a great -- how long do you want me to talk about that?

(Laughter.)

ANDREW JOHNSTON: That's a great question and it tends to be site specific. So what we do here is -- and this goes somewhat to the need for adaptability in the soil erosion and sedimentation control plan. So what we do here is we plan based on the information that we know and we take from the geotechnical investigations that have been done and we put in place a system that we're confident is going to divert that water around and reintroduce it to those stream channels. There may be during construction, you know, if we find that conditions are slightly different to -- to what we're expecting we may modify that system, but -- but based on the information that we have -- and there is very substantial geotechnical information across this site, we think there is going to be an effective way

of effectively mimicking what comes down those streams now.

MR. MARTIN: And one more question. I think -- and this may -- I'm trying to avoid branching into yesterday's testimony on this, but I believe to summarize some of the enhancements of the streams appear to be based upon lessening of the silty bottom, I believe that's how it was potentially described. Can you describe the interplay between perhaps that -- that diversion system that is being constructed and kind of the silt aspects of it and how that would interact from kind of a stream enhancement perspective?

ANDREW JOHNSTON: I can from -- from the perspective of what we're putting in as measures at the outlets. So what happens right now is the water obviously flows unhindered down the existing stream channels and I think the issue there is they -- they have very fine sediments in the bottom of the channel, so that is constantly scouring out those channels and so the water moves unimpeded down the -- down the slope towards the reservoir. What we have at the outlets of the new underdrains is rip rap plunge pools, which are intended to dissipate the velocity of the water coming down the hill. So it

should reduce what the natural velocity of that channel is and hence reduce the erosive capacity of the water that's coming down the channel. As -- as to the stream enhancements and the -- and the channel enhancements, I -- you're not asking that right now.

MR. MARTIN: Right. What I was trying to get at, I guess, was the portion that you answered which is how does the system interact in terms of silts and erosion and where that would interplay and I think you've answered that adequately. Can you -- I guess for my clarification none of that -- none of that water is stormwater I guess would be -- it's upgradient water from the site?

ANDREW JOHNSTON: Correct.

MR. MARTIN: Okay. I think that's all I have. Thank you.

MR. DUCHESNE: Mr. Draper.

MR. DRAPER: I have just one brief question and it's follow-up to Mr. Johnston about the on-site inspections that will be ongoing during the construction. I understand that this construction process will be long-term, years. I would expect that contractors may change, personnel may change, can you talk a little bit about how, you know, we described the inspections that will be done, but how

the result of those inspections will be passed along some sort of chain of command, the person that will be responsible for making a decision something needs to happen here or something needs to change?

ANDREW JOHNSTON: I'll try and answer that as briefly as I can. So first there is the responsibility for the contractor to do weekly inspections and file those in what will be called a stormwater pollution prevention plan. So each of those reports and report logs has to be filed and kept on-site available for public inspection, but will also be forwarded to the Department and to the City of Belfast. In addition to that, you will have the third-party inspector unless there is an independent inspector working on behalf of the Department. He or she will be providing reports directly to the Department and copying the ownership/construction team on those reports. They will also be filed in the stormwater pollution prevention plan. That is a record I say has to be kept on site, has to be available for public review and it has to be kept for three years after the project is stabilized.

MR. DRAPER: Just a quick follow-up and I agree, I understand that, but I guess I'm getting

more to the point of, you know, someone does an inspection and sees a problem right now, they file a report, put it in a book, that's correct, but that should be brought to the attention of somebody who has authority to make a change right now not a week later or when someone reviews the book later is what I'm trying to get at. I probably didn't make that clear.

ANDREW JOHNSTON: And the typical operation for that when an inspector, whether it's a third-party inspector or whether it's one of the owner's inspectors or the city inspectors, he will report his findings directly to the responsible person on the site, that member of the construction team then can take immediate action on that and the action is then logged on follow-up report as to what was done to remedy that if there was a deficiently found.

MR. DRAPER: Thank you.

MR. DUCHESNE: Mr. Sanford.

MR. SANFORD: Okay. So I have four general questions. So think -- think of your response as a summary of like a bird's eye, non-gender specific, non-endangered, but just flying way up high a thousand feet up in the air and we're looking at this

project. One, no project, but just the site, is this a complex site for erosion control and stormwater? So don't answer that. I'll give you all of them because they'll be in the context of each other probably and it will save some time. Two, is this a complex construction and operation, the physical design, upon the project in terms of the stormwater and erosion control? And number three, should this project be approved, are they -- are the measures recognizing there may be further detail, are the measures proposed adequate to -- to reduce or mitigate erosion and stormwater impacts? And the fourth question is should this project be approved, we've heard indicators that the life of it might be 30 -- at least 30 years on indefinitely, do the stormwater measures and does the assessment contemplate changes to the hydrologic regime that might occur as a result of climatic factors like increased precipitation or decreased?

MAUREEN MCGLONE: Yes. No. Yes. Yes.

MR. SANFORD: Thank you.

(Laughter.)

MR. SANFORD: Because I'm asking in the light of overall making findings and, you know, what these details all build towards.

MAUREEN MCGLONE: Right. So obviously to elaborate -- that was my sarcasm and I'm sorry for that. The project site itself is actually not terribly complex, so maybe that was a no. It's not terribly complex in terms of stormwater currently. It actually in terms of the development of the site, stormwater on the site is not terribly complex either. What is complex about this particular project is all of the other things that go into the project that is other than stormwater. So my limitations are not limitations of the methodologies that we would use to treat the stormwater, my limitations are more on the locations of process piping and where buildings are and so my collaboration with -- with other utilities in the area have been my biggest impediment on this one in terms of stormwater.

In terms of how we look at these systems for the future -- or actually, I'll up to the third one. Yes, the measures are adequate. In terms of how we look at these systems for the future and potential additional rainfall, we -- we have evaluated all of these systems for a 2 year, 10 year, 25 year, 50 year and 100 year storm event. The requirement is to look at a 2 year, 10 year, 25 year storm event. The City

of Belfast requires 50 and we've gone on to provide the information for 100 year storm event. So, you know, in thinking that -- that potentially stormwater and rainfall rates might increase, we've actually looked at what those increased rates might look like by looking the at that 100 year storm.

MR. SANFORD: Like, for example, on October 23 of 1996, we had a 500 year storm event in Maine and then in April of '97 we also had a 500 year, so either we're really, really old and time has warped or --

(Laughter.)

MAUREEN MCGLONE: My kids would tell me that that's true.

MR. SANFORD: -- or we're in the process of recalibrating, for example, the flood plains and all of that. So I'm -- some of my previous questions for other panels have been towards trying to understand the dynamics of a system that we -- previously these models treated as more static than they were.

MAUREEN MCGLONE: Right. And I think that the -- the information that is out there that we have is what we used. And by looking at the larger storm events it -- and factoring in what the effect of those larger storm events is it might help to give us

a little bit more perspective on what might -- what those numbers might look like 25 years from now, but I can't predict it.

MR. SANFORD: Okay. Thank you. And, oh, Mr. Johnston, do you have any comments?

ANDREW JOHNSTON: From a construction perspective I would -- I would classify this as moderately complex. There are some very unique features about this development and there is a lot of earthwork that's required to -- to achieve the project, but we're not, you know, we're not doing the Big Dig.

MR. DUCHESNE: I've got -- yes, Ms. Bensinger, go ahead.

MS. BENSINGER: I believe you stated an open area can be cleared but not grubbed. That may have been misspeech. If an area is clear but not grubbed it's not considered open, am I correct?

ANDREW JOHNSTON: That is correct. That is what I was trying to say.

MS. BENSINGER: Okay. Thank you. So the flow -- Mr. Martin was asking you about the flow coming through to the rewatered stream channels, will that flow be intermittent like the stream flow is now or will it be more constant or less constant?

ANDREW JOHNSTON: Very likely it will be intermittent. It's going to depend on the ground water systems on the site, so, you know, in periods of high groundwater the streams or the rewatering of the streams will be more effective than it will be during dry conditions.

MS. BENSINGER: Thank you.

MR. DUCHESNE: Mr. Pelletier.

MR. PELLETIER: Mr. Johnston, just -- I'm happy to hear it's -- you don't consider it to be too complex, but I understand its -- the Presumpscot Formation, it's a lot of these marine clays and there is some fairly deep areas of excavation and -- and I understand you said that there is nine excavation areas and I'm assuming that's going to be over time. Do I have it right that essentially you'll have one area that you're working in at a time and that you'll go down the full depth or say in the deeper places or are there certain lists where you stop? It seems like you'd want to go out to the bottom and then bring it back up with gravel fill.

ANDREW JOHNSTON: Yeah, perhaps I could try and explain this. In the square boxes where the buildings are which you can see on a plan, the plan -- the plan for the excavation is essentially to

start from this end to dig right down to the bottom and then start effectively moving across the site in this direction and as the excavation proceeds in this direction the bank fill will be occurring from the end where it was first excavated. So what you will have is a -- is a moving portion under each of those boxes that is limited to 80,000 square feet where the excavation will be at the bottom of the exposed natural soil, behind it there will be gravel backfill going in and in front of it there will be areas that will be cleared and not grubbed.

MR. PELLETIER: Okay. Thank you very much.

MR. DUCHESNE: I have one question from me, Ms. McGlone, you said that soils are not conducive to infiltration there. We did a site visit on a dry day in a dry month of October, is that why my shoes got wet?

MAUREEN MCGLONE: (Pause.)

(Laughter.)

MR. DUCHESNE: Why don't I just move on?

(Laughter.)

MAUREEN MCGLONE: There could be any number where of reasons why your shoes got wet.

MR. DUCHESNE: There could be. I did get a question from the audience and I have to apologize to

somebody who sent me a good question on vernal pools earlier and unfortunately we had dismissed the panel when it came to my attention, so I apologize for missing that one. This one submitted, last year when Nordic presented its plan to minimize stormwater drainage someone in the audience asked what would happen in the winter when heavy rain occurred when the ground and drainage areas were frozen. As I remember it, a Nordic spokesperson said this had not been -- this situation had not been studied. I think this is a potential serious problem. What plan does Nordic have?

MAUREEN MCGLONE: I -- I think that was -- that was me that had responded to that question and it was not what I had responded, but regardless. The question is what happens in the winter and I think that is a very fair question. Studies have shown and there are studies, numerous studies that have been done out there in cold weather climates including Ontario as well as multiple studies from the University of New Hampshire and what they've looked at is what -- what does happen when we get these stormwater events in the shoulder seasons in particular. And what they've found is that because of the engineered system in the filter layers that

these systems actually function and they still function and they continue to function albeit maybe not as quickly. So they may not be -- they may be a little bit inefficient, but they still function. They're still moving. They're not frozen. I -- I would say just as a comparison it's -- it's very similar to like how your septic systems functions also in winter, all right, so hopefully that answers that.

MR. DUCHESNE: Great. Thank you very much. Ms. Lessard.

MS. LESSARD: Just a couple questions. I am assuming that the phased approach to the nine phases that were discussed in this mirror the two phases of construction of the project in general, but I'm thinking that some of them have to be done even though they are uncovering areas that aren't part of it first; is that correct?

ANDREW JOHNSTON: It is. It's actually -- it's rather complicated the way we do it. The reason we produced a phased sort of erosion and sedimentation control with those nine plans is because we couldn't find another way of adequately explaining how the project is going to proceed in detail. So we were going to develop those plans

anyway to think through the process and we submitted them as part of the application, which is kind of an unusual thing to do. But it is split into nine phases. You are correct, there are some things that have to be in place before the Phase 2 of the construction is completed that will be in the Phase 1 of the soil erosion and sedimentation control plan. That's all laid out in the plans. Like I say, if I had them all in front of me, I could explain it to you, but it would probably take quite a long time to do so.

MS. LESSARD: Not necessary. I'm just trying to understand better. I've seen a lot of plans. I've never seen nine phases in a sedimentation and control plan, so I was just wondering how that related to the phased approach to the construction of the project. If, God forbid, this project was permitted and Phase 1 was constructed and Phase 2 never made it onto the face of the earth, how would that impact your stormwater management nine phases?

ANDREW JOHNSTON: There are nine phases on the erosion control plan, so the -- and the aim of the nine phases is at the end of each phase the site will be stable. So if you terminated the project at

the end of any one of those phases the sites will be left in a stable condition. As far as that relates to the permanent stormwater features on the site that gets a little more complicated, but the stormwater system is also phased.

MAUREEN MCGLONE: The stormwater systems that we're providing particularly for the buildings themselves get installed prior to the building being installed. So, for instance, I'm just going to use this as an example, for instance, when we -- when we look at maybe the construction of this building here, for this module of this building we have a separate sand filter which will be located in this area. Now, that sand filter gets constructed prior to the building and so that those systems are then functioning as the building gets constructed and so as we move forward towards the bottom of the site we're obviously not going to construct any of the portions of the filtration systems that would be needed for these buildings until they're ready to put these buildings online. Does that help?

MS. LESSARD: It does. And my last question relates to the depth because it was -- it's been explained that there is a lot under the -- under the tanks that's going on at significant depths so that

some of this excavation is not going to be filled back in it's going to be creating a building, so where is that in terms of -- is it under that entire structure? I guess I'm looking at when you're doing excavation and taking it down to I think at one point I saw 44 feet below grade that -- how you're managing the stormwater erosion for that hole while it's still a hole before it turns into a building. I'm not technical, but it's a question.

ANDREW JOHNSTON: And that relates somewhat to the answer to Mr. Pelletier's question, which is the excavation that's going on underneath these buildings will proceed from one side to the other with material being backfilled in the excavation from the same direction onwards. So, for example, we start at this end with a deep excavation going down to put the foundation of the building in. As we start proceeding with the excavation in this direction material will be backfilled from this end underneath the building so that we are reducing -- so the whole excavation -- the whole operation goes from one side across the site. And you are correct, it's a lot of soil. I'm not sure your figures were quite right. I think the elevation that we're going to is around 44 in some places, but it is, I think, an

average of 14 to 15 feet of material that is coming out underneath these buildings. Does that answer your question?

MR. DUCHESNE: Yes, Ms. Bertocci.

MS. BERTOCCI: Just to follow-up on Ms. Lessard's question, with that understanding that some of these buildings will ultimately be below grade to accommodate their tanks and so there is going to be space for constructing that tank that's going to be still like a hole.

ANDREW JOHNSTON: Yeah, that's actually not the limiting factor. So the limiting factor and the reason the excavation is deep underneath these buildings is because there is a compressible layer of clay under the buildings which won't support the load of the buildings, so that material has to come out and be replaced with a more structurally sound material to put the buildings on. So you are correct, there are big tanks going under the building, but that's not necessarily a limiting factor for the depth of the excavation. Some of the tanks is underground.

MR. DUCHESNE: I'll call on Ms. Lessard.

MS. LESSARD: I thought I read that one of the reasons was the clay and then another reason

related to the need for the infrastructure that was going to be located below the --

ANDREW JOHNSTON: Correct.

MS. LESSARD: -- tanks was also a factor as to the depth of --

ANDREW JOHNSTON: Correct.

MS. LESSARD: -- what it was going to be. It wasn't all about clay.

MS. TOURANGEAU: Since some of these questions are going to construction more than soils and Mr. Cotter is happy to answer the kind of construction detailed questions, I think.

MS. LESSARD: I mostly was wondering there is going to be a hole that's open during this construction even if you're backfilling you're not backfilling it all, so depending on the length of the construction activity does this plan address stormwater that will fall into the hole while you're --

MAUREEN MCGLONE: How do you keep water out of the hole?

ANDREW JOHNSTON: Yes. And that was, again, goes back to the explanation of the limiting that open area of excavation to 80,000 square feet. In that area there are underdrains which have a sand

blanket around them which will be taking the bulk of the dewatering load from that open hole during construction.

MS. LESSARD: Thank you. I am sorry if I wasn't clear.

ANDREW JOHNSTON: That's okay.

MR. DUCHESNE: Ms. Bensinger.

MS. BENSINGER: I have a follow-up question to Ms. Lessard's one line of questioning. So the top large tank building is the first one you would build if -- if you received a permit; is that correct?

ANDREW JOHNSTON: Yes. And that guess into the construction phase, but, yes.

MS. BENSINGER: Right. Bear with me. So the stream channels impacted will be impacted partially or would be impacted partially by that building but then the stream channels would be impacted further by the second large tank building, correct?

ANDREW JOHNSTON: Correct.

MS. BENSINGER: So the rerouting of the ground water coming down from upgradient would be done in two phases as well and the plunge pools that are depicted at the bottom there, would those be built adjacent to the first building when that

building was the only one there and the stream is rewatered from that point?

ANDREW JOHNSTON: Yes. Correct. So we have intermediate plans for those plunge pools, which are actually in this area of the site to rewet those streams in advance of the Phase 2 construction.

MS. BENSINGER: Thank you.

MR. DUCHESNE: Great. Seeing no more questions, I believe we proceed to redirect.

MS. TOURANGEAU: I'm going to take my lead from the Presiding Officer and skip this section.

MR. DUCHESNE: Terrific. So there is no recross, so I believe we're done this with panel. Thank you very much. All right. That brings us to blasting. We will take a five minute break as we change the panel out.

(Break.)

MR. DUCHESNE: Counsel ready to go, the Board and staff are ready to go, panel ready to go, I think we're ready to go. So with that, we go into blasting and order and, Nordic, you may proceed.

MS. RACINE: Presiding Officer Duchesne, just before we begin I just want to say for the record that for blasting and odor Upstream will not have Mr. Fred Johnson on behalf of GEI coming. It

will only be Mr. Lannan. And also for planning purposes I want to have it on the record and I have told Nordic counsel this, but Professor Dixon is out of the country. He was asked to come, he's not able to, so I just wanted to make sure that I let everybody know sooner rather than later.

MR. DUCHESNE: Great. Thank you very much.

MS. TOURANGEAU: To the extent that we -- nordic does not have an opportunity to cross-examine Professor Dixon or Mr. Johnson on his blasting testimony, we would move to strike the entirety of Professor Dixon's testimony and whatever portions are not available for cross on Mr. Johnson.

MR. DUCHESNE: Yes. I agree and...

MS. RACINE: And we would -- I understand the rules as to -- certainly as to Mr. Dixon not being here. I would just say in terms of Mr. Johnson's testimony that we'd have an opportunity to take a closer look at what testimony actually directly speaks to blasting if there is and maybe at a later time not to take up everyone's time now and make a specific motion as a lot of the testimony does not deal with blasting.

MS. TOURANGEAU: Agreed.

MR. DUCHESNE: Great. Thank you very much

to both. And it looks like our panel may proceed.

CATHEL DINNEEN: Good morning, Presiding Officer Duchesne, Board members. My name is Cathel Dinneen. I'm going to speak to odor. Just for the record, my surname is spelled D-I-N-N-E-E-N. I am the head of production for Nordic Aquafarms. I have a degree in zoology and a Master's in Aquaculture and I have been growing fish in land-based facilities for the best part of 22 years now all over the world growing a variety of different species. I have been involved in the development and management of some of the largest land-based facilities in the world, so I have quite at bit of experience with the materials that are handled on these facilities and materials that can potentially lead to offensive odors and how to manage them.

An important point to make is as a team member of Nordic Aquafarms, I am supported by a much greater international team of almost 60 employees who collectively have an enormous amount of experience in operations and design. And, for example, we have our own in-house design team that's been -- that has delivered commercial land-based facilities all over the world for 20 years before joining our team.

Another point I'd like to make is that we

currently have several large facilities in operation today. Two of our biggest units are located in a city of about 80,000 people in Fredrikstad in Norway and they are literally a stones throw from kindergarten and housing states and we've never had any odor issues with our facilities because we know how to manage it.

So I -- I have drawn on that collective experience in addressing Section 22 of the SLODA application and ensuring that we comply with each and every odor submission requirement in Chapter 375 Section 17 of the Department rules. We have identified the key sources of potential offensive odors and we have comitted to implementing and mitigating factors to address -- address all applicable requirements.

We have identified four key sources. Those being the fish sludge from the fish feces and the dead fish handling, the processing plant and the feed storage. The Site Law rules ask us to either establish the area that's potentially affected by these offensive odors or to provide information on the proposed systems or the proposed technology used to reduce or eliminate those odors and we have provided both. And in terms of the area that's

potentially affected, we have stated that it will be confined to within the associated buildings and infrastructure and will not create a problem outside of the facility. The reason we can say that is because we will implement measures to mitigate, to contain, to capture and to treat offensive odors.

So in the case of the -- the fish sludge, that material is contained indoors in a sealed tank that has a filtration device incorporated into it that will remove offensive odor. And that material will also be conveyed off-site frequently and will not be allowed to accumulate on site. So that material is handled by containment and captured and treatment and will not create a nuisance odor outside of the facility.

In terms of the dead fish handling, the dead fish, it's a normal part of fish farming, you always have mortalities in, you know, farm operations. Those mortalities are removed on a daily basis long before they start to degrade. They go straight to an ensilage plant that, again, is a sealed building and a sealed tank where the process involves dropping the pH down to 3 -- between 3 and 4 for the purpose of completely stopping all microbial activity and because of that process the ensiling process itself

does not generate offensive odors because it simply stops all microbial activity. So the ensiling portion of the facility will not create offensive odors outside of the facility.

The processing plant, while the processing plant is a -- is a strictly regulated environment subject to DHHS guidelines and controls because you're dealing with food grade products, that's not just the fish that also applies to the offal and the blood, it's all considered food grade and handled with the same standards because it ultimately ends up being consumed somewhere. So that facility is washed down and sanitized and disinfected daily. Product is shipped out daily and you -- you have a constant movement of clean, fresh, cool, chilled air through that system. So the processing plant, these kind of modern processing plant where you're not cooking anything, you're just doing basic processing of the fish will not create a nuisance odor off-site.

And then the last one is the feed storage. The -- with the feed like we do with all of our facilities, we'll make sure we have a good feed and inventory management. So, for example, you have the first in/first out storage system so feed is not hanging about and you're not prolonging the storage.

Again, the feeds -- the feed storage like the other two is contained in a dedicated sealed building. And even within that building because the feed comes in different pellet sizes it's contained in silos. The silos are sealed with a vent at the top and that vent has a filter incorporated, so with the combination of those barriers let's call them, you will absolutely not have any odor issues outside of the facility - due to the feed storage.

So just to briefly recap, we -- we have a vast amount of experience, collective experience in these kind of operations and in managing odor and we have an excellent track record when it comes to our current facilities. I have been doing this for 22 years. I've done it all over Ireland, the UK, Iceland, Norway, Canada and I've never had any odor issues on the facilities that I worked on because it's -- we know how to manage it. We have addressed the Site rules in identifying the nature and the key sources of potential offensive odors and we have established the area that can potentially be affected, which we have stated is confined to within the associated buildings and structures. And we have -- we have outlined the measures we will take to manage and control odor which involve a combination

of good operating practices and design appropriate for the materials that are being handled and infrastructure and equipment that will eliminate and remove offensive odor. And we have comitted to not having a nuisance odor at the boundary of our facilities and we stand by that commitment.

BRETT DOYON: Good morning, Presiding Officer Duchesne and Board members. I am Brett Doyon of Maine Drilling and Blasting and I have 10 years of experience in the drilling and blasting industry.

My role in the project was to review potential drilling and blasting impacts to neighboring structures to the project as well as to provide a blasting plan and a blast assessment that meets the MaineDEP standards for drilling and blasting. The blasting plan was provided to Nordic Aquafarms in April of 2019. The blast assessment was also provided at that time.

In our blast plan, we detailed the means and methods that would be used while blasting on the project and what those means were to reduce impacts to neighboring structures and features on the site. These methods include limiting the pounds of explosives per delay, using blasting mats to cover the blast, offering pre-blast surveys to neighboring

structures and monitoring all blasts with seismographs at the nearest off-site structure.

In addition to this, in October of 2019, I addressed comments provided by the DEP. These comments were in regards to standards that the DEP has on blasting limits and air blast over pressures, which were just minor clarifications to our blast plan. The intent of our blast plan was to comply with all MaineDEP standards as far as blasting goes.

MR. DUCHESNE: Great. That was quick. Yes, cross by Upstream. Thank you. Can we ask for the picture to keep that up on site plan? Thank you.

MS. RACINE: Mr. Dinneen, am I pronouncing that correctly?

CATHEL DINNEEN: Yes.

MS. RACINE: Mr. Dinneen, you're the production director of Nordic Aquafarms, Inc.; is that correct?

CATHEL DINNEEN: That's correct.

MS. RACINE: And you were involved in assisting Nordic to prepare it's SLODA application?

CATHEL DINNEEN: Yes.

MS. RACINE: And part of the application is Section 22 that pertains to odors, correct?

CATHEL DINNEEN: Correct.

MS. RACINE: And DEP regulations require that applicants applying for a SLODA permit make adequate provisions for controlling odors, correct?

CATHEL DINNEEN: What it asks is to identify the key potential sources of offensive odors, the area potentially affected or identify our outline of the infrastructure or technology that you would use to reduce or eliminate those odors.

MS. RACINE: And Nordic didn't provide any estimation of area to be impacted in this application; is that correct?

CATHEL DINNEEN: We have said it will be confined to within the associated buildings and structures.

MS. RACINE: So Nordic didn't do any odor emission estimating?

CATHEL DINNEEN: Nordic did not do that and I don't know of any fish farm anywhere in the world that would do that simply because it's quite simple and easy to manage by capturing it, containing it and treating it.

MS. RACINE: So Nordic didn't perform any odor dispersion modeling of any sources of odor?

CATHEL DINNEEN: As I said, that's -- that would be extraordinary because the odors are confined

and it's relatively easy to do that to confine and capture the sources of potential odor.

MS. RACINE: And, in fact, in your pre-filed direct you seem to indicate that the main source of odor is spoilage, in other words, that if fish are allowed to deteriorate that's when things become odiferous?

CATHEL DINNEEN: What I said is basically you've got four different areas, the approach in each of these areas is different, the strategies is different, but what I've said is the -- the strategies that we use if you're -- to describe it in general terms involve a combination of good operating practices designed appropriate for the materials being handled and equipment or infrastructure designed to remove offensive odors.

MS. RACINE: But correct me if I'm wrong, and maybe I'm summarizing a bit, but you identify in your opinion the main source coming from the spoilage, in other words, the dead fish, as a major source of odor.

CATHEL DINNEEN: That was -- that was one of the four sources identified, yes.

MS. RACINE: So you agree that fish mortalities create in your opinion offensive odors?

CATHEL DINNEEN: No, not if they're handled in the right way. And as I explained --

MS. RACINE: Well, before handling they don't smell so good.

MS. TOURANGEAU: Objection. Just let him answer the question, please.

MS. RACINE: Sure.

MR. DUCHESNE: I agree.

CATHEL DINNEEN: So you mean before they go to the ensilage plant?

MS. RACINE: Before all of the measures to make sure that no odor escapes that dead fish don't smell very good.

CATHEL DINNEEN: Fish, as I said, are removed from the tanks on a daily basis, so they're relatively fresh mortalities so they're -- they're -- the state of decomposition is virtually very little decomposition at that point, so the odor from the fish is negligible and it's definitely not going to create an issue at the boundary of the facilities.

MS. RACINE: I think you mentioned in your direct that there was a specific tank for the fish mortalities, did I hear you correctly?

CATHEL DINNEEN: That's correct. It's called and ensilage tank and the tank is contained

indoors in a sealed building.

MS. RACINE: What's the capacity of that tank?

CATHEL DINNEEN: Each tank is about two-and-a half cubic meters.

MS. RACINE: Okay. Can you --

CATHEL DINNEEN: Sorry, I don't know what that is in...

MS. RACINE: Yeah.

(Laughter.)

CATHEL DINNEEN: Sorry.

MS. RACINE: That sounds pretty large. How often will that be then emptied or disposed of or?

CATHEL DINNEEN: I mean, you can't answer that question because it depends on how many fish are dying. As operator, I hope that you're rarely emptying that tank.

MS. RACINE: But if you're rarely emptying the tank no matter how many are in there, is there a cumulative effect over time as to that smell or it there --

CATHEL DINNEEN: No. As I -- as I tried to explain the process of ensiling for -- first of all, the mortalities are removed from the tanks as fresh mortalities, they go straight into a sealed

container, they stay in that container for the period of time that it takes the operator to finish what he's doing, in other words, going to those designated tanks to remove the mortalities, minutes, half an hour, I don't know, it depends. Then that sealed container goes straight to the -- where the shoot is that leads into the ensiling tank. The ensiling tank is contained within a sealed building. And as I tried to explain, maybe I didn't do a very good job, we -- in that ensiling tank the pH is dropped to between 3 and 4 and that process stops all microbial activity so the fish do not decompose. You get a process called autolysis where the enzymes start to digest the fish. It doesn't -- it doesn't create an offensive odor because you completely stop all microbial activity.

MS. RACINE: And I -- I think we've been characterizing odor here offensive or not offensive, but just taking a step back because the regulations actually just speak to odor. Would you think most people think that a fresh fish market have an odor?

CATHEL DINNEEN: You're asking me?

MS. RACINE: Sure.

CATHEL DINNEEN: Well, what I would say to answer that question is if you look at the Chapter

375 rules Section 17 it says right there in -- in the rules offensive odor. Also, we're -- we're talking about a standard that deals with no adverse environmental effect, so I think it's a reasonable assumption that the odors we're talking about are odors that can potentially create a negative environmental effect, but what I will say it doesn't really matter. The -- the strategies that we plan to implement together with everything that we know and everything that we've seen in practice and, like I said, we have an enormous amount of collective experience, everything tells us we will not have any negative odor impacts off-site of this facility.

MS. RACINE: And I understand that, but the regulation does just ask for the identification of any sources of odors from the development. So my question is to you and you can, you know, if you know, would you say that even a fresh fish market or fresh fish have an odor?

CATHEL DINNEEN: I mean, that's a very subjective thing and I honestly don't know how you would even answer that. Everything has a -- has an odor.

MS. RACINE: Everything has an odor.

CATHEL DINNEEN: What I can tell you is

because of the methods we will use, the plans we will have in place to manage odors on our facility there will be no nuisance odors or any kind of negative odor impacts at or beyond the boundary of our facility. That's a commitment we have made and we will stand by that commitment.

MS. RACINE: And I suppose what I'm trying to get at is would you agree with me that identification of odors is separate from coming up with mitigating mitigation? In other words, identifying sources and saying what odors are is different than -- I -- I think we are often jumping to the next step, but they're two separate -- they're separate and the regulations contemplate that.

CATHEL DINNEEN: I mean, as I said, that's a -- it's a very, very subjective subject and to try and avoid getting into that kind of back and forth discussion because I don't think anybody can win that discussion. What I will say is that the Department rules ask us to identify the key sources of potential odor on the site and we have done that. It asks us to either establish the area potentially affected or outline the measures that we will put in place to eliminate odor and we have done both of those things.

MS. RACINE: Yeah. And speaking to the measures, right, the third requirement about -- the application about having proposed systems for the enclosure of the materials, to that end in the application it stated that Nordic is going to partner with established recycling and disposal professionals with years of experience of odor control and, quote, through consultations we will install improvement equipment at key areas to ensure additional odor control.

CATHEL DINNEEN: Mmm Hmm.

MS. RACINE: Has there been any specific equipment identified in the application?

CATHEL DINNEEN: Well, again, the Site Law rules based on our understanding of the rules doesn't at this stage in a proposed facility ask us to commit to any specific piece of equipment or any specific configuration.

MS. RACINE: So is that a no that the application doesn't contain any specific equipment or any particular configuration?

CATHEL DINNEEN: As I said in my testimony, the exact choice of technology, the exact piece of equipment, that -- whatever the best technology is to use in each of the four areas identified that will be

done in collaboration with the appropriate engineers at the appropriate time. So, for example, just -- just to explain why I'm saying that, if you take the fish sludge there is no one catch all solution for any of these four areas, but if you look at the fish sludge of course it involves our design team and our experience in -- in coming up with a method to manage this particular kind of odor and of course we're going to draw on our vast experience to do that, but you also have to involve vendors like the guy supplying the tank because that tank has to be built in a certain way to do job we need to do. We also have to incorporate a filter into that tank to remove the odor and you need to involve that vendor so to make sure, for example, if you're using granulated activated carbon that, you know, what's the correct mesh, what's the right size, how many units do you need, do you use a single stage approach, do you use multi-stage approach, do you have to have a pre-treatment, so at some point you need to involve those vendors. And then also because ultimately this material has to be collected and taken off-site you have to involve the disposal and recycling experts. They have to be involved in the whole design phase because otherwise they come and their equipment is

not compatible with ours, how do they get the stuff on board. So you have to involve the whole combination of vendors, yes, and strategies to do it successfully.

MS. RACINE: So that will happen later?

CATHEL DINNEEN: Correct.

MS. RACINE: And you mentioned that as part of your explanation that they'll have to -- some of these materials with the potential to emit odor, which don't have any potential inside the building I understand you're saying, but have to leave. What sort of measures are in place for they those materials have to leave?

CATHEL DINNEEN: What materials are you talking about?

MS. RACINE: Any of the four categories you mentioned. They won't always be inside the -- the sealed building, but the sludge, for example, or the...

CATHEL DINNEEN: Yeah, the sludge, again, I mean, we have tons of experience doing this. There is lots of different ways of doing it. You need to involve the vendor that's collecting it because they're going to have their own ideas based on their own experience. They'll have their own types of

tankers that they'll -- they'll want to work with. So basically --

MS. RACINE: Okay.

CATHEL DINNEEN: -- basically the tanker will come on-site you'll pump material from or sealed storage tanks with the filter indoors, you'll pump it onto their tank and it's all water tight, air tight, their vessels, their tank is -- it doesn't allow any odors to escape and it goes off to their facility.

MS. RACINE: So Nordic will rely in large part, which I think reflects in the application on vendors who have yet to be retained?

CATHEL DINNEEN: Well, as I said, each of these strategies require a combination of different approaches and I'll remind you again that I've been doing this for 22 years. I've done it all over the world. We have an in-house design team that's delivered facilities for 20 years probably 25 or 30,000 tons of capacity all over the world, so I would say we can handle the majority of it ourselves.

MS. RACINE: The proposed facilities could be processing 200,000 pounds of fish every day, does that figure sound accurate to you?

CATHEL DINNEEN: I don't know what pounds

are. Sorry.

(Laughter.)

MS. RACINE: Fair point. Well, let's just say that prior to harvesting these fish, right? The fish have to eat.

CATHEL DINNEEN: After harvesting them?

(Laughter.)

MS. RACINE: Prior. I think I said prior. After harvesting I think it's over.

CATHEL DINNEEN: Well, I think so too.

MS. RACINE: Prior to harvesting they have to eat.

CATHEL DINNEEN: Yes.

MS. RACINE: And living things they eat are going to turn some of the food into mass and energy and some into waste?

CATHEL DINNEEN: Yup.

MS. RACINE: And not all of the food is consumed by the fish, correct?

CATHEL DINNEEN: Mmm Hmm.

MS. RACINE: Would you agree that depending on the type of food it's going to have an impact on odor potential?

CATHEL DINNEEN: No.

MS. RACINE: So the food that you propose to

use will have no odor potential?

CATHEL DINNEEN: Almost virtually none. The feed is -- the feed is a compact, solid pellet. As I said, it's contained in a sealed building within sealed silos that just have a vent with a filter incorporated and those silos have pipes, stainless steel pipes usually, that go all the way out to the tanks. In the pipes you have a disc with a chain running through it. That disc slowly pulls -- sorry, that chain pulls the disc and in so doing pulls the feed very slowly and gently out to the tank so that we're not damaging the pellet on its way out and it finally gets out to the tank and it drops maybe 3 or 4 feet into the water which takes literally, I don't know, a couple of seconds and, like I said, this is a compact, hard pellet. So the contribution of odor from the feed in my opinion from doing this a long time is definitely not significant.

MS. RACINE: So the feed won't have an odor but you're describing a method to contain that odor. I thought I read as well that there was a plan to only store up to a week's worth of feed at a time, is that -- is that accurate that that was part of the plan -- part of the mitigation to only ever -- to have the capacity to store only a week of feed at a

time so that you could keep it in this sealed dedicated building.

CATHEL DINNEEN: That's not from my statement, so I don't recall, but --

MS. RACINE: Okay.

CATHEL DINNEEN: -- yeah. Possibly, yeah.

MS. RACINE: And I understand you to say that the buildings are going to be completely enclosed; is that right?

CATHEL DINNEEN: Yes.

MS. RACINE: But there will need to be personnel doors, of course?

CATHEL DINNEEN: Yes.

MS. RACINE: Overhead doors?

CATHEL DINNEEN: And what are overhead doors?

MS. RACINE: Large -- large doors, not ones that you just walk through but --

CATHEL DINNEEN: Yup. Okay. Yup.

MS. RACINE: And those on occasion will need to be open for construction operations, maintenance reasons, I imagine?

CATHEL DINNEEN: Man doors will not lead into main processes. They'll lead into offices, so man doors are not going to create an odor issue. The

other thing that's important to understand with these facilities is these -- all of these buildings are biosecure buildings, so we have very strict biosecurity protocols. So gates and doors being open for extended periods is not going to be common event and staff will have training and will very -- very much understand the significance of having these gates and doors closed.

MR. DUCHESNE: If I can butt in just briefly.

MS. RACINE: Yes.

MR. DUCHESNE: We've spent about the 20 minutes that we had planned on and you haven't touched blasting yet, so I want to make sure we -- we're encroaching our time.

MS. RACINE: Thank you. I only have one question on blasting and I will wrap up very briefly with odor and then I'll --

MR. DUCHESNE: Oh, absolutely. I was just doing time management. Thank you.

MS. RACINE: I appreciate that. Thank you. In terms of the enclosed building then, I imagine if it's -- this is enclosed there must be some sort of ventilation plan?

CATHEL DINNEEN: Correct.

MS. RACINE: And ventilation is going to be, I imagine, an important part of operations given what you're doing?

CATHEL DINNEEN: Yes.

MS. RACINE: And that ventilation system, as I understand it, is somewhat dependent on the HVAC system that's going to be designed and operated to avoid offensive odors?

CATHEL DINNEEN: Well, I'm not an engineer, but in my mind the HVAC is the ventilation system.

MS. RACINE: Have we seen anything in the application specific about how the HVAC system and the ventilation system is going to address odors specifically?

CATHEL DINNEEN: In what way? I mean, you need to explain. I don't understand.

MS. RACINE: I guess there were statements in the application as to odor that said that the HVAC systems were going to be designed to ensure adequate ventilation using proven air treatment technologies. I was just wondering if at any point the application was supplemented to let us know what the air --

CATHEL DINNEEN: Just to give you an example then. In the main production systems where you have the tanks, as I mentioned, will -- the fish -- the

fish are in the tank in the water so that you don't smell fish. It's about a biosecure clean environment in there and the HVAC system is used to move significant volumes of clean air through that building because not -- not specifically for odor, it's part of dealing with humidity especially when you're talking about a salt water environment and it's also important in controlling the temperature in the building and in the water and obviously for creating good working conditions for the fish. So in that example the ventilation is pushing large volumes of clean air through that building which of course also is a mitigation factor for odor development.

MS. RACINE: Anything about those air technologies about when that air needs to leave the building, have we seen anything specifically as to -- specifically as to odor control?

CATHEL DINNEEN: Yeah, you're going a little bit out of my scope now because I'm not an engineer --

MS. RACINE: Okay.

CATHEL DINNEEN: -- so I'm sorry, I can't answer that.

MS. RACINE: That's okay. Mr. Doyon, my one question about blasting is has Nordic identified

exactly you're going to be blasting?

BRETT DOYON: We do not have exact limits where we're going to be blasting at this time based on the design and what's actually out there for ledge will -- will result in actually where the blasting will have to take place.

MS. RACINE: Okay. Thank you.

MR. DUCHESNE: Great. Ms. Daniels, as indicated -- before you get up, as time allows it and we're way behind, so I can't allow it this time around. I know, I'm sorry, I feel bad about it.

MS. DANIELS: May I say something?

MR. DUCHESNE: You may say something on mic, yes.

MS. DANIELS: I'm an abutter to this project with just 300 feet from my house to this project, so I believe I have significant perspectives and concerns about both of these issues.

MR. DUCHESNE: And I would agree and that's one of the reasons we've allowed the questions earlier. The reason we don't -- when we have time we do it. We are running short of time right now. The way the process would normally have worked would be to look at the testimony coming up and requested time as some of the other intervenors have done and that

request wasn't made, which is why we can only allow it when we have the time to do it. So that's the situation we find ourselves in.

MS. DANIELS: I'm sorry, but I didn't understand that to be the case when I made my complaint to the process to the BEP about the prohibitive factors for normal citizens who are not represented by legal counsel to be able to participate meaningfully in this process.

MR. DUCHESNE: Right.

MS. DANIELS: And I find that unnecessarily prohibitive to my participation.

MS. BENSINGER: And we understand that, but we did have several conferences before the hearing --

MS. DANIELS: Oh, the one with two days of notice where the agenda was at the bottom of the email?

MS. BENSINGER: There were several conferences in which we discussed the process and there were several procedural orders that went out describing the need to request time for cross and it's not fair to the other parties who also did not request time for cross, so thank you. But thank you, your objection is noted.

MR. DUCHESNE: Thank you. And just to

explain to the audience, part of reason is people bring in their witnesses sometimes from far away on a certain schedule and if we don't keep somewhat to that schedule it causes tremendous difficulty and expense for some of the other interested parties as well. That's why we have the procedures ahead of time saying how much time are you going to request, why -- are we going to be -- how do we get the schedule up. So just so everyone understands what the -- why the procedure is the way it is. And so at this point we can go to, I believe, DEP, Board questions. Ms. Lessard.

MS. LESSARD: I actually have some expertise in this area. Seriously, I have a certified nose and that sounds silly, but I've been to odor science monitoring training because I once managed a community that had a landfill that generated significant odors. So I understand that odor isn't what it smells like. Offensive is a function of intensity and time that the odor is present, so I get what you're saying about everything being sealed, but is it fair to say that this project is going to be larger than any other project that you have managed as a production manager?

CATHEL DINNEEN: As the head of production

for Nordic Aquafarms, I am involved in the management of over 3,000 tons of the production output. These facilities -- these units that you see up here -- well, you can't really see anything other than the buildings, but in there what we have is a modular design, so we basically have essentially 18 different systems that are all identical, but they're their own system and each one produces approximately 2,700, 2,800 tons, so I would argue that I have appropriate experience for the scale that we're talking about here, it's just that there is more of these units, but once you know how to operate and manage one of them they're all essentially the same. Another thing is that as I was saying in my summary, when -- when I addressed this part of the SLODA application, I drew on our collective experience and between us we probably have more than 100 years of experience in operations and design. And as I mentioned, our design team before they joined us delivered between 25 and 30,000 tons of production outputs in their 20 years. The last thing I would say is I understand what you're saying, but fish poo smells the same regardless of the scale and the -- when it comes to the scale the principles are the same. You're still talking about containment and capture and treatment.

It just means that if you have more units or you have bigger units then if you're incorporating some treatment device somewhere you have to scale it appropriately, you have to have more of them it has to be bigger or whatever.

MS. LESSARD: I wasn't impugning your reputation. I was asking about the size of this compared to the size of other facilities that Nordic operates.

CATHEL DINNEEN: Yup.

MS. LESSARD: And that relationship what you're telling me there is a linear relationship that if you can manage one you can manage 25 --

CATHEL DINNEEN: Mmm Hmm.

MS. LESSARD: -- over two buildings, which is -- the generation capacity for odors is that much larger even though it's inside, even though it's -- so the systems that manage it would need to be scaled appropriately to deal with the fact that this facility is 10 times larger than any other facility that -- that's not -- might not be the right number, but it's close. I'm just trying to get to the relationship between the size of this facilities and the size of what's currently being manage by Nordic and how that works, that's all.

CATHEL DINNEEN: Yeah, so you're -- you're talking about 3,000 tons approximately versus Phase 2 at 33,000 tons. Don't forget this will be built in two phases. And while in my opinion managing odor is -- it's not hugely different because we're able to control it. It's not like a landfill where it's much more difficult to contain it. The different parts of the facilities, the feed storage, the processing plant, the wastewater treatment and the production all have different -- they have different strategies and they're different in terms of the odor or no odor that they develop. Most of the buildings that you're looking at, the production units in my opinion and my experience do not produce offensive odors and they will absolutely not produce any kind of a nuisance odor at the boundary of the facility there and the same goes for the processing plant. And then you have the wastewater treatment plant, which is the separate building down to the southeast there that deals separately with the waste that comes from -- from those units and then you have a different strategy there that's appropriate for the scale of material that's coming its way.

MR. DUCHESNE: Great. Mr. Draper.

MR. DRAPER: Thank you. So I appreciate the

information you've provided with regard to the systems that you're contemplating. And but also in deference to the fact that there are neighbors that are going to be in close proximity to the facility --

CATHEL DINNEEN: Yup.

MR. DRAPER: -- and recognizing that engineered systems and mechanical systems can fail, has there been any consideration or is there any plan for Nordic providing, and I'm going to use the term a hotline, that's not necessarily the right perhaps term, but a way where a neighbor can report, A, I'm smelling something, there is a problem here. Is there a way that that can be reported and then subsequently addressed?

CATHEL DINNEEN: Well, what might be good is to perhaps submit it as a sort of an odor control plan where you can incorporate into the plan a strategy for neighbors to do exactly that and we'll have no problem whatsoever at doing that.

MR. DRAPER: Thank you.

CATHEL DINNEEN: Yup.

MR. DUCHESNE: Mr. Pelletier.

MR. PELLETIER: Mr. Dinneen, you were talking about the fact that you got a tank for the one -- to handle the mortality and you said for 2 1/2

meters, so I'm guessing a little over 8 feet cubic of volume, but these are big tanks with a lot of fish in and there I'm assuming, you know, we're talking about handling occasional mortality fish on a daily basis, if there was a more of a catastrophic event for one of those big tanks or a couple of those big tanks at a time, is there multiple tanks beyond that one 2 1/2 cubic meter tank that they can handle it -- do you have the capacity to handle a big event?

CATHEL DINNEEN: At least before going into operation for sure there will be other requirements that will come along that we'll have to be compliant with and one of them will be having a contingency plan for a mortality event like you're -- you're talking about. Actually, we've already started drafting such a plan. But what I would say is with these kind of systems, again, they're modular and we have contingency plans in place and back-up equipment, back-up pumps so if something breaks down another one kicks in, does so automatically. We have scatter systems. We have alarming and monitoring systems. There is probably going to be people on-site all of the time. We have emergency back-up power for power failure events and even if we had a doomsday scenario where all of our back-up generators

just blew up or something, we still will get oxygen that will automatically be dosed into the tanks and support the fish. So those kind of -- I mean, I can't -- I can't predict the future. You never know what's going to happen, but those -- those sort of scenarios would be very rare and it's highly unlikely that you would lose a very large amount of stock. But the ensiling tanks, to answer your question, will not cope with that. That's for just your normal mortality and of course we have contingency built into the scale of that -- of those tanks. But you would have a contingency plan in place where you have one of your disposal partners you have a plan with them where they can handle that volume of material and you have a plant in place to get it off-site, which would probably involve pumping it into a sealed dumpster that -- and then conveys it to their site.

MR. PELLETIER: And I understand there is a number of back-ups --

CATHEL DINNEEN: Mmm Hmm.

MR. PELLETIER: -- and that wasn't the question. In terms of maybe -- and I don't know if you can answer this or not, but in terms of the products, I'm assuming most of them would be whole fish that have been beheaded and gutted --

CATHEL DINNEEN: Hmm Hmm.
MR. PELLETIER: -- and I don't know if you have filets so you're going to have racks as well, the fish racks possibly.
CATHEL DINNEEN: Yup.
MR. PELLETIER: So it's -- it's kind of the mix of materials --
CATHEL DINNEEN: Yup, that's correct.
MR. PELLETIER: -- that will be pumped. No frozen fish though?
CATHEL DINNEEN: That's not really our current plan. The current plan is to, if anything, chill the product, but the product, I mean, one of the greatest attributes of this type of product and being able to grow the fish in this way is you're -- it's the freshness being able to get it to the consumer so quickly. So basically what you want to do is as soon as you process that product you want to actually process it before -- before it even goes into rigor, which is pretty amazing, and then get that product straight down the road to the consumer.
MR. PELLETIER: Thank you. Mr. Doyon, I understand the question was you're not really sure yet where blasting could occur. I'm assuming you have some ideas where that might occur. How does

your work fit in with the phased approach that Mr. Johnston talked about just in the panel earlier where you're working in one area? So you're going to go down, he's going to excavate -- they're going to excavate to a point where you have refusal and then you step in and you stay within that one small excavated area?

BRETT DOYON: Correct. That's how I would imagine it would go. They would -- they would dig until they hit ledge until they couldn't dig anymore and then they would -- we would be on-site and work right in that linear fashion with them. We would just be an added step when this did, in fact, hit ledge.

MR. PELLETIER: Yup. And just -- and I understand you don't know exactly where -- you wait until you start pulling off materials to see where you've got to work, but any idea where blasting might occur relative to the location of the dams -- of that Lower Dam?

BRETT DOYON: I think there is some anticipation for some blasting under the lower southeast building and some of the trenches. And then I would assume that in the deeper areas of the building, the deeper cuts you -- it would be greater

odds that you would hit -- hit ledge.

MR. PELLETIER: And what's --

MS. BENSINGER: Could you use the pointer, please.

BRETT DOYON: Yeah, so I would -- I think we're anticipating some ledge here and then in the back here where some of the deeper cuts are.

MR. PELLETIER: And how do you handle an area like that that may be of concern? I know this is part of your regular business, but how do you -- you know, when you've got a particular structural concern in pretty close proximity to where your blasting is?

BRETT DOYON: Yeah, I mean, once we hit the ledge and we know where it is and the depths of the cuts, I mean, we analyze it and we run calculations and, you know, figure out how many pounds of explosives we can use at this certain distances that we're, you know, that we are away from the structure and, you know, and limit that exposure to -- to those structures.

MR. PELLETIER: But would you say there would be a series of smaller blasts if you were close to something like a dam structure that you may have some concerns about and just do it that way?

BRETT DOYON: Correct. Yeah, I mean, when you're closer to buildings you kind of tend to go smaller, less pounds per delay and you -- you go smaller and, you know, you prefer to start further away, collect data. We set up seismographs at the existing structures of concern and then we calculate based on the results of the seismographs and stay within industry standard limits that -- that we're allowed.

MR. PELLETIER: Okay. Thanks.

MR. DUCHESNE: Anything else? Mr. -- Dr. Hopeck.

DR. HOPECK: Mr. Martin had questions first.

MR. MARTIN: Sorry. I apologize if I'm repeating anything. I missed some of the context on the engineering answers before. But are you familiar with some of the air filtration technologies that were mentioned, industrial mollification covers and carbon absorption filters? Are you familiar with those technologies and how they work?

CATHEL DINNEEN: Certainly the carbon filters. That's typically what we would use to remove the offensive odor from absorption.

MR. MARTIN: Are you able to speak to the effectiveness of those technologies in terms of

removing odor?

CATHEL DINNEEN: I would say I have personally pumped hundreds of thousands of liters of this material, sludge, into stored tanks -- sorry, sealed tanks that had carbon filters installed and it was very effective at removing those odors.

MR. MARTIN: Okay. Kind of a follow-up question to the technology there and this might -- feel free to defer to this Mr. Whipple later this afternoon. But are any of those HVAC unit components that you've discussed in your testimony, are any of those being used for or relied on to remove pollutants or hazardous air pollutants from the inside of the building before they go into the exhausted air?

CATHEL DINNEEN: I would like to say no and that said in my testimony what I indicated is that the -- the exact choice of equipment, the precise technology that we use will be selected and installed in collaboration with experts in the field, so what we actually will install, the specific piece of equipment and the configuration of that will be done later with the appropriate engineers. But I guess the message I'm trying to give -- because some of these things we just simply can't do. We have to

award contracts to vendors, for example, the people collecting the sludge or the people building the processing plant and so on, before we can actually do the very detailed design and configuration of some of these units even though we know pretty much how it's going to be they have to be involved. And obviously we -- we would need to have permission to build this facility before we go and sign contracts with these vendors, but they'll want to have their -- their own say and they'll have their own ideas from their own experience in the different areas as to how -- how they want to -- to be a part of the strategies that we use in those different areas for odor removal.

MR. MARTIN: So would -- would the final product of whatever that negotiation is be as effective or better than what is proposed in the application?

CATHEL DINNEEN: I would say what's proposed in the application will be extremely effective. And, again, we are comitted to not having a nuisance odor at the boundary or outside the boundary of the facility and that's exactly what we'll do.

MR. MARTIN: Okay. Mr. Doyon, and this is a follow-up on some earlier questions. It sounds like you are familiar with blasting in the vicinity of

dams or older dams and I'm going to try to be careful here because some of this testimony is going to be stricken shortly, but you mentioned calculations and how that kind of seismic activity is monitored. In your opinion, are the blasting limits that you are mandated to follow protective of those structures?

BRETT DOYON: Yes, I would say they're protective of those structures. Most of the blasting limits are based on actually like horse hair plaster and sheetrock and, you know, a concrete dam would be of greater stability than -- than say a residential house, so I would say that they're -- they're a good standard to use.

MR. MARTIN: Thank you. That's all I have.

MR. DUCHESNE: Great. Dr. Hopeck.

DR. HOPECK: Okay. Thank you. I think most of my questions are for Mr. Doyon, but there may be some that could be answered by people from Nordic or Ransom as well. First off, I guess I'm going to refer to a -- to the report by Wright-Pierce that's in the rebuttal testimony. It is the upper and lower Little River dam assessment report. What's here in this Section 3 of that report is it possible to get the complete report submitted for the record?

MS. TOURANGEAU: So I think that that report

came in, I'm trying to remember who that came in under, but it wasn't under either of these witnesses.

MR. DUCHESNE: If you want, while you're looking that up I've got one question from the audience. It was submitted with a bunch of questions, but given the time constraints I explained to Ms. Daniels I can take time for maybe the best of the bunch and that question would be are Maine's odor control requirements higher or lower than those at Nordic Aquafarms' Norwegian and Danish facilities?

CATHEL DINNEEN: It's impossible to answer that. They're different standards. Totally different countries.

MR. DUCHESNE: And they don't even have the same system of weight measurement that we do.

CATHEL DINNEEN: Exactly.

(Laughter.)

MR. DUCHESNE: We tried metrics decades ago, it just didn't stick. Did you find your answer?

MS. TOURANGEAU: I did. So that segment of that report is Nordic Exhibit 28, which was referenced by Mr. Neilson in his response to the water use testimony and how those dams played into water use, which I thought was the only reason that

the -- that was kind of what the Board limited the scope of the analysis of the dams to and not to looking at stability. Am I remembering right? It's been a while since I looked at those procedural orders.

MR. DUCHESNE: Yes, but we did allow blasting.

MS. BENSINGER: We did allow blasting.

MS. TOURANGEAU: Oh, definitely blasting, but in terms of looking at the stability of the dams.

MS. BENSINGER: Well, I think that blasting -- if blasting could result in potential impacts to the dam that would be a fair topic that we didn't -- we didn't rule that out.

MS. TOURANGEAU: I guess my only point is that that exhibit was not appended to their testimony so they don't -- they haven't looked at it. They don't have any ability to comment on it. It's outside the scope of their testimony.

MR. DUCHESNE: So if I understand correctly they're not really prepared to answer that question, is that accurate?

DR. HOPECK: Well, the question is more appropriate to Nordic as to whether the complete report can be submitted.

MR. DUCHESNE: Okay. Can that complete report be submitted?

MS. TOURANGEAU: I think that that report -- the full report, I think, was in the application materials and we can find out where exactly that was, but we only put in the Section 3 because it's a pretty this long report and that was the part that was relevant to Mr. Neilson's testimony. But the short answer is yes and I think it's already in the application.

DR. HOPECK: Okay. Then I guess we'll -- that we'll -- both -- looking at the potential pre-blast survey radius that's based on 2,000 feet from the complete impacted area, so there are -- so first off, is it true that there are no areas that could potentially be missed if that were your pre-blast survey area? That might not be the number, but within 2,000 feet of a blast area.

BRETT DOYON: What do you mean by missed? That a property would not be surveyed or?

DR. HOPECK: Yes, that's what I'm getting at.

BRETT DOYON: Correct. Yes, we're basically being extra cautious that we would cover the limits of the project if rock was hit at any spot on it.

And I believe it's actually a half mile radius that's required by the DEP.

DR. HOPECK: There are two -- yeah.

BRETT DOYON: There are many.

DR. HOPECK: Okay. So we would capture every area that could be -- would fall within the appropriate radius would be captured by that -- what's shown in that figure?

BRETT DOYON: Correct.

DR. HOPECK: That does capture both of those dams, so if -- and if we get to that point, if a permit is issued and we do have those covered in pre-blast survey, would it be reasonable for the Maine Emergency Management Agency to participate in that pre-blast survey or at least review the results of it and would you be willing to accept any recommendations they might have, if any, for monitoring of the dams during blasting?

BRETT DOYON: As far as our pre-blast survey, we would do just like a video of the existing structures and the existing cracks and I assume that they could do their own or, you know, tag along, I guess, with the process. And if they had, you know, concerns and limits and standards I believe we would, you know, we would listen to their recommendations.

DR. HOPECK: Okay. In the -- in your testimony you talk about placing a monitoring location at the closest point. Is that given that the anisotropy of the rock is it always appropriate to have just one monitoring location at the closest point?

BRETT DOYON: I mean, one would be the minimum that you would have. It's, you know, good practice to do it at multiple locations and then depending on where blasting is in relation to the site you would, you know, adjust that location, you know, you're not just going to pick one point at the beginning of the project and stick with that, you know, you're going to -- if you move to the northeast at the northwest corner of the project you're going to want to, you know, set up on a structure closer to there and when you're shooting down on the southeast building you obviously want to monitor the dam and the neighboring structures at that location.

DR. HOPECK: But for any given shot you might need multiple locations because the seismic energy propagates differently in different directions, so it might not propagate as well toward a structure that happened to be the physically closest structure.

BRETT DOYON: I mean, it's -- it's pretty consistent, I guess, in a certain area. Like you would anticipate if one was set up at 100 feet and one was set up at 200 feet they would, you know, correlate pretty similar to one another, so you could in theory, you know, kind of calculate what those -- what those blasting effects were at another structure at a further distance away or a closer distance.

DR. HOPECK: Along the same line I would agree, but in a perpendicular direction would that still be the case?

BRETT DOYON: I believe that still would be the case, yes.

DR. HOPECK: But if we were to be looking at that and we did require monitoring in multiple locations, would that be acceptable to the applicant?

BRETT DOYON: Yeah.

DR. HOPECK: I'm taking that as a yes.

BRETT DOYON: Yeah, I mean, it's typical around dams to have multiple seismographs set up is my experience.

DR. HOPECK: And when you do a pre-blast survey on a well, what would you -- what do you typically do?

BRETT DOYON: We typically do like a Maine

standard water well test and test for certain elements that are found in the -- you know, per the DEP standards.

DR. HOPECK: Specifically which ones, I guess?

BRETT DOYON: I -- I don't know off the top of my head. I mean, I know that ecoli is one of them and is some other -- there are some other chemicals that they test for.

DR. HOPECK: Again, that is -- that's something potentially we could establish through a condition in the order if it got that far?

BRETT DOYON: Correct, yes.

DR. HOPECK: That's all I have.

MR. DUCHESNE: Great. Thank you. Mr. Parker, did you have a question?

MR. PARKER: Just briefly. A couple observations and one question for Mr. Doyon. Growing up in a fishing family, I always found if you go to a fish market and you smell the fish, you don't buy a fish there. If they're fresh it doesn't smell bad.

(Laughter.)

MR. PARKER: The only environmental problem I've dealt with directly on odor was a bakery in Augusta and the bakery totally enveloped the

neighborhood. But my question I wanted from Mr. Doyon, John because of the complexity of the site and the vicinity of the buildings, some them being fairly close together, would you anticipate going in and pre-blowing a lot of that area if there is ledge there if -- before their construction occurs on the buildings? In other words, do it ahead of time while there is nothing else in the way to slow you down.

BRETT DOYON: That's -- that is a good idea as opposed to blasting after the first building is up, but we haven't gotten into those details.

MR. PARKER: Okay. Would it be an easier job for you if you did it before the next building goes up or would that depend on what you found for rock?

BRETT DOYON: Yeah, it would depend on what the rock was and it would probably most likely be easier.

MR. PARKER: Okay. Thank you.

MR. DUCHESNE: I do have a question or two. How much waste are we talking about using any system of measurement you want.

CATHEL DINNEEN: 160 tons per day of sludge in Phase 2.

MR. DUCHESNE: So that's multiple truck

loads of sludge coming out of the facility. About eight large trucks.

CATHEL DINNEEN: Yeah. Well, it depends on the truck itself, the size of the truck --

MR. DUCHESNE: Right.

CATHEL DINNEEN: -- but it should be one a day.

MR. DUCHESNE: Okay. Great. I'm recognizing the fact that you may get sucked into another 15 year old state controversy about where does all this waste go. I look at Exhibit 18 and you have a number of vendors you've been in communication with. One of them is Casella Organics, for instance, who certifies to you that they have the capabilities to transport and use the project and when they run out of space for that at their facility in Unity they take it up to West Old Town to the Juniper Ridge Landfill. Have they given you any indication that they would reserve for you the capacity at Casella Organics before just bypassing it up to Old Town?

CATHEL DINNEEN: It's the chicken and the egg.

MR. DUCHESNE: Yeah.

CATHEL DINNEEN: Again, you know, until we sign a contract with these vendors or we enter into

an agreement or at least negotiate an agreement they're not -- they're not going to commit to anything.

MR. DUCHESNE: Mmm Hmm.

CATHEL DINNEEN: And just so you know because we haven't entered into an agreement yet because we really need permits to move this that next phase --

MR. DUCHESNE: Right. I get it.

CATHEL DINNEEN: -- there are several options and the next phase would be deciding who is the best -- who is the best one to go with and it may be more than one.

MR. DUCHESNE: Oh, good. And I'm just raising that red flag that you might experience a little later on. I think if the Bureau of Waste and Remediation were here they may look at statistics and say, yes, they have the capability in Unity but they often use that capability for what they can bring in from out of state and just directly bypass and I'm only concerned about what my neighbors are going to say when they find out, so that's the reason for the question.

CATHEL DINNEEN: Yup.

MR. DUCHESNE: Are there any last minute

questions? Seeing none, I believe we can go to redirect.

MS. TOURANGEAU: I have just two questions for you, Mr. Dinneen. Is there an ensilage tank for each module?

CATHEL DINNEEN: Yes.

MS. TOURANGEAU: So how many total?

CATHEL DINNEEN: If I remember correctly there should be four.

MS. TOURANGEAU: Is the fish sludge suitable for reuse? Mr. -- the Presiding Officer was asking about it being sent to landfill as basically solid waste, but would it also have nutrients and those kind of things in it?

CATHEL DINNEEN: The landfill is something that we really want to avoid and, you know, the way the world is going everyone wants to avoid that. So, again, until we sign a contract with a vendor it's hard to say exactly what we're going to do, but I would say that one very good option with a company called Waste Management, which is one of the biggest waste vendors in the country with over 40,000 employees providing environmental services all over the U.S. They have a plan to dry it into dry fertilizer powder which then will have a -- obviously

a resale value.

MS. TOURANGEAU: Thank you.

MR. DUCHESNE: And the recross?

MS. RACINE: No recross cross, but I'd ask if I could cede maybe two questions to Miss Daniels for my time if I waive my recross?

MR. DUCHESNE: I'm afraid not.

MS. RACINE: Okay.

MR. DUCHESNE: Thanks.

MS. RACINE: No recross.

MR. DUCHESNE: And I hate to be hard on this, I really do.

MS. RACINE: Understood. I thought I'd ask.

MR. DUCHESNE: Great. Thank you. That concludes this panel at 12:30 and I think we may have been anticipating taking lunch. What are we looking at for a schedule? We will resume shortly after 1 o'clock.

(Luncheon recess.)

MR. DUCHESNE: All right. It appears that we have not gone more than five minutes past our half an hour lunch, so I thank you very much for your promptness. We can proceed to our next panel, which is blasting and odor and again and that's Upstream's witness Mr. Lannan.

MS. TOURANGEAU: Before we start, could I --
MR. DUCHESNE: Oh, yes, you may.
MS. TOURANGEAU: Before we start, I would like to make a motion to allow Mr. Dinneen to correct a misstatement about the number of trucks from the facility each day. He misspoke in his original statement to the Board.
MR. DUCHESNE: Yes.
MS. RACINE: We're just going to note our objection that the panel has concluded and that his testimony is and so we would object for an opportunity for him to -- to not do that.
MR. DUCHESNE: No, I appreciate that, but I'm going to sustain the -- go ahead with the motion. Recall the witness.
MS. TOURANGEAU: Okay. I just -- I sent Dave to get him, so.
MR. DUCHESNE: Good. And I think I will -- I can just explain in this proceeding too that when he made that statement eyebrows popped up about halfway around the table and suspected a correction might be in order, so if we can accomplish that that would be good.
MS. TOURANGEAU: He's in the restroom.
(Laughter.)

MR. DUCHESNE: Talk amongst yourselves. Mr. Dinneen, you may come forward. You're still sworn in. I believe you have a quick correction to make.

CATHEL DINNEEN: Yes. You are absolutely correct, it's closer to four to five trucks a day depending on the size of the trucks.

MR. DUCHESNE: Great. Thank you. I appreciate it. Now, we may proceed. Mr. Lannan.

MICHAEL LANNAN: Good afternoon. Unfortunately, I'm right after lunch, so I hope I can keep you awake.

My name is Michael Lannan. I am a professional engineer in Maine, President of Tech Environmental and have an office down the street on Front Street in Belfast. I am also an overseer for the Northport Village Corp we call Bayside and a Trustee of the Bayside Utilities. I have the unique perspective of being involved professionally for hundreds of proposed facilities throughout the northeast and also as a local resident with local questions and concerns. When the project was originally proposed, I was asked by many of our neighbors as an environmental engineer what I thought and I replied that the devil was in the details and that we as a village should hold judgement until

after we have seen all of the details. The Northport Village Corp Board of Overseers has remained neutral for this project throughout the process.

I'm here to discuss the potential impact to local uses, including odor and blasting, as outlined in the Third Procedural Order. Unfortunately, as of today we have seen very few details associated with these two topics. The potential impact to local uses as a whole includes a combination of air quality dust, odor, vibration, continuous noise, impact sounds, light, visual traffic, discharge, et cetera. The nuisance potential for local uses is additive, but today we are limited to discussing odor and blasting.

With respect to blasting, Nordic has made statements about where bedrock may be and how bedrock may be removed by excavator and with or without blasting, but their blasting plan at this point simply includes the entire site. It seems clear that they have no idea how many blasting events are needed as with the water supply testimony yesterday or the day before the goal seems to be not to commit to define the blasting needs directly so as to keep it open for flexibility as part of a deal with it as we go approach. Unfortunately, this does not allow the

DEP to determine the potential noise effects of blasting with respect to vibrations and impact sounds and it does not allow the DEP to examine how this nuisance potential will add to other nuisance potentials.

With respect to actual blasting, the effects on the structures, the maximum blasting limits rest -- reference are reasonable and within the guidelines for structures in good standing. Unfortunately, it does not address whether or not vibrations from blasting or driving sheets as part of blasting and excavation will affect compromised structures such as the two existing dams. Although, I'm not a structural engineer myself, blasting projects that we have been asked to explore for the actual noise vibrations and impact nuisance potential typically include reduced limits for compromised structures that may be less stable than typical structures.

There was one question before that was asked, I think Mr. Martin asked it, with respect to the -- are the protective blasting limits for a typical house or a normal structure good for this and the example given was short of sheetrock and it's been our -- when we were asked to analyze the

vibration or do the vibration measurements, what's important is to analyze the vibration with respect to where the load is coming from. In this case, when there is a load on the side of the dam that's a much stronger load --

MS. TOURANGEAU: Objection. Can you point to where in your pre-filed, direct or rebuttal testimony there is discussion of --

MS. BENSINGER: Ms. Tourangeau, please direct the objection to the Presiding Officer and not asking a question of the witness.

MS. TOURANGEAU: It's unclear where this discussion is in the pre-filed or direct testimony.

MR. DUCHESNE: Can you point it out, Mr. Lannan?

MICHAEL LANNAN: It's -- it's not in my pre-filed testimony, however, it was a question discussed by the Board prior to me coming up here and I just wanted to -- to comment on that because it's part of the process, I believe.

MR. DUCHESNE: Great. I'm going to sustain the objection and the reason is because we are sticking, I think, to testimony that was pre-filed, if that's okay and even if it isn't okay.

MICHAEL LANNAN: There has -- there has been

very little information provided on these two topics. A lot of it was actually provided today for the first time. To me, a lot of this felt like -- I mean, I've been involved with many of these projects --

MS. RACINE: If I -- if I might interject perhaps if the Board wanted to revisit that question with Mr. Lannan during the Board question times perhaps it could be addressed at that point.

MR. DUCHESNE: Sounds like it might be a good idea.

MS. RACINE: Thank you.

MR. DUCHESNE: Thank you so much.

MICHAEL LANNAN: Sounds good. We'll keep going.

MR. DUCHESNE: Yes.

MICHAEL LANNAN: Lastly with respect to blasting, with the potential blasting zone proposed over the entire site for flexibility it's important that the blasting notification zone include not only those external projects directly within the proper distance of -- from the structures, but from within the full extent of the property lines and that was one of our comments from the pre-filed testimony.

Now, with respect to odor, again, I -- this really feels like a kick-off meeting at DEP for a new

project today. The applicant has done nothing to address the regulatory requirements referenced in the written testimony. There are no odor emission estimates, no expected emissions, no odor control plan, no area of impact, no potential frequency impact. It's -- it's my opinion that the applicant's burden of proof has not been demonstrated for local impacts or impacts to local uses for odor or all potential nuisance areas of concern. Suggesting that odor is subjective and is not -- it's not a demonstration of adequate odor control provisions.

Similar to the flexibility suggested for blasting and, again, using the analogy of the flexibility requested for water on day one by not directly answering the question of how much water do you need. Based on Nordic Aquafarms' odor testimony provided it can only assume that the same approach would be taken for odor. Nordic Aquafarms would plan to see what the odor concern may be and then will use its experts in its bullpen to address it. This approach is not a demonstration of compliance with the regulatory requirements and allows no way for specific conditional permitting. Establishing baseline conditions and allowable increase is the whole purpose of permanent conditions. Without

specific odor baseline conditions or a control system expectations an undue burden would be placed on local citizens, local regulators and state regulators to examine the entire site if a future odor control concern is identified as opposed to specific conditions that could quickly eliminate compliant sources.

When I've done, you know, studies at landfills, for example, or wastewater treatment plants we often examine the entire site to establish what the baseline is. Once we have that later if there is an odor complaint and if there is an odor hotline and so on, it's very easy to go to each location and figure out is this area the way we expect it to be or is it not and that's what needs to be done now in the permitting process. It's not something that can be done by condition later because the only condition you could possibly consider now is we agree thou shall not commit odor. It will be like a Commandment essentially. And that's just not going to work for a facility that has a power plant that is big enough for tens of thousands of people, a wastewater plant that if this was a municipal wastewater plant would service 30,000 people. You know, for the -- the water plant alone is enough

water that they're going to treat on-site for tens of thousands of people.

So we have solid waste that's being created by the -- from the fish waste and I think that the applicant was asked, you know, how much fish is going to be produced and he didn't know. He didn't know how much fish was going to be produced yet he is going to tell us that the fish produced and the waste produced from that process is not going to be a problem off-site. He talked about --

MS. TOURANGEAU: Objection. We're straying outside the pre-filed direct and rebuttal testimony.

MR. DUCHESNE: Sustained.

MICHAEL LANNAN: We talked about offensive odor in the testimony. It was talked about today, but it was also talked about in my pre-filed testimony. And when we examine odor we often look at what we like to call in addition to, as Ms. Lessard said, you know, frequency and intensity we also look at the relative offensiveness and that's commonly called a high adenotome. A high adenotome is -- is a measure of sort of a plus or minus of it being favorable. Fish -- fresh fish odor is a negative. Rotten fresh fish odor is even more of a negative.

So wastewater, wastewater sludges, that's a negative. All of these things are by definition offensive odors. It's subjective but there aren't many people I know that want to hang out with wastewater sludges and I know because I work in a lot of plants and -- and the people there say it doesn't smell but then when they go home they're told to take their clothes off out in the garage before they go in the house. So, you know, it's all relative.

So I think really without any of these specific conditions as opposed -- they really can't -- they really can't say that they're -- they're complying with Chapter 375. There is a lot of written testimony I'm not -- in the interest of time, sir, I am not going to get into all of that, which is good, I know. But, I mean, I think that there was a lot of discussion about an odor control plan and we talked about it as well, but -- but they've had two years to develop a plan. According to Nordic they have been doing this all around the world, okay, and they can do it here but they haven't done it. That haven't done it yet. And there is -- there is an understanding that you cannot do a final design at this point, but it's my experience that you can do a conceptual design that gets you to the point

where you can demonstrate compliance with the regulations, one, and two, set it up so that the DEP can come up with adequate conditions so that the -- the facility can be set up to be compliant so that if there is an odor complaint it can be addressed quickly, but the information provided cannot do that. And it's unfortunate to say that I, you know, I told the folks in my village that that's where we are today. You know, we're waiting for the details and we still have not seen the details. Thank you very much.

MR. DUCHESNE: Thank you. We can go to cross by Nordic.

MS. TOURANGEAU: Good afternoon.

MICHAEL LANNAN: Hi, Miss Tourangeau. I've been practicing that.

MS. TOURANGEAU: Thank you. So I will start with blasting.

MICHAEL LANNAN: Okay.

MS. TOURANGEAU: Are you aware that blasting will be monitored with seismographs at the closest protected natural resources or structure to ensure compliance with all applicable limits?

MICHAEL LANNAN: Yes. They will be compliant with applicable limits is relative to

assuming that the structures that are being evaluated can withhold the normal seismic activity and that's -- that's the concern with the dams. With respect to everything else, yes.

MS. TOURANGEAU: Are you aware that if rock removal is required and blasting is deemed to be unsafe next to the existing dam or other existing structures that other methods of rock removal will be utilized in those areas?

MICHAEL LANNAN: Sure. I would think there will be flexibility in everything, but, again, there is it no real plan provided for it.

MS. TOURANGEAU: Is it common to be able to determine exactly where you're going to blast before the areas to be blasted are visible?

MICHAEL LANNAN: No, but -- but in our testimony we do go over some real inconsistencies in the original testimony with respect to how the -- the figures didn't really make much sense about where you thought bedrock was going to be with -- with one drilling location and -- I don't want to get into the details here. We don't need to. It's in the testimony. Okay.

MS. TOURANGEAU: Okay. Do you feel like you've answered the question?

MICHAEL LANNAN: Ah, maybe you should say it again to make sure. Please.

MS. TOURANGEAU: Is it common to not be able to fully determine the exact extent of ledge removal until excavation is completed?

MICHAEL LANNAN: It is common to not -- yes, the answer is yes.

MS. TOURANGEAU: Thank you.

MICHAEL LANNAN: Mmm Hmm.

MS. TOURANGEAU: Do SLODA or Chapter 375 of the Departments rules require preparation and submission of a conceptual or operational blasting, facility odor control plan in advance of construction?

MICHAEL LANNAN: So we switched to odor now?

MS. TOURANGEAU: Yes. Sorry. No more blasting.

MICHAEL LANNAN: Sorry. I was trying to figure out what you were saying before.

MS. TOURANGEAU: I didn't even keep up with myself when I said blasting. Do you want me to repeat the question?

MICHAEL LANNAN: Yes, please do.

MS. TOURANGEAU: SLODA and Chapter 375 of the Department's rules --

MICHAEL LANNAN: Yup.

MS. TOURANGEAU: -- do not require preparation and submission of a conceptual or operational facility odor control plan in advance of construction, correct?

MICHAEL LANNAN: They're required to demonstrate compliance and that can be done a number of ways. It can be done by saying that we have this plan in place to -- to address odor, that's -- that's one way. That's a reactive way. Another way is to examine some of the odor control potential measures that they talked about, but they really only talked about the technology and when you're looking at odor it's about capture, conveyance, control and dispersion and it's very important to consider that every odor control technology you have has limitations. They all have a fraction of residual odor that's emitted, so you really do need to come up with a conceptual design for a facility of this magnitude to really determine whether or not you can make those statements that were made earlier.

MS. TOURANGEAU: So as you said, Chapter 375 has three alternatives for submission to demonstrate compliance with the odor -- the no adverse odor impact requirement.

MICHAEL LANNAN: When you say alternatives, do you mean like you can do one of the three or?

MS. TOURANGEAU: Yes.

MICHAEL LANNAN: You have to be able to demonstrate compliance with the --

MS. TOURANGEAU: With one of the three?

MICHAEL LANNAN: Yes.

MS. TOURANGEAU: Would you like me to read them?

MICHAEL LANNAN: Yes, please do.

MS. TOURANGEAU: Identification of any sources of odor from the development, 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 a similar material or processes, or propose systems for enclosure of odor producing materials and processes and proposed uses of technology to control, reduce or eliminate odors. Would you agree that that is from Chapter 375?

MICHAEL LANNAN: That is from Chapter 375.

MS. TOURANGEAU: And are any of those three requirements of submission of an odor control plan?

MICHAEL LANNAN: They would all be included in the odor control plan. You would talk about all of those things.

MS. TOURANGEAU: Correct. But do any of those three alternatives require submission of a facility odor control plan?

MICHAEL LANNAN: I guess I'm a little confused. You're asking me if a facility of this magnitude should be considering an odor control plan? Is that what you're asking me?

MS. TOURANGEAU: No, I'm asking you whether the facility complies with all three of these Chapter 375 alternative requirements for demonstrating compliance with the odor control standards in SLODA?

MICHAEL LANNAN: They comply with none of those.

MS. TOURANGEAU: So we did not identify the sources of odors from the development?

MICHAEL LANNAN: No, not in a way that could -- could allow conditions to be written, no.

MS. TOURANGEAU: Okay. We didn't estimate the area that would be affected by the odor?

MICHAEL LANNAN: Absolutely not.

MS. TOURANGEAU: And we didn't identify proposed systems for enclosure of the odor producing materials and processes?

MICHAEL LANNAN: No, not at all because the -- the interesting thing is -- is with that last

one is there is a lot of talk about keeping things air tight and that's, I mean, that's really what I do for a living is we -- all these facilities are living facilities. There are many, many different things going on at any one time and there is materials being moved around and -- and you really have to understand how you're going to do ventilation. An example would be that in the air quality stuff that we'll talk about later there was -- there was a response from Nordic that suggested that -- that they were going to switch from propane heaters to heat pumps, okay. So that has a direct impact on odor control because if you're really considering carbon absorption, which they've said that they're really interested in exploring and using, carbon absorption is a real -- is really affected by humidity and one of the best ways to limit the humidity is you use some of the heat from the -- from the -- that's created from the heaters, the propane or gas fired heaters, to help keep the -- the humidity down and also in the odor control section, but since they've said there is no other combustion sources on the site it's hard for me to imagine how they could use carbon absorption. So those type of things do need to be included in this or else you can't -- you can't justify that this

facility is not going to have odor.

MS. TOURANGEAU: So you've just discussed Nordic's prior testimony regarding the HVAC system and the use of granulated activated carbon to control odor, but your testimony is still that there was no discussion of odor control techniques?

MICHAEL LANNAN: Yes, absolutely.

MS. TOURANGEAU: Thank you.

MICHAEL LANNAN: Because the techniques are a combination of capture, ventilation, control and dispersion and to just suggest that you're going to offer a technology is not at all a discussion of an odor control system.

MS. TOURANGEAU: So going back to the third standard -- alternative standard under Chapter 375, identification of proposed systems for enclosure of odor producing materials and processes and the proposed use of this technology to control, reduce or eliminate odor, you don't think that those -- those technologies would fall within that category?

MICHAEL LANNAN: Again, the system is -- the only way you can tell if the system is going to be adequate is you have to look at how you are going to capture it, they've claimed sealed buildings, which I don't understand exactly how you seal a building and

then have HVAC in it. And then you -- you move the air and you have to move the air you have to allow fresh air in and you have to allow exhaust air to come out, then you control it and then it's not 100 percent controlled. There is residual odor and then you emit it somewhere, somehow, through some building somewhere and that is the odor control system and if you don't discuss that for a facility of this size then you -- you really have no odor control system.

MS. TOURANGEAU: Thank you.

MR. DUCHESNE: We can go to Board and staff questions. Mr. Martin.

MR. MARTIN: Since it was me who had asked the question the first time it should probably be me who asks the question again.

MICHAEL LANNAN: Okay.

MR. MARTIN: You referenced earlier testimony regarding the adequacy of the blasting span, which -- can you state a little bit further on your opinion on that matter?

MICHAEL LANNAN: Yeah, so -- so I think when we're talking about a structure that may be compromised you have to look at what the loading is on the structure and then vibration would effect that loading. And what we have to remember with the dam,

and I'll keep it very short, is that the dam has a significant water load on it. So when that water load is -- when that dam is vibrating from that water load you don't just have the vibration acting, you have the vibration acting in conjunction with the load from the water, so. So it really -- all I'm suggesting is that it really needs to be evaluated whether or not lower criteria would be necessary for around the dam and I know that they talked about the possibility of that, but that should be something that's done before -- really before this hearing took place.

MR. MARTIN: So I guess to go into a little bit more detail on it. Do you have any, I guess, idea in terms of I think term would be peak particle velocity and ground vibration what type of numbers would be more adequate, I guess?

MICHAEL LANNAN: No. No. I would not do that. I'm an environmental engineer. I'm not a structural engineer. I take what they say and I make sure that through our monitoring that -- that it is upheld. But I was just giving you my experience relative to other projects to where you had structures that have had compromised -- or compromised structure.

MR. MARTIN: Sure.

MICHAEL LANNAN: Potentially. Let's call it potentially because it might not be.

MR. MARTIN: Sure. I'll switch over to air here and I had --

MICHAEL LANNAN: Odor you mean.

MR. MARTIN: Excuse me, odor.

MICHAEL LANNAN: We'll get to air later.

MR. MARTIN: I had asked Mr. Dinneen questions to -- similar to along those same lines of questioning regarding control technologies. It sounds like and I presume you have experience in implementing control technologies in this type of context; is that correct?

MICHAEL LANNAN: Yes, absolutely. I -- I didn't give my full resume, but essentially that's what I would focus on a lot is a lot of odor control technology stuff. I've done a lot of it at food processing facilities, landfills, wastewater treatment plants, really anything where you need to capture, ventilate, control and disperse.

MR. MARTIN: Do you have any sort of statements regarding the adequacy of some of the other particular control technologies that are referenced in Mr. Dinneen's testimony?

MICHAEL LANNAN: Yes. There has been insufficient information provided to suggest that anything that they've said is -- is a solution for odor control. Suggesting that you're going to use carbon, okay, it's -- carbon has -- has affinity for different compounds of concern. They haven't identified any of the compounds of concern. It's related to how much contact time there is between the carbon and the -- and the compounds and then there is a certain amount of life associated with carbon where when you -- after -- so carbon is essentially just like coal and you take it and you heat it in an oxygen-free environment and it cracks and it has all these little micropores and little pores and then that's -- those are the little spaces where the compounds attach. So over time what happens is smaller compounds that are attached there will get displaced by larger compounds, so you have to know what sort of your slew of compounds are to know whether or not it's -- it's effective for that in that situation and then you really need to know whether or not the carbon is a viable alternative. There are -- there are times where the loading is not viable and there are times when the loading is viable.

MR. MARTIN: Are there other control technologies that you would recommend in this type of facility?

MICHAEL LANNAN: There are a lot of technologies that should be considered, but it -- it all comes down to first identifying what the odor sources are, what their odor loading is land what the control needs are and none of those things have been done yet. They talked about other technologies, right, wet scrubbing, is definitely a technology. I'm working on that right now for a facility that's pelletizing cheese waste. You know, biofiltration is often used for composting facilities. When I was training the DEP, Carla -- Carla Hopkins hired us to train the DEP on odor monitoring similar to what you had done before the certified odor inspector, which sounds silly but it is a subjective concern but there are objective ways to -- to observe it and that's -- that's sort of what you can do there. And where was I going with this?

MR. MARTIN: I -- I was trying to get whether there were suggested technologies, I think.

MICHAEL LANNAN: Yeah, yeah, that's right. So we were talking about suggested technologies, so, yeah, there are other technologies that could work,

okay, but we have to remember part of this whole process is -- is related to is the project technically financially feasible and -- and maybe it's just because I'm always called in when there is an odor problem, right, but it's usually when the -- the -- no offense, the solid waste facility --

MR. DRAPER: None taken.

MICHAEL LANNAN: Yeah, okay. -- did not properly consider that up front and then -- then this is just a huge added cost and it was never considered in the -- in the original cost, so not knowing what technology you're going to use or, you know, carbon has a finite life. How often are you going to change out this carbon? We're talking about hundreds of thousands of square feet of floor space and lots and lots of air that is going to need to be turned over to keep the humidity down. And we've got to keep the humidity down even lower -- I say we, it sounds like I'm in the project now because that's what I like to do is help solve the problem, but, you know, you need to keep the humidity even lower in a situation where you're going to use carbon, so you'd need even more air flow and so on. So you're talking about huge vessels with lots of potential carbon in them and so on and whether that's viable or not from a financial

standpoint, if you haven't even done a conceptual design you have no idea yet.

MR. MARTIN: Okay. One last question and this is, I think, was touched on a little bit in cross but maybe not with this particular area, so the Department in the event a permit is granted has pretty considerable discretion to add conditions to provide for adequate coverage of odor. You suggest sometimes that some sort of odor control plan and I would presume that you -- that your position is that that would be something that the Department should require. One of the key terms here is the reasonableness of such a requirement. Have you ever been involved with a project -- in what circumstances have you provided one of such of these plans or are there specific conditions or specific elements of a project where you think that these types of plans are warranted?

MICHAEL LANNAN: Right. So it's not based on size, it's based on odor potential and the tolerance for odor for the area, okay. And in this case, although Belfast has rezoned this area to be -- to allow this project the area around it is still walking trails, it's houses, it's a neighborhood. There is the Matthews Brothers up in the -- up in the

upper corner there and then there is a church, but that's in sort of a protected location, so you have to consider all of those situations. In those situations I've done projects where we've come up with an odor control plan for a pump station because it was necessary and then you can do that all the way up through, I mean, a very large landfill, you know, and often before you even consider, especially nowadays trying to permit a new landfill anywhere, odor control is -- is so far down the road. Now, again, we're talking about a facility that we're going to have -- that's going to be processing 200,000 ponds of fish a day. A day. So in one day depending on whether they're being gutted or just, you know, filleted or just gutted and -- and the heads knocked off, you know, you can see anywhere from let's say 10 percent of that to 50 percent depending on the fish and blah, blah, I don't want to get into the numbers, but my point is that you're talking about, again, hundreds of thousands of pounds of waste as well, so that's just from the processing end of this, okay. When you take that waste in -- in many of the projects I've worked on, I've worked on another animal feed pelletizing facility where the local or the state regulatory authority required that

we limit the amount of fish waste because fish waste has its own unique odor potential. So that alone would justify that you need an odor control plan for this facility and you have to consider about where that waste might go. We also are looking at a very liquid sludge and as we know right now -- and I don't need to get into the PFAS discussion of course, but as we know in Maine we've got concerns about PFAS and where we're going to put sludge in general and, you know, this is another concern that comes up with -- related to that is the sludge and, okay, so we're going to try and concentrate it even more so there is less material and now it's on-site longer, what are the odor control measures that are going to be installed there. Then we start looking at water treatment. We're talking about water treatment for three different types of sources. So each one of those has its own unique sort of process to get the -- the materials out that we don't want, okay. And those materials, you know, are going to create its own sludge and -- and that has odor potential. And I think what really concerns me a lot is that this entire process, and this is in my -- this is in my testimony -- it's in my testimony. It is, you know, I'm concerned about not just sort of the every

day thing but when things start to back-up. If we have concerns with storms, if we have issues with -- with -- and I don't want to say the wastewater treatment plant is going to fail, right, because everybody -- when I say that they're like, oh, my God, it's going to go to zero, well, no. A module is going to get out of whack, right, and, you know, we're talking about 99 percent of removal of -- of TSS and if it gets just a little bit out of whack, you know, when I was in grade school I got a C minus, it was still a passing grade --

MR. MARTIN: Sorry to cut you off, I --

MICHAEL LANNAN: No, no, wait, just let me finish this one last thing. So when I was in grade school if you got a C minus that was a passing grade. In this case that's 30 times the amount of sludge created in one day, so it's a 30 day supply of sludge created in one day. Those things haven't been evaluated for what the odor potential is from this facility. That's all I want to say.

MR. MARTIN: Sure. I guess what I was trying to get to is what types of activity would warrant a reasonable condition. It sounds like landfills, yes; facilities with lots of sludge, yes; but that's -- that's what I was trying to get at and

I don't want to go too far down --

MICHAEL LANNAN: What types of facilities require an odor control plan?

MR. MARTIN: What -- what -- which types of facilities would you recommend?

MICHAEL LANNAN: Any facility that has a potential odor loading that is -- that is high, okay.

MR. MARTIN: How do you define high?

MICHAEL LANNAN: Well, that's right. And you define high by how much buffer do they have from an odor perspective between the facility -- between the facility and the fence line, okay? So here we are. There is the fence line, okay. That's how much buffer we have, so that's one of the things, okay. And then we look at, okay, how much odor loading is there? Odor loading is a combination of the amount of concentration and the amount of flow, okay. Well, you know, when you can fit -- when you can fit sort of Gillette Stadium here and Fenway Park here, you know, it's quite a bit of -- of flow, so even when the concentration is low there is a -- there is a -- there is a potential. So in a facility of this size absolutely you'd need to do one.

MR. MARTIN: Thank you.

MICHAEL LANNAN: Yup.

MR. DUCHESNE: Other questions from Board or staff? Mr. Draper.

MR. DRAPER: So I just want to make sure that I kind of understand reading through your testimony and hearing you today --

MICHAEL LANNAN: Mmm Hmm.

MR. DRAPER: -- and this is a very generic type of question, but I wasn't -- it sounds like you're not saying that odor cannot be controlled from a facility like this, but rather they have not demonstrated how they're going to control odor from a facility like this and there is, I think, from my mind is an important distinction there.

MICHAEL LANNAN: Was that a triple negative?

MR. DRAPER: I don't know. I'm not sure. I think I hear you say, yes, there are technologies, there's techniques, there's ways of controlling odor from a facility like this but they have shown us what those -- what those are and in enough definition -- in enough detail in your opinion. And I know that's a --

MICHAEL LANNAN: This -- this project, I mean, I live down the street. This project has consumed quite a bit of my life for the last year to two years and they've had lots of time to come up

with a plan for this and -- and they haven't done it. Is there a way to do it? Yes. Is it cost-effective? I don't know. You'd have to look at it first. That's the problem is until you look at it that's one cost on top of many of the other unknowns that we've talked about. And to me the other thing that's a very much of a concern with limiting this discussion to odor and blasting is nuisance is a cumulative effect. I don't know how many times I've worked on a wastewater treatment plant where the odor didn't change but when they cut down the trees because the pine trees have gotten too big and fat and the neighbors could now see the facility because of the visual impact they're calling about odor. So all of that is related and there is a lot of that because, again, there is -- there is very, very little buffering here around this facility. They've used every inch of this site with process equipment. And the interesting thing is it does that -- does using every inch address the buffer you need for nuisances or not and that's the, you know, I -- typically it doesn't, but, you know, they haven't -- they haven't addressed it either way.

MR. DRAPER: You've answered the question. Thank you.

MICHAEL LANNAN: Yeah, thank you very much.

MR. DUCHESNE: Thank you. Any other questions from Board or staff? Seeing none we can go to redirect.

MS. RACINE: None.

MR. DUCHESNE: None. Okay. So no recross either. So we may --

MICHAEL LANNAN: We saved some time there.

MR. DUCHESNE: We did. A five minute break for a reset. I believe air emissions will be next. That will be Nordic and Whipple. So a five minute break while we reset.

(Break.)

MR. DUCHESNE: I believe we are now pretty much reassembled and ready to proceed. I am reminded by Ruth Ann that microphone control is going to be important. If you're too close it blows out the audio online. If you're too far away nobody can hear it. So if I'm occasionally repetitive about making sure that you're just about right, that's why. And with that in mind, Mr. Whipple, you may proceed.

STEVEN WHIPPLE: Good afternoon, Presiding Officer Duchesne and members of the Board. My name is Steve Whipple. I'm the owner of Mainely

Environmental, LLC. Prior to starting my own firm I was a partner at Woodard and Curran where I worked running the air program for about 18 years. Prior to that, I worked at the Maine Department of Environmental Protection Bureau of Air Quality back in 1994 and '95. I'm a licensed engineer in the State of Maine and hold a Bachelor of Science degree in Environmental Engineering from the University of Vermont. I have a Master's in Business Administration at the University of Southern Maine. My technical experience over my career has been focused on the area of air pollution, including permitting, air pollution control technology assessments, dispersion modeling. I have -- I have more than 25 years of experience practicing in this area.

Nordic Aquafarms reached out to me in October of 2018. Their energy consultant asked me to identify the Clean Air Act requirements with regard to a potential electric generating equipment. In 200- -- in December later that year in December of 2018, I was asked to prepare the required DEP Air License application materials to support the installation of a 14 megawatt electric generating set of engines. The engines will operate intermittently

to offset electricity supplied by Central Maine Power during peak local demand period. The application was prepared in accordance with Maine DEP Chapter 115 requirements for a minor new source facility.

During the period in which I prepared the application, I consulted with the Bureau of Air Quality staff on regular basis with regard to the proposed regulated equipment, emission controls, fuel burning limits, modeling applicability and total project emissions. The application was submitted May 24, 2019 and accepted for processing on June 13. Additional information pertaining to diesel fuel, storage tanks and engine construction schedule was requested by the Department on July 2 and that follow-up information was provided on July 12.

DEP regulation Chapter 115 identifies which equipment must be included in an application for a minor new source and Nordic adhered to DEP's requirement and identified addressed this equipment. Accordingly, non-emitting equipment, such as electrical heaters, mobile sources and construction activities were not addressed as part of the application.

The license -- point of fact, the license granted in accordance with 115 will include the

following standard conditions; the license shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction or operation which may result in fugitive dust and shall submit a description of the program to the Department upon request. This requirement will address miscellaneous construction activities not listed in the air license.

On November 19, 2019, Nordic provided additional information to DEP in response to DEP's follow-up request for information on November 8. The update included refined emission factors provided by Caterpillar, the likely engine supplier. Nordic also updated the specific location dimensions of its proposed stacks, the underlying equipment and emission control technology remains unchanged as Nordic proposes the best available control systems in its original application to DEP.

Here is a -- I'm going to list out sort of a summary of what's in the Air License application. The proposed construction of eight 2 megawatt diesel fired electric generating engines; seven engines may fire simultaneously and one engine is permitted as a back-up. We proposed a 900,000 gallon full limit,

which represents about 10 percent of the capacity of this engine bank. The engines are classified by DEP as non-emergency compression emission new stationary engines located at an area source of hazardous air pollutants subject to NSPS Subpart IIII. This is important because this is a federal standard that basically dictates state-of-the-art controls. They're subject to Tier 4 control technology standards. We did a best available control technology analysis, which included those standards or meet -- which meets those standards. For nitrogen oxides we've identified selective catalytic reduction for particulate matter there will be a diesel particulate filter. And for carbon monoxide that will be used in volatile organic compounds it will be oxidation catalysts.

Air dispersion modeling. When this application originally went in the -- the potential emissions are below the applicable modeling thresholds identified in DEP Chapter 115. Because potential emissions were below the applicable threshold and based on consultation with DEP staff, modeling was not performed at that time. On December 18, 2019, DEP released a report documenting the results of its own in-house air dispersion modeling.

The air dispersion modeling input included Nordic's proposed emission rates and stack parameters, actual surrounding terrain parameters, five years of real measured representative meteorological data and building parameters.

DEP's extensive modeled coverage of the surrounding areas includes discrete points, receptors, points at which the model predicts impacts, adjacent to the proposed project a density of 20 meter spacing, which provides a good understanding of potential ambient air impacts around the Nordic plant. Notably, many receptors were included in areas of potential public access to the south of the plant adjacent to the Lower Reservoir. Receptors generally start within about 100 feet of the proposed plan, buildings, areas accessible to the public without being accompanied by Nordic staff such as building footprint and service areas are not included in the modeling. The exception is the parking lot to the southeast of the site, which may be used for access to the area that's adjacent to the Lower Reservoir. However, modeled receptors encircle this area and provided representative air quality impacts. Only temporary access to parking will be permitted in this area, which will be checked and

preserved periodically.

DEP's modeling results documented compliance with applicable ambient air quality standards and Class II increment standards. Of note is the one hour NO2 Ambient Air Quality standard. DEP models shows a maximum modeled impact of 123 micrograms per cubic meter. The standard is 188, which includes a background concentration of 39 micrograms per cubic meter. Modeling shows compliance with the applicable standards. It is also conservative for the following reasons; the model assumes seven engines running simultaneously at full capacity all year long. In actuality this will not be the case and likely overpredicts the annual and even the short-term impacts -- impact results. The engines are intended to run during high local regional electrical demand periods such as a few hours in the late afternoons in the summers when people are running their air conditioners. Nordic intends to only run engines intermittently and will not run them continuously throughout the year.

With regard to the most notable short-term ambient air quality standard the one hour NO2 standard, the one hour standard is actually based on the average of many hours of operation and

meteorological conditions. The standard is defined as a three year average of the 98th percentile of the yearly distribution of one hour daily maximum concentrations. I just -- the one hour is not really one hour is my point. Because of the engines we only intermittently operate in the likelihood is -- because the engines will only intermittently operate the likelihood of seven engines operating during the worst case meteorological conditions that result in the averages calculated by the model are extremely unlikely. Actual impacts will likely be considerably lower than those compliant impacts that DEP modeled.

So this is a -- a rebuttal to some of the testimony that we received. Mr. Lannan had commented on Nordic's application and the Department's modeling in a manner that I respectfully found a little confusing, so I tried to fit it together and I'm just going to walk through and -- and it appears in some spots it met Maine rules or Maine protocol as I understand it. For example, there is criticism of the Department modeling seven engines rather than eight, but that is what Nordic's application has requested, seven 2 megawatt rather than eight, so we're -- we're offering to have a condition that says you can run seven and not eight at any given time.

So criticized Nordic for not seeking an air emission license for it's HVAC equipment making a confusing reference to hydrogen sulfide reporting requirements. Chapter 137 includes a reporting requirement for hydrogen sulfide which is dependent on other criteria exceeding the thresholds. This has nothing to do with which equipment must be included in the permit application. Nordic will install heating, ventilation and air conditioning equipment which is electrically different and not fuel burning. MaineDEP Chapter 115 does not regulate electric equipment such as heat pumps.

He suggested that potential hydrogen sulfide emissions from wastewater weren't sufficiently accounted for in Nordic's application or the Department's modeling. In Maine, the hydrogen sulfide levels Mr. Lannan mentions are in actuality an annual emission inventory requirement and not an application requirement. The annual inventory requirements for hydrogen sulfide is further only applicable if other pollutants exceed the pre-specified thresholds.

The Aquafarm processed water description was fully disclosed in the application and communicated to DEP staff. There is nothing to suggest that

hydrogen sulfide would have or could have been treated differently by Nordic for the Department.

Criticized Nordic for providing updated information on the specific Caterpillar engines once they had been selected as best available -- once they had been selected as best available control technology. This is part of a normal process in responding to requests for information from the Department. It does not change the underlying fact-findings of the original application.

Further project engineering conducted from May 2019 through November 2019 facilitated Nordic's ability to update the Department with refined emission rates provided by the likely engine manufacturer to replace the maximum emission rates allowed by the federal rules using -- used as estimates in the original application on Maine's common update DEP -- updated DEP application with additional supporting information as it -- as it becomes available. At no point did we ever change anything. We had identified maximum emission that's allowed by rule and then provided for a requirement in November with emission rates that a specific engine manufacturer was willing to meet.

So in summary, Nordic's project, the project

is minor and proposes state-of-the-art air emission controls, meets all applicable air -- Clean Air Act requirements including Chapter 115 Licensing Standards. The Department's decision to conduct air dispersion modeling went above and beyond the minimum requirements of 115 and the Department used reasonable and dispensable assumptions in its modeling. The air dispersion modeling prepared for the -- by DEP conservatively demonstrates compliance with all applicable ambient air quality standards. DEP regulation 115 requires implementation of best management practices, address miscellaneous potential fugitive emission sources including construction and operation activities and Nordic's facility proposes to use all of the best control technology. So and that's what I have.

MR. DUCHESNE: Well, thank you. We'll go to cross-examination by Upstream. And as Ms. Racine is getting ready I should let the listening audience know and announce to people in the audience here that we have new staff members joining us at the table. Jeff Crawford is Bureau Director of the Air Bureau. Esteemed staff members Eric Kennedy and Kevin Ostrowski are also up here now. And we did -- and we did lose one Board person, Board member Mark Draper

is required to recuse under federal law because his employer has an air emissions license and therefore he can't rule on other people's air emission licenses. So it's not lack of interest, it's that he must leave us for this particular portion. So that's where we stand and we can go ahead with cross-examination.

MS. RACINE: Thank you. Good afternoon. So Nordic has applied for a minor source air emissions license to pursuant to Chapter 115; is that correct?

STEVEN WHIPPLE: Yes.

MS. RACINE: And you were asked to prepare the required application?

STEVEN WHIPPLE: Yes.

MS. RACINE: When you referenced you prepared the required application materials, did you at any point ever calculate the uncontrolled potential to emit for all criteria pollutants?

STEVEN WHIPPLE: The uncontrolled potential for all criteria pollutants?

MS. RACINE: Yes.

STEVEN WHIPPLE: From what?

MS. RACINE: From the identified sources.

STEVEN WHIPPLE: I -- I calculate -- I looked at the equipment that they were proposing to

install and calculated the emissions from that. I looked at a bunch of different types of equipment and how they were going to operate the facility and...

MS. RACINE: But did you look at that specific aspect? The -- the uncontrolled potential to emit for all of the criteria pollutants on say like an hourly or a daily or an annual basis?

STEVEN WHIPPLE: I guess I -- I looked at the -- the potential emissions for the equipment they were allowed to install by law because the federal regulations are so strict on if you have this application you need to apply this type of equipment, so to say that that equipment was uncontrolled it would never be allowed by law, so I -- that wouldn't be something that I would have calculated.

MS. RACINE: So you didn't calculate that?

STEVEN WHIPPLE: Right, if that's specifically your question.

MS. RACINE: That is. Thank you. And Nordic classifies the emissions as a minor source; is that right?

STEVEN WHIPPLE: Yes.

MS. RACINE: And that's in part or because it's elected to restrict emissions?

STEVEN WHIPPLE: Yes.

MS. RACINE: And that's why it would be referred to as perhaps a synthetic minor source?

STEVEN WHIPPLE: It's power language.

MS. RACINE: In other words, the capacity of the proposed electrical generators is more than the proposed use?

STEVEN WHIPPLE: Right. Yes.

MS. RACINE: So does that statement mean more than the generators? In other words, are we only -- were you only speaking about -- oh, I'm sorry, excuse me. You had stated in your pre-filed direct that you had consulted with BAQ staff with regard to the, quote, proposed regulated equipment. Does that -- is that your recollection?

STEVEN WHIPPLE: Yes. Yup.

MS. RACINE: Okay. And that was my question. Does that statement mean more than the generators?

STEVEN WHIPPLE: Yes. I looked at more -- more than the generators.

MS. RACINE: What else did you look at?

STEVEN WHIPPLE: The -- the water and fish farm operations in -- in general in addition to the engines.

MS. RACINE: Were there any specific

equipment you looked at in relation to that?

STEVEN WHIPPLE: The -- the processing operation, I guess, in its entirety. I don't...

MS. RACINE: So I guess what I'm getting at is the regulations actually provide that once a source requires an air emission license, and this is from Chapter 115, all emissions units which emit regulated pollutants at the source must be included in the license. Does that language sound correct?

STEVEN WHIPPLE: Yes, but layers of different applicable rules.

MS. RACINE: Sure. Sure. Let me give an example. I think you raised this already. For example, Nordic's proposed HVAC process equipment is going to be used to remove regulated pollutants; is that right? I believe we heard that today.

STEVEN WHIPPLE: There is -- what we heard -- what I heard today is there -- there is heating and ventilation equipment throughout the facility that's moving the air.

MS. RACINE: I -- I guess my question is that this HVAC process equipment wouldn't therefore be categorically exempt from the Chapter 115 requirements and I'm referring to Appendix B. I believe that was Appendix B Section A-9 that the type

of HVAC equipment that's being proposed here wouldn't be the type of equipment that would be categorically exempt.

STEVEN WHIPPLE: My read of 115 is that it is exempt.

MS. RACINE: That this HVAC equipment is exempt?

STEVEN WHIPPLE: Yes.

MS. RACINE: Just looking at Appendix B under insignificant activities and under categorically exempt I'm looking at Subsection A-9 and it says comfort air conditioning or air cooling systems not used to remove regulated pollutants from specific equipment is not -- that would be what would be exempt, but it specifically says not used to remove regulated pollutants.

STEVEN WHIPPLE: Yes, there is --

MR. DUCHESNE: A little closer to the mic, if would you please.

STEVEN WHIPPLE: Yup. There is two sets -- I mean, there is multiple sets of exemptions. There is exemptions in the regulations themselves and then there is exemptions in I think that's Appendix B. And then there is, you know, I don't know like 100 exemptions based, you know, categorical exemptions

and then there is a whole bunch of exemptions based on size and through-put and so forth. So that may be one that is arguably doesn't apply, but there -- there are others and that was all noodled through with Department staff, you know, and I -- and I went through it in detail with Nordic, you know.

MS. RACINE: So just to confirm that, for example, that HVAC process equipment wasn't in the actual application when you were listing?

STEVEN WHIPPLE: The list --

MS. RACINE: The regulation equipment.

STEVEN WHIPPLE: The heating --

MS. RACINE: The regulation equipment like HVAC stage and process equipment doesn't appear in the application?

STEVEN WHIPPLE: I guess that's right. I mean, we just identified the process in its entirety.

MS. RACINE: You also at least initially as I understand did not include information about the size of the diesel fuel tank in the application?

STEVEN WHIPPLE: Right. At the time we submitted the application we didn't have that information, so we followed-up with details of the size of the tanks.

MS. RACINE: That's right. I understand and I believe in your introduction you mentioned -- you referred to that July 12, 2019 memo.

STEVEN WHIPPLE: Yup.

MS. RACINE: But you never went back and updated the actual application form; is that right?

STEVEN WHIPPLE: Right. I supplied the -- the licensing engineer reached out to me and I supplied that, you know, the detailed and cut sheets to that person as a supplement to the application.

MS. RACINE: So that should be incorporated is that what you are saying, but it's -- you didn't update the application with that information?

STEVEN WHIPPLE: I'm a little confused about the question because as part of the application process the Department often comes back and asks for a different -- for additional information to support the application and that's what I did, so that is part of the application.

MS. RACINE: And I think you referred to also the November response to the RFI and there was some updates about the stack heights and I think some temperature updating. I guess my question is at what point -- I believe in this area from what I understand there was quite a bit of back and forth,

at what point is there an obligation to go back and actually update the application with this information to clarify what figure and what information the Board should be making its decision on?

STEVEN WHIPPLE: I mean, that's all -- that is the update. That's updating the application and providing the Department with updated information.

MS. RACINE: Chapter 115 doesn't explicitly require non-emitting equipment such as mobile sources and construction activities to be included in the application. Did I hear that correctly?

STEVEN WHIPPLE: Right.

MS. RACINE: But Chapter 115 doesn't eliminate Nordic's responsibility to at all times comply with Clean Air Act requirements; is that right?

STEVEN WHIPPLE: Right.

MS. RACINE: In fact, you state, I believe, in your summary at the end of your pre-filed testimony that Nordic -- in your opinion Nordic's project meets all applicable clean air requirements; is that right?

STEVEN WHIPPLE: Right.

MS. RACINE: So are you representing then that emissions from Nordic's mobile sources and

construction activities will not exceed the Clean Air Act requirements?

STEVEN WHIPPLE: You know, I guess my statement would be on the stationary sources and the stationary equipment that's part of the -- the licensing process, so my understanding is that they will meet the Clean Air Act requirements using all their mobile equipment --

MS. RACINE: But in your --

STEVEN WHIPPLE: -- I wasn't questioning that in any way.

MS. RACINE: But you were not opining in that statement at the end of your pre-filed direct about Nordic's project meeting all applicable Clean Air requirements as to the local sources and construction activities?

STEVEN WHIPPLE: So as I understand the project and what -- what I've looked at and the equipment that I've looked at they're going to meet all of the requirements going forward. On a day-to-day at the site operation of equipment, I believe the facility to plan to meet all of those requirements, I can't imagine that they won't, so I'm not -- I'm slightly confused by the question.

MS. RACINE: Sure. Did you have any -- so

you represented that in your opinion that Nordic's project met all applicable Clean Air requirements and I'm just recognizing that while Chapter 115 I understand you made the statement about the non-emitting equipment and the mobile sources and construction activities, I'm asking if you have any evaluation as to those sources as to the Clean Air Act requirements?

STEVEN WHIPPLE: I mean, in terms of how they're going to contract this --

MS. RACINE: Compliance. If you've done any evaluation at all. I just tried to clarify how broad that statement about compliance for the Clean Air Act is.

STEVEN WHIPPLE: I guess I -- I believe they're going to meet those requirements. I have -- I don't control that going forward and...

MS. RACINE: You also stated that Nordic will comply because the license includes a standard condition and I think I'm reading this right in which you state -- in which the licensee agrees to establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction or operation which may result in

fugitive dust. Did I that state the condition correctly, the standard conditions?

STEVEN WHIPPLE: Yes. That's a condition that's in -- that will be in the air emission license.

MS. RACINE: Does this condition as I understand doesn't address respirable dust?

STEVEN WHIPPLE: I don't know that that's true.

MS. RACINE: It's -- I am just asking because it says fugitive dust specifically, so I've been just trying to clarify whether that would also include respirable dust under that standard condition?

STEVEN WHIPPLE: So that's a catch-all requirement that the Department includes in air emission licenses and the applicant -- or the applicant, the person that's licensed, that, you know, engages in construction and operation of their facility needs to put together a best management program, a plan, and then the Department has the authority to come in and look at that plan and review it and ask for updates and work with them, so I've never heard anyone delineate respirable dust versus other dust, so I...

MS. RACINE: Well, regardless if it's -- I guess included in this standard condition we know that respirable dust is regulated under the Clean Air Act.

STEVEN WHIPPLE: Okay.

MS. RACINE: Would you agree?

STEVEN WHIPPLE: I haven't heard it defined that way.

MS. RACINE: Nordic proposes a massive excavation of soil which will require tens of thousands of dump truck loads of soil removal, is that your understanding?

STEVEN WHIPPLE: That they're going to -- there is going to be some earthwork, yup.

MS. RACINE: Quite a bit. Nordic has also proposed a cement plant on-site, is that your understanding?

STEVEN WHIPPLE: I'm not aware of that.

MS. RACINE: And the generators themselves also generate dust, I imagine.

STEVEN WHIPPLE: I mean, there is particulate emissions that is will come from the generators.

MS. RACINE: And would you say that these are all activities that would generate respirable

dust which would be subject to, I guess, perhaps that standard in -- that condition Chapter 115 with the Clean Air Act as well?

STEVEN WHIPPLE: I mean, the term respirable dust, I mean, I think I know what it means, but I -- we typically talk about fine particulate matter, 2.5 microns and smaller, particular matter 10 microns and smaller, you know, total particulate matter, so the respirable dust I'm stumbling a little bit on that because I -- it's just not a term that's common.

MS. RACINE: I believe that respirable versus fugitive dust would refer to the particle size. So let's see, I do want to just turn to a discussion of the seven versus eight engines and I believe you stated that the engines are not -- are intended to run during high regional electrical demand periods?

STEVEN WHIPPLE: Yes.

MS. RACINE: And I guess what about if there is a storm and Nordic needs the generators as a back-up if the power is out?

STEVEN WHIPPLE: Right. I believe they would run in that situation as well.

MS. RACINE: Would all eight run in that situation?

STEVEN WHIPPLE: No, they'll never -- they can't run eight because they're going to have a licensed condition that says thou shall only run seven, so that's not an option.

MS. RACINE: Even in an emergency situation?

STEVEN WHIPPLE: No, they're not going to run them. They're not going to run eight.

MS. RACINE: And what if CMP tells Nordic to get off the grid more frequently than a few hours in the late afternoons in the summer?

STEVEN WHIPPLE: They -- I mean, they have a certain license cap that will limit what they're allowed to run so I don't -- I don't -- you know.

MS. RACINE: That it would be more continuous source?

STEVEN WHIPPLE: I think there is a certain history and reasonableness to what is projected in terms of how much they will really run. So I don't know that I would use the word continuous.

MS. RACINE: Would it be -- well, it would need to be more continuous than a few hours in the late afternoon if they were telling them to get off the grid more frequently.

STEVEN WHIPPLE: I suppose they could run for more than a few hours. That's what they're

projecting and thinking.

MS. RACINE: Nordic has proposed a fuel cap of 900,000 gallons per year; is that right?

STEVEN WHIPPLE: Yup.

MS. RACINE: Can you tell me how that fuel cap was decided on?

STEVEN WHIPPLE: So that -- that fuel cap was set based on -- GridWorks is their energy consultant and that was who I was working with and they needed a certain amount of run time for their operation and I just roughly like they might have said a few hundred hours a year and -- and so when we're going through the permitting there are certain regulatory thresholds and, you know -- and, you know, I laid out the different thresholds and they're like, well, we only need a couple hundred hours a year, so like, well, if we accept a limit of 900,000 gallons that will give you, you know, two, three, four times what you need and it will keep the project as minor, it doesn't require air dispersion modeling, it -- you know, it ends up being, you know, a fairly small source of air emissions in the scheme of things and gets them what -- what they need.

MS. RACINE: So the fuel cap was derived by trying to determine keeping under a certain emissions

limit?

STEVEN WHIPPLE: I think it was derived by what the project's need was plus a safety factor and that was a reasonable level to set it because it was also below regulatory thresholds.

MS. RACINE: And was the fuel cap and those needs, did it take into consideration emergency back-up use or just the peak shaving.

STEVEN WHIPPLE: So I'm not the engineer of record figuring out exactly how these engines are going to run, but --

MS. RACINE: Okay.

STEVEN WHIPPLE: -- yeah, those questions were discussed and the -- the understanding that this would give them what they -- more than give them what they needed.

MS. RACINE: And you mentioned GridWorks as the energy consultant, did GridWorks ever prepare any type of report?

STEVEN WHIPPLE: I haven't seen it.

MS. RACINE: Okay. Has Nordic presented any plan for monitoring recordkeeping or reporting in relation to this fuel restriction?

STEVEN WHIPPLE: I think they understand that they'll be required to keep, you know, monthly

and annual rolling total records, but that's for equipment and stuff of this size that's -- that's routine and expected.

MS. RACINE: But no specific plan has been outlined or submitted or?

STEVEN WHIPPLE: Right. Because the next step of that is to work with the Department and flush out those details, but, again, that's a very generic requirement for this type of equipment that will be incorporated into the air emissions license. Or I should say routine.

MS. RACINE: You think that areas inaccessible to the public -- I believe this is from your direct testimony -- without being accompanied by Nordic staff such as building footprint and service areas are not including the air dispersion modeling?

STEVEN WHIPPLE: Right.

MS. RACINE: But the EPA air guidelines would require that you model everything that the public has access to; is that right?

STEVEN WHIPPLE: The EPA air guidelines have specific guidance around what you need to model and what you -- what you don't. This is a minor source in the State of Maine that, you know, the Department has the leeway to model what they think is reasonable

and protective of the environment, so, you know, I'd have to go through the details of exactly what would be required in terms of...

MS. RACINE: Well, for example, there is set to be an education center on-site and conceivably members of the public may have access to that, correct?

STEVEN WHIPPLE: I think that's right.

MS. RACINE: And there is a hiking trail that we've heard about that is close to the property, members of the public.

STEVEN WHIPPLE: Yeah.

MS. RACINE: So I guess my question is individuals may be exposed to NO2 from the presence of those locations; is that right?

STEVEN WHIPPLE: Yup.

MS. RACINE: And I think my only other question, but I think you've answered that, but just specifically for any of the responses to the RFI specifically about the engines, the stack heights, the temperature changes, that back and forth, none of that has specifically been updated in the actual application that's in the record as correspondence back and forth from the RFI; is that correct?

STEVEN WHIPPLE: I take the position that

the record has been updated and that information has been provided to the Department as requested.

MS. RACINE: Okay. Thank you.

MR. DUCHESNE: Thank you very much. We can now go to DEP, staff and Board questions. Would the Air Bureau like to go first?

MR. CRAWFORD: Sure. Mr. Whipple, the air emission license application as in Exhibit 13-D of Mr. Lannan's testimony proposed a fuel use limit of 900,000 gallons per year and to operate a maximum seven of the eight engines at any one time. Based on your understanding of the expected electric demands for this facility and the electricity market, can you clarify how often and what configuration and what purposes the engines are anticipated to operate? And you touched on this as peak shaving, could you define that for me?

STEVEN WHIPPLE: I'll give you my understanding, but I don't want to hold -- I mean, I've been asked to put an application together to address the Clean Air Act, so -- but I can give you my understanding of -- of the usage of the engines. And that is that, you know, for instance, the likely scenario is, you know, on, you know, the middle of July on a super hot day when everyone is running

their air conditioners and there is a lot of stress on the utility and pricing goes up quite high as a result, Nordic would turn on up to seven engines and run those for a series of hours to take -- to run its own -- generate its own electricity during those super expensive periods, but it also has the -- the market sort of forces that reduction of their draw and takes stress off of the utility grid at the same time, so it has sort of a mutually beneficial purpose.

MR. CRAWFORD: Does peak shaving include demand response?

STEVEN WHIPPLE: I think -- I think of them as separate things but they could overlap, shaving and demand response. I mean, if the utility for any reason could have a -- my understanding could have a demand response episodes where they need this facility to operate which may not line up with, you know, the peak electricity demand period.

MR. CRAWFORD: Thank you.

MR. DUCHESNE: Other questions from the Board or staff? You do. Okay. Thank you.

MR. KENNEDY: As far as the testimony from Mr. Lannan's written pre-filed testimony, he made reference to penthouses being located on top of the

buildings that are proposed. Do you know anything about proposed design of penthouses that would go above the heights of the buildings that were submitted to the Bureau of Air Quality as part of the requested update in December?

STEVEN WHIPPLE: So the -- the drawings and the buildings that were supplied to the Department -- I assume the Department has everything that Mr. Lannan has and those -- those penthouses are on the drawings. I -- clarify the question.

MR. KENNEDY: Okay. It's getting to the gist of the question is are penthouses above the elevations of the buildings that we were given in our request for information in November of the 45 feet?

STEVEN WHIPPLE: Right. So I looked at -- I didn't go in and analyze that in any detail, but I looked at it and it looked reasonable, but Kevin and the Department had included it as the elevations from those drawings, but -- I don't know if that fully answers your question.

MR. KENNEDY: Okay. Perhaps that's more of a question for Nordic.

STEVEN WHIPPLE: Yeah.

EDWARD COTTER: Good afternoon. Edward Cotter, Nordic Aquafarms. The building height is 45

feet, that is inclusive of the penthouses.

MR. KENNEDY: Thank you.

MR. DUCHESNE: Keep going.

MR. CRAWFORD: Thank you. There is a little bit of discussion on non-road equipment and emissions from -- from those. I am thinking more on criteria pollutants, you know, my understanding is there -- a number of projects have been undertaken in the past few years where there have been restrictions on the type of non-road equipment, construction equipment that's used on site, for example, I think the Vineyard Wind Project is requiring the use of Tier 2 certified non-road equipment. Has Nordic considered that and is that something that, you know, might be feasible as a way of addressing some of these construction equipment emissions?

EDWARD COTTER: Sure. We've had discussions with -- we have -- we have a construction manager who we've partnered with, Gilbane Building Company, and they're -- they're going to be running the entire project for the duration. So we've met with them and talked about strategies that they've used elsewhere and they have -- several towns on many of their projects require Tier 2 equipment. The challenge here was making sure that the local contractor force

can -- can deal with that. So we've met with some of the local contractors that are potential bidders especially for site and concrete work that would have a lot of heavy have equipment on-site and what we understand is the average age of the older equipment up in this area is about 10 years. I think Tier 2 was introduced I want to say in the late '90s, early 2000s, so we feel very comfortable putting that restriction on our bid packages.

MR. CRAWFORD: Okay. Well, then I'd like one final one, if I could.

MR. DUCHESNE: We need to work on clarifying something, if we may.

MS. JENSEN: Can you just clarify for the Board what Tier 2 equipment is? What the implications are?

EDWARD COTTER: I can give you my understanding and then hopefully the Air Department can tell me -- Bureau can tell me if I'm wrong, but basically over the years as the EPA standards for air quality have improved, they have -- just like everybody's personal vehicles the requirements for air quality and emission controls out of diesel and off-road equipment have also changed. So they've gone through several iterations where EPA rules and

some state rules have required upgrades to equipment. And typically, I think that equipment is grandfathered. If you're operating equipment you can keep operating it, but new equipment has to be manufactured with better technology. So we're at Tier 4 I think is the latest equipment, equipment that's bought today. If you bought a new bulldozer today it would be Tier 4. Tier 2 is typically what you see on-site. Although I will say there is some specialized equipment, maybe a pump rig or a drill rig or something that a small contractor has been operating for 20 years, it might not be Tier 2, but typically the bulk of the equipment you see on-site is at least Tier 2.

MR. CRAWFORD: Pretty good job. Actually, I think Tier 2 became effective in 2008 --

EDWARD COTTER: Oh, okay.

MR. CRAWFORD: -- but other than that.

EDWARD COTTER: I do also -- if you have further questions about peak shaving now that I'm up here --

MR. CRAWFORD: Sure.

EDWARD COTTER: -- Mr. Whipple tried to address that, but that's really something that we've been managing in-house more. But he did -- I agree

that it's -- it's typically something that we're looking at as an opportunity to run as cost-effectively as we can, to work with CMP and their pricing structure to take advantage of price breaks that they offer and the reason that they offer those price breaks is because it helps them taking load off the of system at certain times. But in addition, the other interesting twist to that is the reason why they're so stressed at that time is they're -- all of the load that's on the CMP grid at that time probably forces them typically to run some of the power plants that aren't as efficient for them. They cost more and they're more emission heavy. So it helps us -- if everybody had the ability to do this it would help keep coal plants from getting turned on during afternoons and it's overall a really good thing that CMP is trying to do. And we have the opportunity because we have back-up generators, which most places won't have that opportunity.

MR. CRAWFORD: One final one, if you would. I heard some earlier testimony that there would likely be come concrete plants on-site. Can you tell me how long those would be on-site and do they need an air permit?

EDWARD COTTER: What we've discussed, and this is -- that testimony is referring to discussion that have been at the city planning board level. We understand that the region we're in does not have a plethora of concrete plants nearby, so delivery of concrete is something that we want to make sure we understand and that that's something that available to us at this site. So what we have noted, again, with Gilbane is that several projects in rural areas typically will ask a concrete producer if they can do a batch plant on-site and it's just specifically for that site. Most of the -- I would like to say all, but I can't say with 100 percent certainty, but that typically when we've been asked about that everybody has asked us what do you have on-site for construction electricity. So the real load there is electricity. Now, I can't say that there is not some full source needed for combustion engines. I'm not sure of that, but it's worth noting that this is for concrete batching, it's not for cement, creation of cement. We're not building Dragon cement down here. The Portland cement would be trucked in similar to any other material. We're simply mixing concrete.

MR. DUCHESNE: Yes, Mr. Kennedy.

MR. KENNEDY: Just one other question

regarding the property line. Is Nordic proposing to put a fence around the property line?

EDWARD COTTER: Thank you for bringing that up because we'll -- we've got a couple points on that. We are planning on providing a fence. Our Buildings 1 and 2 that you see, the north -- the northern edge of the site and the northern edge of Building 1, the southern edge of Building 2 create a great barrier for us and what our plans indicate is that we will be fencing the corners between Building 1 and Building 2 and over here Building 1 and Building 3, Building 3 to Building 2. That will keep the -- the site secure. What was noted earlier is the areas of where we expect the public to be is the -- this location down here is the visitor center. I'm sorry, I'll use the screen. The low -- sorry. The existing Belfast Water District building is where we plan the visitor center and as well the parking for the nature trails right there and the nature trails along the water, the hiking trail. That hiking trail is in the area that has been modeled by -- by staff. It is outside of our property lines. I don't remember, Steve maybe you do, if the visitor center was within the model. I don't remember how --

STEVEN WHIPPLE: There is a small triangle

that is not blocked out of the model. But the actual visitor center on that point --

EDWARD COTTER: Just to give you an example, this area right here.

STEVEN WHIPPLE: There were -- there were receptors down along the edge of that.

EDWARD COTTER: Yeah. This only area has receptors on it which indicated compliance. The source is located right here. So I would say it's -- it's -- I hate to say intuitive, but it seems intuitive that if the receptors indicated compliance right here, I think even if this were outside of the model I think we would see that that would be compliant as well.

STEVEN WHIPPLE: There are receptors that wrap that triangle.

MS. RACINE: At this point, I'm going to have to object. While I appreciate that Mr. Cotter came up to help illuminate some of the questions, at this point I think he's crossing into a territory of testifying about something for which he -- there was no pre-filed or rebuttal testimony on his behalf and I think we're venturing in a territory sort of outside the scope of what we've prepared for this panel.

MR. DUCHESNE: Is there a reply from Nordic and Ms. Tourangeau?

MR. KALLIN: Just that he is just here to respond to questions from DEP, staff and Board.

MR. DUCHESNE: So the extent that, I mean, if I understand this correctly my understanding is that Mr. Whipple was pretty much involved with the design of the project and the engineering for how things are going to operate. When it comes to some of the more detailed things about how is it going to be built and some of the questions the Air Bureau is now asking it would be more appropriate to have Mr. Cotter up here. Is there a reason to disagree with that analysis?

MS. RACINE: No. And I appreciate that, but I believe there was a statement that something was in compliance in terms of the air emission standards and I just felt that that went to -- in terms of I think we were talking about the visitor center and the walking trail and the NO2 emissions and I thought I heard a conclusion that that was in compliance and I wasn't aware that Mr. Cotter was qualified or set to testify to that, so.

MR. DUCHESNE: Okay. I think I'm going to deny the objection only because I think the questions

being asked by the Department are applicable to what Mr. Cotter has brought to the discussion and since he's also part of the Nordic operation here it's appropriate to have him answer, so I think I'm good with it.

MS. RACINE: I understand. Thank you.

MR. DUCHESNE: So more questions? Yes, Mr. Martin.

MR. MARTIN: So mobile sources have been discussed at this point. Can you comment on the likelihood, you've obviously seen Department modeling that's taken place. Can you comment and I understand that there is phasing and potentially there might be periods of time where construction equipment and emission sources might be operating together. Could you comment on the likelihood of in combination those two sources potentially violating ambient air quality standards or otherwise unreasonably providing some sort of adverse effect on air quality? That can be with or without the Tier 2 condition that Mr. Crawford has suggested.

STEVEN WHIPPLE: The frequency of those engines running is going to be pretty minimal and given, you know, the periods when the facility is in operation are fully running there is going to be

limited need for those engines, so I think, you know, and I'm out on a limb a little bit, but I don't see a huge additive component to mobile sources plus these engines.

MR. MARTIN: Do you have any rough idea, and obviously you're not an expert in air quality matters, but do you have a rough idea in terms of what type of contribution these mobile sources contribute? Relative maybe to the air emissions that are already modeled.

STEVEN WHIPPLE: I mean, that's a really subjective hard thing to answer. I mean, we'll say that in the air dispersion modeling we have a background component which in the theory includes, you know, traffic and, you know, mobile sources in and around the area, other facilities. So in terms of, you know, what's the density of operation here compared to the density of the Belfast area it's probably not hugely significant, so I would -- I mean, you could make an argument that background picks up a lot of it, so, again, I'm out on a limb. I mean, I...

MR. MARTIN: Okay. Thank you.

MR. DUCHESNE: Mr. Ostrowski.

MR. OSTROWSKI: I'd like to ask a follow-up

question to maybe reinforce what Mr. Martin was asking. So where the Aquafarms facility is going to be designed in two phases, could it be a safe assumption that only half the engines might run while Phase 1 is operation -- operational while Phase 2 is being -- like you wouldn't need all seven engines operating for half of the facility to run, the Phase 1 section. I don't know, did I ask that correctly?

EDWARD COTTER: That's correct. We -- right now, we're looking at a very complicated electrical control system around the campus and the back-up generation here is similar to a mission critical facility that has a very intensive commissioning period. So our plan right now is to install maybe not half, but maybe five or six of the generators with Phase 1 with the idea that we can get a really good idea on loading and sequencing for our back-up systems. At that point, we'll really know much more about the need and the amount of time that we're using those -- that equipment so that Phase 2 we can right size the system and make sure that we're 100 percent confident in our back-up systems when we're at that phase. So I wouldn't want -- yes, you're right that it would typically need half as many generators, but I -- I can't -- I don't know if I'm

ready to say just four at this point based on our design discussions right now.

MR. OSTROWSKI: Okay. Thank you.

MR. DUCHESNE: Okay. Great. Mr. Martin.

MR. MARTIN: Some added questions. You mentioned the fencing and the concrete batching. Do you have any idea -- you mentioned the fencing, that's within the project boundaries you said?

EDWARD COTTER: Correct.

MR. MARTIN: Do you have any idea where the concrete -- the batch plant I believe you called it where that would be located as well?

EDWARD COTTER: It would probably not be fixed for the entire project but the majority of the concrete is here and in these buildings, so I would expect based on our phasing plan we have a laydown area that's shown on the ES drawings that's this area. I would expect the batch plant to be somewhere -- somewhere up in this area.

MR. MARTIN: Okay. I guess I'm asking more from a visibility component whether this would affect any sort of scenic analysis if this is visible from any place.

EDWARD COTTER: It would be smaller than the proposed buildings and the buildings in that corner

are not really visible from the roads.

MR. MARTIN: Okay. Thank you.

MR. DUCHESNE: Ms. Lessard, did you have a question?

MS. LESSARD: I did.

MR. DUCHESNE: Is it still with you?

MS. LESSARD: I did. Someone got to the fence questions before I could, but. So the building itself will serve as the fence, quote, unquote, for along the hiking trail?

EDWARD COTTER: The hiking trail has -- between the trail and the property line is about 200 feet or more of woodland, so then beyond that, yes, the -- the next -- if somebody were trying to get on-site the next thing that they would encounter would be the wall or the side of the building.

MS. LESSARD: Okay. I guess I anticipated there would be some sort of a perimeter around the entire facility, but I was wrong.

EDWARD COTTER: The reason -- if I can expand. The reason for the fencing in our mind is simply to secure any area that might be either dangerous for -- for somebody that's not supposed to be there or susceptible to somebody coming on-site to do harm. The outside of the buildings we feel are a

pretty good security barrier for both of those purposes.

MS. LESSARD: Will it be fenced during construction?

EDWARD COTTER: Yes, construction fencing will be placed around active construction areas. That will be mobile or variable and it will follow those ES drawings that Mr. Johnston was talking about earlier today.

MS. LESSARD: Because construction is years --

EDWARD COTTER: Yes.

MS. LESSARD: -- so I was just -- the fence piece was --

EDWARD COTTER: Yes, construction will be secured and the public will be protected.

MS. LESSARD: Will seven engines run your entire -- we were just talking about phasing, Phase 1 and Phase 2, you might install four or five and then see how -- will seven do the whole facility at build-out?

EDWARD COTTER: We have an emergency sequence -- start-up sequence where we have priority equipment that such, you know, Mr. Dinneen mentioned earlier oxygen in the tanks. Oxygen is the first

thing that has to be restored. So in order to keep the -- the liquid oxygen can always take over without power, but the -- the generated oxygen needs to keep going for these fish to stay healthy, so that's something that comes on immediately, then some pumps come on that drive circulation and than we'll start turning on pumps that will filter the water. So there is a sequence that we can even talk about more once we're on the water discharge panel. But there is key equipment that's been highlighted and that is the equipment that we're working with based on the limitations that the generators provide. So that -- that -- yes, that key equipment including life safety will be running during the generator. It won't be at full -- full power. We won't be processing product in a power outage, in other words.

MS. LESSARD: Well, that was my question because I am aware that the length of the time that the fish can be without -- that this can be down is very small.

EDWARD COTTER: Yes. It's based on the key parameters of that water quality that they need and we've prioritized those items that need to be running to keep the fish healthy through an outage. And we -- we feel comfortable with fuel deliveries we

could operate for into the weeks without power if -- if a major storm hit. The key being the fuel delivery.

MS. LESSARD: But not more than 36 days because you exceed your 900,000 gallons.

EDWARD COTTER: That is correct. And then that does actually bring me to something that came up earlier. The hours that were provided to Mr. Whipple did include a conservative estimate of winter power outages.

MS. LESSARD: Okay. I have one other question. Just one second. Oh, it was -- only the engines are discussed in this license and there was some back and forth between you and Ms. Racine that in regard to HVAC equipment that also serves as pollution control equipment for this facility and that that wasn't -- you disagree that it needed to be included and she indicated -- so I -- was there an -- or were you aware that air -- that the air handling system was being used as pollution control -- odor control when you did your evaluation?

STEVEN WHIPPLE: So the -- my basic understanding of the HVAC -- the HVAC system is that there might be isolated places that have some control and some odor control, but the vast majority of it is

literally just air handling systems, you know, for moisture or -- so I -- I don't, you know. And let me throw in another piece here. If, you know, if there are insignificant or minor sources of emissions there is an annual Chapter 137 inventory reporting program where, you know, if there is -- in set amounts of emissions that trip certain thresholds that will all be inventoried and provided to the Department.

MS. LESSARD: I only ask because this Board is being asked to decide and the Department does when they do it too, we have to be able to quantify what it is we're permitting up front and if -- I just wondered if that would become a factor in the -- the -- depending on how the eventual design of the HVAC is if it would become an issue that could change --

STEVEN WHIPPLE: It's not going to be an issue with regard to the Clean Air Act.

MS. LESSARD: Okay.

STEVEN WHIPPLE: There -- there may be an odor issue that's a completely different issue believe it or not, but with regard to the Clean Air Act it's not an issue.

MS. LESSARD: Thank you.

MR. DUCHESNE: Ms. Bertocci.

MS. BERTOCCI: I believe this is more Mr. Cotter. I have a clarifying question regarding the profile of these buildings and the height of them and I'm looking at Mr. Lannan's testimony and in his Exhibit 13-G he shows a profile of these buildings that have large penthouses along the roof. I can't remember what the estimated length of those was, so my question is is that an accurate profile of these buildings and, if not, could you point us to where there is one because I believe much of his analysis involves those penthouses as depicted in this exhibit.

EDWARD COTTER: It is accurate. I don't recall off the top of my head if there is a section shown in our application package, but the -- as I mentioned earlier the roof dimension that was provided to the Bureau for air modeling was 45 feet and that is the top of those penthouses.

MS. BERTOCCI: And could I ask, is Mr. Lannan's description of the length and width of those penthouses is accurate?

EDWARD COTTER: I don't remember that I saw that, but the -- the length is 75 percent of Building 1 and Building 2, so 1,000 feet. And the width is maybe a quarter to a third of the width of the

Buildings 1 and 2. So it's -- if that gives you an idea. I don't know how that matches up with Mr. Lannan's material.

MS. BERTOCCI: Thank you. I'm just trying to have that information as we evaluate Mr. Lannan's assessment. Thank you.

MR. DUCHESNE: Mr. Sanford.

MR. SANFORD: Does Belfast have EPA non-attainment air quality days?

STEVEN WHIPPLE: I do not believe that they do. They are right now in the OTR for -- this is a very confusing topic -- for VOC in Knox, but I don't believe they actually have had non-attainment events in the Belfast area. So I think -- I believe that the Department is right now petitioning, I thought, the Board for re-evaluation of that program in the State of Maine.

MR. SANFORD: Okay. And if this project were permitted and if it's summer and seven generators are running, is it meeting National Ambient Air Quality standards?

STEVEN WHIPPLE: Yes, I mean, that's what -- that's what the Department modeling showed.

MR. SANFORD: Okay.

MR. DUCHESNE: Any other questions from

Board or staff? Seeing none, we may go to redirect.

MR. KALLIN: We'll waive.

MR. DUCHESNE: Okay. So no recross and I believe that finishes up this panel. Okay. According to our calendar we have now reached lunch.

(Laughter.)

MR. DUCHESNE: So we'll take a five minute break and reset for our next panel which will be Upstream and Mr. Lannan.

(Break.)

MR. DUCHESNE: Okay. I believe we can now proceed. Haven't we seen you somewhere before?

MICHAEL LANNAN: Yes, Michael Lannan.

MR. DUCHESNE: Welcome back, sir.

MICHAEL LANNAN: The good news is we don't have to go through a long thing about how great I am.

MR. DUCHESNE: There might have been an objection.

MICHAEL LANNAN: Yes, I can see that.

(Laughter.)

MICHAEL LANNAN: Ow, it's getting cold in here. Okay. So we're we go. Check the time. All right. Good.

So I'm here to answer questions with respect so air quality this time. The applicant has

suggested that only combustion sources are covered with the Chapter 115 application. While combustion sources are used to find which permitting silo one must follow it does not mean that once the silo or a permitting chapter, in this case Chapter 115, is established that the applicant is relieved from examining all potential source if they might have an impact on the Clean Air Act and -- and also you know, we still need to talk about state identified air toxic and odorants as air toxics. I'm not talking about odorants by themselves, but as they are in the air toxic reporting and -- and so on.

On November 8, DEP required -- provided a request for information in response to what we had proposed for potential anticipated accedence of the nitrogen oxide emissions with the short stacks that were proposed in the original application. Nordic Aquafarms responded on November 19, 2019 and as with many of the responses to DEP RFIs by this applicant's response was, again, incomplete, vague and provided no updates to the application text, report or required forms.

I would like to point out item 30 of my testimony which says per the requirements of Section 592 of Title 38, it's in Exhibit 13-F, pertaining to

application for air emission licenses it 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 emissions will, A, receive the best practical treatment; B, not violate or be controlled so as not to violate applicable emissions, 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. So, you know, that's -- that's what we're talking about here is -- is -- especially with -- with the NOx, and I'll get into that in a little bit, but specifically with the NOx when we're talking about dancing on the threshold we have to look at some of the other potential sources that in some cases might not have been much of a concern for other projects, but now since we're so close to the threshold they might be for this one.

The applicant drastically changes potential emissions by switching from a generic Tier 4 emissions-based upon a regulatory threshold, the Tier 4 had regulatory threshold, and control requirements to a very specific approach that was based on one particular engine type. As a result of this specific

change it drastically reduced the other equal options available, but in no way, shape or form can anyone reading the application materials in the memorandum fully understand the implication of these changes or possibly understand what is or is not an equal because the parts of the application that were based originally on sort of Tier 4 emissions versus what now is very specific to these engines it's not clear which apply anymore.

In the original application in the follow-up memorandum the applicant only calculated emissions for seven of eight engines. No other possible combustion sources. The application proposes propane heaters but the applicant changed these to heat pumps via the memorandum requesting information directly for these propane heaters. I guess my question is what does this change do to the power plant assumptions made earlier.

There has been some discussion about, you know, the seven versus the eight and I think -- I think one of the things that we need to consider is -- is whether or not these are emergency generators, back-up generators or emission critical generators and I'll get into that in a little bit because that makes a difference of whether it's

really seven or eight based on what I've heard they need for power demands and at full capacity, not just after Phase 1 like you had mentioned before, Kevin. Oh, sorry, Mr. Ostrowski.

This version modeling suggests that the maximum potential impacts will be close to the allowable limit. It suggested that it will be 162 micrograms per meter cube of the 188 micrograms per meter cube limit of 86 percent of the limit. The applicant has been talking about 122 versus 188, but you do have to add in the background and when you add in the background that that number now becomes 162 or 86 percent of the limit. So they're -- they're very close on this right know based on the modeling that has been done.

But please note that none of the issues have to do with the physical modeling performed by DEP that I'm going to talk about now, it has nothing to do with the way you did the modeling, right, but are related to the old modeling saying a model is only as good as the input that's provided. I know we have other modeling sayings, but that's the proper one for this particular arena.

There are three specific concerns. The applicant did not provide a clear and concise fence

line for the facility. It shows it as -- it actually shows it here and it's hard to see on this. You know what, I'm sorry. You know what, yeah, I don't think it was on this one. It was on the one that was provided that's in the attachment from Ransom, which was I believe 13. The one that you were just referencing earlier, Ms. Bertocci. There are four dashed lines shown, but there was no -- there was no labels, so there was no way that DEP would have known that that was the only fence line. So without -- without that when one considers the area outside of this actual fence and buildings the modeling must demonstrate compliance that the areas outside of the spaces, really outside of this building, this connection somehow, this building and up to here. The way that the rules are is all this area whether it's owned or operated by them, if the public can gain access and there have been plenty of cases where although they're not supposed to be there, if they can get there that's the problem and that's why the rule the way it is.

The air -- the air flow provided -- the second item of concern was the air flow provided in actual cubic feet per minute is incorrect. It differs from the application and the emission

information provided from the manufacturer. And we had contacted Caterpillar directly and since it was now based not on a generic emission but on this specific emissions got those emissions and is included as our Exhibit 13-I. And when you look at that there is a difference in the temperatures of what the ACFM applies to. So rather than getting into the modeling aspects of it let me just say that this change has the effect of artificially diluting the actual expected emission. So it's providing them more emissions for the same mass of pollutant. This change alone when we modeled it demonstrated an exceedance of the allowable limit beyond the property lines.

The building heights do not include the heights of the mechanical equipment provided on top of the building. In -- in the figure that was provided from, what was that, 13-O, is it. Is that right?

MS. BERTOCCI: The one I referred to is 13-G.

MICHAEL LANNAN: Yes, 13-G. In that figure you'll notice -- and I don't -- I don't have it here, but if you were to look at it you would see that there are on the corners of these buildings, these

and these, there are heights given for the corners of the buildings. Those heights include the height above the ground and above sort of sea level, but they do not include the -- they do not include the mechanical buildings on top. So when we added those in and we actually have a higher building and we have more downwash. So earlier when Ed was talking a little bit about air dispersion modeling and I don't know as much about construction as he does, but he doesn't know as much about dispersion modeling as me, he was talking about the -- the potential for the impact from here being different from here and here and the key here is that if you have an emission source and the buildings are close in height so that it influences the wind coming across the top of the stacks it causes what we call downwash which forces the emissions downward. That has -- there multiple regimes in that, but this area right here that's not included in the model typically will end up having worst case impacts. So if you just look at the building heights alone we have impacts that come off the site here and off the site up here. If you just look at the changes in air flows from what they should have been at the temperatures that they're talking about them coming out we have accede of the

emission standard. And then when you look at the -- where the fence line really is then you also have that. So each one of those shows it. All three together obviously shows it as well.

So unfortunately, the stack heights provided to show compliance exceeds the allowable zoning heights for this area. So when -- when we were at the planning board meetings there was visual analysis done that talked about how everything was going to be at 45 feet or below and most recently the planning board mentioned that we're going to have to deal with the fact that the stacks were taller and they exceed the local zoning requirements, so that's something that's not part of this but it's going to be handled there. The unfortunate thing is this is now showing that the stacks probably need to be even higher to address that concern, so that's still an issue.

Furthermore, missing from the analysis are other non-criteria pollutants. They're also readily present, okay, such as VOCs and particulate matter in particular. And then also some the air toxics such as hydrogen sulfide, formaldehyde, carbon disulfide, others things you would do in a -- in a typical air application for a facility of this size. Because remember, we're talking about fresh fish, dead fish,

fish waste, water and wastewater treatment processes, water and wastewater sludges, chemicals being used directly in the process and so on. While many of these compounds may be deminimis for a small facility they may or may not be from a facility of this size, but unfortunately this has never been examined. The application specifically discusses particulate, nitrogen oxide, VOCs and combustion analysis but does not consider the total impact of these compounds from all sources on-site.

When you start talking about emissions from this power plant and we start talking about particulate emissions, particulate emissions from construction can be -- can be pretty significant for a project of this size. When you start looking at the potential pieces of equipment that have to be operating continuously in order to meet the schedule in this area it's very possible and probable that you can exceed the respiral particulate limits off-site and by respiral particulate I'm talking about the PM10 and the PM 2.5 standard. So when we're often looking at dust we look at it from a fugitive perspective, from a nuisance perspective and then also from the respiral perspective. The deisel engines will have emissions of particle. All of the

mobile equipment. We talked about the Tier, the different Tiers for NOx. We also have those for particulate. And I've been involved in enough very large projects where we can exceed the applicable respirable standards for the PM2.5 and PM10 if things are not staged properly to prevent it.

The quantities of soils being removed are very, very large as has been discussed previously. And it's going to occur over an extended period of time during all kinds of different meteorological conditions. And the other thing is when I was in the applicant's office this summer discussing whether or not this facility should really be proposed in one giant phase like this or in small phases, one of the things I mentioned was if you do it in smaller phases you can get a handle on what your actual emissions are versus what you're predicting here and otherwise you have to consider what are the construction impacts during Phase 2, okay, while Phase 1 the engines are operating because now we have that particular scenario. And, again, whether we have all seven or eight running at that time is unclear, but the potential to emit from this facility is -- is very large. If you look at what the potential to emit is based on the equipment that's here the plant

is the size of a power plant for a city. So it actually is -- we're talking about some of the larger power plants that have been permitted in Northern Maine, some of the wood fired plants, we're talking about those type of NOx emission potential, particulate emissions and so on from those type of facilities for this facility if it were running on an annual basis. So from an annual point of view because of the restriction we don't have that annual concern, but because of the size of the facility we do have the same concern for the short-term and when I say short-term I mean one hour and 24 hour standards for this facility as we do for a very large power plant located, you know, that's running continuously.

So that's when -- when I have been talking about in my testimony about the potential to emit is -- is the important thing to consider is that, well, you can get in this the silo be a minor source, but you're not a true minor source. You're what we call a synthetic minor. So you're taking a restriction to be a minor source and there is nothing wrong with that. That's definitely -- that's definitely allowed and it's actually a very good permitting strategy by the applicant, but that

doesn't mean that some of the concerns that are associated with a facility of this size do not need to be incorporated back into the permit in order to make this facility permittable to use that word that I don't think is really a word. But that -- that's my point is that the facility is very large, so the interesting thing is when -- when -- in our testimony in one of the figures I had we showed what the emission would be relative to the background, so if you look at the background as being 39 right around the site here you could have ratios of five or six times that threshold. Now, it's -- it could potentially still be below the standard, but if you're going out to two or three times the background, in some cases as far away as Bayside, which of course I live because you always find your house right there. And, you know, I'm looking at emission potentials on an hourly basis. And, again, as Mr. Whipple correctly stated, it won't happen all of the time, but if I lose the wind direction lottery on a particularly hot day when we have low air quality and the wind is blowing towards Bayside, I'm going to have background conditions in Bayside that exceed New York City on a bad day. So, I mean, when you start looking at the potential increase in

emissions from this facility you do have to evaluate it not just on the fact that it's called this minor source, but how does this -- how does this work towards being protective of the environment and everybody nearby.

So, I mean, the application specifically discusses -- I already said that. I'm sorry. So, I mean, there were a number of conditions -- conclusions put into this application and I think based on some of the things we looked at they have not demonstrated that the project is -- is minor and proposed state of the air emission controls. They propose the Tier 4 emission control standards. There is no problem with that. That's great. That's what they need to do. That's what you need to do for this but you also need to look at that for other facilities. When I've worked on projects for New York City very large dams, when you have this type of construction activity you often require in conditions things that do say you have to use Tier 4 mobile equipment as well because we would need to keep the levels down. So just saying that we will have Tier 2 and that will be okay, we -- that really has to be analyzed whether that is okay or not and it -- and it just hasn't.

It also -- so -- and it is -- it is minor, but, again, I don't think they've demonstrated as minor. They're right on the edge of showing compliance and I have no doubt that they could tweak the model to address some of the things I just brought up, but it's still going to be just barely in compliance unless they go much, much higher to a typical power plant stack height for a facility of this potential output of -- of 16 megawatts. So unless they do that all of these other sources that we normally would be considering deminimis now all have to be evaluated and have to be included in part of the -- as part of project for potential impact to local residents. And I don't think they've demonstrated that it meets all of the applicable air quality requirements, especially the particulates. That -- that still has a lot to do.

There was a discussion about cement versus concrete and, you know, each one has its own issues. There is -- we have emissions from mobile equipment. We have emissions from what we call drops, which is you scoop the stuff up and you put it in a truck, that's a drop, you put it in a pile, that's a drop. You have a pile -- we have wind erosion. Just like we talked about stormwater erosion concerns, we have

wind erosion concerns from piles stacked on-site. So if you go with the cement plants you have issues with other equipment that diesel equipment that's usually run to crush and do other things associated with creating cement. And then if you have a concrete mixing plant you have the same thing where you have the stockpiles and the mixing and we -- we -- we worked for an Aggregate Industries, and I want to point out after which -- after they fired all of their contractors and got in trouble after the Big Dig, not before, that's when we started working for them. And -- and when we do we look at all those types of facilities and they do have a pretty high potential for particulate emissions and depending on the equipment that's necessary to move it around, conveyors and things, often those are engine run. They can be electrical, but then again, now we have another electrical demand that we're talking about. So none of this stuff has been evaluated and really needs to be before anything could possibly be considered in compliance with air quality.

It has not confirmed that the air dispersion modeling prepared by the DEP conservatively demonstrates compliance with all applicable ambient air quality standards and, again, I say that not

because the DEP did anything wrong, but it was just the information that was provided they modeled. I mean, I would -- I'm surprised that the proponent or the applicant would not do their own modeling to confirm what they thought was sort of the room they had available in this, but I guess they just simply relied on DEP based on that response to that memorandum. Had the application been updated, I think some of these things might have been caught by Mr. Whipple and the applicant because I think he's a smart guy and if you start looking at everything holistically you would see all these temperatures don't match up with these air flows so maybe this isn't quite right, but when you just send out a memorandum that says, here, model this, you don't know if it's in the right context or not.

There is no discussion of SSM like I had put in my testimony. I know I'm nearing my end here so I'm paying attention, okay. There was no discussion of SSM, which is start-up, shut down and maintenance. And just briefly that is a highly debatable topic with respect to SIP requirements and whether or not an engine should have to meet it -- meet the Tier 4 requirements during -- during start-up and shut down and I'm not debating whether that's true or not.

What I am suggesting is that during start-up and shut down the emissions are not the same as they are during operations. That does not -- whether or not you meet the Tier 4 that's a different discussion than whether or not your elevated emissions exceed the Clean Air Act and that -- that hasn't been addressed as well.

So -- so the applicant continually discusses the engine as emergency with some ability for peak shaving. Nowhere in the application is the word emergency provided and, in fact, it refers to the engines as non-emergency engines directly. We originally anticipated that this was simply because non-emergency emission factors are higher than emergency emission factors, so it was worded this way for permitting reasons. But based on Mr. Whipple's written testimony it is now obvious that the primary need of the engine plant seems to be these peak shaving or on-demand requirements. So in Mr. Whipple's testimony it states very specifically in Bullet 2 in Item 11 the engines are intended to run during high local regional electrical demand periods such as for a few hours a day in the late afternoon and so on. I won't read the rest in the interest of time. But it's very clear that the

intent is for this start-up and shut down quite often and that hasn't been addressed. In the supplemental tech analysis in the emergency power rule the fuel storage capacity is -- is on the order of hours, not weeks, so it doesn't seem like the number one goal here is for emergency power. It seems to be for peak shaving or on-demand. And so unfortunately peak shaving tends to occur during the worst air quality index days of the year when we need to have air conditioners or people feel they need to have air conditioners on and so on, so that's -- that's a factor as well.

And then in the original application there was no reference to GridWorks Energy Consulting, LLC yet in the written testimony in the first bullet Mr. Whipple's qualification Item 2 -- after his qualification in Item 2 its says in October of 2018, I was asked to work with Nordic Aquafarms, Inc.'s energy consultant GridWorks to identify the Clean Air Act requirements that are applied to potential electrical generation equipment. I couldn't find any other formal references to GridWorks and, I mean, GridWorks Energy Consulting has a tagline of resilience, flexibility and sustainability. Now, while this rebuttal testimony does not suggest that

the applicant should be restricted from employing a more carbon intensive strategy for reducing power demands they're a renewable source such as winter solar, the very specific focus on peak shaving begs the question is this peak shaving facility required because the facility is using so much power that during summer months peak shaving or on-demand was required to meet electrical demands or simply is it being done because the facility can provide this service to CMP. In other words, if this facility is off-line what can happen to the grid during the summer demand with them drawing their normal power? I'm not saying there is an issue here, but it hasn't been addressed. But I will say that it seems that not only was this GridWorks referenced in this but it was also referenced in the noise analysis, which we're not talking about here today, but that's the second time it's been referenced and I've seen no understanding of what their energy demands are and I think that's related to the air quality because if there is any chance that they actually have to get off the grid, okay, the 12 percent -- they have a 12 percent redundancy if they are seven operating and one standby. So they really have very little redundancy if it's necessary for that. And I guess

regardless of whether its required or optional it begs the question of how long will 10 percent operations be sufficient from peak shaving or wants or needs over the project life cycle of this for air quality impacts.

There are many more points offered in the 109 items in the written testimony I provided, but I will stop here.

MR. DUCHESNE: Thank you very much, Mr. Lannan. I believe we can go to cross by Nordic.

MR. KALLIN: Good afternoon, Presiding Officer Duchesne and members of the Board. This is my first opportunity to address the Board directly. I'm David Kallin, one of the attorneys on behalf of Nordic Aquafarm.

MICHAEL LANNAN: Hello.

MR. KALLIN: Mr. Lannan, you stated that Tech Environment has an office in Belfast that opened in 2018; is that correct?

MICHAEL LANNAN: Yes.

MR. KALLIN: And so before 2018 you were based in Massachusetts; is that correct?

MICHAEL LANNAN: Yeah, we still have an office in Massachusetts and I have been working here for a little bit of time mostly out of my house and

it's much better to have an office because I tend to get, you know, distracted by the dog, sailing, other things.

MR. KALLIN: So your project work in Maine has mostly been since 2018?

MICHAEL LANNAN: No, our company has been providing services in Maine for quite some time. In fact, we are certified on the list to evaluate wind turbine projects for noise. We do that as a third-party consultant for DEP. I have provided odor training to Carla Hopkins, the solid waste folks and the sludge folks. At one time when we had some real issues at a particular sludge facility that I will not mention, but we all know it --

MR. KALLIN: So have you done air projects in Maine?

MICHAEL LANNAN: Excuse me?

MR. KALLIN: Have you done air projects in Maine?

MICHAEL LANNAN: Air projects in Maine. I mean, we've done all kinds of air-related things over the years, yeah.

MR. KALLIN: Including Clean Air Act applications on Maine projects?

MICHAEL LANNAN: I don't know if I've signed

any air permit applications in the state.

MR. KALLIN: Okay. And so your opinions about whether or not the air applications here were complete -- were incomplete aren't based on experience that you've had doing air applications in Maine?

MICHAEL LANNAN: My experience on -- on understanding air applications are based on understanding air applications in all of the states where they apply.

MR. KALLIN: But when you opined on Maine-specific air statutes including the air components in SLODA that wasn't based on your experience doing air applications in Maine, that was your experience of doing air applications in other states.

MICHAEL LANNAN: Again, I'd have to go back through all of the projects, you know, the hundreds of projects I've worked on and which ones are related. Like I said, we work quite a bit in Maine and we have done -- I think we've done some of the -- some of the wood fired plants earlier as well, so I'd have to look at it. I don't...

MR. KALLIN: But you can't recall a specific air application?

MICHAEL LANNAN: No, no, I'm not saying I -- I definitely haven't done one in the last few years for sure.

MR. KALLIN: Did I understand you correctly to opine that a 14 megawatt system is enough to run a small city in Maine?

MICHAEL LANNAN: What -- what I was referring to was the 16 megawatt capacity, the air emissions, the NOx air emissions. And if I -- if I said it that way I misspoke because what I meant to say was the NOx air emissions from this are analogous to that from a large facility operation.

MR. KALLIN: So a 14 megawatt --

MICHAEL LANNAN: You need a -- oh, I'm sorry. Finish.

MR. KALLIN: A back-up generator facility is not a sufficient power plant to run a small city in Maine?

MICHAEL LANNAN: It would depend -- well, it would depend on the size of the facility, but my point was that the NOx emissions that are being proposed are -- because of their diesel generators the NOx emissions from that are such that they're similar to larger power plants that provide a lot more power with the same NOx emissions because they

use different technologies than diesel engines those are just sort of inefficient with respect to emissions. Even with Tier 4.

MR. KALLIN: So these Tier 4 Caterpillar engines you're saying are not the best available control technology for a back-up generator facility such as this?

MICHAEL LANNAN: No, I believe if you look through my testimony I mentioned the Tier 4 engines as proposed have that, yeah.

MR. KALLIN: Okay. There was some discussion about the requirements of fencing under the EPA air modeling standards.

MICHAEL LANNAN: Yes.

MR. KALLIN: And those air modeling standards apply by rule when it's a major source emissions, correct?

MICHAEL LANNAN: Yes.

MR. KALLIN: And so those standards aren't actually applicable here, correct?

MICHAEL LANNAN: No.

MR. KALLIN: And so here the Department went above and beyond and used their discretion to model a minor source emission which they wouldn't have to do, correct?

MICHAEL LANNAN: No, I -- I think that first of all it's not the Department's responsibility to model anything. It's the responsibility of the applicant to demonstrate the burden of proof and the things that we're talking about with respect to major sources versus minor sources when we start getting into the synthetic minors there is a gray area of what is really required to demonstrate that the facility is not going to have an adverse impact to public health.

MR. KALLIN: And for minor source emissions modeling is not required, correct?

MICHAEL LANNAN: That is incorrect. For a minor source emission it is not required specifically, but it can be required and, frankly, it should be provided if -- if residents or neighbors of the facility are concerned about it it's something that's routinely done now whether it's required or not.

MR. KALLIN: And here the Department went ahead and did their own modeling even though they weren't requiring to the applicant to do so, correct?

MICHAEL LANNAN: Again, I don't think that the air permitting process is complete, so things that they do along the way are just part of the

process, so I don't think we can say that.

MR. KALLIN: And in doing their own modeling, the Department is not required to follow the EPA modeling guidelines because this isn't a major source emissions, correct?

MICHAEL LANNAN: I think that in order to -- to really to put on a reasonable approach you would be following the EPA standards in all cases with respect to this. We get into this often when we start talking about odor modeling because odor modeling is not part of EPA standards at all, but if you do odor modeling in the same manner as you do your major source modeling you establish quite a bit of credibility, you're basing it on the normal standards and the way things are done.

MR. KALLIN: Right. So the Department's responsibility is to do something that's reasonable, but if there's not actually a fence and they're modeling what would be at a particular line that can be reasonable, correct, even in the absence of a fence there?

MICHAEL LANNAN: It is my opinion that if you have a facility that is inaccessible, in other words, we had a rock cliff or something else we could discuss whether or not the public could have access

to it, but when we're talking about trails that run alongside of the building and when we're talking about an education center and we're a talking about a stream and areas where people can walk and do walk, I see that as -- as not a reasonable thing to not expect that somebody would be there.

MR. KALLIN: So are you saying that you don't think that the building itself is actually a reasonable barrier?

MICHAEL LANNAN: To be clear, this building -- this building in this area here and this building is a very reasonable area to be not included in the modeling and everything else should be included in the modeling.

MR. KALLIN: And there was some discussion on building heights and your opinion that changing those building heights how that would affect downwash. So if the -- if all of the buildings were modeled at 45 -- at the 45 foot height that would be a particularly conservative method of doing that modeling, correct?

MICHAEL LANNAN: Could you repeat that because this was something in there at the beginning I didn't quite get it down before you went on.

MR. KALLIN: So in assuming a building

height, when you're dealing with structures on top of a building, there are models that's sometimes used called a building tier, correct?

MICHAEL LANNAN: There are multiple ways to model a building.

MR. KALLIN: And so a building tier would be a part of a building footprint that is higher than the rest of the building but the footprint of that tier is not the entire building, correct?

MICHAEL LANNAN: If the applicant had wanted to do modeling different than what's typically done, the applicant could have provided the model, but now you're talking about things that are modeler preferences and the typical way to do it is to take the highest point of the building and include that in the modeling at this level. You can then get into tier analysis if you'd like, but that would be something that typically would be done by somebody, you know, on their own when they -- when they want to do the model.

MR. KALLIN: And the reason that you would use the highest point of the building is because that's more conservative, correct, if you assume the whole building is that height as opposed to a tier of the building?

MICHAEL LANNAN: The downwash effect is related to the height of the release versus the nearest controlling structure with some other parameters included, one of them being height, yes.

MR. KALLIN: And so if the Department's model assumed a 45 foot building height then that would be the most conservative if all those chimneys were inside 45 feet, correct?

MICHAEL LANNAN: I don't think I follow.

MR. KALLIN: The criticisms of the Department's model were criticizing the Department for using less than a 45 foot building height?

MICHAEL LANNAN: To be clear, I have never criticized the Department's model. What I criticized were the inputs provided for the modeling.

MR. KALLIN: But if that input had been a 45 foot building height you would have no criticism of that, correct?

MICHAEL LANNAN: I don't know what you mean by no criticism.

MR. KALLIN: That would be an appropriate component for the Department to use.

MICHAEL LANNAN: I modeled what was -- what we found from them from the plan. That would be a hypothetical. We could evaluate it. Nordic could

pay me to evaluate it. I would gladly do it, but it's not something I do.

MR. KALLIN: And you expressed some concern to this Board about zoning issues related to chimney heights that they had to be taller. Are you aware that under the Belfast zoning ordinance that chimney heights are actually exempt?

MICHAEL LANNAN: Yeah, that's a great little question there because that's an interesting thought because I don't know if you've ever seen eight stacks like this high off the building. It's not going to look like a chimney. These are not chimneys. These are industrial stacks and the planning board has seen through this and is concerned about that and has brought it up and they are concerned -- they have a legitimate concern there.

MR. KALLIN: And your models all assumed a 16 megawatt generating facility, correct?

MICHAEL LANNAN: The modeling that we performed looked at 16 megawatts and 14 megawatts.

MR. KALLIN: But the application here is only for 14, correct?

MICHAEL LANNAN: Interesting you mention that because it's -- it's unclear to me -- Nordic has stated that they need 13.2 megawatts of power for

emergency generation. And there are three levels of engines, as you know, as you guys know, there is emergency, there is sort of mission critical and then there is continuous. And this is non-emergency, which is what the application proposes, which is good and those emission factors are a little bit higher than the emergency ones because it's like you have a brand new car and if you don't use that car too much it operates much better than if you use it, you know, now and again, but if you drive it all of the time it really starts to wear in or wear out depending on how you look at it. So one of the criteria is that for emission critical you typically cap and -- and according to the Caterpillar representative we talked to they do for their engines, the ones that are proposed, at 85 percent. So when you look at 85 percent of the 2 megawatts you need all eight engines to get your 13.2. So -- so that's why we considered all eight engines. But we also looked at the seven and the seven also predicted the impacts. And I don't want to get too hung up on whether or not the impacts here are right above or right below. The important thing to take away from this review is that because these engines are so close, anything else on this site needs to be included. Things that we would

normally consider deminimis need to be evaluated because otherwise the facility can exceed the one hour NOx if you're --

MR. KALLIN: So your --

MICHAEL LANNAN: I haven't finished. -- if you're downwind of the facility.

MR. KALLIN: Your concern is that if there is a condition that says they can only run seven engines that they'll actually be running eight and then other equipment as well?

MICHAEL LANNAN: I think if you look at the potential to emit from the facility to meet the energy demands that have been mentioned and, again, we haven't seen this GridWork energy report anywhere, so no one really knows what the true energy demands are relative to this public process. But if you look at the 13.2 that have been discussed by Nordic repeatedly you need to run engines at 85 percent to get to that. It's analogous to your car. If you -- if you got in your car and you -- it was a standard and you stepped on the gas and went into the red zone, you can go into the red zone in your tachometer for a while, but you can't do it regularly or you're going to ruin the engine. So when you go mission critical, it's typically 85 percent. You can't run

at 100 percent or you would -- frankly, you would -- you would ruin the warranty on the engine, which they don't want to do at this price of these things.

MR. KALLIN: So your car analogy, I'm having trouble, you're saying that if they're permitted for seven engines they're going to be running eight?

MICHAEL LANNAN: No, I'm saying that I think based on other things there is a conflict between what they've said is their emergency power demand, which, again, these are not considered emergency powers. There is a discrepancy there because we keep talking about back-up generators, but then we talk about peak shaving and on-demand needs to -- to save money and to look at the grade. I mean, when we look at the grid in this area between sort of Northport and here, I know for a fact that everybody in my neighborhood has an emergency generator because when that one line goes out we're in trouble. So, you know, it's not like we're going to get power for this facility from other areas. It's coming in on this one line, so there are going to be times where they're -- I believe they're going to have to run this because I think the 13.2 megawatts that's been discussed is -- is really sort of this bare bones kind of number. It's not everything that they'd want

to do at all times, but it's something that can get them by in an emergency condition, which is fine. That will work for a while, but the concern is that is -- are they really required to get off the grid because the concern is that the available capacity for this facility is using the electrical capacity and I think for me this is one of the concerns of a lot of the things we've talked about, the allowable air emissions, the allowable energy, you know, the allowable other nuisance condition that we're not going to talk about today.

MR. KALLIN: So your concern is that CMP is going to tell their customer to get off the grid?

MICHAEL LANNAN: Well, I -- that -- it hasn't been discussed whether or not that is an issue because nobody really knows what their energy usage.

MR. KALLIN: In your experience is that a common practice for CMP to tell their customers to get off the grid?

MICHAEL LANNAN: Actually, I was just talking to a guy from CMP at the E2Tech conference last week and he had mentioned that it is common practice for them to try to arrange for municipalities that have a second line in coming in. For municipalities that don't have a second line

coming in, it's less desirable because they can't control whether that is going to be up and running and they don't want to rely on that, so.

MR. KALLIN: But does CMP generally call up businesses and just tell them no grid power, you're on your own?

MICHAEL LANNAN: I didn't -- I didn't say that.

MR. KALLIN: You mentioned that you all in Northport Village have your own back-up generators and in your model you modeled these engines running continuously for every day of the entire year, which would assume a complete power outage for a year for the Nordic facility. Do you also assume a complete power outage for that year for the rest of Belfast?

MICHAEL LANNAN: I don't understand the question.

MR. KALLIN: So your models assume continuous running of these engines for the full year, correct?

MICHAEL LANNAN: The model assumes that the -- it's -- the way the model runs is you're using five years worth of meteorological data and we're looking at impacts over certain average and periods and it's assuming that any hour in that given year

could be the hour that the model runs and that's the way you model for one hour. It's -- it's just what you do is because it's worst case -- and you can do it differently, but, again, that's not the standard way to do it. That's -- now you're getting into more of an advanced modeling, which is not something that you would -- I would think you would expect in this situation unless the applicant did it themselves.

MR. KALLIN: Would you agree that it's an unlikely situation that there would be a complete power outage in the Belfast area for an entire year?

MICHAEL LANNAN: Of course.

MR. KALLIN: And, you know, I know you said you didn't want to get into whether we were just above or just below whatever the applicable limits are, but you did opine that although we're close to the limits even in your opinion we've shown that we meet all of the applicable limits, correct?

MICHAEL LANNAN: Excuse me?

MR. KALLIN: You said that this minor source application you -- because it was a synthetic minor met the applicable standards and your concern was that if it ran higher that than it might exceed them?

MICHAEL LANNAN: No, I said that -- that it's very reasonable for this particular facility to

take the permitting approach of being a synthetic minor. I believe that because of the potential to emit from -- just from these engines that they need to look at other potential facilities on-site that can create emissions. And while the applicant has said that there is nothing else it's hard to believe that a 7.7 million gallon wastewater treatment plant or 2 million gallon water treatment plant, you know, a 16 megawatt power plant and other things won't have other emergency needs locally on-site or other equipment that's run by engines. It's just -- I mean, go to any wastewater treatment plant and you find that, go to any landfill and you'll find that. We're talking about materials being moved around the site in hundreds of thousands of pounds a day. Those have to be moved around somehow and I'm assuming that there is some sort of -- I believe at one time Erik Heim talked about the entire facility having Tesla trucks, but last I checked Tesla doesn't make trucks.

MR. KALLIN: All right. We'll leave it there at the Tesla trucks. Thanks.

MR. DUCHESNE: Thank you. I believe we're up to questions rom the Board and staff. And under the circumstances I'll check with the Air Bureau first to see if you wish to dive in. Mr. Kennedy

goes first.

MR. KENNEDY: Now that I figured out how to turn the mic on, yes.

MR. DUCHESNE: Mike, a little bit closer.

MR. KENNEDY: Mr. Lannan, your pre-filed testimony talks about the potential and you also talk about the potential to emit in your verbal testimony --

MR. DUCHESNE: I'm getting high signs from the back your mic has to be even a little closer.

MR. KENNEDY: Oh, sorry.

MR. DUCHESNE: You can pull it closer to you. You don't have to lean in as much.

MR. KENNEDY: Your pre-filed testimony and your verbal testimony talked about potential to emit from the facility and how the facility can take enforceable restrictions such as fuel use limits to remain a minor source and I just want to clarify with you that based on what we've seen in the application, do you believe that the facility has correctly applied for the minor source license under Chapter 115?

MICHAEL LANNAN: Yes, I believe that what they've done is applied for a 115 license by restricting the fuel to the 900,000 gallons a year

and, you know, I think one of the things that should be considered and I don't now how you work this into your analysis, I don't know if it's something you typically do, but, you know, this is a permit for 20 or 30 years and if they're talking about peak shaving thing, is that 900,000 gallons really going to work over that time frame and is that enough and so on. So from day one, I absolutely agree, yes.

MR. KENNEDY: And as far as the annual emissions that limit a facility to be below a major source level, I guess my question is what other sources do you think should be included in that determination?

MICHAEL LANNAN: You mean which -- relative to which compound are we talking about?

MR. KENNEDY: Any of the compounds.

MICHAEL LANNAN: Any of the compounds. Other things that emit criteria pollutants? I'm sorry, Mr. Kennedy, but I'm not trying to be vague, but I don't really understand exactly. I have been -- I have been really for over a year trying to figure that out myself and I've sent requests in and they've asked for materials and RFIs and I haven't received it. I don't know --

MR. KENNEDY: I guess -- well, let me

rephrase that.

MICHAEL LANNAN: Yeah, yeah, go ahead. Yeah, go ahead.

MR. KENNEDY: Based on the annual emission limits that they've applied for that they are saying they're going to restrict their emissions to from the facility, which pollutants do you think other sources could push them over the edge of being a major source?

MICHAEL LANNAN: I -- I think sort of in the order that we've been talking about we've obviously been talking is about NOx, right. NOx is the first one and I think that there is the potential for -- I don't know if there is any potential NOx from any of their processes, I have no idea, but when you start looking at being this close to the threshold is that something that needs to be considered? I have no idea. So does it come out of the HVAC equipment? No. Now, when we talk about HVAC here, there is a little bit of a -- we're talking about two different things. We're talking about heating and air conditioning, right, which is sort of the heat pump thing that was the propane heaters and now is the heat pumps and then we talk about whatever it is ventilation is needed to keep the odor down and to

keep the humidity down. And so in those operations they're going to be into emissions and within that I think we have the potential for NOx, we have the potential for particulate obviously. I don't think we have much of a concern with NOx I think given what we talked about. But I don't know about ozone at all. I am not -- I am not sure and I have no idea about VOCs because there's been very little discussed in regards to that. But I do think that there are also sort of, you know, some of the state air toxics thresholds. And I know we were talking about reporting versus, you know, concern levels, but what we're talking about a 7.7 million gallon wastewater treatment plant and that's just one of the facilities here and then we're talking about water treatment for three different kinds of water sources, you know, it seems like there is a potential for reduced sulphur type compound emission. And, you know, some of those have air toxics thresholds and have they have they been identified. So, you know, I think that's -- and then -- okay, and then -- I can keep going, but I don't know how much...

MR. KENNEDY: That's fine. Thank you.

MICHAEL LANNAN: Listen, I have more.

(Laughter.)

MR. DUCHESNE: Do you have less?
MICHAEL LANNAN: No. Yes. Yes, when you tell me I have less, I have less.
MR. DUCHESNE: Mr. Kennedy, do you have more or?
MR. KENNEDY: I'm done.
MR. DUCHESNE: Mr. Crawford.
MR. CRAWFORD: As always. Mr. Lannan, can you refresh my memory, you know, we heard some testimony as to the height of the buildings as being 45 feet. What did the Department model? What did we use?
MICHAEL LANNAN: I -- I would have to -- we received the model runs, that's what we went with, so we did -- I got a copy of those. I don't know what it is --
MR. CRAWFORD: Was it something other than 45 feet?
MICHAEL LANNAN: I don't recall off the top of my head, but I know that we did run the model with the parameters provided by the Department and it seemed to work fine and then we adjusted them according to -- to the -- because --
MR. CRAWFORD: Okay.
MICHAEL LANNAN: -- we looked at the

information provided in that memo and then we also looked at the original building height elevations. There were some elevation drawings provided in the application and they sort of assumed flat terrain there, so there was some conflicts there and we tried to be as conservative as possible to minimize those conflicts, which is why we actually -- I think we modeled an extra half a foot --

MR. CRAWFORD: Okay.

MICHAEL LANNAN: -- to make sure that we resolved those conflicts.

MR. CRAWFORD: Another point, you made a statement that the engines would likely not run at peak efficiency during start-up and shutdown periods. Do you have any idea how long it takes one of these engines to come up to manufactured specified?

MICHAEL LANNAN: Yeah, you know, and I -- it's interesting because I had this issue at a landfill and it was run on landfill gas, so the quality was less and it took -- it took about 15 plus minutes and I'm assuming in this case it would be faster because it would be, you know, better quality fuel, but when we're starting to look at expected emissions being, you know, 2, 5, 10 times for that support period of time it doesn't take much time for

that to be over the -- over the allowable one hour thing and with them planning to run it at a couple hours a day, you know, you obviously have a start-up and shutdown each day. Now, I don't think it's fair to hold a facility for the -- because it's SSM as we know, right, and I don't think it's fair to hold them to the M because you don't know that. You can't predict how many times it's going to go out of whack for maintenance, but you definitely know that you're going to start it up and you're going to shut it down.

MR. CRAWFORD: Kind of in the same thing here -- Eric is clamoring for the microphone here. I had a regarding -- or a clarification regarding a statement you made on emergency use. You said that these engines -- emergency standard would actually be cleaner. I just was wondering, are you referring to a Tier 4 gen set such as has been specked out versus, you know, in an emergency application or are you talking about a Tier 4 gen set versus a true emergency generator set?

MICHAEL LANNAN: Yeah, if you talk to Caterpillar and you talk to them about what your intended use is the guarantee -- the number that really should be run in the air dispersion model is

lower for an emergency use than it is for, you know, for a intermittent use.

MR. CRAWFORD: Using an engine certified to these standards?

MICHAEL LANNAN: Exactly. Yeah. Yeah.

MR. CRAWFORD: Okay.

MR. KENNEDY: Thank you. Just a clarification on the start-up/shutdown references.

MICHAEL LANNAN: Sure.

MR. KENNEDY: Are you suggesting that the mass emissions from these engines in a start-up or shutdown period are going to be two to five times higher than what the emission limits are being proposed as?

MICHAEL LANNAN: Well, when you're talking emission limits, right, are you talking about like pounds per million --

MR. KENNEDY: Pound per hour.

MICHAEL LANNAN: Well, there is a difference, right, because the pound per million BTU now we're talking about the tier stuff, right, and that's what people have been arguing about whether you have to comply with that or not. It's -- now that we're to the Tier 4 it's -- there is just no way and they can't be included and that's sort of where

all the -- I see all of the regulations has been going and I don't know if you agree or not, but with respect to the start-up and shutdown the pounds an hour should be more because of that. And I'm not talking about a lot, but when we're very close to the threshold, again, any little bit is -- is going to be problematic. And I think, you know, if this was out in the middle of nowhere and you -- and it wasn't in the direct line of the City of Belfast airport you'd put in a taller stack, but that's just not an option in this case. And then you wouldn't have to worry about the start-up and shutdown is my point.

MR. KENNEDY: Yup. Again, along with the start-up and shutdown and this is more from your pre-filed testimony.

MICHAEL LANNAN: Sure.

MR. KENNEDY: But are you aware that the only start-up/shutdown requirements in our regulations -- Maine's regulations that EPA were pointing to that needed to be revised are in our Chapter 101 visible emissions regulations?

MICHAEL LANNAN: Yes, I do -- I do know that and that's why I -- again, I never intended to say that DEP has done anything wrong here. I'm just saying, again, because we're so close to the limit

when we're looking at complying with the Clean Air Act the silos we put ourselves in for permitting the idea behind that is we know things are deminimis, so if we're -- if we're being very conservative we know we don't have to include all of these other things, but if we're very, very close we may need to. That's it.

MR. KENNEDY: Thank you.

MICHAEL LANNAN: Mmm Hmm.

MR. DUCHESNE: Mr. Ostrowski or anybody else with the Department? Good. Board and staff? Yes, Mr. Sanford.

MR. SANFORD: Is your testimony that there are insufficient facts or conditions for the Board to make positive findings?

MICHAEL LANNAN: Yes, at this time, yes.

MR. SANFORD: Do you think air quality conditions in Belfast are likely to remain the same or change over the next 30 years.

MICHAEL LANNAN: Well, I think if you go to any of the city council meetings they are trying to get as much business in the area as possible. We just had a meeting with them here last week or the week before and -- and there's -- the hope is we will have some more. Emissions -- not emissions, business

that might create emissions but in a very responsible way.

MR. SANFORD: Do you think there could be other changes as a result of climatic factors?

MICHAEL LANNAN: Yes. I think we're going to have more bad index -- air quality index days for sure and I think we're also going to, you know, relative to what you had just said before with respect to Belfast in the future, that's been one of my concerns here all along is that I don't want to see this one particular facility use up all of the allowable utilities and -- and so on in this area for this one facility. Using the -- the water -- the water is as an example where we talked about how much water do they need and then, well, how much water is available and how much water will then be available for other people and that's my concern with -- with the NOx and the other things, is there still room for other growth.

MR. SANFORD: Would you make any modifications to your January 17 pre-filed other than what you have just addressed now as a result of any of the -- anything else that you have heard?

MICHAEL LANNAN: I -- I probably would. I mean, I put 109 points in there and some of them, I'm

sure, could be clarified one way or the other based on that. I definitely did not mean to suggest that you could run a city on 14 megawatts. I was talking about the NOx emissions, so if I did say that that was a mistake.

MR. SANFORD: How significant do you think the discretion -- or just any possible discrepancies are in proposed building heights and monitoring air quality in the area?

MICHAEL LANNAN: Excuse me?

MR. SANFORD: Do you think -- does it make a big difference if a height is 45 feet or 45 feet plus structures on top of it?

MICHAEL LANNAN: Well, not to get too deep into downwash 101, but unless you're 2 1/2 times the building height you're within the downwash regime and how much is affected by that is very site-specific related to terrain, proximity to the other buildings and so on, so it can have a big effect especially in this case where we're looking at something that's, you know, 1 1/2 times.

MR. SANFORD: So that's -- that's similar to like when you're looking at siting towers you need to be a certain distance from the towers because of the wind?

MICHAEL LANNAN: Exactly.
MR. SANFORD: Okay. Thank you.
MICHAEL LANNAN: Exactly. Same thing.
MR. DUCHESNE: Other questions from the Board?
MR. PELLETIER: Back to downwash 101.
MICHAEL LANNAN: Yes.
MR. PELLETIER: Just back to downwash 101, is that only to a particular wind direction or does it matter?
MICHAEL LANNAN: It's -- it's interesting because downwash will be on the upwind or the downwind side and it can be on the crosswind as well -- really depends on, again, the geometry of the area where the eddys form. Because it's really -- if you think about it there is friction from the building and as wind goes over it changes its direction and then it swirls. Can you get this in there? (Making a swirling motion.)
MR. PELLETIER: All right. Thank you.
MR. DUCHESNE: Other questions? Ms. Bertocci.
MS. BERTOCCI: Yes, Mr. Lannan, I'm looking at your Exhibit 13-O --
MICHAEL LANNAN: Yes.

MS. BERTOCCI: -- which was the modeled one hour NOx impacts and you have -- I don't know whether you recall it, it's got a red and a blue line --

MICHAEL LANNAN: Yes, I do know that.

MS. BERTOCCI: -- and it outlines exceedings.

MICHAEL LANNAN: Mmm Hmm.

MS. BERTOCCI: So my question is you've stated several times that we're very close to the limit, this seems to be suggesting that you think they will be exceeding the ambient air quality limits. Could you just clarify for me what your position is?

MICHAEL LANNAN: Yes. My position is -- is based upon the information provided to DEP they modeled it and it showed no accede, but when you consider that the dilution ratio is wrong with respect to temperature versus air flow, when you consider that they didn't put the receptors on-site where people have access and then also when you -- when you consider the fact that these -- these structures on the rooftop are fairly long and large and do have a potential impact that then there will be an exceedance at this point and I'm sure, you know, that something that, again, could be addressed

by raising the stack, but then we have other issues. So right now we show accede -- it shows accede in what they filed at this point.

MR. DUCHESNE: Any other questions? We can go to redirect.

MS. RACINE: None. Thank you.

MR. DUCHESNE: Great. Thank you very much then. We can move on to our next panel, which will take a bit to reconfigure, I think. We have new staff to move in and coffee to refresh, so I'm going to suggest 10 minutes would be sufficient for this. So we will expect to start again at 4:30 and not a moment later.

(Break.)

MR. DUCHESNE: Before we introduce the panel, once again I will note that we've lost another member of the Board. For members of the audience this is an uncompensated volunteer citizen board, a lot of them have regular jobs. If your regular job includes a -- working for somebody who has a waste discharge permit of some kind federal law says you're also ineligible to rule on somebody else's discharge permit. That affects three out of our seven Board members, four is a quorum, so you can't get any of these other people sick. We're down to bare bones

here. So with that in mind, has everybody here been sworn in? No, you have not. Okay. For those who have not been sworn in yet if you would please rise and raise your right hand. Do you affirm that the testimony you are about to give is the whole truth and nothing but the truth.

(Witnesses affirm.)

MR. DUCHESNE: Thank you. You may be seated. We can keep rolling. This presentation is on wastewater characteristics, so. If you'd like to begin Mr. Cotter.

EDWARD COTTER: Ed good afternoon. Thank you Presiding Officer, Board members, staff and other guests. I would like to begin our testimony with an overview of the proposed water treatment system that is included in this permit. The members of this panel that are up here, I'll let them introduce themselves. Maybe just a quick reminder, my title is Nordic Aquafarms Senior VP of projects and I am honored to be on this panel because of my ability to try and tie things back to what we're all here for, which is regulatory considerations. The gentlemen at this panel have incredible knowledge on the systems and we can answer any questions getting into any details, but I will try and bring their conversation

back to the discussion here if needed.

I'd like to begin our testimony with an overview. We will hear a detailed description of the whole system from the team here on this panel by starting at a high level view from outside. I'm going to provide some unit references for everyone's use. Actually, in my testimony I'll try and reference some other units so that we can discuss Fahrenheit versus Celsius. You're going to hear both because Celsius is typically the units that are in the design guidelines, but I'll try to and present that back to Fahrenheit because I think it's a little more intuitive for most of the people in the room.

Over the last several days we've heard a lot peripheral talk about the project effluent, so I want to layout some details regarding the discharge that is very clearly stated in the application and outlined in my testimony. The first value to discuss is quantity. The project proposes a discharge of 7.7 million gallons per day. Where does that number come from? The simple explanation is that when the water is recycled and treated in the tanks one percent of the water is then rerouted to a final treatment and discharge proposed into the bay. It is then replaced with newly sourced water. This process will be

further discussed shortly. We have already stated and others -- other testimony has concurred that this low replacement volume is best in class.

The outline or the application outlines several nutrient loading values in our discharge licensing request. A couple of the numbers are as follows; total suspended, TSS, of 6.3 milligrams per liter or 185 kilograms per day. There is 2.2 pounds per kilogram so you can multiply that number by 2.2 to get pounds. Biochemical oxygen demand, BOD, 5.5 milligrams per liter or 162 kilograms per day. Total nitrogen, 23.02 milligrams per liter, 673 kilograms per day. Ammonia nitrogen, NH4, .0024 milligrams per liter, 07. Phosphorous, total -- or phosphorous .2 milligrams per liter or 5.8 kilograms per day.

And now a couple that are not nutrients but relevant to the discussion. Temperature, we've talked a lot about temperature. We've heard whether this, you know, opinions on whether or not the -- the warm water has or hot water has an impact. So the outline in our permit applications is very clear that we intend to limit the range of the discharge temperature in the -- in the range of 15 to 18 degrees Celsius, which is 59 to 64 degrees Fahrenheit. For reference, the background

temperature of the bay is measured in the area of Belfast Bay between 32 and 72. It's a high variation seasonally. That's at the surface, so we -- we expect it is close to freezing during the winter. It gets up to 72 degrees in the area at the surface in the summer, late summer. At depth where we're talking about our discharge the range is a little bit more of a refined window. It's 36 degrees to 54 degrees depending on seasons.

Salinity. Our discharge is proposed to be at 20 to 25 PPT depending on the life cycles that are being raised at that time. The current salinity in the -- in the Belfast Bay area that we've measured is in a range between 20 to 31. Again, this is -- these are averages. It differs depending on depth, season, rain events and so forth. With those parameters established let's talk about the systems and the equipment that's proposed to get us there and I will hand the mic over to David Noyes.

DAVID NOYES: Presiding Officer Duchesne, Board, Commissioner Reid, staff. My name is David Noyes. I work for Nordic Aquafarms. I have a degree in Marine Biology and more than a decade's experience with large projects from both my 14 years with the Army Corps of Engineers and collective employment.

I've worked as a genotyper at Jackson Lab, a national cancer research institute. I have a decade's worth of direct experience in designing, building and operating recirculating aquaculture systems for the Aquaculture Research Institute, the University of Maine Animal Health Lab, the USDA's National Salt Water Marine Aquaculture Center and commercial RAS aquaculture companies.

I'd like to start by stating how happy I am to discuss our wastewater characteristics and water treatment technology. This would typically be a subject most companies would be uncomfortable with, however, it's a point of pride for us. Our scale allows us to invest heavily in a world class water treatment technology that surpasses any municipal or private water treatment facility currently in operation in the region to my knowledge.

The testimony I submitted centered around how Nordic Aquafarms utilizes this best in class technology and it's proposed design for Belfast, Maine and how it works as an interconnected facility. Our systems are designed with a high degree of redundancy and failsafes as well as conservatisms built in to ensure our treatment goals are always met.

Nordic Aquafarms has six subsidiary companies in three countries to include its own in-house engineering team with 15 full-time engineers, one of whom has so graciously joined us today. We are the largest RAS company in Europe and are seeking to expand into the U.S. market with this project. Our staff has extensive experience designing, building and operating both our own facilities as well as other large commercial facilities. Our deep experience to include the worlds largest land-based RAS kingfish facility and the largest land-based Atlantic salmon grow-out facility in Norway have helped guide us in developing this project. The three commercial RAS facilities we are currently operating have detailed, well-developed standard operating procedures for best management practices.

We have been intensely scrutinized by third-party examiners and are proud of the resulting stewardship certification. We've been able to demonstrate the effectiveness of our design preventing pathogens and parasites from entering, establishing in or exiting our facilities through veterinarian affidavits, third-party inspections and regulatory inspections of our facilities operations.

The statements that we have never had to use antibiotics in any of our facilities holds true to this day. Thank you. That will be followed by Simon Dunn.

SIMON DUNN: Good afternoon, Presiding Officer Duchesne and Board members. My name is Simon Dunn and I am from Nordic Aquafarms, Denmark and I am very honored and slightly intimidated dated by being here today.

(Laughter.)

SIMON DUNN: This is very interesting for me. It's my first time being in -- on this side of the whole process of -- of large scale projects like this. I hold a degree as a civil engineer in biotechnology and aquaculture. And I have been working with recirculating aquaculture systems for about 20 years almost. I started working with truly commercial scale RAS systems in 2004 and I've been through most of the gamut of a company who supplies like a turn-key technical solutions or unfortunately sometimes total turn-key projects. We've done many projects in some of the world's largest empires, the Canadian division of the world's largest salmon producer. We've have an unprecedented history of repeat orders. We're actually helping them out a

little bit now as well. We've done numerous projects. We've done them for a large variety of species. Obviously given the market for salmon the last several years has been largely for salmon, smolt and post-smolt on land. The Danish office is a group of nine soon to be 10 people with a great variety of disciplines that we -- that we need. Anything from construction engineers to 3D designers, process engineers and the whole gamut that we need to undertake our side of the project which is the RAS technology design for the entire organization.

So a couple of the comments have already been touched on. I have been asked to go through a little bit of some of the things that were commented on in our testimony. The first one that springs to mind to me is that the proposed facility that we are intending to build here is definitely not a flow-throw design. There seems to be a little bit of confusion about recycle rate and cultural water volume exchange rates. So just for the record, I did a little bit of training to convert into gallons. If we were a flow-through system, unless I did the conversion wrong, we would be talking a discharge of 2 billion gallons per day. That is the equivalent of what is actually being treated inside the production

buildings in the actual RAS facility, that's the first level of water treatment that is really there. So that's the combined flow that's really having a treatment suitable for growing healthy, strong salmon.

I think in terms of looking -- we were questioned about being best in class. What is important to look at if you want to do those comparisons is that everything in reality is dictated by feed because feed is where you get your growth from, but it is also where you get pollutants from. So in a given fish tank if you feed the fish you need to dilute that water at a certain extent, part of it due to the constraints of water concentration is permissible within that tank to make sure that the fish is healthy. In a recirculating aquaculture facility that water is moved by gravity into an extensive water treatment system and the temperature of fish. There was talk about 10 percent and more percent of the culture volume exchange. We need to take into account that the entire water discharge that we are permitting for is a combination of what is required in the RAS system. It is also for the holding tanks, saturation tanks that's part of the processing facility. So it's a -- our total. My

children have an aquarium at home and we have some guppies and some neon fish and if I were to convert them they are actually only exchanging --

MR. DUCHESNE: We're being asked to move the microphone a little bit closer.

SIMON DUNN: Sorry. I didn't want to yell at people on the internet.

MR. DUCHESNE: Yelling seems to be pretty comfortable in this hearing.

(Laughter.)

SIMON DUNN: Okay. I want to state for the record that I have not been a direct part of this permitting process, so if I'm asked about specific references to rules, I don't know. I am here to provide whatever technical information I can.

So I have one note that says Penobscot Bay, the receiving body for a discharge is Class SB, reference to Nordic Exhibit 37. There is a question about buyers and ISA is one that was commented on. There are very many systems both in municipal water treatment as well as in aquaculture that is fully capable of these. The first point of real safety barrier for any RAS operation is really the intake water. That is your primary source of any virus or bacteria and that's really what the key focus is. So

obviously what we are doing there is also thinking a little bit ahead. We knew that ISA had been detected in Penobscot Bay so it would be a threat, but we're also thinking more long-term, although I don't believe it's there at the moment we are actually targeting much more difficult virus, namely IPN. That requires a dose of 250 to 300 millijoules per square centimeter. So these are the systems that we have in place along with fine filtration and ozonation in the event that there should also be a harmful algal bloom and there would be some toxins released from that.

On that note, we'll be getting back to the wastewater treatment obviously since that is the subject, but on the final discharge side one should remember that there is a -- a proposed membrane bioreactor in place with 0.04 microns, which will take out bacteria, but following that there is actually a UV sterilization step in the same dose as what we give our ending point. So I think all in all, the threat of potentially releasing any known fish virus would be absolutely minimal.

For the wastewater treatment, we -- from the Danish side at least we could not really find any rules or guidelines concerning discharge, what is

actually required. So in terms of the sterilization effect for the discharge we had originally -- we put our basis on what is the Norwegian standard and they -- well, the Norwegian standard is 100 to 300 micron drum filter and a UV dose of 35 and you're pretty much done. And that's what I --

MR. DUCHESNE: I've been asked to see if you could repeat that, please.

SIMON DUNN: Sorry.

MR. DUCHESNE: Those numbers.

SIMON DUNN: Those numbers. Typically it will be 100 to 300 micron mesh primarily intended to take out the solid part of the waste fraction that is typically used for farm fields as a fertilizer. And then there is a requirement of a UV dose of 35 millijoules per square centimeter and this is primarily because they want to protect from the common most bacteria infecting and they do have a lot of cage farming out there, so that's fairly natural. We are seeing increasing enforcement of further treatment technologies for the discharge obviously. It's been a booming sector. For instance, our facility in Fredrikstad is discharging into a fairly sensitive area and it's right at the mouth of I think actually the largest river in Norway and where that

discharges out is quite sensitive to phosphorous so that's the primary focus right there.

What we are doing -- I have to go back. We were talking about the recirculating aquaculture systems and the water treatment that is used in there. This is typically 40, 50 micron drum filter filtration. There is a tank turnover rate of two times an hour, which leads us to a grand total of the 2 billion gallons per day. It goes through the mechanical filtration to take out feces. It goes through an aerobic biofiltration and bioreactor to convert ammonia into nitrates. Following that there is some degassing steps to balance out at CO2 from the fish. There is side stream treatment, which is about 20 percent of the flow. Part of that goes through a second biological treatment for denitrification, which is an anoxic treatment for further removal of nitrate into harmless nitrogen gas. This extra step and the following treatment steps with a fine filtration, a high contact time of ozone and subsequent step of UV is really there to polish up that water to a very, very high degree.

A conventional recirculating aquaculture system would normally stop after the aerobic treatment and the gas balancing oxygen supply and how

the side stream of UV typically around 35 millijoules per square centimeter. Again, this is never or usually not intended to be on the full flow and it's not intended to create sterile water afterwards. There are several reasons for doing that. My -- in my opinion, it is wrong to do that. The fish are a lot healthier if they're actually exposed to some level of bacteria and there is going to be a multitude of beneficial bacteria in that water, but if you create a zone that is completely sterile you've also created a niche for any potential threat to grow and multiply and all of a sudden you have a problem after the UV. The UV serves as a second purpose in the event that ozone should be overdosed and there could be a risk of ozone being introduced directly into the tank, the UV will destroy the ozone and, as you know, ozone would react with anything, and following the UV it will be oxygen. We're happy about the oxygen because the fish like it.

Following that, and this is really way beyond anything that we've been asked to do in history. We have to remember that the water coming out of the RAS systems is post-treatment right before it will go back into the fish tank. This is the water that fish are happy with, so we call it

wastewater, yeah, but the fish are very happy at that level of water. But we propose to take another step. We also do recognize that given just the magnitude of this project, and concentrations aside, we're still also talking about kilogram loads into Penobscot Bay. So for us it's very difficult. I had the design -- process design team in Denmark and usually it would be much nicer for us to ask, well, what do we need to do and design from there, but that's not how it works. So this is the process for right now. The wastewater treatment plant will then -- so there are actually two separate streams coming from the RAS. One is the backwash water from the drum filters, the mechanical of the RAS that's on another side because we want to take out those solids. A very common use is composting, biogas or apply it to fields as a fertilizer. There are some issues involved in this because of the salinity and -- but we know from past experiences that it works quite well both in biogas and also apply it on land is a question of you can mix it also to break down that salinity with other sources. So the wastewater treatment is proposed as an MBR treatment system. It's a membrane bio-reactor treatment. It consists of an anoxic step, so a further de-nitrification step followed by an

antiseptic to aerobic step and an aerobic membrane we have to take out very fine solids down to the 0.04 micron and than the sterilization. So this is the proposal that we're doing it's also -- at the same time, this is also a part of that multi-layered approach towards preventing any escapees. I believe a salmon egg is about 1 millimeter, so many, many times bigger than even the coarsest drum filters that we have in the system even -- not even counting the wastewater treatment plant.

The requirements in Norway for the final sterilization step before you discharge into the bay is that there are sensors in place and an automatic valve that shuts off and redirects the water. There is an end of lap life dose, in our case the 250 to 300, so there are UV sensors online that will keep us informed that this unit or this unit is coming towards the end of lap life, but there is also a detector there that actually measures the dose that is given. If that dose is not met than an automatic valve shuts off and there is a redundant UV that takes over and obviously the alarm has gone off that you need to pay attention to that UV and that is also what we attempt to do. I think we have said several times that we have not and do not intend to use

antibiotics as a very, very last resort in combination with the recommendations of a veterinarian.

The use of surface water for aquaculture has been done for many years. In fact, the oldest guy among us in Denmark used to culture trout there in the good old flow-through systems and that was also discussed earlier. Simply take water from the river, take it through the pond and discharge on the other side. That's very many years ago. So we know that for a fact and we know that there are several places in the U.S. that also use surface waters for successfully rearing fish. We will not rely solely on the surface water. We do require fresh water for the first stages of life and we will primarily use salt water from Penobscot Bay to grow the fish and we'll source the fresh water from production wells on-site with additional needs met by municipal water and surface water and from the Lower Reservoir as a third source in order to provide a resilient and flexible fresh water supply. I don't think I need to say any more about that. I'm done.

DR. IAN BRICKNELL: Good afternoon, Presiding Officer Duchesne and Board members. Might I say what an honor it is to be here to support my

testimony. I am Dr. Ian Bricknell. I work at the University of Maine. And I have undergraduate Bachelor's degree in Clinical Microbiology, Zoology and Geology and I have a Ph.D. in Aquatic Animal Physiology, which I obtained in 1990. And since 1989, I've been working in the field of aquatic animal health predominantly as an immunologist and a parasitologist as somebody who studies pathobiology and the processes of infections that are going on inside fish. So my testimony is focusing on the areas where I have expertise and direct knowledge of fish disease throughout my long career. And as you might know with my accent I am from away and I spent my first 22 years of my post-doctoral career from '89 until 2007 working for Fisheries Research Services in Scotland, which was a government research institute looking at aquatic animal health and ways to control aquatic animal health both in wild and farmed fish. And then I came over here to join the University of Maine faculty in 2007 as a full Professor of Aquaculture Biology and the Founding Director of the Aquaculture Research Institute and I've been here ever since and Maine is very close to my heart even though I am just one of those horrible invading Brits that you got rid of in 1776.

(Laughter.)

DR. IAN BRICNKELL: So I would like to speak about this infection and support, some of the data we heard earlier but looking at it from the point of view of the biology of the pathogens that we want to make sure that we keep out of the fish farm here. So the -- the first one that was mentioned in the testimony of Professor Dixon was infectious salmon anaemia virus, which is called ISO or ISAV. And this is a virus that's related to the influenza group of viruses. It's not transmissible to humans, but it's a very delicate virus. If you imagine little droplets of fat with a tiny little bit of protein inside it and in that bit of protein is a piece of RNA, not DNA. It's a very complicated virus and it's very delicate. It doesn't like to be oxygenized and so it doesn't like the sunlight, it doesn't like a high oxygen environment because it breaks down that lipid layer on the outside of that droplet of fat and it can't get into the fish cell, so that oxidated environment is bad for it. And also ultraviolet radiation damages the RNA, which is genetic material irreparably and it's incredibly sensitive. So that's one of the most sensitive viruses to ultraviolet light, the blue tank that effects fish.

So we find that around 8 millijoules per centimeter squared renders this virus inactive and that is virus that is, of course, of concern here. It has been found in Maine and was a big problem in open aquaculture farms at the turn of the millennium. It's now been pretty much eradicated because of high biosecurity, screening of brood stock, eradication of any animal that tests positive on any sites. On the whole our fish are doing very well at the moment without clinical outbreaks of infectious salmon anaemia virus.

So by using a dose of around 250 to 300 millijoules per centimeter we're exceeding the lethal dose between 31 and 38 times for that particular virus and for the vast majority of viruses that's a very, very safe margin of error. Even if the bulbs aren't replaced over the year of that first turning on, we're still going to be looking at the 40 percent declining efficiency of the ultraviolet bulbs, but we're still going to be in the order of 19 to 20 times more UV than is required to inactivate this very serious fish pathogen. So from that point of view, the virus side of things is very safe.

And Dr. Dixon also spoke about the bacteria that is an epidemic in Maine, Aeromonas salmonicida.

This name is important, but for this Board it causes a disease called furunculosis, which is a large boil-like disease in the flesh of the fish and it causes high mortalities and it was a very serious disease in the 1970s, 1980s and early 1990s but has been pretty much eradicated since the mid-1990s because of a development of very efficient fish vaccines. And, of course, fish vaccines have been a major breakthrough in fish health and biosecurity and I'm very proud to say that I was actually one of the team that developed one of the first vaccines against Aeromonas salmonicida back in the day when I was much younger. And then that patent lapsed last year, but it was used in its first years for over 20 million fish every year. In the UK we were seeing about 25,000 clinical cases, i.e., fish were coming to our laboratory with that disease for diagnosis. And in its first year of use we would use that to below 20 individual fish. So it's been a very effective vaccine, it's very safe and its widely used. And all of the fish that could come onto the site, perhaps in producing their own material, are vaccinated routinely by all the fish breeding companies throughout the world. And, in fact, it's very hard to buy a farmed salmon that hasn't been vaccinated.

I know it because I want fish without vaccines and I want to give them diseases in my research and of course it's a very big challenge for me to get them that haven't been vaccinated because it's so routine and it is no different for people vaccinating any other farm animal or pet. It's a routine process that is carried out by veterinarians and I'm sure Peter will talk about that little more in a few minutes.

One of the things that is sometimes commented on in vaccines and this is erroneously -- the vaccines, when you vaccinate a fish leak back out into the environment and this isn't true. Fish are vaccinated in two ways. The first one is a very simple dip, which is used for tiny little fish that are too small to physically inject with a vaccine, so you make up a solution of vaccine, you soak the fish in it for the recommended amount of time, which is usually between 30 seconds and two minutes, you take the fish out and you rinse them in fresh water and you put them back into the aquariums and then you do it again 10 days later and that gives them a vaccination, but an also very long-lasting vaccination. In fish like salmon they are physically injected with a vaccine just like any other farmed

animal that's vaccinate except it doesn't usually go into the muscle, it goes into the fluid around the abdomen. And it is quite a skilled job but it's done widely and it goes into the fluid around the abdomen, the needle comes out, that little hole is instantly sealed by the fish and the vaccine is retained in the fluid around the abdomen and then processed by the immune system to give a high level of protection. So we tend to see that fish vaccines that are out there against bacteria are very effective.

So we don't think that with appropriate vaccination and good biosecurity it's very likely that disease will enter this farm. And of course if disease doesn't get in the farm in the first place and there's good biosecurity then although there is excellent biosecurity on the discharge that risk is eliminated because the fish aren't infected in the first place you can't have disease being shed from the farm. Of course, if there was an accidental introduction of a disease then they have a very good veterinary plan with appropriated medications and the risk of that disease escaping back into the environment is also minimal because, again, we have a very high level of biosecurity with ultraviolet lights, ozone and then microfiltration to catch any

bacteria that may escape that three stage system. So I think getting an infectious dose out into the environment is a very, very unlikely scenario.

Professor Dixon was concerned about the ozone disinfectious system and he was worried about its efficacy and he was worried or at least Mr. Byron was worried about the ozone --

MS. RACINE: I'm sorry, I'm just going to interject procedurally. I just -- to discuss -- I understand -- I'm sorry, you said Dr. Byron not Dr. -- I think earlier was there a reference Dr. Dixon?

DR. IAN BRICKNELL: Oh, Professor Dixon, yes.

MS. RACINE: But since that testimony is not going to be -- yeah, struck, I just -- can we address since as he won't be able to respond and how that will --

MS. BENSINGER: So if you could refrain from -- oh, do you want to respond?

MS. TOURANGEAU: Please. Although that testimony might have been stricken, our direct and rebuttal was not so we should still be able to...

MS. BENSINGER: It would be better if you could refrain from -- I understand there is a fair amount of overlap between other witnesses testifying

about fish, what the virus is and fish disease, so if you could refrain to the extent possible. I understand we're not going to go through your testimony and strike every reference to Dr. Dixon, but if you could refrain from referencing his testimony specifically to the extent you can on the fly, I realize there was very little notice.

MS. TOURANGEAU: I actually didn't pass that on to the witnesses, so I apologize, but that testimony has been --

MS. BENSINGER: Dixon's testimony has been stricken because he cannot come to the hearing.

DR. IAN BRICKNELL: Oh, okay. I didn't realize that.

MS. BENSINGER: But the issue remains because there were others that talked about the issue generally.

DR. IAN BRICKNELL: Actually, so I need to gather my thoughts for a second here. There is concern that ozone is not a good disinfector -- disinfectant for fresh water and that's not the case. Ozone is widely used in fresh water drinking supplies throughout North America and to keep populations safe from multiple pathogens and has been very effective in remote municipalities for public health in its own

right. These ozone systems are very well developed to make sure that pathogens don't enter or leave a contaminated area. And this is done by dosing the water in a what's called a foam fractionation tower where the ozone is introduced in a fine mist, it reacts with the organic material in the water and it oxidizes it. And going back to the infectious salmon anaemia virus, all of the bacteria, Aeromonas salmonicida, these both have lipids which are very prone to oxidation. You've all probably tasted rancid fat when bottles go off in the fridge with bad milk, that's exactly the same process here. Those oxygen molecules -- those O3 oxygen molecules are breaking apart those lipids and making them unstable and affecting their biological function.

Any residual ozone is destroyed by the UV treatment and of course that would also damage the genetic material, the DNA of the bacteria or the RNA of these viruses and render them unable to replicate further. And then we have those microfilters that will catch the particulate matter before it goes, in so then, again, we have a very high level of biosecurity which is well established as a way of filtering water and making it effectively pathogen free for drinking water within developed nations.

Some people expressed concern that the pathogens can also be transmitted in the offspring, what's called vertical transmission. And although this is true for some diseases, some human ones that I can think of, and infectious salmon anaemia virus hasn't been shown to be transmitted from mother to the egg or via the sperm to the eggs during fertilization. So although there are people that have detected genetic material from the viruses they haven't actually fulfilled I think what's called postulates or river postulates which is actually showing clinical disease in those larval fish. They can detect it from the infected parent but not actually in those fish. So, again, the vertical transmission of both Aeromonas salmonicida and infectious salmon anaemia virus that doesn't seem to happen scientifically.

So I just wanted to mention that the U.S. has signed the Williamsburg Treaty on the use of analytically derived animals in aquaculture, however, this really applies to the Pacific as well and although we have our own state legislation requiring genetic stocks and to be used here, it's not part of the Williamsburg Treaty, which refers particularly to the Pacific salmon. So we won't be importing

non-native fish. That has been a concern and the resulting diseases from the West Coast of North America.

So I am going to pass you over now to Dr. Peter Merrill and he will give his support to his testimony.

PETER MERRILL: Good evening, Chairman Duchesne and the Board. Can you hear me okay?

MR. DUCHESNE: A little closer.

PETER MERRILL: A little closer.

MR. DUCHESNE: Yeah, just drag the mic a little closer. Thank you.

PETER MERRILL: So my name is Dr. Peter Merrill and I'm a veterinarian. I work at an aquatic animal pathogen detection laboratory called Kennebec River Biosciences near Augusta. I am also a marine biologist and I have background in regulatory medicine. I worked for the USDA for 10 years at first as their aquaculture expert and later as director of all animal imports to the United States.

I have a lot of expertise in aquatic animal diseases of all types and particularly for finfish. I've worked with salmonids and many other species of fish, both flow-through and recirculating systems. And I also have an interest and experience with the

epidemiology of fish diseases. As part of that, I've developed a capacity for biosecurity and I conduct biosecurity audits and I also have extensive experience with risk assessment and risk management. So all of these things feed into aquatic animal health in one way or another.

And I provided some testimony already on behalf of Nordic to support the kind of approach that they intend to take for optimal fish health. And as I'm sure you know, fish health and fish disease are quite an expansive spectrum. You have to have pathogens, you have to have susceptible populations, you have to have exposure, you have to have infection, you have to have disease and you have to have mortality to complete that entire cycle. So that gives you many opportunities to interdict the whole process with what you do or what you don't do. And I'll be brief because Dr. Bricknell and Simon Dunn actually covered quite a few tenets of sort of basic fish health.

But you really only have three options as a producer of salmon. You can prevent problems, you can deal with those problems, live with them, manage around them or if you fail at that you can eliminate those problems and that's it. So it behooves Nordic

or any producer to prevent their problems in the first place as part of that. Good fish health will depend on using good source for their eggs and their fry and they will be doing that. Good water quality is extremely important, good biosecurity, good nutrition, good general fish well-being or welfare, and lastly, but certainly importantly a stress-free or as stress-fee environment for raising the fish as possible. So all that boils down to having good facility design, good biosecurity, adequate testing and an extensive set of operating procedures and contingency plans to deal with any problems that do arise.

So I think I'll leave it at that for now and I'm here to provide whatever answers you might have for specific kinds of fish health issues that would pertain to salmon.

MR. DUCHESNE: Grant. Thank you very much. And, Dr. Bricknell, congratulations on your early Brexit.

DR. IAN BRICKNELL: That's not quite how I feel about that.

(Laughter.)

MR. DUCHESNE: I believe we have Ms. Tucker first for cross-examination.

MS. TUCKER: I'm Kim Tucker. I'm the attorney for the intervenors Mabee-Grace and the Lobster Representatives. As a lawyer, I have to say that I am not a math wizard so I'm going to ask that -- I'm confused by this one percent number. So as they used to say to me in school, I'd like somebody to show your work on this math of how you get to the 1 percent because let's just start with 7.7 million gallons a day. What is the total amount of water in this system in your tanks? Are you saying there is 7.7 million gallons in the tanks or how do you get to this 1 percent? And I don't know which one of you that is, but I'd like somebody to show me the mat.

SIMON DUNN: Can I try it?

MS. TUCKER: Please. Thank you.

SIMON DUNN: So the -- I was kind of trying to touch on that earlier because I've also noted that there is -- should probably be some explanation. The recirculation rate is defined as how much water you displace -- I mean, taking in for discharging relative to what you are recirculating. That's the recirculation degree rate, so that is 99 percent meaning that 1 percent of the internal treatment flow is what is going out. The other figure that, and I

think that's where the confusion comes in, is what is the tank volume and how much of the tank volume is being exchanged. And if I did -- I did try to do the gallon conversion. I'll see if I can find it again. Yeah, I'll stick with metric. So total production volume -- and this is where I also mentioned you have to keep in mind that there is water for other processes as well, so total production volume is 162,300 cubic meters, roughly 42.9 million gallons.

MS. TUCKER: That's your production volume. That's what's in the tanks. The water in the tanks.

SIMON DUNN: That's the fish buckets.

MS. TUCKER: Okay. So water in the tanks --

MR. DUCHESNE: I'm not certain the microphone is still on.

MS. TUCKER: Okay. Maybe I just got a little sideways from it. So the water in the tanks is 42.9 million gallons?

SIMON DUNN: 'Ish.

MS. TUCKER: 'Ish. Yes. I'm comfortable with 'ish, but --

SIMON DUNN: That's good.

MS. TUCKER: -- but I still don't get where 7.7 million is going out the tube every day is 1 percent.

SIMON DUNN: No, it isn't.
MS. TUCKER: Okay.
SIMON DUNN: It's not 1 percent of the culture volume, it's 1 percent of the recirculation volume. So for these purposes if we discount --
MS. TUCKER: But recirculation flow, can you define that for me?
SIMON DUNN: Certainly.
MS. TUCKER: And I don't know if it's everybody else in the room, but for me.
SIMON DUNN: Yes, certainly. If you have a big tank with some fish in it you need to feed them. That feed generates some nutrients and at some point unless you take some of the water out and put some fresh water in concentrations will rise and at some point, in particular will be the ammonia is a typical limiting threshold, and that means that in essence you need to -- in the fish tanks itself you need to dilute that water out and do something with it. So in our case with the loading this equates to two times an hour the water in the tank is exchanged. So that circulation or recirculation flow is two times the tank volume that goes through a water treatment system to be cleaned up and returned to that fish tank. So on the side because that water is flowing

around in here, this the big flow, you have a supplementary stream and that is the 1 percent.

DAVID NOYES: So I'd just like to add something to the -- to the context of the conversation maybe to help you understand this a little bit. So that 1 percent is not a hard, fast number of 1 percent. It's tied directly to the feed rate as Simon is alluding to and so the more feed you put in the water, the more feces need to be removed. And if you get out of the pool you're not immediately dry, you're covered in water and so that water entrainment carries that down to the wastewater treatment facility to further treat that feces and so the -- that 7.7 million gallons is a large number that provides us some head room to accommodate all of the other processes in the facility, the processing building and everything else that's carried on at the campus.

MS. TUCKER: So isn't it true that 7.7 million gallons that's being discharged into the bay isn't 1 percent of the amount of water that's in your facility, it -- like -- at any given time. What is the percent of the water -- in your facility, all of your different processes, your tanks or whatever else you have going on, what is the percent of that volume

if you were to take a snapshot of here is my water in my -- in my facility on -- right this minute and 7.7 million gallons is what percent of that volume of water?

EDWARD COTTER: I'll -- I'll let David and Simon chew on that a second, but I think the 1 percent number is a tool that Nordic has used in publications to try and get people to understand our comparison of our system with other systems. This is a figure that is common in the industry to explain the efficiency of our recirculating system. So we've used that because a typical recirculating system, I believe, and somebody at the table can tell me if I'm wrong, but a really good system might be 5 percent, I think an average system is about 10 percent. That compares apples to apples when we say 1 percent. We're at 1 percent. Now, when it comes to 7.7 million gallons, we didn't use that 1 percent to calculate the 7.7 million gallons. We used engineering and design to say -- and it included water treatment, it included cooling systems, it included the processing building and we said -- we added all of those systems up together and we said we need to discharge 7.7 million gallons a day. It had nothing to do with the 1 percent. We didn't use that

number to calculate it. So we can -- we can try and talk to -- to what that percentage is. I don't know if we know that because we -- in our testimony and our material here we don't have every system represented as far as what water is in the system at any one time.

MS. TUCKER: Well, let me ask it a different way. At any give in day in a 24 hour period, how much salt water from Penobscot Bay do you suck into the building?

SIMON DUNN: That one I did not convert to gallons. It is, if I remember correctly, 950 cubic meters.

EDWARD COTTER: Per second?

SIMON DUNN: Hour.

EDWARD COTTER: Per hour. So 950 cubic meters per hour.

MS. TUCKER: So what is that in American because I'm --

DAVID NOYES: Multiply by it 2.2046 approximately.

MS. TUCKER: Normally I'd dribble this, but.

EDWARD COTTER: Approximately 251,000 gallons per hour. And please don't impeach me if did my very quick math wrong.

(Laughter.)

MS. TUCKER: Oh, we're not. I'm not in the impeachment game. That's somebody else. That's an hour, right?

EDWARD COTTER: Correct.

MS. TUCKEr: So over 24 hours -- I don't have my pocket calculator, can you -- and I'm sure the one that I have doesn't have that many zeros. How many gallons of water from Penobscot Bay does that mean you're pulling in in a 24 hour period?

EDWARD COTTER: Approximately 6 million.

MS. TUCKER: So 6 million roughly gallons per day Pen Bay water. All right. And how much fresh water in a given day does the facility bring in from all your sources?

EDWARD COTTER: 7.7 minus 6, so approximately 1.7 million gallons. And that's just using the maximum numbers that we have presented of worst case.

MS. TUCKER: So you're bringing in 6 million of salt water from the bay and 1.7 million of fresh water from the -- from the various sources. I'm not going to try to --

EDWARD COTTER: Or the other way you could do it, and I don't want to keep doing math here under

pressure, but you could also say a maximum of 1,205 gallons per hour -- per minute times 60 times 24.

MS. TUCKER: Say that again.

EDWARD COTTER: The maximum fresh water withdrawal that we've requested is 1,200 gallons per minute and you can multiply that to the -- for the day.

MS. TUCKER: Okay. One minute times 60 times 24.

EDWARD COTTER: Times 24.

MS. TUCKER: Okay. That's the fresh water. Okay. So what we're going to say is -- we're just going to use the numbers, roughly 6 million salt water gets pulled in, 1.7 of fresh water gets pulled in and then 7.7 million gallons of that stuff mixed after going through your waste treatment facility goes back out?

EDWARD COTTER: Correct.

MS. TUCKER: So in other words, every day you bring 7.7 million gallons in and 7.7 million goes out. So that's not 1 percent discharge. It's 100 percent discharge of what you bring in every day and goes out every day.

EDWARD COTTER: That's conservation in mass. Yeah, we -- yes, we are not in the business of

storing water.

MS. TUCKER: Right. So I just want to be clear that every day you have 7.7 million coming in and 7.7 million going out, so 100 percent exchange, not 1 percent.

DAVID NOYES: No, it's not 100 percent exchange of the water in the tanks.

MS. TUCKER: I'm just saying you bring 7.7 million gallons in and 7.7 million gallons goes out.

EDWARD COTTER: That's correct.

MS. TUCKER: Okay. Thank you. It doesn't sound like 1 percent discharge. So then you've got -- the next question I have is you talked about the ambient temperature of the bay you said was 32 degrees Fahrenheit to 72 degrees Fahrenheit.

EDWARD COTTER: At -- that's at the surface seasonally, correct.

MS. TUCKER: Okay. That's at the surface, okay. And what source did you use to determine that?

DAVID NOYES: That information is in the permit application and I believe Normandeau did the field test, but that's by memory. If you give me a moment I can look it up in the actual permit ourselves.

MS. TUCKER: Thank you.

MS. TOURANGEAU: Just to save time because it wasn't part of your testimony, I think it was part of Mr. Dill's testimony.

EDWARD COTTER: We reference the Pen Bay oil spill study by Normandeau that was submitted to the DEP.

MS. TUCKER: What was the date of that?

EDWARD COTTER: 1978.

MS. TUCKER: So the last temperatures you took of the bay or a source for that was from 1978?

EDWARD COTTER: Well, we use that because, you know, there is --

MS. TUCKER: You did not collect -- isn't it true you did not direct data currently?

EDWARD COTTER: There is other data in the application that is provided from August 23, 2018 in Belfast Bay that was taken at an offshore buoy.

MS. TOURANGEAU: So I'm going to object. I know you're halfway through your answer, Ed, but this panel is wastewater characteristics and the testimony that you're looking for is in the next panel on the modeling and the characteristics of the bay.

MR. DUCHESNE: I will sustain the objection because I was coming to the same conclusion.

MS. TUCKER: What was the -- what is the

depth that you discharged water from your system? What's the depth of the pipes at the point of discharge?

EDWARD COTTER: Roughly 35 feet low tide.

MS. TUCKER: So what is the relevance of a surface water temperature when you're discharging it at bottom?

MS. TOURANGEAU: Again, this goes to the modeling of the discharge.

MR. DUCHESNE: And, again, I think we're on the wrong panel for that.

MS. TUCKER: We'll get back to that question. You just think about it and we'll get back to that one. In terms of this panel and perhaps it's the next one, I have a question about isn't it true that there will be days when you cannot discharge water from this facility because of weather conditions tides or storms?

DAVID NOYES: No.

EDWARD COTTER: We don't expect so, no.

MS. TUCKER: So you think that 365 days a year for the next 30 years you are able to just discharge 7.7 million gallons of water into Penobscot Bay?

EDWARD COTTER: We don't see any conditions

that would cause us not to be able to do that.

MS. TUCKER: How long have you lived here, Ed?

EDWARD COTTER: I've lived on the water for 42 years.

MS. TUCKER: Okay. Apparently different water than I've lived on.

MS. TOURANGEAU: Objection.

MR. DUCHESNE: Yes, the --

MS. TUCKER: So you do not --

MR. DUCHESNE: The objection, first of all, is sustained. We're looking to avoid editorializing.

MS. TUCKER: So you have -- you do not have any capacity to store -- in the event you're wrong, you do not have in your plan any capacity to store wastewater on days you cannot discharge it into the bay?

EDWARD COTTER: We have some storage capacity. We also have a higher capacity to reduce discharge for periods of time by limiting feeding and other operations we can maintain water quality at acceptable levels without discharging as much for short periods, but we don't expect that's needed.

MS. TUCKER: What's the lowest amount that you can discharge in a day?

DAVID NOYES: So I'd like to kind of supplement that answer that Ed started to get into. And so with a higher level of treatment within the facility we're able to retain and reuse what water for a high period of time and that's really, as I started to speak to earlier, the replacement rate is tied directly to feeding. So if you stop feeding you can use your water for a fairly long period of time. Obviously eventually you're going to impact the health of the fish because you can't take the fish off the feed indefinitely. That's pretty intuitive. And so we have the ability to shut down discreet units for a given a period of time if need be under various situations for either unplanned maintenance or planned maintenance and that's part of the strength of the modular design of the facility and that you have very discreet units that you can manage as such discreet units.

MS. TUCKER: What's the maximum number of days that you could discharge no water from the facility?

DAVID NOYES: Again, there wouldn't be a situation where we would need to stop discharging wastewater from the facility.

MS. TUCKER: Isn't it true then your answer

is there is not a day that you cannot discharge some level of water then? Are you saying that you -- there is never a day that can you discharge zero from the facility?

DAVID NOYES: Under what context are you hypothesizing this?

MS. TUCKER: A nor'easter, a hurricane, certain tides, the bay gets frozen over where that pipe is.

DAVID NOYES: Okay. So weather has no impact on our wastewater treatment facility's ability to operate or treat its wastewater correctly, neither does the influence of tides, winds or freezing of the surface of the bay. I'm not sure when the last time the bay was frozen, although I have seen pictures of people out on the bay -- Belfast Bay but not necessarily our site. None of that would have an impact on our wastewater treatment facility to correctly operate.

MS. TUCKER: But, again, is there -- do you have the capacity to not discharge any water on a given day?

DAVID NOYES: Again, I would reiterate that the water replacement needs and the ability or need to discharge water is tied directly to feeding and so

we can change our need to intake or discharge water tied directly to the feeding amounts and so if we needed to cease feeding that could reduce our need to discharge.

MS. TUCKER: What is the minimum amount that you can reduce it by reducing the feed or stopping feeding?

EDWARD COTTER: It not a situation that we have done a full analysis on because it's not something we see as a potential.

MS. TUCKER: So you have not planned -- isn't it true that you just said you have not planned that contingency?

EDWARD COTTER: I just answered that question.

MS. TUCKER: Okay. Thank you. Isn't it true that you have not done any study of the impact of this discharge I'm seeing in concentric circles on lobsters within the discharge area? You've done no impact study of the impact on lobsters.

MS. TOURANGEAU: Objection. Again, that guess to the modeling.

MR. DUCHESNE: Which is the next panel.

MS. TUCKER: Okay. I'll save that one. Mr. Bricknell, you talked about your expertise in

fish disease, do you have any expertise in lobsters?

DR. IAN BRICKNELL: No, I don't.

MS. TUCKER: So you have -- I was -- are you planning to vaccinate all of the fish?

DR. IAN BRICKNELL: I am not going to be vaccinating any fish because I don't work for Nordic.

MS. TUCKER: Well, is Nordic planning to?

DAVID NOYES: I'll be happy to answer that.

MS. TUCKER: Thank you.

DAVID NOYES: And, yes, there is a vaccination plan in place. We have discussed the development of that plan, which has not been finalized with Dr. Merrill down here and Kennebec River Biosciences and that's something they have a fair amount of expertise in and so, yes, there is a vaccination plan that is being developed that will be appropriate for this facility, these conditions and these fish.

MS. TUCKER: Dr. Bricknell had described -- and I'm not sure which one of you needs to answer this, but Dr. Bricknell had described two ways of vaccinating. The first one was dipping little fish, smaller fish, into a vaccine dip and then they're rinsed off in fresh water and then put back in their tank. Using that as the first scenario here, what do

you do with the dip of vaccination in terms of disposing of it and what do you do to dispose and treat the fresh water you use to clean off the dip?

DAVID NOYES: So that's one of two methods to include IP injection of vaccines as a secondary one and that IP injection is for a vast number of fish is a preferred method, but then dip baths are also another method. And perhaps, Peter, you'd like to weigh in on how vaccines work.

PETER MERRILL: Sure. Well, I'll point out that the constituents in the vaccine itself are basically salt water and dead bacteria. That's it. So there is only inert ingredients in the vaccine to begin with, nothing living, nothing dangerous.

MS. TUCKER: But what do you do with it when you're done dipping?

PETER MERRILL: It can go into a sewer system.

MS. TUCKER: Did -- does belfast know that, that that was the plan is to put it in the Belfast sewer system?

DAVID NOYES: Anything from the fish process facilities would go into our own wastewater treatment plant which we've described in great detail at this point about its ability to treat and disinfect any of

those materials.

PETER MERRILL: Also, we would recommend that it be chlorinated before it was discharged to anything and then the chlorine itself is diluted out as far the discharge.

MS. TUCKER: But it is your plan after doing those two things to this dip you're going to dump it into Penobscot Bay as part of your wastewater?

PETER MERRILL: After it's been chlorinated and activated, yes.

MS. TUCKER: That's what I meant.

PETER MERRILL: Well, you'd have to speak to --

MS. TUCKER: Is that what your plan is?

DAVID NOYES: The vaccination plan is being developed and so this is one method that you're describing that's available to us. IP injections are a preferable method for a facility of this size because there are automated vaccine machines which can handle a very large number of fish very effectively and provides delivery of multiple adjuvant vaccines versus, you know, a dip method which is very intense handling of the fish and so there is multiple methods here. I think you might be focusing on something that we might not employ.

MS. TUCKER: Well, if you don't employ that for the little fish, how are you going to vaccinate the little fish? Are you not going to vaccinate them at all until they get big enough to use the other method?

DR. IAN BRICKNELL: Well, salmon are usually vaccinated when they're about 3 1/2, 4 inches long and weigh about half an ounce to an ounce, so they're not little fish. I mean, little fish in my -- my experience in using dip vaccinations are like marine fish like turbot which would be 1/8 of an inch long and far too tiny to put a needle in and you would vaccinate hundreds of thousands of these in a net. You literally just scoop up a net full, dip them in the water for the appropriate length of time for the vaccine to take hold, take that out, put them into fresh water to rinse them and put them back into the growing tank. And then I would take both those containers of water, add at least 10 parts per thousand bleach, leave it for 20 minutes and throw that disinfectant solution into the sluice.

MS. TUCKER: Into the wastewater.

PETER MERRILL: Can I just clarify one thing to give you a little scope for context. When fish are very small, say 3 to 5 grams, one liter of

vaccine diluted in 10 liters of water will vaccinate 100 kilograms of those fish, so we're talking tens of thousands of fish per liter. Typically it doesn't take very many liters to vaccinate fish that size. So, you know, in terms of the discharge we're talking 4 to 10 liters per cycle every two months or however often that vaccination might occur for incoming fish. So it's very small volume to begin with. It's disinfected with chlorine. It's inert to begin with and it has no pathogens.

MS. TUCKER: And do you -- what kind of preservatives are in this -- in your vaccines? Do you use mercury, for instance, as a preservative?

PETER MERRILL: No, we don't.

MS. TUCKER: Any other preservative?

PETER MERRILL: Nope.

DR. IAN BRICKNELL: I provided -- excuse me. I provided in part of my testimony part of a book I wrote which is called Management of Finfish and Shellfish: The Larval Health in Aquaculture actually which does deal with dip vaccinations of these very small fish in a lot of detail if you wanted to look at that.

MS. TUCKER: That's all I have right now. I'll turn it over.

MR. DUCHESNE: Great. Thank you. And for the record, where can we buy your book?

DR. IAN BRICKNELL: Oh, yeah. It's very cheap, $337 on Amazon. And I will sign copies.

(Laughter.)

MR. DUCHESNE: Ms. Racine.

MS. RACINE: One moment. Good evening, by the way. I think we're most solidly in the evening at this point. My name is Kristin Racine and I am the counsel for Upstream Watch, one of the intervenors in this action. Could somebody go through with me the total suspended solids, you can go pounds per day, kilograms per day, no -- no preference in the measurement.

EDWARD COTTER: The values that we've reported in our proposed wastewater condition?

MS. RACINE: Yes, please.

EDWARD COTTER: 6.3 milligram per liter. 185 kilograms grams per day.

MS. RACINE: Did you say 185 kilograms per day?

EDWARD COTTER: Correct. So almost 400 pounds.

MS. RACINE: Thank you for the conversion.

EDWARD COTTER: That's -- again, we reported

in a weight, but these aren't desired nutrients.

MS. RACINE: What does -- what are the size of the particles?

SIMON DUNN: TSS is as a standard measured on a .45 micron filter that you -- that's dry and dehumidified, et cetera, et cetera. So anything from 0.45 and up.

MS. RACINE: Okay. 0.45 and up. I'm glad you brought that up because Mr. Dunn and Mr. Noyes, is that correct, when I was reading your pre-filled rebuttal testimony there is something that I wanted to address. You had stated that Nordic's wastewater treatment plan will include filtration that is comprised of a, quote, scalable .04 micron pore sized ultra filtration MDR system. Could you please help educate me what you mean by scalable?

SIMON DUNN: It's scalable in the sense that depending on the phasing of the project, the membranes themselves if you think of a lot of spaghetti pipe or tubing that are hanging down, they come in modular units or cassettes so you will have several parallel treatment trays with a number of these filtration modules within them.

MS. RACINE: So does scalable mean reference -- is not in reference to the pore size,

it's in reference to how they're structured?

SIMON DUNN: Flow. The flow.

MS. RACINE: The flow.

SIMON DUNN: The flow capacity based on how many of those modules you have.

MS. RACINE: Because the application had stated a .4 micron filter; is that correct?

SIMON DUNN: I believe that's correct. It is a .04.

MS. RACINE: So it is going to be a 0.04 micron filter. That's a -- is that a change from the application?

DAVID NOYES: So the early technology we identified was micro MBRs and so there are just in the single producer alone over 51 different versions of this MBR ranging in pore size. And so one of the primary challenges that has been put to us by our boss, Erik, was to do a better job on wastewater treatment. That's actually the initial stance from the company when he started it was do better basically in terms of environmental impact when you're raising these fish on land. And so we were very, very comfortable early on starting with a micro filtration level or a 0.4 MBR and we happily accepted the challenge to go to an ultra filtration, which

further increases our confidence in our ability to do this. It is the same model noted that a 56-M-2400-FF MBR model in the Mitsubishi catalog, but it's a slightly higher performing unit. The flux -- if you want me to keep -- go deep into the details of it I can go into some of those as well.

MS. RACINE: Does the Mitsubishi have a 0.04? I was only aware of a 0.05.

SIMON DUNN: There are one, two, three, four of the world's biggest wastewater water treatment companies in play at the moment, so we're exploring different options for how can we perhaps improve on the overall design to maybe alleviate some of the flood volumes, et cetera, et cetera. So we're going through some iterations, so.

MS. RACINE: So is there a commercially available 0.04 micron versus a 0.05 micron?

SIMON DUNN: There are. There is a 0.02 if you want and there is reverse osmosis, but we'd rather not make drinking water.

MS. RACINE: Sure. I understood. But is there a commitment that you will be using a 0.04 micron? I just -- to understand the application versus what some of the pre-filed testimony and some the other statements that have made subsequent to the

application, I just want to be clear what the commitment will do what Nordic plans to use.

EDWARD COTTER: I think what I'm going to attempt to do as I promised to come back to a -- and I'm not disagreeing or trying to evade your question and we can go back to it if we need to, but I think what I would note is that we in our application submitted a .0 -- I'm sorry, a 0.4 micron filter. That is what we said we were going to use at the time. We now feel we're going to do an order of magnitude better than that. The current standard at the facilities that are operating adjacent to Penobscot Bay are in the 30 micrometer range. So the difference from .04 to .05 I don't think I'd be comfortable putting out a statement that we would never use .05 at this point. Our -- I think our point is that .04 is several orders of magnitude better than what is considered the industry standard. We are proving through our statements that we're not satisfied with that.

MS. RACINE: Is a 0.04 micron filter an admission that 0.4 filter wouldn't filter out certain bacteria?

EDWARD COTTER: We never made the statement that we were using this to filter out bacteria. I

think I'll let David talk about that, but that's not our goal of this filtration. When we do go to the .04 we can very much state that we will be filtering out -- and .05, we would be filtering out bacteria and several viruses, but the .4 was not replaced because it wasn't -- because we felt the need that to discharge to, sorry, to filter out bacteria.

DAVID NOYES: So I'd like to add to that and the real point of going to the MBR is for one as Simon started to talk about is the cassette design. It allows you a high ability to rescale, but also it gives you resiliency and redundancy.

MS. RACINE: And I want to --

DAVID NOYES: But the real point about this, if I might finish, is really the -- the size. The microfiltration and ultrafiltration, the goal of that is to remove solids at very effective rates and so that gives you those incredible numbers we're talking about, total suspended solids, phosphate levels, which are bound to solids, and the added benefit of that very small pore size is it additionally is very effective at filtering out things that are larger than the pore size that's selected. In the case of bacteria, 0.4 is highly effective at filtering out bacteria. As you get down to the ultrafiltration

range of course you then get another order of magnitude of removal as you go further down. And I'd like to note that -- because the scales we're talking about get a little difficult, so we're talking about several orders of magnitude, three or four is a magnitude below what the human eye can see at this point.

MS. RACINE: I'm so glad you brought that up because I want to touch on two points and I'm really glad you raised them. One was the suspended solids figure that you cited, was that based on the .4 micron filter because I imagine that that figure would need to change on the basis of the 0.04 micron figure?

DAVID NOYES: As I stated earlier, we're very comfortable with the numbers we submitted and attempting to implement the same technology at a higher level of treatment further increases our confidence in our ability to always meet our discharge permit that we've applied for, which is by far the industry best. I've seen absolutely nothing that comes close to the discharge concentrations that we have put forth in this permit. This absolutely moves the bar probably 10, 20 years beyond the current standards and that's not a bad thing for the

state or for this region to set such a -- to impose upon ourselves as a high level of treatment and treatment standards.

MS. RACINE: No, I understand. I think my question was much more basic. Would that figure that you stated at the beginning of our discussion change based on the now change of a substantially smaller filter?

EDWARD COTTER: You said basic so I'll take the microphone back. No, it would only provide improvements, but I think we -- as David mentioned, we are even more confident than ever that our numbers reported will be met at all times. And I'll also just remind everybody that the -- I should have mentioned this earlier, but the TSS that we are proposing to discharge is lower than the background of the bay so we're talking about quite clean water.

MS. RACINE: So besides the perhaps the suspended solids changing on the basis of this filter, what design features had to be addressed if you're going to use the smaller filter? I guess, you know, in my basic understanding I'm just imagining -- we're talking about a lot of water that needs to flow through and we're talking about a much smaller filter, so tell me about what adjustments you would

have to make. How are you going to get all that water through?

SIMON DUNN: By having more of those filter cassettes.

MS. RACINE: More of them. Okay. That's the plan. And so has there been any sort of formal, I guess, update of the design on this basis or? Or any assessment of, for example, would the temperature of the effluent increase --

SIMON DUNN: No. No.

MS. RACINE: -- on the basis of using different pumps with this size filter?

SIMON DUNN: No, it won't. The -- at that flux I believe we're at 60 cassettes. That may change a little bit depending on what we finally -- and what we end up at.

MS. RACINE: So that change will have no effect on the rate or the design? There is -- you're testifying there is no -- you don't anticipate any changes?

SIMON DUNN: Not of any significance at least for the purposes of this hearing.

MS. RACINE: I want to ask about antibiotics and the effluence. I think this is also to Mr. Dunn and Mr. Noyes. You represented that Nordic has no

intention of using antibiotics; is that correct?

DAVID NOYES: So what I stated and testified to is that we have not needed to use antibiotics and that we have a series of best management practices, standard operating procedures, a whole litany of technology and methods that prevent the need of using antibiotics. Antibiotics are a treatment method for a disease. When you have an outbreak you would potentially, might, under a situation which would be evaluated by an accredited veterinarian might need to apply antibiotics for the welfare of the fish. Should that situation arise, you would bring it to the attention of an accredited veterinarian and they would evaluate a treatment methodology. Antibiotics are only one of many treatments for treating a fish welfare situation such as that.

MS. RACINE: Well, thank you for that. And I'm not the only one who reacted to that statement. I don't know if you've had a chance to review the memo provided by DMR dated February 5, 2020?

DAVID NOYES: The -- yes. Absolutely.

MS. RACINE: Okay. And in this memo, DMR, I believe, in part responding to your statement about using antibiotic states that it would be unethical to allow fish to succumb to disease by withholding

treatment; is that correct?

DAVID NOYES: That's correct. And a key part of that is allowing fish to succumb due to disease. The reason we have not had to use antibiotics is because we've never had any disease issues in any of our three commercial facilities.

MS. RACINE: In fact, DMR had warned that it would be unwise for Nordic not to include the option of using antibiotics as a contingency.

DAVID NOYES: It would take me a minute to go back to the chemical listings, but I believe that we listed several potential therapeutic options within the permit and, yes, it is a potential option and we're not limiting ourselves for the sake of fish welfare. As, again, I'd like to bring forth that it's -- it really comes down to what you see and what the appropriate treatment method is based off of observations and suggestions of an accredited veterinarian. That's not something that Nordic Aquafarms as if, I, myself were working on a tank and observed a situation that I was concerned with I would bring it to the attention of my supervisor and then we would bring in an accredited fish veterinarian such as Peter Merrill and the Kennebec River Biosciences to evaluate the situation and what

would be the most appropriate method to do that. Antibiotics are one of many methods.

MS. RACINE: No, I understand that. I understand that while you made the statement that there is no intention to use antibiotics, in the MEPDES permit there are those therapeutics are listed. So that you are asking to be permitted for it even though you claim no intention to use them. I do understand that. Is that correct?

EDWARD COTTER: It is correct. And I think the way that this was stated previously was that should we have a disease situation in the unlikely -- in that unlikeliness and we brought in our veterinarian, if the option were to use antibiotics to control the situation and we had not asked for that we would be in a case, and I think this is DMR's point, is that we would be in a case where we would not be allowed to treat the fish and we would be considered in an inhumane situation, so we would be irresponsible not to make sure that that option was available.

MS. RACINE: So you want that option available, but we're not being told really any intention about exactly which ones or the amount, but once you have this permit with a prescription you'd

be free to use these with no limit in the amounts or types?

EDWARD COTTER: No, we'd be -- we would be very strictly controlled by our -- the advice of the certified veterinarian.

MS. RACINE: By the veterinarian but not by the constraints of the permit?

DAVID NOYES: That's a very inaccurate construing of the reading and so what we provided was a list of potential therapeutics that we might have to use. Now, this is something that you would first bring to the attention of the veterinarian who would make a prescription basically for the use of that drug and it would be properly recorded and brought to the attention of the regulatory authorities and it would be administered in a very regimented and regulated manner because it's not by any means a free reign to use whatever you like simply because you wrote it down.

MS. RACINE: So each antibiotic is going to have a half life, is that correct, for -- which is how long it takes half the antibiotic to break down to an inactive state; is that correct?

PETER MERRILL: Yes.

MS. RACINE: And some antibiotics will be in

the wastewater discharge because they won't yet be in an active state? Well some of that will be the discharge will not yet be in the inactive state. It's possible; is that correct?

PETER MERRILL: Yes, it's possible.

MS. RACINE: And microparasites will then be exposed to these antimicrobial compounds and this could possibly result in antimicrobial compounds and this could possibly result in antimicrobial resistance that could jump to other animals; is that right?

DR. IAN BRICKNELL: No.

PETER MERRILL: I wouldn't characterize it that way at all. Dr. Bricknell can probably expand on the biochemistry involved, but we're talking about dilutional factors that apply and that's insignificant in terms of exposure of other biota that might come into contact with that discharge water that's effectively -- you can't prove the negative for that, but scientifically speaking it's of extremely low risk.

MS. RACINE: But possible?

PETER MERRILL: I wouldn't even speculate as to the possibility. I don't think that that's ever been demonstrated for a farm of this type before.

MS. RACINE: So it's your testimony there would be no effect in the antibiotics which were not yet inactive -- in an active state being in the discharge water?

PETER MERRILL: Well, the specifics always matter, the details and the science. There are very, very few approved antibiotics that can be used. The dosage for those is extremely limited. The approval that the Food and Drug Administration has given to authorize the use of those drugs has all been based on a lot of background science involving the effects on the fish that receive the antibiotic as well as the environment that receives the water that the fish were in. So I'm not second guessing that information. I don't think it's prudent for anybody to second guess that information. There has been an awful lot of research done. In addition, despite the half life number, there are all kinds of other mitigations that could apply before that water is discharged into the bay. If you treat it, the salt water, it actually chelates, sort of binds up the antibiotics of at least some of the antibiotics that are eligible to be used. So in the end, the amount of an active antibiotic that would reach open water is vanishingly small and intensely small.

MS. RACINE: But multiplied by the discharge every single day every day of the year.

DR. IAN BRICKNELL: Well, don't forget that discharge is also going to be exposed to ozone and ultraviolet filtration and ozone is very reactive not just with bacteria but these organic compounds, I don't mean to get into organic chemistry, but the organic compounds that form antibiotics will be oxidized by it and broken down to inactive forms by that and that's also true of ultraviolet radiation. Many of these antibiotics are photosensitive. One of the best examples is Terramycin, which you may have had as a child, and it always came in the brown bottle. It was a liquid because sunlight degraded it to an inactive form. So we have to consider as Dr. Merrill was saying these kind of other factors that's going to be going on at the molecular level that we're not even considering with the antibiotic discharge, just in the organisms themselves.

DAVID NOYES: I'd like to add also that there are several other far more benign treatments which are highly affected which this facility has the ability to employ and so there are both fresh water and marine stages life cycle of Atlantic salmon. And so when you have a fresh water stage actually a very

active treatment for many fresh water issues is the addition of salt. And so you raise the salinity to those tanks to 9 to 10 PPT for roughly an hour and that treats a large amount of fresh water funguses and fresh water bacteria. The same thing applies on the marine side in terms of reducing the salinity and also a very effective manner for dealing with virtually anything that's an aquatic in terms of pathogens is desiccation, so simply drawing it out. And so if you have an issue arise in one of these very segregated modules or individual tanks what you can do is remove the livestock or treat them in place, pull them out and then you can drain the system and simply dry the tank and that would kill absolutely everything without the need to apply any chemicals. That's a -- and that's a very common method that's used ubiquitously.

MS. RACINE: Following-up on another method you mentioned, somebody I believe testified that fish vaccines were, quote, very effective. Isn't that figure more like 30 to 40 percent effective?

DR. IAN BRICKNELL: I don't know where you got that figure from. There are some vaccines out there that aren't very successful, but the ones I quoted are successful. There is many, many published

studies showing 97 percent to 100 percent efficacy with this particular vaccine.

MS. RACINE: What are those vaccines made of?

DR. IAN BRICKNELL: Bacteria and saline.

MS. RACINE: Will those also have a half life that could -- meant that they would be inactive at the point that they --

DR. IAN BRICKNELL: No, these are dead vaccines. These have been treated.

MS. RACINE: Okay. Will any of that be in the effluent?

DR. IAN BRICKNELL: No, because it's put into the fish and doesn't go out of the fish.

MS. RACINE: I want to talk about the UV filter system before we end. So some viruses are going to be small enough to pass even through that .04 micron filter; is that correct?

DR. IAN BRICKNELL: Well, that isn't the UV system that --

MS. RACINE: No, I know but I'm -- permit me to at least ask that -- the preliminary question then before we get into the UV, but the point being that if things are already filtered out then I guess we're not sort of talking about the UV, in other words. So

just permit me that we're talking about things that are not maybe filtered out, so, for example, viruses may be small enough to pass through your .04 micron filter?

DR. IAN BRICKNELL: That would be correct. Most viruses are much smaller than .4 microns.

MS. RACINE: And would you agree that 100 percent reduction in contagions is never seen in an operating RAS system?

DR. IAN BRICKNELL: Well, I think that's true of anything. I mean, disinfection only reduces the total number of bacteria by 99.99 percent and sterilization by 99.999 percent, so even if you buy something that is classed as sterile there is a .001 percent chance it actually has a bacteria on it. So, yes, in that scenario there is no way to totally eliminate those risks, but by using those risk reduction methods you can put a handle on reducing the number of bacteria from 100 percent to .01 percent to achieve disinfection and from .001 percent to achieve sterilization. So, yes, there is a small risk, but it is a very tiny one.

MS. RACINE: And if --

DAVID NOYES: If I might add to that just a little bit.

MS. RACINE: No, I have a follow-up.
DAVID NOYES: Yes, because it's directly related to the pathogenicity --
MS. RACINE: Well, after --
DAVID NOYES: And so --
MS. TOURANGEAU: You need to let him answer the question.
MS. RACINE: I didn't ask him a follow-up question, but if it's directly related, go ahead.
DAVID NOYES: No, that's fine. Go ahead.
MS. RACINE: Okay. Sorry, I was just asking Dr. Bricknell and I wanted to follow-up on that. So 99.9 percent is what's known as a 3 log reduction; is that correct?
DR. IAN BRICKNELL: 2 log.
MS. RACINE: That's a 2 log. Okay. Which means .1 percent of the very small particles that are not already filtered out which can still pass through that 0.04 micron filter with what I understood to be a 3 log reduction, but 2 log reduction will not also be eliminated by the ultraviolet disinfection?
DR. IAN BRICKNELL: So I don't understand that question. The ultraviolet light itself will drop it down as a sterilization 3 log orders.
MS. RACINE: Okay.

DR. IAN BRICKNELL: The filtration won't drop it down.

MS. RACINE: In other words, there is no such thing as complete sterilization, so we have the filter, I understand that, there are things that you've admitted that will make it through the filter such as viruses and then we're talking about a -- what I understood to be a 3 log reduction so that in other words we -- I am confused -- I just was making the point that we cannot assume 100 percent.

DAVID NOYES: Could you provide some specific pathogens that you're talking about because we're talking about a massive range and I have in front of me -- if I had a horrible dark sense of humor I would share with you this massive chart of UV doses and a 1 through 7 log reduction for each one and I will say rather than read all 257 sources and categories for spores, bacteria and viruses --

MS. RACINE: Let's go with IPNV --

DAVID NOYES: -- that we are -- that we are far below those requirements that the 300 millijoules per square centimeter dosage.

DR. IAN BRICKNELL: I don't recall any comments on IPNV in the testimony I read. I recall comments on the infectious salmon anaemia virus and

Aeromonas salmonicida, but not IPNV.

MS. RACINE: Okay. Well, if you know and can speak to it, I mean, it's just -- I was just asked to provide an example and as I've heard there are many, many others we could choose from, so.

DR. IAN BRICKNELL: Well, if you do an actual colony sterilization, those sterilization standards are internationally set, so when a surgeon opens a package of sterile forceps or scalpel blades to work on a patient they have the same risk as sterile water. It has that same standard of log alter reduction.

DAVID NOYES: An important aspect of this is we're talking about something leaving the facility, so there are many fire walls in front of this. So first you have the intake and so in the intake water treatment plant we have both ozone and UV and so you have a 6 to 8 minute contact time for ozone followed by a 250 millijoule per centimeter dose of UV just at the intake treatment plants and then the water is recirculated and, yes, I'm going to just use a generic figure to avoid math of 99 approximately times within the recirculating aquaculture system itself where then we also introduce ozone and then follow that immediately by UV and then the water that

leaves that system then travels down to the wastewater treatment plant where it then undergoes further treatments to include the MBRs and then UV disinfection at a 3 millijoule per square centimeter dose, which --

MR. DUCHESNE: Mr. Noyes, you're putting our court reporter -- our reporter to the test.

(Laughter.)

DAVID NOYES: I'm sorry, Robin. I'll bring you a small bowl of ice for your fingers later. And so we're talking about many, many, many disinfections and the important part is the scenario assumes the establishment of IPNV in the facility which would not be tolerated.

MS. RACINE: No, I understand that. I understand that you have several different mechanisms that you're proposing including the ozone, including the filter and including a UV system, but my point being that once very small viruses get to -- that have not already been caught by the filter or eliminated by the ozone get to the UV system and we're talking about a 99.9 percent reduction we're still talking about some of that not being eliminated.

EDWARD COTTER: I think that the way I would

look at it is every single one of those series of data that you talked about has at worst a 99.9 percent efficacy, and please correct me if I misstate anything, but -- so if you look at every one of those series you're -- every opportunity that you go through that you are eliminating 99.9 percent of any potential virus that might be in the system. So I think it's safe to say --

MS. RACINE: Well, I don't think the filter can do that if the filter is --

EDWARD COTTER: No, I'm saying the series of systems.

MS. RACINE: Okay.

EDWARD COTTER: So if you go through that series of filter, ozone and UV you've eliminated at worst 99.9 percent and you go through that series over and over and over again before that water is ever discharged back into the bay, I think it is safe to say that any risk of disease coming from that water is small. I am not a scientist, I will state that, but I will leave it to the crew here to tell me if I've stated anything incorrectly.

PETER MERRILL: Just for frame of reference, I think it's important to keep in mind from the common sense perspective there are papers in the

scientific literature that indicate that every ML of natural seawater there are 10 to 7 viral particles. That's 10 million.

MS. RACINE: I under -- but --

PETER MERRILL: 10 million viral particles per ML of seawater naturally.

MS. RACINE: But as I understand it we're -- we're taking some of those either in the seawater or I guess the surface water and in these tanks I imagine there is some sort of reaction happening that's not happening out in the water you're describing so there has to be some -- are you saying there is no amplification?

PETER MERRILL: Not necessarily at all. As I said before you have to have -- you have to have pathogens, you have to have animals that are susceptible to those pathogens, you have to have exposure, you have to have infection, disease and so on in order for that biomagnification to actually occur. The great vast majority of viral particles in natural water luckily for us or we'd be all dead are not of consequence to us nor would they be to fish.

DAVID NOYES: And I would I like to add David Russell's -- I think it's David Russell's comments from the DMR to the Board here and so its

operations and productions teams and contingency plans to address problems quickly before they can compound into bigger problems and you're talking amplification in this -- this directly relates to that. They have their own brood or own source --

MS. RACINE: Could you direct me to where in the memo you're reading from?

DAVID NOYES: This memo was sent to DEP on --

MS. RACINE: February 5, 2020?

DAVID NOYES: Yes. Correct. So that's Page 8, I believe.

MS. RACINE: Oh, someone did number.

DAVID NOYES: I'll wait for you.

MR. DUCHESNE: We're just doing some time management, Dave.

DAVID NOYES: Sure. Rather than --

MR. DUCHESNE: The Board is requesting that we take a five minute break.

MS. RACINE: Sure.

MR. DUCHESNE: Thank you.

MS. TOURANGEAU: Before any parties leave but while the board is taking a break, would it be a good time for me to make a motion on time?

MR. DUCHESNE: I beg your pardon?

MS. TOURANGEAU: Before any parties leave, but I don't know that this is something for the whole Board, would it be a good time for me to make a motion on extension of time for submission of responses to Dr. Hopeck's memorandum or should I wait and do that later?

MR. DUCHESNE: We don't need the Board here for that. You can make the motion to the Presiding Officer, I believe.

MS. BENSINGER: Yup, you can rule on that.

MR. DUCHESNE: So go ahead.

MS. TOURANGEAU: Okay. So Nordic is preparing responses to Dr. Hopeck's memorandum that was dated, I believe, January 27 but that we got maybe February 3, 4, 5, something like that, and we are hoping to have that to the Board and the parties of course by Tuesday of next week. Is that acceptable? Can we keep the record open to allow submission of those responses?

MS. BENSINGER: Procedural Order Number 9, Section 3, Paragraph 3, I might have that wrong.

MS. TOURANGEAU: I'm impressed already.

MR. DUCHESNE: That sounded convincing.

MS. BENSINGER: I had it written down here. Anyway, Procedural Order Number 9, Section 3,

Paragraph 3 said the parties may request additional time to submit written comments to the John Hopeck memo dated January 27 and to the -- and/or to the January 30 DMR memo. So you just want time to respond to Mr. Hopeck's memo?

MS. TOURANGEAU: Correct.

MS. BENSINGER: And you want until what date?

MS. TOURANGEAU: Tuesday of next week, which would be the 18th.

MS. BENSINGER: 18th.

MS. TOURANGEAU: Is that right? I might be doing my days wrong.

MS. RACINE: Yeah, that's right. And if I can follow-up on --

MR. DUCHESNE: One motion at a time.

MS. RACINE: Okay. Sure.

MS. BENSINGER: If the applicant is -- if you -- we were envisioning the applicant would ask for more time --

MS. TOURANGEAU: Nope.

MS. BENSINGER: -- but that's fine, so the rules provide that the other parties must have an opportunity to review and comment on the applicant's response to such memo. How much time would the other

parties like to review and comment if -- if the Board were to allow until February 18, how much time would the other parties request?

MS. RACINE: Is a week reasonable?

MR. DUCHESNE: Seems like it, yes.

MS. BENSINGER: Yeah.

MS. RACINE: Okay. A week from that Tuesday then, please.

MS. BENSINGER: And other parties?

MS. TUCKER: That would be fine, a week.

MS. BENSINGER: Any other intervenor want to weigh in on that?

MS. DANIELS: Sounds fine.

MS. BENSINGER: Okay. So one week from the 18th is the...

MS. RACINE: 25th.

MS. BENSINGER: 25th.

MS. RACINE: No more math.

(Laughter.)

MS. BENSINGER: No math at all.

MS. BERTOCCI: That would be both for John Hopeck as well as Mr. Martin's?

MS. BENSINGER: Well, they only asked for the opportunity comment on Mr. Hopeck's. Would the other parties want to ask for time to comment on the

DMR memo?

MS. RACINE: Yes, I'm glad you brought that up. Yeah, it was my understanding that we could request additional time.

MS. BENSINGER: Yes.

MS. RACINE: At the hearing Dr. Bill Bryden if I could request an additional 15 minutes for him to specifically address the memo during his panel time.

MS. BENSINGER: Okay.

MS. RACINE: That's it.

MS. BENSINGER: That's reasonable.

MR. DUCHESNE: Yes.

MS. BENSINGER: And you don't want time to address it in writing after the hearing?

MS. RACINE: Oh, I see, because I'd be only addressing a response. Yes, we would similarly ask for -- I guess to make things easiest... I mean, I --

MS. BENSINGER: You can think about that and get back to us.

MS. RACINE: Is that okay? All right. Thanks.

MS. TUCKER: Yes.

MS. TUCKER: I have a -- I don't have a microphone over there, so I had to come up here. In

terms of the DMR memo, I filed an objection to the DMR memos because they violate 480D Subsection 9 that they have not gone through that process yet, so how will that be resolved, that objection over the fact that DMR has not complied with the statute and then they're submitting things that are being reviewed by the Board that haven't complied with the statute?

MS. BENSINGER: The Department has accepted DMR's memo, otherwise we wouldn't be talking about it and allowing people to respond to it today. So if you want to -- your objection is noted and if you want to request time to respond to it please do so before the end of the hearing.

MS. TUCKER: Yeah, I do request time to respond to it, but I would request until next Friday to respond to it.

MS. BENSINGER: Okay. Next Friday... And, Ms. Racine, you're going to get back to us, so we'll take that under advisement.

MS. RACINE: No, I -- we'll do one week as well.

MS. BENSINGER: So next Friday.

MS. RACINE: Yes.

MS. BENSINGER: Other intervenors who would like to say anything or request anything different?

So all intervenors would have until Friday the 21st to -- and we'll issue an email with this. It may not be a procedural order just because of time. We'll have until the 21st to respond to the DMR memo. And the John Hopeck memo, the applicant has requested until the 18th and the other parties will have until the 25th. Is that acceptable or do you still want to get back to us?

MS. TOURANGEAU: Um --

MS. BENSINGER: Wait a minute.

MS. RACINE: No, go ahead.

MS. TOURANGEAU: So is there then going to be a time for response...

MS. BENSINGER: No. So --

MS. TOURANGEAU: Okay. Gotcha.

MS. BENSINGER: -- do you want to also respond to the DMR memo?

MS. TOURANGEAU: The same kind of time line would apply for anyone, right?

MS. BENSINGER: Sure. You can -- well, no, the problem is that if the applicant -- if the applicant doesn't respond our rules require that the parties have -- the other parties have time to review --

MS. TOURANGEAU: Gotcha. I'm with you.

MS. BENSINGER: -- and respond to that. So if you'd like to do a response to the DMR --

MS. TOURANGEAU: No.

MS. BENSINGER: Okay. So the one thing still in question in my mind is do you want to get back to us on the date?

MS. RACINE: For the DMR or?

MS. BENSINGER: Yes.

MS. RACINE: Okay.

MS. BENSINGER: That's fine if you do. You can wait until the end of the hearing and --

MS. RACINE: Yes, let me get back to you on that.

MS. BENSINGER: Okay. We'll leave it at that.

MS. RACINE: Okay.

MS. BENSINGER: Thank you.

MR. DUCHESNE: So whatever motion that was and it evolved into is granted.

(Break.)

MR. DUCHESNE: Did you wish to say something on mic?

MS. TUCKER: I do.

MR. DUCHESNE: Okay. Yes.

MS. TUCKER: I'd like to make one other

motion and that's that the next panel be shifted to the first thing tomorrow.

MR. DUCHESNE: Yes. Another excellent motion. Okay. We are reassembled and ready to start and you may proceed.

MS. RACINE: Okay. Thank you. So partially open RAS which is what Nordic is proposing to allow for the discharge of millions of gallons of effluent a day into the bay; is that correct?

EDWARD COTTER: I'm sorry, did you say open?

MS. RACINE: Yes, partially open.

EDWARD COTTER: So you're saying that the situation where we -- I -- could you rephrase the question?

MS. RACINE: Yeah, of course. Well, partially open RAS such as what Nordic is proposing allows discharge of millions of gallons of effluent a day into the bay; is that correct?

EDWARD COTTER: I think that what -- I don't think that there is any statute or regulation for RAS facilities. There is a Maine discharge permit regulation which we feel that this system falls under.

MS. RACINE: And what we've talked about are our concerns about nutrients, pathogens, viruses and

pharmaceuticals being released through that partially open system. There are fully espoused RAS systems in various stages of development. There are those new technologies that exist and are being designed in the U.S. Canada that are zero discharge, is that something -- a closed system with zero effluent discharge that Nordic's has ever considered?

SIMON DUNN: Yeah, of course we have. In my past, we both designed and built some zero discharge systems.

MS. RACINE: So you would agree that such a system would be possible?

SIMON DUNN: In theory. In theory. They do work. They have not yet been proven for a sufficiently long time. This is risk and it's also a balancing of the pros and cons involved and there are many. We've done them in the past that was in the Netherlands that had quite some different challenges being groundwater at about a shovel underneath the soil and many other constraints there and that was for a warm water species which lends itself better for doing that because you get into the whole temperature balance of things. You can do a zero discharge for a number of species, but for salmon in particular and a project of this scale not allowing

yourself to have that flexibility would be too high of a risk.

MS. RACINE: So the scale of the project does influence the decision not to use a closed or a zero effluent discharge model?

SIMON DUNN: The scale, the species, the overall project viability also in terms of economy, in terms of energy. If you close it down completely then you have to accept some other challenges that are also of consideration such as energy usage, a multitude of things.

MS. RACINE: Thank you.

MR. DUCHESNE: Great. We will get to questions from the Department and Board, but first I'd like to thank everybody for the last almost hour primarily because I think the road that Ms. Racine was going down was voiced a lot by citizens at our hearing on Tuesday night. It was a real concern, so it was good to march us through that even though it could have been slightly painful. I have a lot of friends who are chemistry majors and after taking organic chemistry became art history majors, so I can understand how this might have been an interesting challenge for everybody. I am looking around to see who wants to pop the first question. Staff first, by

all means. Mr. Martin.

MR. MARTIN: I will go first. I proceed with caution going toe to toe as a lawyer against engineers and scientists here, but a couple of subjects peaked my interest.

EDWARD COTTER: We feel the same.

MR. MARTIN: A couple of subjects peaked my interest and I thought I'd ask one or two questions. So you mentioned the these kind of finer, for lack of a better word, filters that they go through, these cassettes I believe you called them. Obviously, we're going to be analyzing the application based upon the criteria the pollutants that you've proposed. Is it -- it sounds to me that your position is that those will be the limits and obviously with the TSS, for example, will be significantly better as actually going through the system, am I understanding that correctly?

SIMON DUNN: We have gone through I want to say at least 100 if not 200 different iterations. We have a unique benefit compared to a normal RAS technology supplier customer relationship in that we have a very, very close dialogue with production team, construction team and process design. So we have been looking at an insane number of different

scenarios taking into account what if the peak diversion rate looks different than we are anticipating, what if growth rates change, what if, what if, what if. So what it all boils down to is that we don't really know how will the discharge possibly -- how would that be measured? Is it a grab sample, is it -- whatever can happen. So everything that's in here is based on the production team's absolute best day ever in life because each and every system is at the same time operating at its absolutely max capacity. So it's a worst, worst and probably a little bit on the unlikely side to really happen, but we have to take that into consideration when we're sitting down and doing design, what is the absolute worst nightmare that we can imagine for the final effort and those are the accomplishments that are submitted. So in reality to answer your question we expect to be below most of the time, but if it's a grab sample, something in the pipe somewhere, where is the sample point going to be, is there a little bit of mussel growing somewhere in the pipe far down along the line and that gets knocked off and oops it appears in the sample. There are several reasons for not feeling very comfortable about going too low at least for our permitting purpose.

MR. MARTIN: Sure. I'm not sure if it's accurate to characterize it this way, but it sounds like you are making efforts to continuously add new technologies that improve, is that...

SIMON DUNN: That's very correct. That's very correct.

MR. MARTIN: Are there -- and certain ones have already seemed to be implicated -- implemented through the application, for example, is micron filters. Are there similar types of technologies that you're pursuing that might be more helpful for other pollutants that are posed for this, for example, nitrogen?

SIMON DUNN: Nitrogen -- the reduction of nitrogen -- keep in mind this is already nitrates and not the ammonia that would otherwise normally be discharged from the municipal wastewater treatment plant, so it's not directly oxygen consuming. There are -- you could add more basically capacity to reduce that nitrate nitrogen further.

MR. MARTIN: Okay. Thank you. That's all I have.

MR. DUCHESNE: Mr. Wood.

MR. WOOD: That's my question too. If I remember in your application the 23 milligrams per

liter for total nitrogen being discharged represents a 99 percent removal; is that correct?

SIMON DUNN: 85, I believe.

MR. WOOD: 85. Your column is off a little bit, but 85 percent. What would it -- what would it take either internally or black box on the end, if you will, to reduce that number say to 90, 95 percent?

SIMON DUNN: Given the space constraints inside for the grass there really isn't room to incorporate more up there, so any additional treatment needs to be in the wastewater treatment plant. I have a good confidence that I think that we'll actually end up bringing that down further, but this is subject to -- we need to be very certain with this ongoing dialogue to make sure that we can actually do that within that building footprint because obviously we can't expand on that.

EDWARD COTTER: What I'd like to add is that the numbers that we've represented in our application are numbers that we are -- we hold in a high, high confidence. We are also, as Simon alluded to, working on additional systems that we feel confident internally will improve our numbers but not to the point where we're confident putting in writing on

something that we're going to get held to. But that said, I will offer to buy anybody a cup of coffee it we can't do better than that.

MR. WOOD: Okay.

EDWARD COTTER: Buy you, not you state officials and Board members.

(Laughter.)

MR. WOOD: Thank you.

MR. DUCHESNE: Other questions from the Board? Yes, I'll go with Mr. Sanford first.

MR. SANFORD: Is the -- is the water leaving the facility discharged into the bay area, is it cleaner than the seawater that's entering the facility?

EDWARD COTTER: Yeah, I'll start just because I did -- I did make a statement along those lines. When we did our initial analysis and reviewed the numbers so that we could start putting an application package together and understand our systems in the context of the bay, what we noted is that samples that we took of TS -- of water quality samples in the bay in the area of our discharge point several of the samples of TSS came out to be higher than what we are proposing as our discharge number. So from that, yes, I'm -- I can say that in that

context this water will be cleaner and it will be clearer than the samples that we took at that time. Now that said, I can't tell you that if I went and took a sample right now that the TSS might be much lower, it might be much higher, but, yes, we did take samples of TSS that were higher in the existing conditions than where we are. And when I say TSS that's the measurement that if you have a glass of water that you're looking at TSS is what you're looking at. So that's -- that's the context of that. Regarding BOD total nitrogen and phosphorous, I think our comparisons to those background levels are in the application, our levels are slightly higher, but they do, as you know, we have stated that they do go back to background levels very quickly and we'll talk about that tomorrow.

MR. SANFORD: Yup. The -- with maintaining the .04 micron screens, are there extensive processes to deal with that kind of clogging that sort of like comes to mind when you start using something that tiny?

DAVID NOYES: So I'll attempt to start and Simon will attempt to follow-up here. So there are a couple of methods. So the MBRs are actually string tubes strung between some frames and so part

of this -- the continuous cleaning prospect is from all of those air bubbles that are pushed over them so it not only does air scouring but also allows those bands to interact with each other and kind of scrape each other clean. There is also another method and so basically you stop pumping water pulling the water into that and you basically reverse flow and so then you basically push off any particles that have stuck to the surface and then a more -- or a heavier method would be to actually use a cleaning agent to then clean though pore surfaces back up and so that's a continuous process and that's an advantage to advantage multiple cassettes and dual trains so that you can continuously maintain and optimize that equipment so it's always working effectively. So there is a couple of unique design features to that MBR that help keep it quite clean and working effectively. And Simon might have some more to add to that.

SIMON DUNN, yeah there is also an automation in there because there is obviously going to be an operating pressure in driving water through such tiny, tiny holes and so that pump operate under a pressure and when that pressure starts to rise too much it will shoot back.

MR. SANFORD: Okay. If you were to use a 30 micron filter, would the under environmental impacts be significant and do you think this facility would be permittable with those impacts?

SIMON DUNN: If we were to replace the membranes with the 30 micron filter?

MR. SANFORD: Yeah, let's say you decided not to go to this -- to the ultra and were just going to use what you've said is the -- is typical use in there.

SIMON DUNN: Kind of an industry standard?

MR. SANFORD: Right. I'm trying to get a range of -- a sense of comparison.

SIMON DUNN: So essentially that would mean really quitting most of the wastewater treatment plan except for that physical and UV dose, so the concentrations in the water, I can't really make that up in my mind what that would mean to the solids, but it would basically have the same concentration as inside the fish tank. So your total nitrogen, I can't do this math in my head right now, I'm getting tired, but --

EDWARD COTTER: I think the answer is yes.

SIMON DUNN: You will feel an impact total nitrogen as nitrate, nitrogen would be at a max of 70

milligrams per liter. So, yeah.

MR. SANFORD: Okay. And so because when you jump from an order of magnitude from .4 to .04 there is a point at which there is some interplay between trying to use best technology and making the impact acceptable, so I am sense -- I am trying to get some sense of how that trade-off is being made. Like you -- it's your desire to have a facility that people come around to go see because of this, right?

SIMON DUNN: Yeah, naturally. The -- there are obviously two aspects of it. .45 or .04 really stops being very meaningful in terms of escapees because we're already so far down. From our point of view we are focusing on the total phosphorous removal at that final step to make sure that we can get that out at the end, so that's one of the reasons or one of the primary reasons really for making that even finer.

MR. SANFORD: It's bacteria and the clumping that occurs?

SIMON DUNN: Yeah, I mean, at .45 we would still be taking out bacteria.

MR. SANFORD: Yeah.

SIMON DUNN: That's a side benefit really because the UV right afterwards, the UVT or the --

the clarity of the water for the UV to function at that given dose to kill something will regardless of whether it's a .45 or a .045 it will still be more than sufficient to ensure that kill dose. It's an added effect. It's really the phosphorous I'm looking at there.

MR. SANFORD: Okay. And in addition to the kind of sampling or modeling you'd be doing to -- with the permits, are you also looking at the research aspects of this from a -- from a science and technology perspective?

DAVID NOYES: I apologize, Mr. Sanford, can you clarify as to what research aspects you're talking about? And I only say this because I have worked with and talked with a lot researchers around a lot of different aspects about this and so if you were talking about MBRs I believe I that wrote a letter of support, I forget the researchers name, to discuss the effectiveness of MBRs, we've talked about phosphorous, fish vaccines, general research, so, yes, we are talking about researcher's in a wide application surrounding vasts of wastewater treatment.

MR. SANFORD: Okay. So it's not just compliance, it's also an interest in how this works

from expanding environmental knowledge, let's say, or toxicology?

DAVID NOYES: Yes. So exactly proving that these systems are effective. They've been applied in many industrial and municipal settings and that we feel is completely appropriate to apply these to an aquaculture setting because it gives you such a fantastic treatment and so it removes some of the pollutants that aren't necessarily permittable here today, but we recognize is potential concerns later on and so we're trying to get far ahead of the permitting process by spending an immense amount of effort worrying ourselves about phosphorous and nitrogen and other aspects and trying to be many steps ahead of the regulatory process. We don't want to be barely compliant, we want to be so far ahead of that that we're really a model citizen and so we absolutely invite that partnership with researchers to try and make this not just a best fit for us but also best fit for the entire industry as an example of how the industry can do better. That's where we want to be. We want to be an industry leader in this area.

MR. SANFORD: If -- so if new types of filters come along or different techniques are you

looking at experimenting with those?

EDWARD COTTER: At that point, I think it comes down to a situation of operations and making sure that our operations are not at risk. We'll always look for opportunities to improve. I think we'll be -- we've already started partnership opportunities with staff and faculty at UMaine and University of New England. But I think once we're a permitted operating facility, I think it -- I'm being a little careful answering that because we do need to maintain that we are always functioning as permitted. So I don't like -- you used the word experimental, which makes me nervous as a future operator of the facility. But, yes, I think the research partnership opportunities are absolutely there and we look forward to that -- those opportunities. If that -- does that make sense?

MR. SANFORD: Yeah.

DAVID NOYES: If I could clarify. So we're not going to be performing experiments on our commercial facility and our treatment methods and so I refer to research partnership so long as it be bringing researchers in to demonstrate the effectiveness of our treatment technology, so actually documenting some of these key processes. In

terms of research, so there are many off-sites recirculating research facilities such as the Center for Cooperative Aquaculture Research, which is a fantastic place to build a pilot system. I built many there for collaborative work with the USDA's cold water facility, which I also worked with right next to that and we've been in active discussions with them and the University's own on-campus facilities to evaluate these in a pilot and a research setting. What I'm talking about is collaborating in providing our knowledge and our expertise and our ability and our own personal knowledge of how we can continue to adapt and evolve in this technology. Recirculating aquaculture is a rapidly evolving and progressing field and we're one of the leaders in that aspect.

MR. SANFORD: Okay. And this might pertain to Mr. Dunn, but do you use an ISO 9,000 or the 14,000 aspect of say industrial ecology or cradle to grave application in this -- in aquaculture, is that something that is it done?

SIMON DUNN: There are -- that's tricky. Yes. In principle, yes. I am on the process side --

MR. SANFORD: Mmm Hmm.

SIMON DUNN: -- so there are requirements

for whatever equipment that we are bringing in that it is certified. Not all of them have ISO certificates because it becomes very prohibitive for business, but obviously standard procedures are in place and others are a normal thing as well.

MR. SANFORD: Okay. Thank you.

SIMON DUNN: What they end up really doing when the plant is fully built in terms of ISO that's a little beyond me.

MR. DUCHESNE: Mr. Parker.

MR. PARKER: Thank you. The discussion has been interesting, but I'm going to hopefully and probably in the next session I'll get answers to what I want, if not, the staff can help me get answers to what I want. What I'd like to know first of all -- well, I did get one thing today, I got your mass balance of your water flow. That finally came out so we know what we're talking about because it was always sort of a vague number, so I got a feel for that. I don't have any kind of a mass balance of how your treatment system is going to work, but tomorrow we're going to get or the next session or whatever it is we're going to get more information on that. But what I'll be looking at and you gave us some projected numbers on total solids, BOD, nitrates and

phosphates and stuff coming out of the plant. Is this going to be licensed specifically around the filters or is it going to be licensed more like a typical plant with limits on discharge by quality and pounds per day. That's something I want to get information from because it will make a difference how your license is addressed. And it also will lead me to ask more questions on internally how does your treatment plant work. Will it knock down your BOD and get stuff knocked down to the point where these microfilters can handle it? One more concern I have, and it's something you don't have to address tonight, you can address it tomorrow or whenever, but I've spent a lot of time working with groundwater in this state and I expect Belfast groundwater where you are like most of the groundwater in Maine is high in iron, manganese and things of that nature. Are those minerals going to blind and affect such a fine filter and that's a concern I have.

EDWARD COTTER: So I'll start you basically --

MR. PARKER: I threw a whole bunch at you.

EDWARD COTTER: Well, yeah, you asked three questions that I heard. I might handle the first one and I think Simon has got the next one as far as the

series of how we get down to those fine micron and drum filters. And then David has already written down your third question. As far the as regulatory framework, I think I'm going to be very careful not to step on Mr. Woods' toes here, but it's my expectation based on conversations and what I've seen permitted elsewhere that we would end up -- we are requesting a permit that is limited at the discharge with certain values whether it be milligrams per liter, total kilograms per -- per a time period and so forth and that gives us the flexibility to always make sure that we're operating the best systems we can internally. Obviously, I think everybody here knows that technology changes faster than regulations, so we wouldn't want to get limited internally by our regulations if we had an opportunity for improvements. So that -- I think that answered that question and I'll let you have discussions with Mr. Wood afterwards if that doesn't totally satisfy your question.

MR. DUCHESNE: The question was on groundwater.

MR. PARKER: One of the questions I had was will the background in you're groundwater wells impact your filters? When your filtering that fine

you know you're going to have manganese, you know you're going to have iron and probably some other minerals, those are the two primary ones, and they're pretty prevalent in the groundwater. I expect there is quite a bit in these wells even in the new wells you develop. Will that be something that affects such a fine filter?

DAVID NOYES: So you're correct and we did observe and note that there were elevated levels of iron in the ground water and we actually precipitated that iron out at the intake water treatment plant before it enters the fish processing facility, so that iron is removed long before it ever gets to the wastewater treatment plant, so it won't impact our fish because limiting iron actually is a very effective method for managing bacteria and it also improves the performance of everything in the facility including the MBRs that you're referencing. So, yes, we've identified it and we've also implemented a treatment method to remove that iron right at the intake coming out of the wells.

MR. PARKER: Just a follow-up. Are you going to precipitate that out? How are you going to take it out?

DAVID NOYES: Yes, precipitate it out.

MR. PARKER: Are you looking at manganese too or just iron in these wells?

DAVID NOYES: This is by recollection, but I specifically recall iron being elevated and I don't recall any other elevated levels in reference to manganese, but I know iron absolutely was elevated.

MR. PARKER: I'm sure you're going to have to be careful of what you precipitate it with so you don't affect the fish, but --

DAVID NOYES: Yup. Correct.

MR. PARKER: -- you can deal with that.

DAVID NOYES: Yup.

MR. DUCHESNE: Okay. I think the final two questions -- I'm sorry. Mr. Pelletier, go right ahead.

MR. PELLETIER: Sorry. I know we all want to get out of here, so I will make it quick, but.

MS. BENSINGER: No, ask your questions.

MR. PELLETIER: Thanks to these panelists. You guys provided quite a bit of good information tonight. A couple of questions. Dr. Bricknell, when you first started talking tonight you talked about a couple of different viruses, but then Mr. Noyes later talked about -- and you also talked about the preferred method for treating these things will be

injections of, I don't know, smolt size, I guess, 3 to 4 inches.

DR. IAN BRICKNELL: Yup.

MR. PELLETIER: And then Mr. Noyes mentioned the fact that this is -- sets you up for a good opportunity to do multiple viruses at the time of treatment. I'm assuming that, you know, we're trying to keep a healthy stock of fish, if everything is going well, if there a number of different viruses you're trying to treat for, are there a number of different vaccines?

DR. IAN BRICKNELL: Well, there are many formulations of fish vaccines that tend to be made regionally or Dr. Merrill's company will make them specifically for a problem in a fish farm and you can buy them off the shelf. I think the most complex one contains nine different pathogens in it, both bacterial and viral, and the simplest one contains one. And most vaccines I work with tend -- a lot of these have developed over the years tend to contain in the region of 2 to 4. And so, yeah, and they're delivered a little bit before smolt size to those fish as an injection and they're formulated in such a way that they will give life-long protection to those animals and, you know, they probably -- if they were

given to a mammal it would probably last about 10 years, the same length of time as a tetanus injection or tetanus booster. But most salmon are harvested two to three years old so once they have that single shot it's a lifetime protection against those diseases.

MR. PELLETIER: Thanks. Mr. Noyes, I'm trying to remember if I've seen this or not, but I can't recall. What's the general -- from eggs to harvest what's the rearing period for a fish? How long will a fish be in your facility?

DAVID NOYES: So generally speaking, it could be roughly about two years or so. And so it's, you know, roughly 8 to 10 months in the fresh water hatchery, our smolt building, Building 3 in the center of the campus and then the fish are finished out around 5 kilograms. And so with any population as you might imagine there is a bell curve, some fish grow a little bit faster, some grow a little bit smaller, so you look at that average, but we have the ability to grade our fish and harvest them and select them at a pretty consistent size and so that's why I'm giving a pretty general range.

MR. PELLETIER: Yup. And when you're treating these it's going to be in that Building 3

there where the smolts are I would assume.

DAVID NOYES: Mmm Hmm. Yes.

MR. PELLETIER: The -- you mentioned the fact that sometimes you may find you've got an issue with a particular tank or a compartment area where you may have to dry these tanks out. I'm assuming you're going to try to run all these thanks as much as you can and if you've got a good system, you know, in progress, but what do you do with the fish that if you end up having to dry a tank out and you have to put them somewhere? Are you going to keep reserve tanks open? How does that work?

DAVID NOYES: And so you're -- Cathel Dinneen, our production director, and I don't want to invoke his name too much because I'm hoping he's already gone home for dinner. And so he's developed probably 149 different iterations of bio plans in terms of how do you grow the fish and move them through that production facility. And so there is a bit of range and overlap and what we've done to accommodate the difference in growth in the fish and to allow us to both speed up and slow down the fish depending on what the fish ahead of them are doing you can adjust temperature and so you have the ability to dry tanks out in between cohorts. So

we've provided ourselves the operational room not just for operational flexibility and to deal with situations such as that but also to improve, quite frankly, and so you're never as good as you might be later on at day one and so you'd like to give yourself some wiggle room on those aspects. And so, yes, there is room provided in there to dry out those hatcheries specifically. It's a common practice just once you transfer the fish out of a tanks, for instance, you just let the tanks sit and dry for a while because it's a very effective and simple method and you fill the tank prior to removing the next batch of fish in behind that.

And I am going to apologize if I elaborate too much on a further aspect that was discussed and so the reason I stated earlier that injected vaccines might be preferred, and the reason I say this is because the fish are vaccinated for IP injections around 30 to 50 grams, they're really quite small, but when you do that you handle each individual fish and when you do that you have the opportunity to then grade those fish.

MR. PELLETIER: Yup.

DAVID NOYES: And so you do that because of that population bell curve you can take off your

smallest, weakest fish which is another method for maintaining a healthy population and then you keep your strongest best fish and by doing those two things in a single step process you reduce handling and stress and mechanical damage to the fish and that's why I kind of was hinting at why it might be a preferred method. It's just a reduction of handling and stress for the fish. And as Ian stated earlier it's also a very effective long-term vaccination for the fish. 30 to 40 grams is a very small fish, so it's still very early in their life stage.

MR. PELLETIER: I understand. Just one final question. There was testimony, and I'm assuming this can be handled fairly easily, but they talked about the shapes of the tanks and bacteria buildup, oval versus circular. I'm assuming that could be handled by increasing salinity and there is a number of ways you can handle that. Do you have any comment about that?

DAVID NOYES: Yes. Correct. And so also part of that oval shaped tank is there is a moving partition in it and so for two things, there are some brushes on the side of that, one, prevent fish from sneaking past that small gap that's there. Also as those screens move they clean off that tank structure

and so those screens are moving around that oval tank and what that does is it allows us flexible tank space for rearing of each cohort, but as you move those screens it also cleans those tanks walls. And the buildup of bacteria is generally beneficial bacteria, so it's denitrifying bacteria which is the same bacteria you're growing on your moving bed bioreactor and so the flora actually provides additional benefits for the system and for the fish. It's naturally occurring marine bacteria and so to just say bacteria we're talking about a massive range of particular things.

MR. PELLETIER: Understood. Thank you very much.

MR. DUCHESNE: Ms. Bertocci.

MS. BERTOCCI: The conversation has gone back and forth between treatment of fresh water coming in, treatment of wastewater going out and what would be helpful to me would be to have, you know, big picture clarification, you know, what is it that you're treating incoming fresh water for, incoming salt water for, what are the mechanisms, you know, treating the water that's currently in the tanks and circulating within the tanks and then the different steps in the process for the wastewater effluent

because we have talked about certain size screen for certain points in the process. So if you could big picture or if there is a flow diagram somewhere in the application I think that might help us all better understand exactly what is happening at these various water wastewater treatment portions.

DAVID NOYES: So, yes, there is a PID in the application and so there are, as you -- Simon started to get into earlier when he was kind of walking through that process, so there -- it -- there are treatment methods for both the fresh water and the salt water at the same intake water treatment building and so there is mechanical filtration that's provided in the case of the seawater first. And then it's ozonated and that provides a level of disinfection and it's put through a UV and so you have mechanical filtration followed by two disinfection methods for the seawater at the intake. And then I'll just -- I'll follow that seawater through the facility in the hopes that will help with the clarity. And so that seawater goes into a buffer tank, that buffer tank is where we're adding both fresh water and seawater to create the appropriate salinity for the fish before it goes in, so it gives you a mixing time to add both the seawater and fresh

water and then that goes into the -- I'm just pausing because I see you're writing.

MS. BERTOCCI: No, that's okay.

DAVID NOYES: So then it goes into the fish tank and then we have mechanical filtration and biological filtration and disinfection in the recirculating loop to include denitrification. And then you have, again, biological, and when I say biological filtration, the breaking down of nitrogenous products and mechanical filtration and disinfection back down at the wastewater treatment plant and that's where the MBRs that we were talking about, the pore size width, the -- that those MBRs, the very small micro and ultra filtration that we've been discuss back and forth comes into play, at that point the wastewater treatment plant to remove as much solids as possible prior to disinfection.

MS. BERTOCCI: Thank you.

MR. DUCHESNE: Great. The last two questions, I believe, are going to come to the audience. What happens to the fish before they get vaccinated that makes them susceptible to diseases?

DR. IAN BRICKNELL: They would be like any other unvaccinated animals. They would technically be exposed and be susceptible, but of course the

hatcheries they come from are, again, high biosecurity. This is true in the aquaculture animal. Piglets would be the same until they're old enough to receive the vaccine, same with chicks, same with cows. They all have that window where they get a little bit of protection from their mother in their yolk sack, she puts little bits of defense mechanisms in there, when that wears off in those few weeks between first feeding and being the size to vaccinate that's around this size here, sort of 3 or 4 inches, they are technically susceptible to disease.

PETER MERRILL: Can I comment?

MR. DUCHESNE: Sure. Yeah.

DAVID NOYES: I might add before Peter jumps in that is immediately following the quarantined phase --

MR. DUCHESNE: Right.

DAVID NOYES: -- and so the fish are certified and -- or the eggs I should say, the brood stock and the eggs are certified at the facility and when we receive the eggs we hold them in a quarantine facility and test them and then ultimately upon validation that they don't have any concerns then we allow them to hatch and then we would go into a temporary first feeding holding tank prior to them

growing large enough to then be vaccinated, so it's a very small window, but it's right after they've been tested and confirmed not to have any issues and then they're held for a little while to make sure they actually become competent fish and then we vaccinate those competent fish and that's that -- those very small fish. And I think Peter would like to add something on that.

PETER MERRILL: Well, he just took the words out of my mouth. That's the one other time factor that needs to be considered that they're -- fish are relatively primitive vertebrates in terms of their immune systems, so it has to develop to the point where it actually would be a benefit to vaccinate them and generate a response.

MR. DUCHESNE: Great. Last question before redirect. Mr. Dunn, I believe, said primary source of infection is intake water and a member of the audience says why not simply use only aquifer water, would that not significantly reduce the risk?

SIMON DUNN: Yup.

MR. DUCHESNE: Thank you. I guess we can go right to redirect.

MS. TOURANGEAU: We're going to waive redirect.

MR. DUCHESNE: So there is no further activity, we're going to finish up with an announcement about schedule. So we do return here tomorrow morning at 8 o'clock. We will start with the panel Nordic Panel 2, Dill and Parent, modeling and impacts and that will be, again, wastewater modeling and impacts and then wastewater will continue after that. And that is where we stand, we will see you at 8 tomorrow morning.

(Hearing continued at 7:16 p.m.)

C E R T I F I C A T E

I, Robin J. Dostie, a Court Reporter and Notary Public within and for the State of Maine, do hereby certify that the foregoing is a true and accurate transcript of the proceedings as taken by me by means of stenograph,

and I have signed:

_____

Court Reporter/Notary Public

My Commission Expires: February 6, 2026

DATED: March 8, 2020