PUBLIC HEARING

WHITES POINT QUARRY AND MARINE TERMINAL PROJECT

JOINT REVIEW PANEL

V O L U M E 4

HELD BEFORE: Dr. Robert Fournier (Chair)
Dr. Jill Grant (Member)
Dr. Gunter Muecke (Member)

PLACE HEARD: Digby, Nova Scotia

DATE HEARD: Wednesday, June 20, 2007

PRESENTERS:
-Bilcon of Nova Scotia
Mr. Paul Buxton
-Transport Cda and Atlantic Pilotage Authority
Jim Cormier/John Prentiss/Gary MacCaull/Steve Bone/Patrick Gates/Mike Freeman/Alan Milne
-Fisheries and Oceans Canada
Mike Murphy/Dave Bishara/Ian Marshall/David Millar/John Tremblay/Ted Potter/Kent Smedbol Tana Worcester/Tony Henderson/Norman Cochrane
-Dalhousie University
Mr. Chris Taggart
-Jerry Ackerman
-Leslie Wade
-Linda O'Neil

Recorded by: A.S.A.P. Reporting Services Inc.
200 Elgin Street, Suite 1004 Ottawa, Ontario K2P 1L5
130 King Street W., Suite 1800 Toronto, Ontario M5X 1E3
613-564-2727 (Ottawa Office) / 416-861-8720 (Toronto Office)
613-564-7756 (Ottawa Fax) / 416-946-1693 (Toronto Fax)
1-888-661-2727 (Toll Free)

Per: Hélène Boudreau-Laforge, CCR

Species at Risk Coordinator for the Oceans and Habitat Branch, and it's M-i-l-l-a-r.

THE CHAIRPERSON: We have you all, then. I understand you're going to make a presentation now.

PRESENTATION BY DEPARTMENT OF FISHERIES AND OCEANS - VARIOUS PRESENTERS

Mr. MIKE MURPHY: Yes. Thank you very much.

In terms of the presentation, we've provided you with the presentation already, and in the interests of time, I think I'll move to the middle of the presentation and leave out a lot of the roles and mandate and our involvement in the project and go directly to the middle where we talk about the overview of issues related to DFO's mandate.

I'd like to review some of DFO's findings, recommendations and outstanding questions as a result of our review of the Proponent's information.

Our presentation will highlight the main findings around marine mammals and blasting, marine mammals and shipping, fish and blasting, and this is on a variety of fish and shellfish species, lobster and blasting, invasive species, and fish habitat.

My colleagues and I will address any detailed questions in these areas after the presentation.

Human activities in or near the ocean often transmit sounds under water, and some of these sounds can have a range of effects on marine mammals from no response to small behavioural changes, masking of hearing, temporary or permanent changes in hearing sensitivity to non-auditory injury such as haemorrhage and direct fatality.

In general, sound propagation modelling conducted by the Proponent and reviewed by DFO predicts sound levels in the water column at 500 metres to be 185 decibels as the worst case estimate for a single blast, and we understand a single blast to mean a single shot.

It is important to note that noise levels for distances other than those at the water line and at 500 metres were not modelled.

The US National Marine Fishery Service has been using 180 decibels root mean square as the maximum acceptable exposure level to impulsive sounds for cetaceans. To compare these thresholds to the sound levels predicted for the Whites Point Quarry Project, five decibels should be added to this value to arrive at an exposure level of 185 decibels.

DFO assumes there is a risk of potential effects within 500 metres, and this is reflected in the DFO guidelines for the use of explosives in or near Canadian fisheries waters, which states that no explosive should be

detonated within 500 metres of any marine mammal.

While the zone of disturbance of marine organisms by sound may extend beyond the 500-metre safety zone, it is considered unlikely that blasting would result in physical effects on marine mammals, endangered or otherwise, beyond 500 metres.

However, there may some behavioural effects, but it is uncertain what this would be and whether they would have any long-term impact on an individual or population, considering the amount of blasting.

There may be some subtle behavioural effects on marine mammals beyond 2,500 metres from the blast site. However, these are not expected to result in overall changes to the distribution of the population or other population scale impacts.

The 500-metre safety zone, which states no blasting in this zone when marine mammals are observed or known to be present, and the 2,500-metre safety zone for endangered marine mammals are expected to reduce the potentials for harmful impact of blasting on marine mammals under good visibility conditions.

The use of a trained observer to monitor the 2,500-metre and 500 metre-safety zone would need to be in place to ensure marine mammals are not in these areas prior to a blast.

However, there is some uncertainty as to the ability to detect and identify marine mammals at distances of 2,500 metres, particularly under poor visibility conditions such as fog, rain or waves.

It is not clear, from the information provided by the Proponent, when observation from a boat would be conducted to improve the chance of sighting marine mammals and how much this would increase the effectiveness, especially in poor visibility.

The following research and monitoring recommendations would help to verify the predictions included in the environmental assessment.

Validate acoustic modelling using the initial blast in near and far field locations prior to operational blasting and arrival of endangered right whales in the Bay of Fundy.

This would include measuring the underwater blast sound levels at 500, 1,000 and 2,500 metres plus at the margin of the right whale core area during blasting conducted outside the time when endangered whales are present in the Bay of Fundy.

After this initial blast, there should be visual observation of marine mammal behaviour before, during and after operational blasting when whales are present. This would be conducted in areas of known marine

mammal aggregations.

Verifying the effectiveness of visual observation methods at 2,500 metres from the blast site is also recommended, including determination of the average site visibility conditions.

Use of ongoing passive acoustic monitoring should also be considered.

Opportunities to link up with other research initiatives such as university research should be considered.

I'll now move to marine mammals and shipping.

It is understood that shipping has the potential to affect marine mammals through noise and ship strikes. However, the project is not expected to significantly increase shipping in the Bay of Fundy.

Just using the pilotage numbers for the Port of Saint John, the relative increase in large vessel traffic from the proposed project would be approximately six percent.

The main mitigation in place for ship strikes in the Bay is the new shipping lane. The new shipping lanes which came into effect on July 1, 2003 were expected to reduce the likelihood of a right whale suffering a ship strike in the Bay of Fundy by up to 80 percent.

Now, biologists at the Centre for Coastal Studies in Provincetown, Massachusetts think the reduction is closer to 95 percent. Also, the route from the shipping lane to the quarry is not a known aggregation area for whales, including right whales.

The Proponent has also stated that the ships will decrease speeds once leaving the shipping lanes. Our information was to below 10 knots. I understood this morning now to 12 knots, which will further reduce the likelihood of lethal strikes.

However, given that the shipping companies would likely not be under the direct control of the Proponent during transit, it is not clear how some of the proposed mitigation will be controlled by the Proponent.

Shipping noise. It is possible that the higher levels of ambient noise in the ocean have reduced the ability of right whales to hear mating calls over large distances, perhaps reducing mating opportunities.

As noted previously, the Proponent has indicated that the ships will decrease speeds once leaving the shipping lanes, which will also reduce the noise from ships approaching or leaving the quarry.

If this project were to proceed, it would be advisable to make baseline measurements of bulk carrier noise around the terminal and nearby areas of

potential environmental sensitivity.

Fish and blasting, potential effects. Studies by DFO show that an over-pressure in excess of 100 kiloPascals will result in damage to the swim bladder, the gas-filled organ that permits most fish to maintain buoyancy. The kidney, liver, spleen and sinus venous may also rupture and haemorrhage.

Fish eggs and larvae also may be killed or damaged.

Department of Fisheries and Oceans has prepared the guidelines for the use of explosives in or near Canadian fisheries water to provide information to Proponents on the conservation and protection of fish, marine mammals and their habitat from impacts arising from the use of confined or unconfined explosives in or near Canadian fisheries waters.

These guidelines provide methods and practices which, if incorporated into a project proposal, are intended to prevent or avoid the destruction of fish or any potentially harmful effects to fish habitat that could result from the use of explosives.

Using DFO's guidelines, the Proponent would need to maintain a setback distance of at least 33.7 metres in order to meet the DFO guideline criteria of less than 100 kiloPascals over pressure. DFO has requested that

the Proponent increase the separation distance by a factor of three, to 100 metres when inner Bay of Fundy stock of salmon, an endangered species, would be present.

Our information is that this is between May and October. I believe the Proponent said May to September.

This would ensure the shock waves from blasting are well below the levels that could cause injury or death. Any behavioural reaction would likely be a brief startle response, with no impacts to the individual or overall population.

Monitoring of the initial blast levels near shore should be required to confirm these calculations.

Blasting and potential effects on lobster. DFO's guidelines on the use of explosives in or near Canadian fisheries waters are based on impacts on fin fish, and therefore do not necessarily apply to lobsters, which lack the sensitive swim bladder.

The Proponent's modelling predicts that the pressures at even the closest location in the water are not expected to exceed 216 decibels.

There's very little information on the impact of blasting on lobsters. The most relevant and recent information we are aware of is a study done by DFO staff in Newfoundland examining the impact of seismic noise

on lobsters.

This research demonstrated that adult lobster exposed to seismic sound levels of 227 decibels showed no mortality or significant injury.

It should be noted, however, that non-lethal effects were observed in the recent lobster research with respect to feeding and biochemistry, with effects sometimes being observed weeks to months after exposure. A histochemical change was also noted in the hepato-pancreas, tamale, of animals exposed four months previously.

These initial studies were meant to be exploratory in nature, and caution is warranted about over-interpretation of these results. Also, the recent study did not include an assessment of noise on lobster eggs or larvae.

Given that some uncertainty on the impact of blasting on lobsters remains, a monitoring program with input from DFO should be implemented if this project proceeds.

Potential impacts from invasive species. Aquatic invasive species have already been responsible for significant impacts on some native fish species in Canada.

Annually, the problem is responsible for billions of dollars in lost revenue and control measures.

During the late 1990s, two invasive

species of tuna kit were determined to be having a detrimental impact on numerous shellfish aquiculture sites in Nova Scotia. The European green crab originally arrived in a ship's bilge water and have moved up the coast from Cape Cod.

For this project, the determination of likelihood of effects is challenging in that one successful introduction in colonization from one vessel discharge can lead to local and regional effects.

One of the main mitigation measures is the Ballast Water Management Regulations. These Regulations require ballast water exchange for vessels travelling between points south of Cape Cod, Massachusetts and Canadian waters.

These Regulations are administered by Transport Canada and were addressed in their presentation. Also, the risk of invasive species increases with the rate of shipping.

As previously mentioned, the relative increase in shipping for this project is low, but it still must be recognized that it only takes one successful colonization to result in regional impacts.

Monitoring may help detect possible invasive species in the early stages of colonization. However, depending on the species, eliminating or

controlling the introduced species after it is detected can be difficult or impossible.

Fish habitat. The marine terminal would be built using pilings, which are less destructive to fish habitat than a traditional in field wharf. However, the installation of the pilings will result in some habitat loss.

The extent of marine benthic habitat affected by the pilings would be approximately 40 square metres.

If the project proceeds, an authorization under Section 35 of the **Fisheries Act** would be required and the proponent would be required to establish or enhance fish habitat in accordance with DFO's policy for the management of fish habitat.

This policy contains the guiding principle of no net loss of productive capacity of fish habitat through habitat compensation.

As part of its Environmental Impact Statement, the Proponent has provided an initial compensation plan using artificial reef structures for a site near the proposed terminal. DFO's conducting research on various artificial habitat structures to evaluate which are best for habitat enhancement for various species, including lobsters.

If this project proceeds, DFO will use this research and information from similar projects to ensure appropriate fish habitat compensation is developed by the Proponent. Also, as a component of the compensation plan, the Proponent will be required to monitor the project to ensure it is providing the required compensation for lost productive capacity.

In some situations, habitat can be harmfully altered by the release of sediments which covers habitat, affecting feeding or reproductive areas in both fresh water and marine environments.

DFO works closely with the Nova Scotia Departments of Environment and Labour and Natural Resources in protecting fish habitat from sedimentation arising from projects regulation by Provincial legislation.

Mitigation and monitoring of sediment from quarry, mines and pits are typically requirements of Provincial approvals, and DFO will often review monitoring information and recommend additional mitigation if there is a concern that sediment levels may affect fish habitat.

If the project proceeds, in addition to the mitigation measures proposed earlier, DFO recommends monitoring in the following areas.

Noise from blasting and shipping at various locations and times of the year to verify noise

level predictions, including a representative blast prior to the presence of right whales in the area.

Marine mammal behaviour observation during blasting events using qualified observers.

Monitoring of habitat compensation for various species, including lobster, as well as a monitoring program developed with DFO input on the impact of blasting on lobsters.

Sediment monitoring at the settling pond's outfall or other potential sediment source areas.

Monitoring for invasive species near the terminal.

If the project proceeds, DFO will continue with our regulatory role, specifically applying the **Fisheries Act** and **Species at Risk Act** to those components of the project which interact with DFO's areas of interest. There are other areas, such as ballast water management, where we can provide expertise, but we do not have a regulatory role.

If monitoring was to show that the project was having unacceptable impacts on fish or fish habitat, including marine mammals, DFO would address these issues through the **Fisheries Act** or **Species at Risk Act**.

Fisheries and Oceans Canada looks forward to the recommendations from the Joint Review Panel

and, shortly thereafter, the Federal Government will provide a formal response to the Panel findings. Thank you.

PRESENTATION BY THE DEPARTMENT OF FISHERIES AND OCEANS - QUESTIONS BY THE PANEL

THE CHAIRPERSON: Thank you very much.

One issue of some interest to us is whether, in fact, DFO has any experience with other coastal quarries. There was recently a coastal quarry that was under way in British Columbia, I remember.

Are there others, Newfoundland, anywhere else, where you've had experience?

Mr. TED POTTER: Your reference to BC is the Orca Quarry, and here in Nova Scotia in Aulds Cove and Martin Marietta (ph), Porcupine Mountain on the Strait of Canso. That's right next to the water.

THE CHAIRPERSON: Are there lessons to be learned from these other quarries?

Mr. TED POTTER: In that particular site, we're not dealing with species at risk in that immediate vicinity, similar to the right whale or inner Bay of Fundy salmon. There are things we've learned with regard to infilling the rocks, habitat compensation issues.

THE CHAIRPERSON: What about the British Columbia experience? That is some ways is similar to this one, is it not?

Mr. TED POTTER: It's similar in some ways, but in other ways it's different. Different species, again. So, you know, and you have the same general project components from quarrying to shipping, ships coming in, the conveyor belt. And so that information from this project and work done there has been exchanged back and forth.

THE CHAIRPERSON: So there, what you're saying is that the information obtained in those other places is not translatable; it doesn't translate to this project, not even in generalities.

Mr. TED POTTER: No, in a general sense, yes.

THE CHAIRPERSON: Can you convey any of that wisdom to us? Is there anything there that you should flag for us, or anything of importance?

Mr. TED POTTER: Well, in a, from a DFO perspective, we focus our attention on fish and fish habitat, and in the case of these quarries, unless there's diversion of a stream, fish bearing waters, we look at the marine terminal aspect of the project.

Quite like, as a general sense, we look at the footprint of the facility, what's that going to be, is that a solid structure, is it on piles, will there be free-flow, what's the sources of sediment, will the sediment be going into the fish bearing waters, and we will also use

the guidelines for use of explosives near fish bearing waters.

THE CHAIRPERSON: What about some of the issues that were just identified, the five, the list, the five, of invasive species, for example? If I'm not mistaken, the project in the west coast is actually moving into the U.S., is it not?

Mr. TED POTTER: The, looking at the invasive species, we're working here on the east coast, we take it from a zonal perspective. So we're working here on the east coast through a committee that's been set up, and it's to look at what species we have here.

The primary mitigation that's used is the similar thing that's being considered on the west coast, which is the ballast transfer zones. So those things are very similar.

Ms. JILL GRANT: A few questions about the species at risk. As you just identified, that's a different issue here. So I understand under SARA that when a species at risk is likely to be affected there is some kind of notification that happens. Does that happen in this project?

Mr. TED POTTER: In general sense, in this case, for this project, when it was initiated, the Department of Fisheries and Oceans was lead RA, responsible

authority, for both the **N P A** and the **F A** . We are not in the practice of sending letters to ourselves, given that we initiated it, so we were aware of it from the onset.

When the file, when Transport Canada received the Navigable Waters Program, there was no need for them to send back a notification on a file that we had already initiated. So the responsible authority in this case, DFO, for the marine mammals and marine fish, was well aware, and we were working in close collaboration with Environment Canada for the migratory birds and any bird species that fall under the **S R** .

Ms. JILL GRANT: And can you clarify for me whether the meaning of "likely effects" is the same under SARA as it is under the CEAA legislation? It seems like it's a little bit different. Can you clarify what the meaning of "likely effects" would be?

Mr. KENT SMEDBOL: Yeah, and it's used slightly differently in Section 79(1) from 79(2), so in 79(1), the requirement for notification is likely effects, and it's not just adverse, and it's not just significant. It's any effect, there should be notification.

So even if your project is going to benefit a species at risk, and even if it's not a significant benefit, it's just minimal, whatever the effect

is, you're supposed to do the notification. So we don't use that same significance criteria in the **S A R A** . And also, under 79, it doesn't have to be adverse.

Under 79(2) it's about identifying adverse effects, but again, you don't have that word "significant" in there. Under 79(2), you're supposed to identify any adverse effects, and if there is an adverse effect you're supposed to take measures to reduce that effect and to monitor it.

So again, we don't put that significant threshold in the **S A R A** . We would expect that any adverse effect at all, minimization should be in place, mitigation, as well as monitoring. So I think that's the big difference is that we don't put a focus, under the **S A R A** , on whether an effect is significant or not, because with **S A R** we want any adverse effect to be managed, effectively. So I guess that's the big difference.

Ms. JILL GRANT: And am I right in understanding that if there's likely to be any effect under SARA that's some kind of permit, if there's any kind of potential harm, some sort of permit would have to be issued? Is that correct?

Mr. KENT SMEDBOL: If there's an expectation that there would be... Basically, there's a

section of SARA called the "Prohibitions", which you may or may not be aware of, which is, you know, you cannot harm, kill, harass, there's a series of them, capture, take, a species at risk.

And so if you expect that one of those prohibitions would be violated, then if someone wanted to proceed with an activity that was going to cause that violation, then they would need a permit in order to avoid potentially facing penalties under the **S A R A** .

So the question then becomes is the activity going to violate one of those prohibitions, and if there is an expectation that it is likely that it would violate one of those prohibitions, then the Proponent would need that permit, if they wanted to protect themselves from prosecution or from penalties under the **S A R A** .

Ms. JILL GRANT: So in this case, you've indicated that there is some possibility of physical harm from ship strikes, and some possibility of behavioural effects.

Can you give us an idea of what kind of behavioural effects are possible in the species at risk, especially the right whale?

Mr. KENT SMEDBOL: Possible, so you're thinking non-lethal? With behavioural, I assume you mean non-lethal. It really is quite a range there. It would

tend to group into things. I think that it would affect behaviour on a relatively long-term basis, and those that would affect behaviour very quickly or quite, what's the word that I'm looking for. Anyways. Quickly gone.

They can, for fish... Well, let's start with marine mammals. If we look at things such as noise, then some suite of behaviours that may be changed include things like feeding behaviour, socialization, logging at the surface, which is just the animals resting.

It's difficult to say what the animal, what a particular animal will actually do in response to a particular event. There is a large variation in individual behaviour [inaudible].

Some of the controlled studies that have been done in the U.S., for instance, using noise playbacks to right whale, in particular, some whales will stop doing whatever they're doing and just hold to and listen. Others are oblivious and continue on with what they're doing. Others change from one behaviour to another. So for instance, if they're involved in feeding dives, they'll stop diving and they'll swim along the surface.

It's difficult to pinpoint a particular type of behaviour resulting from a particular stimulus.

Ms. JILL GRANT: And my understanding of some of the studies that were done in Trinity Bay,

Newfoundland, in I think that's humpback whales, but in the 1990s there was a lot of drilling and blasting and...

Mr. KENT SMEDBOL: The Bbllеoram, yes.

Ms. JILL GRANT: Yes. Do you have some indication on the kinds of results that that had?

Mr. KENT SMEDBOL: There are two cases from Bbllеoram of actually humpback whales washing up dead on the surface. Post-op necropsies highlighted damage to inner ear structures that were likely caused by severe over-pressure, but this could not, they could not link blasting in Bbllеoram directly to those whale deaths.

Sudden lethal behavioural changes, the suite of things that were seen in that, in the Bbllеoram situation are similar to what's been seen in most studies that have looked at the effect of noise and marine mammals.

This is actually a large field, especially brought to prominence again in the last several years because of the use of mid-range, mid-frequency sonars by U.S. Navy. So there actually is a lot of literature on the effect, possible effects, of noise on cetaceans, but it is not a group of animals upon which we can easily experiment, so it's difficult to establish cause and effect.

Ms. JILL GRANT: Right. And in the blasting in Trinity Bay, there was feeding changes and avoidance behaviour, is that right?

Mr. KENT SMEDBOL: I am familiar with some avoidance behaviour, but it's a long time since I've read that literature, so I can't give you a definitive answer yes or no. I do remember vaguely some behavioural changes, but I'd have to go back and look that up for you.

Ms. JILL GRANT: Thank you. And there was some discussion in the presentation about changes to the conservation area, the shipping lanes, and so on. When were those changes made?

Mr. MIKE MURPHY: The shipping lanes were instituted July 1st, 2003.

Ms. JILL GRANT: Thank you. 2003. And am I right in understanding that two right whales were killed by collisions in the summer of 2006?

Mr. KENT SMEDBOL: Actually, more than two. I think you're referring to possible deaths in Canadian waters. One was seen off shore, off the southern southwest Scotian Shelf, close to Brown's Bank. There's actually a second right whale conservation area in Rosalie Basin, in that vicinity.

A second one, I don't remember the exact location, but I do not believe it was discovered in the Bay of Fundy. There have also been two right whale strikes this year in U.S. waters. Lethal. All four that I'm discussing are lethal.

There was also a definitive strike in Canadian waters in 2005, which was, we actually did the necropsy in Campobello Island. Our U.S. colleagues actually undertook the necropsy. That was struck and killed by what was likely a small vessel, probably around 50 feet, based on the propeller size.

So actually, when we talk about ship strike, some of us who are a bit close to this prefer to use the term "vessel strike", because it's not just large ships that kill right whales.

THE CHAIRPERSON: When these whales are pronounced dead, is it generally the case where knowledge about the experience is available? You just conjectured that maybe it was a 50-foot, based on a propellor, but are most of these kills simply discovered after the fact and it's hard to connect the information together, so you don't know necessarily exactly where it was, or what the ship speed was, or any of that contributing information?

Mr. KENT SMEDBOL: With the right whale, we actually rarely have that information. Most of the evidence generated for cause of death comes from the necropsy. There are a few cases, especially down in the southern U.S. where right whales are much more coastal than they are in our waters, that we have, you know, a vessel master will actually call in and say, you know, "We struck a

whale", and we have a time and a place.

Right whales are actually, you know, they're very rare, so actual collision of right whales relative to the total number of large cetaceans is relatively small. For instance, in Dr. Taggart's presentation, they used, in their analysis, they used ship strikes, ship collisions, with all large whales in the vicinity in order to generate the figure.

THE CHAIRPERSON: Isn't it true, too, that right whales are essentially oblivious to their surroundings, or at least oblivious to ships we hear, and they're either feeding or sleeping or doing something, but the ships just seem to, they don't frighten them away.

Mr. KENT SMEDBOL: That's generally correct. Especially relative to other cetaceans, they tend not to show this type of escape response, or even often any response to vessels at the surface.

There was a study undertaken in 2005, I believe, in the U.S., where they've been trying to develop alarm calls, actually using some of the whales' calls themselves to alert whales, and this has turned out to be, the irony of it such work actually elicits the worst possible behaviour from right whales. The come up, and they hide ten metres under the surface, which means they're basically undetectable.

Right whales also have a habit of what we call logging, so that they may sit just at the surface and do nothing. It probably relates to its resting behaviour.

The second type of behaviour that's quite common especially in Canadian waters, right whales are taken, a behaviour that's called, we call surface active groups, and it's quite intense socialization, actually, a lot of wrestling, a lot of splashing of water. You can have up to 50 animals involved in these. And when right whales are involved in a certain active group, they are utterly oblivious to what's going on around them.

It's unfortunate, but their behaviours make them very conducive to vessel strike, and they're a coastal whale. So time and space and their behaviour are all against them.

Ms. JILL GRANT: One of the elements in the presentation suggested that a six percent increase in traffic was not significant. What level of traffic increase would there have to be for it to be significant.

Mr. KENT SMEDBOL: That's a good question. My background, as a scientist, I tend to treat significance from a statistical sense. I don't think that's the way that it was meant.

Six percent, five percent chance of...

What was really being measured there is what is the probability of a whale and a ship occupying the same three-minute square in about the same time.

So what you're saying, you're increasing that probability, or with that increase in shipping if it's a linear... I can't remember, actually, from the research that was undertaken, I didn't not undertake that research.

If that relationship is linear, it's one to one. If not, it is quite a small increase. We've already Saint John has reduced the potential overlap, time/space overlap in the same squares by about 95 percent over the last three years, so I guess you would add six percent shipping to that, do your re-calculation.

You'd have to re-look at, you'd have to look again at the new shipping distribution, taking into account that six percent of ships. I would argue that it is likely not substantial. I think it would actually be quite a low increase in probability of ship strike, but not zero.

Ms. JILL GRANT: Thanks. And there were some comments raised about problems with the proposed observation strategy to identify whales in the area that the ship is traversing, so I would like to have some comment on the technical feasibility of this mitigation strategy.

Mr. KENT SMEDBOL: Yeah, I listened to your questions earlier today concerning... So if I deal

first with the single observer on the stand. If one looks at that relative to 2500 metres is your outer limit of interest, given... Well, first I'll say given excellent conditions, good sea state, the trained observer, that observer would be able to detect whales out to 2.5 kilometres now, starting from that point.

The first thing is, at that distance it would be extremely difficult to detect, to be able to speciate that animal. You might be able to say, yes, it's a large animal, it's a large whale. It'd be highly unlikely to be able to say that is it a right whale or is it a hump back whale.

When we do this kind of sightings work from ships, I actually went back last night and looked at some of the data that we have on this, we have detected right whales as individuals out to over a kilometre. Usually we're using cues like the blow, which is a V-blow, which is diagnostic, but you can't have any breeze and you have to be right on the angle when you see that.

Really, there are four factors or four different issues that come into play in detectability and sightability of animals at the surface. The first one, of course, the obvious one, is weather. So on a clear day, without glare, without haze, with a good sea state, say Beaufort two and lower, you might have a good chance.

I'm not saying you'll see every whale that's there, but you might detect whales if they're present. The detectability is definitely not zero at that range.

But as soon as you bring in glare, fog, precipitation, sea state, we don't even, for abundance estimation, if we use line transect sightings data, we usually throw out everything at Beaufort four and higher. We don't even use it because detectability goes down so low.

The second thing is the angle of incidents from the, of the observer to the whale. This actually, with the set-up that's described by the Proponent, is actually quite good for that. They're very high up, relative to the surface.

The third thing that people who do this work understand all too well, but if you don't do it, you probably never of it, and that's the idea of observer fatigue. You're basically staring at the water for a long time. When we do sightings, transect surveys, we usually employ a team, and those teams are rotated out to avoid...

This has been modelled many times on sighting surveys, that observer detectability drops, and it's a non-linear function. The longer an observer is looking at the water, the poorer they get at seeing anything.

The fourth thing is actually the target species that's involved, so this brings in all the issues of size of the animal, so detecting a humpback versus a harbour porpoise. Harbour porpoise you will not see up to two and a half kilometres, and the animal is only a metre long.

The behaviour of the animal, so what does it do at the surface, what are its markings or cues, is there something diagnostic about that species. For instance, the right whale, they don't have a dorsal fin. They have a V-blow, it's the only one to V-blow, and they also fluke up when they dive, so they tend to wave at you.

Dive time is important, right whale dive, although not in that close to shore, but out in the basin, probably 20-minute dives. So there is an issue of availability to be sighted. So you have to factor that into the time that one would allow prior, you know... How long would one have to be watching before you were sure that there were no animals in the area.

So there are all those, those four general categories that come into play in detectability.

Ms. JILL GRANT: And you said that was in the best of conditions. So in this particular part of the Province, how often is that going to be the case, and what's the situation when the conditions are not so good, starting with that observation tower, and then we'll go to the boat.

Mr. KENT SMEDBOL: Higher is probably always better, except maybe in fog conditions. To be honest, I wouldn't be able to give you a good estimate of amount of available days that are of use. High summer, when we do our work is, we do it because the weather is great and not just because the whales are there. The whales are also there through October, and once you hit September then you get wind shifts and stuff like that.

Very difficult to determine. Some animals... I'll just leave it at that. I don't think I can give you a solid answer on that. But there's no doubt that as those conditions change, your detection range, effective detection range, is decreasing.

Ms. JILL GRANT: And what about the proposal to go out with a work boat and try to observe in situations where the visibility is not adequate to observe from the observation tower or the distance is too far? How effective can we expect a work boat observer to be?

Mr. KENT SMEDBOL: I think that would depend on the protocol, how they search the area. They will run, an observer on a small boat, we run small boat surveys, as well. If one's effective sighting range is reduced down to, say, 500 metres, then you would have to adjust your survey track to make sure that you're effectively occupying or at it can cover, at least, sight all the available area.

As, of course, in fog, well, I basically think you're out of luck.

So it then becomes an issue of coverage in time, but I don't think there's a straightforward answer to it. It's certainly better than not having the boat out. There is no doubt about that.

Ms. JILL GRANT: Is there a certain level of sea swell where it becomes impossible to see enough?

Mr. KENT SMEDBOL: We don't count whales after sea state four. You can...

THE CHAIRPERSON: Can you put that into miles per hour? Or knots would be fine?

Mr. KENT SMEDBOL: Beaufort four? Anyone?

Mr. BOB MORSCHES: [No microphone] Doctor, sea state is wind plus the water, and it's how high the winds are...

THE CHAIRPERSON: Yes, but can you convert Beaufort four to knots?

Mr. KENT SMEDBOL: There's a fetch issue too, with that.

THE CHAIRPERSON: Yeah.

Mr. KENT SMEDBOL: So usually, effectively, for large whales, we would stop counting at a metre seas with breaking waves. You can still see them,

though, but your detectability drops. But if you have the wherewithal to spend time at it, you will still detect whales.

Ms. JILL GRANT: And I notice that the Proponent, in their Proposal and in your presentation here today, too, it was suggested that the effectiveness of this observation strategy should be monitored. How can you monitor and determine the effectiveness of this mitigation strategy, given that you won't know what you've missed. What do you...

Mr. KENT SMEDBOL: Yeah, and that's an excellent question. That also confronts us whenever we do a survey for abundance estimation. So what we do is we actually statistically model our detectability, and then once that function drops down below a pre-defined threshold, say, well, pick one, then we lop off all the distances that are greater than that, and we discount it.

So what we do is, after the fact we come back into the lab, analyse our data, fit a curve, and the say: "Oh, actually, we were only really good out of 500 metres instead of a kilometre", and then that's what we're stuck with.

In this situation, I tried to give it a little thought last night. I'm not sure how... I think it would require a bit of thought, and I can't give you an

answer right now, how one would address that. One possibility, off the top of my head, is you put markers out, but you just don't tell the observer where the markers are, and then see how they go.

But there may be, there may be stuff that's already done, but I'm not familiar with it, any such techniques.

Ms. JILL GRANT: If this monitoring identifies a whale as a ship's coming in, is it feasible to think that strategies can be taken with sufficient time to actually avoid a collision?

Mr. KENT SMEDBOL: I can't speak for the vessel. There's one thing to bear in mind with this. There's no guarantee that the whale is going to stay where it is. So the two things are moving in time/space. I'll let others perhaps address the vessel issue.

THE CHAIRPERSON: So I guess to summarize, that if you're dealing with winds of 30 knots, let's say, 30, 35, wind speeds in which it's probably okay for a ship to make its way into a pier, but probably not higher than that, and if the wind has been blowing for a day or two, so that you've had a fetch and you've got a sea that's running a metre or a metre and a half or so, and that individual's up in the tower, 110 feet above the water, looking out there, and of course it's blowing at the same

time, and presumably the weather could be deteriorating.

The, what you're saying is it's almost impossible for somebody to see 2500 metres, two and a half kilometres. That's a mile and a half.

Mr. KENT SMEDBOL: I think effective detectability would be close to zero at that range.

THE CHAIRPERSON: Zero.

Mr. KENT SMEDBOL: Close to zero. I can't give you a definitive, out to the end of the range, especially if there's whitecaps. So one of the things, one of the things we really cue on is water disturbance or a whale jumping or a fluke-up or something like that.

So what happens with sea state, where you have waves, you're looking for that motion as well, right? And everything is motion. So it really drops. Especially at distance. It really is a function of cue sighting at distance.

But I can't give you a percentage. I would say it's definitely low, out that far.

THE CHAIRPERSON: Okay.

Mr. MIKE MURPHY: I think I should, just for a little bit of clarification, the 2500 metre zone, the observation during that period is for the blasting, not so much for the shipping.

THE CHAIRPERSON: Okay. Well, there are

two elements of concern, as you are well aware; incoming ships and the blast effect. Yes.

Mr. GUNTER MUECKE: Taking in a slightly different direction, regarding the blasting model that is going to be applied.

You said that what, in terms of the model, what matters is the charge, and you gave 45 kilograms as the model parameter, if I understood this right. And my question is, to what extent is the total blast size in terms of total amount of explosives relevant in the modelling.

Mr. NORMAN COCHRANE: Well, I think this is a very important question, and one that I don't think has been really fully resolved. The modelling study that was done by Hannay and Thompson, that is the JASCO and LGL report dated August 2003, largely dealt with the effect of a single shot hole that was loaded, as you say, with 45 kilograms of ANFO.

And the modelling that they did was in terms of a single shot hole detonation, and there are, I think, mentions that probably the effect of multiple shot holes would not enhance the overall sound pressure levels due to the fact that the signatures, the pressure signatures of these individual blasts would not significantly overlap.

I, myself, am not fully convinced that that is necessarily the case, and especially at the 500-

metre range, where if we accept the CONWEP model that was put forth by the Proponent's representatives, the duration of the blast is quite long, in the order of ten milliseconds, and it would seem to me that certainly if you are detonating explosives with the 8-millisecond delay, that there would be some quite significant overlaps.

Now I'm not sure if you want me to go into my assessment of the acoustic model, its virtues and shortcomings, so of which has been I think communicated to the Proponent's representatives.

Mr. GUNTER MUECKE: Perhaps before I ask you that, you can talk to one of my concerns of risk here. As an earth scientist, I'm somewhat familiar with seismology, that's one of the things I've touched upon in my life.

How would the model be effected do you think if there was, in the rocks themselves, if there were in the rocks themselves, good reflectors?

Mr. NORMAN COCHRANE: Well, certainly there would be diffraction effects, and I think there are many good questions that could be asked.

I think, and I believe I'm correct in stating this, that the model put forth is not intended to be a very precise description of actually what happens but rather is to give essentially an upper bound... It's a

crude model that would give an upper bound to the effects, that is the model has been parameterized very conservatively, and I would agree that that's probably the case.

As you'll notice, the model is two dimensional, and it's being applied to a three-dimensional situation, an actual shoreline.

It is a complex model in that it deals with an explosion in an elastic medium, where the effects are very close to the explosives, very difficult to model.

But in addition to that, it deals with the propagation of sound into a sloping wedge of water, where the medium does support elastic waves, and that is a very complex problem in itself and one that you really have to search the literature to find it dealt with properly.

Do you want me to go on and elaborate in some detail or are there some...

Mr. GUNTER MUECKE: It would be useful, yes.

Mr. NORMAN COCHRANE: Okay. The... I will tell you what we have done anyway in trying to assess this model.

The Proponent uses a transmission model from the elastic medium for soundwaves propagating from the elastic medium into the water by Oriard, I have taken to try

to verify Oriard's computations.

It is basically a model that predicts energy flux from one medium into the other in terms of P-waves in the water wedge.

The only thing I could find immediately in the literature is a model by Perkowski that dealt with the same problem, and I was able to verify from Perkowski the magnitudes of the reflected P-wave from the water bedrock interface and the converted S-wave that is generated.

However, Perkowski's results for the transmitted P-wave were in variance with Oriard's, and it appears that that is most likely a typographical error in the formula and that derivation of that particular result was not recorded in the literature, and it's a very complicated thing, so it was not easy to go back and verify, however at least the amplitudes of two of the waves were predicted properly by Perkowski's result.

Perkowski's result, as stated, does not appear to support conservation of energy, is not consistent with where Oriard is, so I presume that there is a typographical error, and so we were able to satisfy ourselves that the Oriard Model is very likely correct, and we were able to set that model up on a computer so that we could actually compute the transmission coefficients from

the bedrock into the water as a function of angle incidence.

Now as I said, the model that they used is a fairly conservative one. I believe for the transmission coefficient of 0.3 that is stated in the Hannay & Thompson report, they assume an incidence angle of about 80 degrees, or the waves are coming in at about 10 degrees to the water bedrock interface, that is at a very shallow angle.

It seems to me from looking at the shoreline, we're probably dealing with a slope on that interface of two, three, maybe 3.5 degrees.

We did do some calculations, but what we did come up with, and I don't think it has been verified by the Proponent's representatives, but I believe that there was an error here and that the transmission coefficient is much smaller.

Our calculations seem to show that that's about a factor 5 too large.

THE CHAIRPERSON: Could I just briefly interrupt here? I find this very interesting and in many ways, it would be extremely useful for us, for me, if you could have that writing. Would that at all be possible?

Mr. NORMAN COCHRANE: Yes. I'm not sure...

UNIDENTIFIED SPEAKER: We have submitted that as part of our comments.

Mr. GUNTER MUECKE: Pardon?

THE CHAIRPERSON: I couldn't hear you.

MR. NORMAN COCHRANE: We have submitted our critique as part of our overall comments on the review of the EIS.

Mr. GUNTER MUECKE: At the level of detail we have just heard?

MR. NORMAN COCHRANE: Yes, approximately that level of detail.

Mr. GUNTER MUECKE: Okay. Okay, I will go over that again. Going back to one of my original points, a single shot versus timed multiple shots.

Could you provide me with some indication on this, as you increase the size of the array, the size of the blast, what happens to the ability of the waves to become accumulative?

MR. NORMAN COCHRANE: The model, if you look at the transmitted wave form, you will find that a key point in the Proponent's model is that there is a cancellation of the pressure signature in the water column from the pressure wave reflected from the water surface, the water/air interface, which is a pressure release surface that leads to an inversion of the waveform when it is

reflected.

The effect of the directly transmitted wave up through the water column and the reflective wave from the surface tends to effectively shorten the pulse length associated with the detonation, that is if we do accept the CONWEP model.

Now I have not stated this, and this is not in writing, but I feel that there is an additional problem here.

We're really using a RAY (ph) Model, and I believe that it's really what I would call an item RAY Model, where you have to trace out all the possible ray paths, and it seems to me that some important ray paths have not been included here that would lead to a much extended reverberation within the water column.

For one thing, if the ray is transmitted into the wedge and the transmission coefficients are very small, then the reflection coefficients are very large, and that means that the ray, once it's into the water column, gets trapped there and reverberates.

I don't think the model as presented takes into account these effects properly, so while I do agree with the Proponent that if the model as stated is valid, then the effective waveform is greatly shortened and the potential for overlap, even at 8-millisecond delays, the

effect is greatly lessened.

But if the reverberation is extended within this water column, then the effect of overlap becomes I think much more significant, and it would have to be further investigated.

The other thing is I'm not... The Proponent has not really given us a proper description of what the delays will be from the individual shots once they actually reach the water.

It depends upon the geometry and the precise layout of the shot array. Actually, I would like to see a better description of what the impulses, the sequence would be really like in practice.

The other thing to consider, if we go to longer ranges, and really long-range propagation has not been modelled.

In fact, predictions within the water column are only out to I think 164 metres. We have looked at 500 metres, but only by us taking the model, the CONWEP model for the impulse in the bedrock at the 500-metre range and assuming the same angle of incidence and the transmission coefficient of 0.3, and that's the way we were able to come up with the 186 dB or so.

Mr. GUNTER MUECKE: Yeah, I think that has...

Mr. NORMAN COCHRANE: But longer ranges, I don't think this model is necessarily valid. There are a lot of other things that occur that...

Certainly at longer ranges, there are interface waves and things like that. They become very important to the propagation of the energy along the water bedrock interface.

Mr. GUNTER MUECKE: I think I have a better understanding now of what is happening here and what the limitations of the model are, and I'm looking forward to seeing it a written submission. I really would look forward to that.

I think it's probably at this point an appropriate time to break?

THE CHAIRPERSON: Yes. I would like to take a 15-minute break and then we will come back and resume this discussion.

--- Recess at 2:46 p.m.

--- Upon resuming at 3:01 p.m.

THE CHAIRPERSON: Ladies and gentlemen, let's begin.

It's come to my understanding that you do have some information on the Orca program?

Mr. MIKE MURPHY: Yeah, we have a couple of pages that may help you out, and we'll provide this at

the end of the process. And if there's any more, then feel free to get a hold of us and we can try and get the information from the Pacific Region.

I also - I'd like to ask David Millar to just add a couple more comments about the SARA permitting process that he'd like to add to his answer of earlier.

THE CHAIRPERSON: Please.

Mr. DAVID MILLAR: So I just wanted to clarify on SARA permitting that we don't just give permits to anyone. There are conditions that have to be met to get those permits, and this is definitely germane to this particular project.

There's basically three conditions for issuing an Incidental Harm permit, which would be that they must have considered all reasonable alternatives to the activity and selected the best solution. They must put all feasible mitigation measures in place.

And the third one is that we must be confident that the activity will not jeopardize the survival or recovery of the species at risk.

We determine that, in part, through something that we call an Allowable Harm Assessment, which is a scientific review process done through peer review that looks at the productivity of the species and the amount of human-induced mortality and harm that it can tolerate.

For both inner Bay of Fundy salmon and for right whale, that process has been done. And in both cases, it's determined that there's no allowable mortality for either of those species.

So that's obviously an important consideration, and it means that there would be very limited circumstances in which we would issue permits for these two species, so that should be taken into account.

THE CHAIRPERSON: Thank you.

I would like to raise an entirely different subject with you, and that has to do with residues from blasting.

Yesterday, I think, or maybe it was the day before, we had a discussion in which we were talking about the explosives that will be used at the site, which is ANFO, Ammonium Nitrate Fuel Oil.

And we were talking about the fact that it's a well-known fact that when this explosive is used that there's a residue of ammonia left behind.

We were using the number of two percent, which may be incorrect, but we're in the process of trying to refine that number. But for the sake of this discussion, we will assume it is two percent until we hear otherwise.

The question I have for you is that if blasting is done in this site once every two weeks and we

established this morning that the amount of explosive that will be used is 20 tonnes. 20 tonnes every two weeks.

Two percent of that is residue in the form of ammonia which, as I said, may be too high, but that would work out to 400 kilograms released every two weeks. So it would be on the site.

And obviously some of it would be buried, some of it would be on rocks, some of it... I don't know. But there's a large amount. 400 kilograms is almost half a tonne.

So every two weeks, this material would weather and, presumably, the way the plan is in the EIS, is that it would converge or be drawn to sediment ponds, where it would be trapped.

Now, the sediment ponds would retain water and the water would be used to... Be recycled within the project, but at some point those ponds would be too full and there would have to be a controlled release, so this material, which every two weeks is accumulating and building into the system.

Now, I'm well aware that ammonia breaks down and changes to other things, but also, there would be a strong nitrogenous component to this material.

Now, as it builds up, assuming that ammonia washes out, one part of it is that it's toxic. The

other part is that it's an important nutrient.

And if there was... And we have heard earlier in our presentations, presentations of others, that if there was an anticipated storm or a big event was coming and there was some fear that the ponds couldn't hold the amount of water that was anticipated to be coming, there would be a sudden flash release of it to bring the levels down. Otherwise, the water would overflow or the berms might break. Okay?

So it's possible that not only could there be controlled releases of this material, but there could be sudden episodic events of 10,000, 20,000 litres.

Now, the impact on this... This is hypothetical, of course, because we don't know the exact number of the percentage, but the question then becomes, from a habitat standpoint, from an organism standpoint, the sudden release or even the controlled release of large amounts of toxic material or even if it breaks down and converts to nitrate or nitrite, it's still going to be nitrogenous and it's still going to end up in the environment.

I'd like to hear what you have to say about that.

Mr. TED POTTER: I'll speak to this on a couple of fronts.

The pollution prevention provisions of the **F A** are administered by Environment Canada and, in this case, the residue here would be considered as a deleterious substance, and we'd be looking for Environment Canada to speak to this.

In the scenario that you've outlined, this is something that's really become, to our knowledge, as an issue over the last few days as... You know, and the amount, as you said, could be a hypothesis as to the correct amount.

So it's not something that we have spent a great deal of time or effort looking at.

That being said, you know, this stuff goes into a sediment pond. That needs to be treated in an appropriate way.

And your question also alluded to upset or storm events which would see washouts and that. These are things that would need to be considered and contained in environmental protection plan for the site.

So there's not something there where we've gone through or reviewed anything in the EIS that would speak to that at that level as you've described.

We would be very concerned if there was eutrophication in the area on the nitrogen side.

THE CHAIRPERSON: Is there anything to be

gained by asking you to take an undertaking to reflect on this, and is this... Are your comments all that we can expect from you, or is there anything additional to that that we might find useful in considering this?

We consider this to be an important issue, and we would be interested in having a more reflective view of it.

Mr. TED POTTER: Where I would see going with this is that we'd work in collaboration with Environment Canada to provide an appropriate response.

THE CHAIRPERSON: All right. The hearings break up on the 30th. We would like to know when that might be possible.

Mr. TED POTTER: Prior to the 30th, but as soon as possible.

THE CHAIRPERSON: 29th?

Mr. TED POTTER: At the latest.

THE CHAIRPERSON: At the latest. Okay. We'll put it down as the 29th.

Mr. TED POTTER: And if it's earlier, you won't mind.

THE CHAIRPERSON: No. Correct.

I'd like to take you somewhere else as well, and that is, is that we've also discussed the role of science in this initiative. And we recognize that samples

are collected and observations are made for multiple reasons.

One of those reasons, of course, is to satisfy regulatory requirements, but there are also other requirements or needs that are filled by science.

And one of the things that has concerned the Panel is the fact that observations have been made on sediments, benthos. Photographs have been taken. Plankton samples have been made. Inter-tidal observations have been collected, that sort of thing.

But most of these are rather modest in number, maybe a dozen samples, let's say, and usually taken within a day or two or three, on the outside, maybe four times. So what we have is maybe anywhere from half a dozen to a dozen samples collected over a period of several days, which really works out to a point in a temporal point.

And in some sense, you might consider these to be opportunistic rather than systematic.

And as I said, collections of this sort can be extremely useful, and I'm not questioning the collection process itself or the quality of the individuals who did it. That's not in question.

But the collections can be used for identifying VECs, for example, or they can assess the presence or absence of things, or they can create a

snapshot.

But if you wanted to use that information to look at ecosystem-based management, for example, a broader overview, or you wanted to do long-term monitoring, for example, or, as has been suggested in the Proponent's document, the EIS, adaptive management, all of those things require very secure view of the starting point.

They require a baseline that is substantial because everything is related back to that baseline. You start from something and you proceed onward.

I'm wondering how DFO would view this in the... I'm asking now about the role of science in all this because ecosystem-based management is an important component of the EIS. Long-term monitoring has been suggested in many different places, and adaptive management is referred to in the EIS 140 times.

In other words, there are many places where things have been referred to adaptive management. This is what we'll do, and if we run into difficulties, this is how we'll do it.

So I'd be interested in DFO's comments.

Oh, and there's one other example which I might offer to you, and that is, it's been suggested that the conservation square that is used to contain... That contains the right whales that a small boat would monitor

the explosives, the shock waves from the explosives, at the corner of that square.

And it's considered to be long-term monitoring as a way of gauging the impact from the explosives on the right whales.

And maybe you could comment on the value of that.

Mr. TED POTTER: There'd probably be two or three of us who would respond to this question given its breadth.

With regard to your introductory part about the number or quantities of samples taken, they are low. They are very low.

It provides some background information. It gives an indication of what's present, so it can be used as a presence-absence for what's been found, but it does not provide a detailed baseline overview that could be used for future environmental effects monitoring.

In particular with respect to other, large-scale projects we've been involved in, this is probably one of the weakest parts of the science links going forward, is not having adequate or sufficient quantitative versus qualitative baseline measurements.

Over the course of an environmental effects monitoring program, our observations for other

proponents has been more along the lines of hypothesis drift as opposed to substantiating hypothesis.

The questions from a scientific perspective, these were the predictions that were made in the Environmental Impact Statement. Here are our conclusions as to what would be the results, and we have either met or not met them.

And therefore, the value of the information derived is limited, at best. And so that would be a key cornerstone that an effective environmental monitoring program would be established, the cornerstone of which would be sufficient in number and in quality of baseline samples so that... As a general overview.

And this is across many major projects.

THE CHAIRPERSON: I could ask Dr. Smedbol about the corner monitoring of sound, particularly in result of the blasting. Will it be useful? Will it be effective?

Dr. KENT SMEDBOL: Yeah, I haven't given that a lot of thought.

One thing that comes to mind immediately is I would see the primary use of such a passive receiver would be simply to monitor the... And determine the level of received sound from the blast and to ensure that that level of received sound is below some threshold that has been determined by management of the project.

It's interesting to note that, unrelated to the project, that one of the core objectives of the draft recovery strategy I have in front of me is actually passive acoustic monitoring of the population.

So there might be some piggybacking on that value above and beyond its worth to this particular proposal. Beyond that idea of ensuring that received sound stays below a threshold, given... For instance, if it was only one receiver, you can't triangulate on, so that same receiver could also be set up with hydrophones to receive whale calls, for instance.

If you had an array, you could then triangulate on calls and determine where the whales are relative to the sound source, so there may be additional value in that.

I think the receiver would have to be set up in a way that it can be interrogated almost real time.

There are examples of this in use, for instance, in Cape Cod Bay. There is a passive acoustic array set up in there to track right whales in relation to traffic and they're communicated with through cell phone technology.

Beyond those two ideas, determining received sound level and detection of right whales, off the

top of my head, I can't think of any other strong uses for it. Give me a few days, I might come up with some other hypothesis to test.

But I think the important one is ensuring compliance monitoring.

Mr. MIKE MURPHY: There's some additional comments from Tana.

THE CHAIRPERSON: Please.

Ms. TANA WORCESTER: My additional comments were just on the first part of the question, not so much on the right whale monitoring.

In terms of long-term monitoring of environmental effects, I guess some other experience from some other projects would be the establishment of sites that you could go back to and look at sort of over time.

So in order to look at a time series of change over time in response to an environmental effect, you might want to establish those up front of what the locations were that you were going to investigate.

And certainly, I mean, specifically in relation to the existing baseline monitoring data in terms of the inter-tidal habitat, for example, there might be additional sites that you would want to investigate, including what was mentioned this morning about the Laminaria beds or the kelp beds, which I believe were not

surveyed in the information that's been presented to date.

So that would be another component to consider.

THE CHAIRPERSON: Thank you. Thank you to all of you.

Mr. GUNTER MUECKE: Since we have been talking about monitoring, maybe I can continue along those lines.

Bilcon also proposes to monitor for invasive species, and now I need feedback because my memory has just gone from Bilcon.

Could you quickly outline to us again the monitoring program for invasive species that you're proposing?

Mr. PAUL BUXTON: I think I... Rather than get into specifics, I think I should return to a point here, and I was going to make it in my remarks, but that we have proposed monitoring protocols, but there has been general agreement at all meetings with DFO that the issue of long-term monitoring would be discussed with DFO, with the appropriate people within DFO.

So whether it's... And I noted the comment that we would be doing monitoring at the corner of the North Atlantic right whale conservation area in a boat.

Well, I don't think we've ever discussed

a boat, and we would certainly not propose a boat. It would be either a surface buoy or a bottom-anchored buoy, whatever our experts proposed, and the protocols of the information would be determined in consultation with DFO.

I think what we have said is that we have got some background information on invasive species. We have taken samples at the site, that we will take samples in the future at certain points in time for two reasons.

One is we want to know what's happening at the site because if something does come in, we want to be able to issue a warning that it's come in.

I'm not so sure that there are rules and regulations in place which would specify what we should do in terms of monitoring because the compliance monitoring basically rests with Transport Canada.

And I think I made this point the other day that what we would like to do is to contribute to some knowledge here so that we would propose to do some long-term monitoring of invasive species off the site.

We would like to do that in consultation with DFO so that we can determine (a) if something is coming in, but also to provide some background and some research data on the site.

So I don't think I'd be prepared right now to say this is what we intend to do, although we have

suggested various things that we would propose to do. Those things, in my view, would be determined in discussions with DFO.

Mr. GUNTER MUECKE: Okay. Could I turn it back to DFO, then?

What would you envision would be an effective monitoring program for invasive species?

Mr. TED POTTER: Our first step would be before that. It's prevention, as Mr. Murphy outlined in his presentation that one incident can lead to colonization either at a local or regional level.

So prevention is the measure here as opposed to sighting it once it arrives. Invasives have proven very difficult to the point of almost impossible to eradicate on establishment.

So the first part would be direct... The main mitigation would be directed at the ballast transfer as through the Transport... Or Transport Canada regs through the ballast.

Within the broader context in a Nova Scotia setting, there are 45 monitoring sites in Nova Scotia along the coast, through the Bras d'Or Lakes, as well as 11 additional sites on the New Brunswick side of the Bay of Fundy.

DFO's aquatic invasive species group is

looking at five species, primarily tunakits. Of those, we have already discovered... Our closest monitoring site is at the Digby Yacht Club, and we have found gold star and a few vase tunakits at that site.

We have also found... Our next site going down around the Neck and around the Islands is near Meteghan in St. Mary's Bay, and again, vase and gold star tunakits are present there.

We are concerned that other species would come in. In particular, we're concerned about potential diseases that would affect lobster and, in particular, the disease that affected the Long Island lobster in 1999.

There are green crab, which was mentioned in our presentation, which have already established themselves and have moved north along the coast through the Bras d'Or Lakes and into the Gulf of St. Lawrence.

And we are concerned about Chinese mitten crab as well entering the area.

Monitoring. We have monitoring protocols set up, and I believe it's... I'll just refer to the document here. We can provide a copy of that to the Panel, but it's ranked as invasive species Level 2 monitoring.

And there's a whole series of detail here as to site selection, protocols, equipment to be used that we can provide.

Really, monitoring confirms that you've got a problem and there's very little you can do about it. Prevention is the answer in this case.

Mr. GUNTER MUECKE: Thank you.

Ms. JILL GRANT: Just a couple of other questions on the invasive species question.

Do you have any special concerns around the area where the ship is going, the other end?

Some concerns have been flagged in a study done for the Proponent by Mallet about the high risk of some of the species in that area, so I just wonder whether that creates a special concern or not.

Mr. TED POTTER: In general, it's the ballast water that is the source of invasive species, although it's not the only source. There could be attachment to the hulls.

Our environment assessment focuses on invasive species coming to our area, not going to a home port, international destination. Our jurisdiction doesn't carry us that far.

Ms. JILL GRANT: What's your experience of the effectiveness of ballast water transfer for removing

the risks of these kinds of organisms?

Mr. TED POTTER: That would be beyond my capacity to answer.

The program has been put in place over the last two years. The monitoring started last year.

And for effectiveness, what we've seen is about five species per decade since European arrival in the Americas. And with increase in shipping and vessels going all over the world, I'd be at a loss to see that actually declining.

We are trying to take preventative measures here. I think that, in the long run, this will delay as opposed to prevent.

Ms. JILL GRANT: One of the species that you mentioned is the parasitic lobster disease.

What's the value of the lobster fishery in the Bay of Fundy, and what's the nature of the parasitic disease that might affect them?

Mr. TED POTTER: What I'll do is I'll ask two experts here we have with us. I'll ask the Area Director for Southwest Nova Scotia to speak to the value of the lobster fishery, and then I'll ask Dr. John Tremblay to speak to the effect with regard to lobster.

Dr. JOHN TREMBLAY: The way the information on landings is acquired b DFO is through logs

from fishermen. It's not sliced up quite as easily.

I don't have that in front of me for the entire Bay of Fundy, but on the Digby side, looking at, say, the upper Bay of Fundy on the Nova Scotia side, you'd be looking at the order of 10 million, 10 million dollars.

Are you looking at... Looking for figures on value or landings?

Ms. JILL GRANT: I'm not sure what the difference is between those two, but we... Yeah. We want to get a sense of what the annual value of the lobster fishery is.

Dr. JOHN TREMBLAY: Yeah. It's substantial.

With respect to the disease, it hasn't been found north of... It hasn't been found in Maine, I don't believe, so there are, you know, other waters where these vessels are going through and the disease has not been found there yet.

So I expect the chances of it getting here are reduced, but they're not zero.

Ms. JILL GRANT: And does that disease completely eliminate the lobster catch? Does it reduce catch?

What is, exactly, the effect of it?

Dr. JOHN TREMBLAY: In Long Island Sound,

which is quite a localized area when you look at the distribution of lobsters as a whole, catches declined remarkably over a period of several years.

But I understand it wasn't just disease. It was a combination of low temperature, particular environmental conditions, low oxygen as well.

So I'd be very surprised if it would eliminate any population of lobsters on its own, but it would certainly have a serious impact.

Mr. MIKE MURPHY: If I could just add in terms of the value of the lobster fishery, I wouldn't want you to leave with the impression that the industry is 10 million dollars.

It depends on where you decide to... From what line to what line. You know, I think if it was helpful we could provide you with some information by statistical district or by different areas along the coast and you would have a sense of 10 million dollars in this particular area, but if you expanded those boundaries out, you may be talking of 300 million dollars in Sou'west Nova Scotia.

I mean, it just depends on where you want those boundaries to be.

Ms. JILL GRANT: Thank you. That would be very helpful, so we'll register that as an undertaking.

If you could get it to us by the 29th at the latest, that would be great.

Mr. MIKE MURPHY: That one I think we can get by the 29th.

Mr. GUNTER MUECKE: While we're on the lobster fishery, I'm, in my mind, trying to configure how the impact of this project on a lobster catch can be evaluated.

And is it possible or has it been done in terms of the possible local effects to evaluate? You have to have a baseline to evaluate change, have the lobster catches been affected.

This will be, obviously, within a certain specified, limited local radius, and to evaluate it you have to have a lobster catch analysis prior to the enterprise.

Has this been undertaken or should it be undertaken?

Dr. JOHN TREMBLAY: It hasn't been undertaken. There are landings available on a 10-minute grid basis.

That's the finest resolution we have, so quite a large area, but we do have landings on that basis going back 10 years, so we could look at the grid that is closest to the proposed quarry and look at changes over

time.

Obviously that's not the best way because we like to have higher resolution information, so this is why DFO proposed a monitoring program.

We haven't discussed this any further. We certainly would want some industry input in the design of any such program, but it could involve sampling before and in between actual blasts, for example, to see if something like catch rate declines dramatically after a blast.

And it could also involve looking at hemolymph protein to see if it's affecting moult cycles and so forth.

But basically, there is not a lot known about the effect of blasting on lobsters and other decapod crustaceans, other crabs and so forth.

It certainly doesn't seem to induce mortality. Some studies in the lab exposing animals to quite high levels of seismic have not shown any mortality, but there are some sub-lethal effects that have been shown recently.

Most of that information is preliminary or in review, is where that is. It hasn't really been peer reviewed.

Ms. JILL GRANT: Just a follow-up. We asked Transport Canada earlier today, and maybe it's

appropriate to ask you as well.

Given the nature of the kind of turbulence that the ship's likely to generate coming in and the unpredictability of when it's going to be able to get in due to conditions, how feasible do you see it being for lobster fishermen to continue to work in this area once... If the project does go ahead?

Mr. JOHN TREMBLAY: I guess we really don't have the information on the table as to what the turbulence would be, to answer that question.

I mean, there is fishing going on in other areas where large ships come in, but, you know, we don't have the comparative data to make the conclusive statement.

THE CHAIRPERSON: That information wouldn't be generally available, say, 70,000 dead weight tonne ship reversing its propellers, for example, as it positions itself. The amount of energy released into the water would be huge.

And that turbulence, I mean, tipping over lobster pots, perhaps, or... I don't want to put words into your mouth. I don't even know the answer to this.

And lobster pots are joined together so that tying them up in knots and that sort of thing, is that just fanciful or is there any possibility there?

No one knows.

Mr. TED POTTER: I think the answer is nobody's really looked at this closely.

With regard to what's proposed here, if we were to look across the Bay at the Canaport facility with huge oil tankers coming in, there's an exclusion zone there for safety while the vessel's coming in.

And having talked to some of the operators, while the vessels are not there, strings of lobster pots are laid through the area and recovered or retrieved prior to a ship coming in.

That does not negate that traps get entangled or washed out.

What DFO would do, because this is not part of our authorization process, is we would strongly encourage the Proponent and industries, in particular in this case with the fishing industry, to have discussions on how they would interact and what the arrangements would be there and come to an agreement.

THE CHAIRPERSON: Thank you. That's very helpful.

Mr. GUNTER MUECKE: We understand that there is quite an important herring fishery in this part of the coast, and having a facility, the loading facility which is lit up and with lights directed downward in order to

avoid boat collisions and interference with migratory birds, could you give me a sense of how you feel about possible interference of the facility with the herring fishery?

Mr. KENT SMEDBOL: Light is a known attracter for herring. In fact, it used to be commonly used in the herring fishery, the seiner fishery, as a way to attract fish to the surface. That's no longer done.

So I could foresee, hypothetically speaking, that it may actually function in drawing herring into the area.

It should be noted that there is... The area along Digby Neck, in the summer months, it does sustain a very heavily prosecuted fishery for herring. Mainly seiners come in quite shallow in that area.

There are also still several weirs that function along Digby Neck, so it's a known area for herring aggregations during the spring, summer, fall months.

Other than it... So it is possible that lights at night could attract them, but they're there in the area to begin with.

Mr. GUNTER MUECKE: Would it in any way interfere with their spawning or their usual movement patterns?

Mr. KENT SMEDBOL: Spawning areas for herring in Scotia Fundy are well documented, and there isn't

one in that particular area.

Spawning tends to occur in the summer months, usually July, August for this species. The main areas in and around Fundy would be there's a large spawning area in Scotts Bay at the head of the Bay.

There's also a very large one on German Bank, which is the largest component of Scotia Fundy herring, where that spawns. There are a few smaller ones down past St. Mary's Bay.

To my knowledge, there is not a substantial component that spawns in that area.

Mr. GUNTER MUECKE: What about movement patterns?

Mr. KENT SMEDBOL: They actually move back and forth quite close to the coast in that area. It's one of the reasons why we... You know, it's an historical area for fishing weirs.

It's also one of the reasons why we find large fish-eating whales in the area. They're targeting herring in that area so, for instance, herring are the reason why we have whale watchers on Digby Neck.

THE CHAIRPERSON: Okay. I believe that the Panel is finished its questioning, so now we'll turn it over to the Proponent, Mr. Buxton.

Mr. PAUL BUXTON: Thank you, Mr. Chair.

Some of these will be clarifications, some may be a comment, and some may be direct questions, if you'll let me.

To your last question with respect to turbulence, it may be that there is significant information available at Porcupine Mountain Aulds Cove. Certainly about 60 ships a year come into that facility to pick up aggregate and, also, there was a coal loading facility there taking coal up to Point Aconi.

And I'm led to believe that the area directly in front of the port is, in fact, heavily fished for lobster, so it may be that there is some background information that the local lobster fishermen could provide data on.

I don't have it, but it may be available.

A clarification with respect to the in shore Bay of Fundy salmon.

I did say May through September, and Mr. Murphy said May to October. It may be my wretched accent, but I did say May through September, and I'd like to ask you if that's correct.

Mr. MIKE MURPHY: Our information is to October, through October, that would... There would still be inner Bay of Fundy salmon in the area in October. So to or through.

Mr. PAUL BUXTON: Okay. Thank you. I think our original information was that it was May through September, and so that's what we put in the document.

If it's October the 15th, we have no difficulty with that. We just don't have that information, I guess.

On to fish habitat compensation plan, which was mentioned in your presentation. And I would just simply like to comment on that, perhaps, that I think we spent a dozen, perhaps not a dozen, 10 meetings with DFO officials outlining this compensation plan to the extent that we felt at our last meeting that everybody was comfortable with it.

I understand since from DFO that there's been new research, new documentation and they would like us to revisit that in the light of new information which has come to hand, and we're very comfortable with that. If there are new technologies, we'd be very pleased to meet with DFO again and revise that plan in accordance with better science, if you like.

I have a comment on CEAA and a question on CEAA. Perhaps as an impression that only new projects that pass through comprehensive studies or panels are subject to CEAA, and I would like the DFO expert... I am sorry about names. Didn't get them all in my head. To just

comment on whether or not CEAA, in fact, applies to all existing projects as well as new projects which are coming in.

Mr. DAVID MILLAR: There's different components of CEAA that apply differently. Section 79, which is the project review component, applies to new projects. It's specifically intended to apply to these kind of situations, projects that are undergoing an environmental assessment under CEAA.

And so that's intended to make sure that CEAA review identifies adverse effects on species at risk and proposes appropriate mitigation monitoring.

So that part of the Act would apply only to new projects. On the other hand, the prohibitions which say you can't harm, harass, kill applies to all activities unless they have a permit or some sort of exemption, so that does apply to all activities regardless of whether it's a new project or an ongoing activity or any other kind of activity, regardless of whether it requires a review or an EA or anything.

Does that clarify?

Mr. PAUL BUXTON: Thank you very much, Mr. Chair.

I would just like to make a comment on ammonia, since it came up yesterday, and, in fact, we have

an undertaking to provide you with some background data.

And also, we are preparing an additional piece on that to clarify our position.

But I would like to refer to a meeting which was held February 7, 2005 with DFO and Bilcon, and it covered a number of subjects, as our many meetings with DFO did.

But at that meeting, DFO... And these are the minutes. I'm reading from the minutes of the meeting now, which were prepared by DFO.

"DFO provided the Proponent with a paper entitled 'Practical Methods to Reduce Ammonia and Nitrate Levels in Mine Water' by Gordon F. Reevey on mitigation measures for the use of ANFO, ammonium nitrate fuel oil-based explosives. DFO's explosives expert has said that if the mitigation that has been proposed by the Proponent and the recommendation outlined in the paper by Gordon Reevey were incorporated into the blasting plan, there will be little in the way of residual impacts occurring from this aspect of the proposal."

And I could just also add to that

that... And we will put this in writing for you, that an awful lot depends, of course, on best practice.

If things are done properly, certain things happen. If they're done improperly, other things, and not very nice things, happen.

In correspondence with Gordon Reevey as of last night, communication to Bilcon, his statement is the percentage of ammonium nitrate residue would likely not be measurable if best practices are used.

Now, we intend to put this into a little presentation for you along with the reference documents that you asked for, and we will give that to you before this Panel terminates.

I would like to ask just, really, a general question with respect to the model, the CONWEP model. This is certainly not my field of expertise, and clearly DFO has very considerable expertise.

But I would like to confirm, and this was my understanding and I think it had been clearly said in the documents, that the CONWEP model that we ran was, in fact, a very conservative model.

Mr. NORMAN COCHRANE: Presumably you want me to respond to this.

Mr. PAUL BUXTON: Well, let me perhaps give a quote from DFO's comments on our EIS because we can

only respond to communications that are made to us. And it refers to fish habitats blasting:

> "Most assertions in this section are based on the acoustic model study by Department. Hannay, JASCO Research, and D. Thompson, LGL Limited, titled 'Peak Pressure and Ground Vibration Study of Whites Cove Quarry Blasting Plan'. Comments on this study have been provided previously by DFO. See Appendix 9 of the EIS.
> And that was a preliminary.
> Several issues were earlier identified in regard to the study, the most important pertaining to apparent quantitative inaccuracies in assessing how P compressional to S sheer wave conversions at the water sediment interface would enhance the amplitude of P waves transmitted into the water. The conclusion was that Hannay and Thompson study probably over-estimated the compressional wave amplitudes transmitted into the water column. This would tend to strengthen the statement

that the model presented represents worst case situation."

And that is a direct quote from DFO comments. Our response to that was:

"Bilcon agrees with the conclusion that the CONWEP model study conducted by JASCO Research probably over-estimated the compressional wave amplitudes transmitted into the water column and that this aspect of the model represents a worst case situation."

I'd just like a comment on that, please.

Mr. NORMAN COCHRANE: Is it all right if I speak to this, Mr. Chairman?

THE CHAIRPERSON: Yes, please.

Mr. NORMAN COCHRANE: Yes. I think there's a bit of confusion here.

The CONWEP model is only one component of the Hannay and Thompson overall model. We mentioned the CONWEP model, which was essentially a model for giving us the time domain signature of the compressional wave in the bedrock generated by the explosion. That is the CONWEP model.

The Oriard model is the model that attempts to quantify the transmission of acoustic energy

from the bedrock into the water.

And in addition to that, the Hannay and Thompson study also attempted to look at what happens within the water wedge itself and how there can be interference phenomena that tends to decrease the acoustic pressure signature within that wedge of water itself.

So there are really three different components, and the CONWEP model is only one of them.

I, myself, am not an expert on the CONWEP model, and I cannot really give you a very good idea of just how accurate it is likely to be or at what range it would give an adequate description of this compressional wave pulse in the bedrock.

Mr. PAUL BUXTON: Thank you very much. I would just perhaps like to ask a follow-up question. It was our intent on this project from September 2002, when an application was first made, to in fact have a blasting plan approved so that we could set off test blasts and produce empirical data, and I would just like a comment on the value of, let's say, models versus the data that can be gained from empirical test blasts where we now have concrete evidence.

Mr. NORMAN COCHRANE: Yeah. I'd like to go back to some of your earlier comments. I would like to say that we still...

In fact, in my earlier remarks, I did support the stated conclusions in that DFO report that indeed the transmitted pressure wave into the water is likely to be somewhat lower than was stated in the Hannay and Thompson report by...

A transmission coefficient lower by about a factor of five, which probably makes you very happy so...

But I should also say that there is some concern about the Hannay and Thompson model, as well as the reverberation phenomena within the water column is properly and adequately modelled. So in a sense, that might increase the acoustic levels within the water column.

But at the same time, the model does seem to be parameterized fairly conservatively, so... But there are many uncertainties. It's a very simplistic model, and I believe what you're trying to imply is that monitoring is going to be a very important component, and I would certainly concur with that, and I would certainly encourage a very comprehensive modelling or monitoring, as opposed to strict modelling, study.

Monitoring is going to be all-important.

Mr. PAUL BUXTON: I think that that was the point that I was trying to make, Mr. Chairman, however complex, and this seems to be an extremely esoteric subject

which I don't pretend to understand.

But certainly we do intend to enter into detailed discussions with DFO's experts to set up the test blasts to that we can either confirm or amend the sorts of distances that we've set out, and I think that that's the position that we've taken from day one, and we're simply waiting to be able to do the test blasts to be able to do that.

Just moving on a little bit, and again, I don't want to get into large debates about these issues, but perhaps a commentary would be useful. We did have some information earlier on this afternoon about ship speeds and the speed of the ship with respect to mortality rates.

But I think we missed out a rather large section of the discussion, and that is, I wonder whether any reliable information can be brought forward with respect to the reliability or, I'm sorry, the probability of a whale/ship collision, because we can debate what happens when a ship hits a whale, but what is the probability of a whale/ship collision in the Bay of Fundy?

Mr. KENT SMEDBOL: There are a series of analyses that are currently under review. They have not been peer reviewed. They deal specifically, though, with the relative probability of collision, not the absolute probability of collision. So what these analyses evaluate

is the probability of having a collision in a particular area within the Bay, relative to any other area within the Bay. But it can't, but these analyses can't give you an answer that says there's a one in one thousand chance a whale will be struck.

It's... There are statistical reasons why for that. For instance, we don't know where all the whales actually are in time and space, so we can't give you, we can't calculate an absolute value. So I guess the short answer is at this moment there is not a peer-reviewed document that can provide that answer. It is an area of current study, even the absolute analysis.

Mr. PAUL BUXTON: Yes, thank you. We've found the same thing. We do have at hand a non-peer-reviewed study, which leads us to believe that the levels of probability are relatively astronomical, and you may have access to that document and may want to comment on it.

Mr. KENT SMEDBOL: One comment I can make is that the probabilities, the magnitude of the relative probabilities are driven by where the whales are, not by the ships. I'll leave it at that. So one could understand that the likelihood of collision, the relative likelihood of collision is highest in the lane of the traffic lane that crosses the major concentration of right... Or just is adjacent to the major concentration of right whales.

So it is the whales that tend to drive the risk.

Mr. PAUL BUXTON: Yes. Thank you very much. But I'm just wondering whether anybody has an estimate of the probability. We know in general terms where the ship is going. May be some debate about precisely where it comes off the shipping lanes.

But in broad terms, could you characterize the level of risk, the probability of a whale/ship collision?

Mr. KENT SMEDBOL: Again, not in absolute terms, and I'm not the lead on these analyses. I am familiar with them, and given they're not peer-reviewed, I don't know how much I should really speak to them, since I'm not the author.

But in general, if you can recall the sightings per unit effort map that was displayed in two of the, actually one of Bilcon's presentations and also one by Dr. Taggart, that figure is not greatly different from the relative probability analysis.

As I said, it tends to be driven by the whales, but I must stress, this has not been, this has not made its way through peer review.

Mr. PAUL BUXTON: Thank you very much. On whales again, I think something else that perhaps was not

gone into, we talked about the issue Okay. blasting with respect to whales, and we have talked about the issue of whale ship collisions.

But I wonder if you could give us some sort of reference or some picture of, for example, what the effect of fishing is on whales, for example net entanglements, and I'm aware of a paper that was produced I think jointly between Nova Scotia and Scotland within the last year which talked about the fact that whale watching tours were now being held to be the most significant problem with respect to behavioural effects on whales.

A comment would be useful.

Mr. KENT SMEDBOL: I have some of that information before me. For context, last winter, in February, DFO undertook what is called a recovery potential assessment for North Atlantic right whale, so most of these statistics that I'll read off in the next little bit are driven from that analysis.

So I do have some information that relates to that. I'll find the Table. 50 percent of mortalities in right whale are known to have... Known mortalities in right whale have a human origin. Of those, almost all of them are either due to vessel collision or entanglement.

So from 1970 through January of 2006 for

known mortalities in North Atlantic right whale... These numbers include both Canadian and U.S. waters... We have 27 mortalities due to vessel strike, we have eight known mortalities from entanglement, 12 mortalities are suspected from entanglement, there are eight whales currently entangled, 33 have been entangled in the past, and are now gear free.

We have 21 mortalities for which there is not a known... To which we could not ascribe a cause, and this is all excluding neo-natal mortalities, so not young of the year, 'cause there tends to be a high mortality among newly born calves.

Some more statistics. From 1986 to 2005, there was 61 confirmed reports of entanglements of right whale. Of those, a significant proportion have been entangled more than once.

In fact, over 60 percent of the population, the last estimate which is not published, but I have from the right whale consortium, and the New England Aquarium, is that 71 percent of photographed right whales have entanglement scars.

Two issues related to detection of cause of mortality. The first one is that... And I think the question even the Panel was getting toward this; that if ships... If vessel collision occurs offshore, we do not

know, we don't know what, how many of those that are actually struck that we detect, and when we do detect and are able to assess the condition, they're usually well, you know, well into decomposition. But if they get hit well offshore, we are not going to detect.

In fact, there was a vessel, a whale that was struck off the coast of Georgia this winter, and simply... Well, a dead whale was detected floating. We never could get out to assess it because of weather conditions, and we lost track of it. It's gone.

Another thing is all... So the best way to characterize this, then, is that known mortalities due to human causes are underestimate of the actual number of mortalities caused by human activities. So I already mentioned vessel strike; what happens if it occurs offshore. We might not be able... It may escape detection.

With entangled right whales, for those that are chronically entangled, and that end up dying from that entanglement, they are often in an emaciated state so they no longer float, or it's highly unlikely that they would float. So if the animal eventually dies, we may not detect that death.

So there are... We actually have a statistics in the consortium that is used. If we do not re-detect an animal after seven years, it's considered dead,

and a higher proportion of animals that have been entangled for at least two years fall into that category than the population at large. So there is some evidence to say that we are not detecting all of the actual human-induced mortalities.

But that's all that I have with me.

Mr. PAUL BUXTON: Thank you very much. I didn't realize I'd get such a comprehensive answer.

Just perhaps another quick comment, can you... And I was surprised to hear you say that there had been a detected whale killed from a small vessel, and you characterized that by being in the 50-foot range, which would be a standard size, let's say a scallop dragger. Have you any information in fact to sort of characterize ship strike mortalities by size of vessel, for example?

Mr. KENT: Yeah. In that case, and all the necropsies are actually undertaken by a team that's led out of Wood Hole, Woods Hole Oceanographic Institute, so DFO actually doesn't undertake necropsies but we are party to the information.

There are two known deaths from ship strike that are likely caused by... My sentence structure's horrible there. In the last two years, two whales that have been struck and likely killed by a vessel, it was determined that it was likely struck by a small vessel, so the first

one which I had mentioned was off Campobello in 2005; a second one off the coast of North Carolina. In that case, we know it because it was hit, and then the owner of the vessel reported it. That was about a 50-foot pleasure craft.

The one that was struck in the vicinity, in Canadian waters, in the... Around Campobello, an analysis of the corpse showed from looking at propellor cut patterns on the corpse, from that and from the mark of the skeg which was visible through the cut pattern, one can determine approximately the size of the prop that struck that animal. And from that, that information was sent to a marine engineer and a marine architect, and they said the best guess was that prop size was between 26 to 30 inches. So it was obviously struck by a small vessel. Whether that vessel was a commercial vessel or a private vessel, we don't know.

So the point is right whales can be killed by vessels of all sizes. The manner of their death is different. So in that case, it was probably blood loss. In necropsies of dead whales, there's a second type of cause of mortality, and this is usually extreme blunt force trauma, and this is the one that we consider likely to have occurred from large vessels over 300 gross registered tons. So in those necropsies, you can see, for instance, jawbone

completely broke.

There's one case last year where the skull was actually cracked in two. The very large broad-scale injuries that are consistent with extreme blunt force trauma, and we would consider those to be consistent with impact from a large vessel.

Mr. PAUL BUXTON: Thank you very much. The... My previous question actually had two parts, and you answered one at great length and in great detail, but the second one was concerning a recent study 2006 between a Scottish university and a Nova Scotia university that reported to find that whale watching was the biggest cause of behavioural changes in whales. If you could comment on that, I'd appreciate it.

Mr. KENT: Yeah, I'm somewhat familiar with that study, and this is... We acknowledge even within Fisheries and Oceans science that this is a knowledge gap that we have to fill. We actually had our own pilot study to evaluate behavioural responses to ship, to vessels in the Bay of Fundy, but we've been unable to secure further funding for that.

In that particular study, it looks at what is considered chronic visitation of individual animals so that the view in that particular paper is that these animals were exposed at, to small vessels, whale-watch

vessels, or also private vessels, for an appreciable time during the day, and the view of those researchers was that this, in their interpretation, was interfering with those animals' ability to undertake their daily requirements for, you know, feeding and socializing and that sort of thing.

Well, that was their conclusions. There is, among whale researchers, some acknowledgement that this could indeed be occurring. On the west coast, for instance, with transient killer whales, there are rules about not only how close you can approach those pods, but for how long you can stay on an individual pod.

We have done some back in the envelope calculations based on mark recapture photography of individual whales.... We can identify individual right whales by their markings.... That for instance one whale in 2004 was visited 14 times in one day, 'cause we had 14 photographs from different proprietors. So there's no doubt that this may be an issue. We have not properly evaluated it, though.

Part of the problem is determining... The real kicker for this is determining impact of those visitations, because the variant, the change in behaviour among individual whales is extremely variable, so it requires a fair bit of data to be able to pick out patterns that we could then relate perhaps back to that human

activity. But we fully acknowledge this is a... At least from DFO science, we consider this a knowledge gap.

Mr. PAUL BUXTON: Thank you very much. And finally we've had some doubts with respect to the capacity of observers at whatever height and with whatever techniques being able to detect varied mammals in the water at various distances.

I believe that the last time that we met with DFO, or perhaps second-last time, we did discuss the state of the art and the development of detection devices to assist in this kind of thing, and I wonder whoever would be the appropriate person could comment on that, at this time.

Mr. MIKE MURPHY: Yeah. Unfortunately, there's nobody here who was at that, who was present at that meeting. I think earlier on Kent gave a fairly good overview of the process that they use in science for observation, and certainly that, you know, that gives you a sense of the protocols, or a sense of the concerns that we may have.

Mr. KENT: There is one addition that actually I forgot in my evaluation. When the Panel had asked me to... About the probability of detecting animals at distance. If you have a stable platform, you can also employ what are called "Big Eye" binoculars, which... I don't know if you've ever seen them, but they're... And

they can basically take you out to the horizon, but the... And these are used on large, stable platforms such as large vessels. The National Marine Fishery Service uses them on their surveys.

But again, you need good sea state. That's still a factor. There's no doubt that... It may not help you in the original detection, but it may help you in honing on that cue, and determining the species.

The other issue would be passive acoustic detection of animals. That's sort of considered state of the art.

Mr. PAUL BUXTON: Thank you very much. I think at that meeting we did say that we would commit to whatever new devices were, had been devised for the detection of marine mammals, and it seemed that the state of the art, at that time, was not quite developed.

I think if I could just turn to my colleagues just to see whether that is complete, if you wouldn't mind, Mr. Chair.

--- Pause, conferring with colleagues)

Thank you, Mr. Chair.

And I would like to say, at this stage, that we have been meeting with DFO officials since July 2002. We've had a significant number of meetings on a large number of issues, and I would, on behalf of the company,

like to, at this time, thank DFO for their professional advice to us over the years. We very much appreciate it. Thank you, Mr. Chair.

THE CHAIRPERSON: Thank you, Mr. Buxton. I think there are a couple more questions from the Panel that have surfaced since, so Gunter?

Mr. GUNTER MUECKE: Yes. I would like to briefly come back to the blasting model and the test blast.

The blasting model is a numerical model which involves large uncertainties. I think that we have established that. And I would like to have your comments on the value of a single test blast in evaluating a model of this type.

Mr. NORMAN COCHRANE: Well, I think there are two types of test blasts that one might consider. One might be the detonation of a single shot hole, and the other would be the detonation of a pattern of shot holes similar to what would be utilized during the operational phase of the quarry, which could involve something like 50, 60 or maybe more shot holes.

And I think really both of these should of these should be done. For one thing, I think the detonation of a single shot hole could be quite valuable in determining whether reverberation effects within the water layer are quite significant or not, and I personally am not

quite certain as to the significance of this, and I think you have to realize that these models are very simplistic, and whereas the physics are very complicated, and certainly the use of a single blast, a single shot hole blast would give us some confidence that we have really captured the complexity of the phenomena.

Mr. GUNTER MUECKE: Thank you. Just in my memory, a similar model was evaluated, or they tried evaluate at another quarry. This was respect to damage to buildings, and it actually, in terms of testing it, they suggested that it would take at least a dozen events to test the model to some level of satisfaction. Is that a realistic evaluation that it would take?

Mr. NORMAN COCHRANE: I would say the more events that can be tested, the better, yes. But certainly even if the physics is really not properly covered by the simplistic model, by a great margin, maybe even one test would disclose that. But certainly the more you have, the better.

I mean, there are many approximations and simplifications have gone in this. We don't consider a rough interface, the fact of scatterers, boulders, that sort of thing, and also I think there could be disagreement as to exactly what the slope of the interface is, or how it is really oriented, as well, with respect to the blast. I

don't think the geometry of the monitoring has been very well defined.

Mr. GUNTER MUECKE: And the model assumes homogeneity?

Mr. NORMAN COCHRANE: Yes.

Mr. GUNTER MUECKE: As a geologist as opposed to a geophysicist, I never look at a rock body and think of it as being homogenous.

Mr. NORMAN COCHRANE: Certainly if there are systematic refraction effects, then that could affect the effective angle of incidents of the blast waves onto the base of the water column, and the propagated energy into the water column is very critically dependent upon that angle of incidents.

Ms. JILL GRANT: We don't have time to get into all of the, those species that are listed under CEAA. We had a fair bit of time to talk about whales, but... The right whale, but I wonder if you could endeavour to come back with(sic) us with a summary table of the species listed under CEAA that apply in the marine environment in this Project, and identify the potential effects on each, and whether the effects are likely, as defined under CEAA... Whether the likely effects are adverse, and whether they're mitigable, and whether a CEAA permit would be required.

If you could do a summary table on that for all of the species, that would be very helpful for us.

Mr. TED POTTER: We'll do it.

Ms. JILL GRANT: Thank you. By the 29th is okay?

Mr. TED POTTER: [Inaudible].

Ms. JILL GRANT: Thank you very much.

THE CHAIRPERSON: Okay, I think...

Mr. PAUL BUXTON: Mr. Chair, I wonder...

THE CHAIRPERSON: Yes?

Mr. PAUL BUXTON: I think a new element was introduced...

THE CHAIRPERSON: Yes.

Mr. PAUL BUXTON: ...and I think...

THE CHAIRPERSON: Yes, of course.

Mr. PAUL BUXTON: ...I must comment on it. I don't believe that we've ever talked about a single test blast. We reference in our document an initial blast. In all our discussions, we've talked about whatever information we need to do to test the model, and find out what is happening, and I think that that would be our commitment.

And I would also make the point here that since 2002, when we first tried to, I guess, have a blasting, an initial blast, and a test blast put in place,

at that time, we had a quarry on the site, a permitted quarry. And hence we came under the Rules and Regulations of Nova Scotia Department of Environment and Labour.

Later on we dropped the permit to that quarry, and I would say that when the quarry ceased to be there, we could have, in fact, had our test blasts on the site. We were only prohibited from holding that test blast, because we held a quarry permit.

And I think that what we have tried to do here is to be very reasonable with the process, and not, I suppose, be somewhat inflammatory by setting off test blasts to get this empirical data which I think you will all agree would have been very valuable to present to this Panel.

But there has been nothing to stop us setting off a blast on that site since we gave up the quarry permit.

Now having said that, DFO will very quickly remind you, and very correctly that had we killed a fish, or had we harmed a mammal, we would be in very serious trouble, but the fact of the matter is that we could have conducted that sort of experiment, and chose not to do so.

So that I think it is wrong to leave it out there that we are supposing that one test will do it, and that's a fix, and we gain all the information. I don't

believe that we've ever said that. We will do whatever we need to do to gather the empirical data to establish the accuracy of the models that we've run, and then we'll proceed on that basis with our blasts. Thank you.

THE CHAIRPERSON: Thank you, Mr. Buxton. Okay, we now... First, any questions that would come from Government individuals, Federal or Provincial, to DFO? None? Okay. Mr. Sharpe had his hand up first, I guess. Quick off the mark.

PRESENTATION BY THE DEPARTMENT OF FISHERIES AND OCEANS - QUESTIONS BY THE PUBLIC

Mr. ANDY SHARPE: I'd like to follow up on a line of questioning from Dr. Muecke earlier on the number and series of blasts as part of an overall explosion.

The DFO representatives made a number of predictions of impacts on whales, fish and lobsters to blasting. This morning we had a discussion on the amount of the ANFO that would be used every two weeks. I think 20 tons was the number that was put forward.

A quick back at the envelope calculation at 45 kilograms per charge suggests something in the order of 400 charges per overall blast, so my question for the DFO representatives would be do they feel there's any need to modify their predictions for blasting on whales, fish and lobsters, in light that there will be in the order of 400

individual charges, particularly taking into account behavioural and sub-lethal effects?

Mr. NORMAN COCHRANE: Well, I didn't believe that there would be as many as 400 shot holes detonated at once. I thought it was more of the order of 40, 50, 60, something of that order.

I think what we stated this morning referred, or this afternoon, referred to one shot hole that the predicted levels at 500 metres I think was... And I think there was some other levels that were quoted, as well, for closer distances. Those referred to the detonation of one shot hole, and I personally believe that those probably are not good estimates, if there would be multiple detonations; that is an operational-type blast involving many tens of shot holes.

However, I think it is one of the reasons that we wanted to institute a monitoring program, because this is somewhat of an unknown, and has not been properly modelled.

THE CHAIRPERSON: Thank you. Mr. Morcocchio, and I go right down the list.

Mr. MIKE MURPHY: If I could, I think it's... I'd like to follow up on Norman's point that we really were suggesting that after the initial blast, the initial test, the idea was to look at the predictions that

had been made, and then evaluate the program and see what type of mitigation measures should be put in place at that stage.

I don't think we really said we predicted a lot of things at this stage. The idea is to have some safety zones set up, and have that initial blasting, and then look at mitigation and where we are in terms of the prediction, right?

Mr. NORMAN COCHRANE: Certainly if we did have some field data from single shot hole detonations, it would certainly give us a much better basis to determine whether these levels would be significantly enhanced by multiple shot hole detonations.

As I said earlier, this model is very simplistic, and it depends upon interference effects in the water column, in many cases, to shorten the effective length of the acoustic pulse as measured within the water column, itself. That may or may not be sufficient to prevent the... May call stacking or accumulation of multiple acoustic events, the pressure pulse, to very high levels.

And certainly if we had monitoring results from single, a single shot or shots, it would give us a better basis for knowing whether the... Inserting simple delays between the shot holes, time delays, would be sufficient to prevent the stacking and the accumulation of

the acoustic energy.

Mr. BRUNO MORCOCCHIO: Bruno Morcocchio of the Sierra Club of Canada. Document 1637 on the Public Registry is the comments from the Sierra Club of Canada on the adequacy of the EIS, and it refers, in part, to an Environmental Assessment Best Practice Guide for Wildlife in Canada, Canadian Wildlife Service, Environment Canada, February 2004.

I'd like to read some of these best practices that will help me frame the question that I have about some of the interventions and recommendations that DFO has made. It says:

> "Describe project effects on wildlife and risk with vigour and detail reflecting the current understanding of the ecology of the species. Use status reports, recovery strategies, action plans, and species management plans as main information sources where available, and consult with wildlife experts, specialists and local and Aboriginal communities. Consider all direct, indirect and cumulative effects in the analysis. Tolerance of risk impacts should never be lower for

wildlife at risk than for other species. Uncertainty should not be used to allow a project to proceed, but rather should require further work to demonstrate that the project will not affect the species before it's allowed to proceed. Where there is a threat of serious or irreversible harm, that is significant adverse effect to wildlife at risk, or a threat of significant reduction or loss of biological diversity, the precautionary approach should be applied, which means lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat. Adaptive management is not a solution where harm may be irreversible. Adaptive management, also referred to as adaptive resource management, is a management and learning process developed to meet the challenges of managing resources in the face of uncertainty, with a focus on monitoring and assessing the outcomes of decisions

to reduce the uncertainty in the future. It can only be applied in cases where harm is reversible, since it implies that mid-course correction should be made as required. The onus of proof should be on the Proponent to demonstrate to the satisfaction of the decision maker that the adverse effects on wildlife at risk, or biological diversity are not significant. The level of caution should be proportional to the level of threat, recognizing that in some situations, no risk is acceptable, determine by factors such as the following: Populations present, or a number of individuals."

I think we can agree that the right whale population certainly meets this test that would demand the highest level of caution, and one would also expect that DFO would have "operationalized" these best practices principles in their assessment of the impacts of the proposed quarry.

Yet many of the recommendations seem to be adaptive management measures. You point out quite rightly so, on slide one, that any additional shipping the

Bay of Fundy increases the potential for collisions with marine mammals, including right whales.

You point out on slide four that how mitigation...

THE CHAIRPERSON: Mr. Morcocchio, is this going to a question?

Mr. BRUNO MORCOCCHIO: Yes, it is, and... Yes.

Troubling also is the uncertainty about the impacts within the 500-metre range from the percussive events and between 500 and beyond 500 metres, and it's striking that with not being able to gauge the effects at less than 500 metres, that with any degree of certainty beyond 500 metres we can establish that only behavioural effects will go on.

My point is that many of these principles outlined don't seem to have been followed, and will DFO undertake to review their assessment to comply with these measures set out in these best practices that one would hope for an endangered species as threatened as the right whale would be the minimum amount of concern, particularly the reverse onus, which doesn't seem to have been applied here by DFO as the regulator.

Mr. MIKE MURPHY: I think we have upheld what we've had to do under the terms of both the **S A**

R A , the best practices that you've mentioned, and our responsibilities as part of this process.

If you will notice through this, we recommend that a lot of this initial, the initial blast testing should only be done outside of the period when right whales and inner Bay of Fundy salmon are present. That gives us some information as to what the effect would be without a possibility of harm to those endangered species.

So I don't really view that as adaptive management in the sense that you're talking about. I view it as collecting information that will allow us to see what the effects could be when those animals are present.

I think we've been pretty stringent in ensuring that it is the Proponent that comes forward and tells us what they're going to do. We haven't been telling the Proponent that this is the minimum standard. We've been telling the Proponent: "These are our concerns. It's up to you to develop measures, to develop processes that will give us comfort that we can uphold the standards that we are supposed to uphold, according to the law."

So it... I think I answered it.

Mr. BRUNO MORCOCCHIO: I don't think many of the questions, particular with respect to applying those principles, have been answered. But I'll move on.

I have a particular question about

the...

THE CHAIRPERSON: Mr. Morcocchio, one question in follow-up.

Mr. BRUNO MORCOCCHIO: Oh.

THE CHAIRPERSON: So if it's not a follow-up to this, then we're going to move on. I mean, the time is late, and I'm sorry to cut you off, but...

Mr. BRUNO MORCOCCHIO: We've been exceptionally patient so far all day today.

THE CHAIRPERSON: Mr. Muir, are you... No, I think Mr. Mullin had his hand up. Yes, please.

Mr. DON MULLIN: I'll try to make this really quick. It's regarding comments that Dr. Smedbol made, and it has to do with some work done by John Lean (ph), a Professor Emeritus at Memorial Univeristy, and it was the same situation that we were discussing in terms of location.

And he published, peer reviewed, in peer reviewed journals, as well as non-peer-reviewed publications, indicating that the blasting didn't have an immediate effect on the whales' behaviour, and he said that that was the wrong dependent measure to be using to test the effects of blasting.

However, his subsequent work suggested strongly that what happened is in the area where blasting

occurred, the next season the whales did not return to that location. So I just want verification of that because Dr. Lean has retired and no longer practices, so I can't ask him for verification. But I wonder if I could get a comment from DFO, and if that's true, what's the implication of blasting for whale-watching activities in the Bay of Fundy.

Mr. KENT SMEDBOL: I'm only familiar, actually, with one publication by John on that particular topic, and it does relate to a change in occupancy in Belleoram area following... During construction phase. So that I can, that I can confirm.

The rest of it, I'm afraid I'm a little distant from that literature. I'd have to get back to the Panel.

I think, though, in any evaluation of behavioural impacts to a human activity or to any stimulus, it's necessary to consider both short and long-term impacts in that analysis. So if I was designing or, you know, I think a properly-designed study would not limit the analysis to a very short-term post-stimulus response.

These animals, particularly white whales, but all large cetacean, their migration routes and patterns are learned. So there is a fair bit of individual input, input from the individual to where and when they are in time and space. So it is not, it's not like doing tests

on worms. You definitely have to think in multiple temporal and spatial scales.

THE CHAIRPERSON: Thank you. Mr. Moir, Mr. Hunker, and Ms. Peach.

Mr. ANDY MOIR: It's Andy Moir. I hope this is going to be very, very brief.

I just, we've seen a couple of times now, both from the Proponent and a couple of other slides, showing this distribution of whales in the Bay of Fundy, and I guess my question is how do you figure out where those whales are? Is it based mostly on what the whale boat watchers report plus some of your own surveys?

And the reason I ask this, I guess, is I'm fairly familiar with at least the whale watch aspect of this, and I know well that if one whale boat sees a whale, there'll be no less than seven or eight sort of steaming to the same area, so you may in fact... And I don't know if this happens with that, because I'm not a scientist, but you might have sort of skewed results on where these whales are, because all of a sudden you're getting a lot of reports from different whale watch boats that have gone to the same place because that's where the whales are, or perhaps they're find a couple of humpbacks off of Beautiful Cove in Freeport, and because that is so close to where a lot of the whale boats are, they go and look at those whales, and then they steam

back and get their next group of 35 people to go and look at the same whales.

So I guess I'm curious, is there a chance that the very data that you have collected as to where whales are in the Bay of Fundy may be skewed.

Mr. KENT SMEDBOL: I can address that question. The answer is yes. But the databases, I assume most of the information that's been evaluated here has been provided from the right whale consortium, of which DFO is a member, but so are may NGOs and Universities and such. And that database is built from contributions from a number of sources.

But there are various levels of sources, if you will. There are opportunistic sources, such as one example is from contributions from the whale watch companies, and we have some of that information yourself, we're very lucky to get that information. But also information or sightings that are collected from standardized line transect surveys.

So I would make the distinction, and I haven't generated the plots that have been shown here today, but I would make the distinction between those two types of data. For instance, the plots that both the proponent and one of the presenters today showed talked about sightings per unit effort, which was that kind of density plot. That

information, if it came from the Right Whale Consortium, which is the holder of that information, and has not been altered, is based solely on formal line transect surveys.

Scatter plots may include all opportunistic data, so I can't comment on the second series of plots that were shown, but what we call the SPUE, the sightings per unit effort, the information that was used to evaluate the lane change, information that is used to evaluate right whale density and aggregation, that is based on formal transect methods.

THE CHAIRPERSON: I think Mr. Hunka is next.

Mr. ROGER HUNKA: Good afternoon. I'm Roger Hunka, with the Native Council of Nova Scotia. I have a series of questions, but I'll restrict it to one and come back.

You weren't here Saturday or Monday, and it's a similar question as far as consultation goes. We heard from the Proponent that Nova Scotia Department of Environment and Labour did not give them instructions to discuss this project or consult with aboriginal people. Neither did the Nova Scotia Department of Natural Resources.

I ask the question of the Department of Fisheries and Oceans, who's aware of the Aboriginal peoples in the area, did you provide any instructions to the

Proponent in your many meetings since 2002 to consult with them about their fisheries, be they food fisheries or commercial fisheries?

Mr. TED POTTER: Well, I'll provide two parts in response. One is, we've directed the Proponent should discuss interactions with all users in the area, and that included people involved in the fisheries, and the fisheries is made up of a number of different sectors, including Aboriginal fisheries. So in a general sense, yes, we have.

In the Federal fiduciary aspect of consultation, letters have gone to Native Council, the 13 Chiefs and Councils here in Nova Scotia, and the Mi'kmaq Rights Initiative, the KMK.

Mr. ROGER HUNKA: So in a general way, but as a follow-up, when you read the Environmental Impact Statement, it's silent on food fisheries and Aboriginal commercial fisheries. Is that... Whose fault is that? Can't blame the Proponent, if you were general about it, and you have a fiduciary.

Mr. TED POTTER: It's, the information and the discussions with interactions between various industries, including the fishing industry, and the Proponent should be led by the Proponent.

With regard to our consultation, our

letters have gone out as of late December offering to sit down and meet with the various Aboriginal groups throughout the Province at a time and in a forum that's convenient to them, requesting a response back to, at the time, our acting manager for major projects, Environmental Assessments and Major Projects.

We've had some informal discussions, including with yourself, but there has been no formal consultations.

Mr. ROGER HUNKA: So there is no consultations.

Mr. TED POTTER: It's been offered. We've sent out a letter that's requested that, and at the convenience of the...

Mr. ROGER HUNKA: Well, I don't want to argue with you, but I'm going to the EIS. Are you satisfied that regardless of whether it was in 2002 or December of 2005 or 2006, whenever your letters went out, that there is, within the Impact Statement, a paragraph or a sentence indicating that there Aboriginal food fisheries occurring, and as well as communal commercial fisheries, in the area. Do you feel satisfied?

Mr. TED POTTER: There could be a lot more information provided on the interaction for all fisheries, including Aboriginal food fisheries and any

ceremonial or recreational fisheries, yes.

Mr. ROGER HUNKA: So is it sufficient or deficient?

Mr. TED POTTER: It could be added to substantially.

THE CHAIRPERSON: Mr. Hunka, thank you.

Mr. ROGER HUNKA: Alright. I have another question later on.

THE CHAIRPERSON: There's only one round tonight. I mean, we're running out of... It's already quarter to five, and we've got two more speakers that were supposed to go. Mr. Dittrick, no, you're sharing off with Mr. Marcocchio for Sierra Club. You're...

Mr. MARK DITTRICK: I have a point of...

THE CHAIRPERSON: Ms. Peach is next, and we're not going another round either, so I'm sorry.

Ms. JUDITH PEACH: I just have a question about the idea of tipping point.

The marine environment is obviously very stressed, like Mr. Buxton pointed out, from various sources, and all these at-risk species get stresses from various sources, mostly human.

I'm wondering if the DFO or scientists have any sort of modelling for incremental increases in stress. So when do you know when you've pretty much

admitted the last ship that is going to kill the last whale that makes that species viable? Because there's so many species in the marine environment that seem to be at risk, compared to the terrestrial environment, I wonder if there's any sort of modelling to say how do you know when you've reached that sort of tipping point for that environment, considering how inter-related it is?

THE CHAIRPERSON: Looks like it's you, Mr. Smedbol. I heard the word "whale".

Mr. KENT SMEDBOL: Well, I actually don't think the question was specific to whales. It sounded to me a bit more to the marine environment, or the marine community, if you will, community of species, and the questioner put her finger on what might be one of the most difficult things to model, and that is community dynamics. Especially changes or influences on community dynamics.

We have some simple energy flow models, state flow models, of community structure within, say, the larger Gulf of Maine, but what the questioner has asked for is probably beyond our ability to give a strong answer for. It is extremely difficult. We're dealing with non-linear dynamics and flexion points of severe knowledge gaps on the inter-relationships between species.

THE CHAIRPERSON: Ms. Peach, it sounds like your question is pushing the envelope, so I think...

Okay. One last question. Mr. Stanton, and then I'm going to wrap it up, I think, so that we can move on.

Mr. KEMP STANTON: I think there's been a study done in Cape Breton on seismic testing concerning crabs, and the test found, preliminarily, anyway, that most of the damage done to the crabs by the seismic testing was to the ovaries of the female crabs. It didn't kill any of the crabs and it didn't much affect the males.

My concern is, if that is so, and there's damage done at Whites Cove by the first few blasts, how many years would it be before you would be able to detect that damage by examining the population dynamics? Because if the ovaries were destroyed, you wouldn't see the effects for five to eight years.

Mr. JOHN TREMBLAY: Yeah, the study you mentioned is somewhat controversial in that there was a control site and an experimental site. Crabs were exposed to seismic noise at both sites, and there were some sub-lethal effects, as mentioned, some damage to the ovary, in the test site.

But a kind of rigorous review of the experimental design found that the two sites were not really close enough, similar enough. There were differences between the two sites such that you couldn't really say for

sure whether the effects seen were due to the differences between the control and the experimental site, or due to the seismics.

So there has been some further work on snow crab. My understanding is that that is, I haven't... I wasn't at that review meeting, but it's still in review. Again, there's some controversy as to interpretation of the results. They're certainly not clear, but there is some uncertainty about the effects of noise, such as seismic and probably blasting, on the eggs of decapod crustaceans.

THE CHAIRPERSON: Okay. That brings to the end the DFO portion of this. I'd like to thank you gentlemen. It has been extremely useful to us and very valuable, and we do have a couple of undertakings, I believe, so we'll look forward to seeing those on the 29th.

Thank you once again.

We'll take about a minute or two, just to get, allow our colleagues here to move off, and then we have two presentations, actually, one by Jerry Ackerman and a second one by Leslie Wade and Linda O'Neil.

--- Pause

PRESENTATION BY ERRY AC ERMAN

THE CHAIRPERSON: As I indicated, we have two presentations. The first will be by Gerry Ackerman.

Mr. JERRY ACKERMAN: I thank the panel