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Order of Appearances

Government of Canada Panel 1

Environmental Effects

Ms. Bonnie Antcliffe	Mr. Michael Engelsjord	Mr. Brad Fanos
Dr. John Ford	Mr. Steven Groves	Mr. Thomas King
Ms. Tracey Sandgathe	Dr. Caroline Caza	Dr. Sean Boyd
Dr. Carl Brown	Ms. Coral deShield	Mr. Chris Doyle
Dr. Dan Esler	Mr. Grant Hogg	Dr. Bruce Hollebhone
Mr. Richard Holt	Dr. Ali Khelifa	Ms. Laura Maclean
Mr. Ken Morgan	Dr. Patrick O'Hara	Dr. Barry Smith
Ms. Jennifer Wilson	Dr. Xuebin Zhang	Mr. John Clarke
Dr. Heather Dettman		

Introduction by Mr. Brendan Friesen for Government of Canada 15680

Examination by Mr. Tim Leadem for the Coalition 15877

Examination by Mr. Nathan Cullen, MP for Skeena-Bulkley Valley 16580

Examination by Mr. Robert Janes for Gitxaala First Nation 16959

Examination by Mr. Jesse McCormick for Haisla Nation 17331

Introduction by Mr. Brendan Friesen for Government of Canada 15680

Government of Canada Panel 1 - Environmental Effects Panel

On behalf of the Government of Canada, Ms. Dayna Anderson offered preliminary comments about the federal government witnesses, particularly that they would not be giving media interviews. And that four of the witnesses are on call in case of a significant pollution incident. 15656

Mr. Friesen introduced the witness panel members, their areas of expertise and evidence they are qualified to speak to. The witness list for Prince Rupert and their CVs is in [Exhibit E9-53-4](#), and the witness panels and statement of issues is in [Exhibit E9-53-5](#). Because there are 25 witnesses, readers wanting more detail are encouraged to resort to the transcript, beginning at paragraph 15680.

Examination by Mr. Tim Leadem for the Coalition 15877

(ForestEthics Advocacy, Living Oceans Society & Raincoast Conservation Foundation)

Mr. Leadem said he would focus on the biology and the environmental effects on wildlife, especially on the biology represented by the Dept. of Fisheries and Oceans (DFO), reflecting the position of his clients. Is conservation of fundamental importance to maintaining biodiversity? Mr. Engelsjord agreed. 15878

PNCIMA, the Pacific North Coast Integrated Management Area

Mr. Leadem put up his first aid to cross examination (AQ87-A), "Science Response to the Information Requests Submitted to the Enbridge Northern Gateway Project

Environmental Impact Assessment Hearings Respecting North Coast Integrated Management Area” (PNCIMA), “a DFO Science Response 2012/029.”

He asked about a meeting held by DFO in Nanaimo in February 2012 which was “to provide an evaluation of proposed ecologically and biologically significant areas (EBSAs) in marine waters of British Columbia.” He said, “My understanding is that there was a group of scientists both from DFO, from Environment Canada, from the Province. There were some representatives from First Nations. There were some representatives from the NGO community who attended this workshop.” He asked, “Is it your evidence that none of the participants who have intervened in these proceedings were invited?” Ms. Bonnie Antcliffe said she could not comment on who was invited. Mr. Leadem said that Cowichan Tribes were invited, but no First Nation further north. Again, Ms. Antcliffe said she had no evidence to the contrary. 15891

Identification of EBSAs in PNCIMA

Mr. Leadem noted that “that a number of follow-up documents were going to be prepared.” One of these documents is his second aid, specifically [AQ87-B](#), a report by Clarke & Jamieson entitled “Identification of Ecologically and Biologically Significant Areas in the Pacific North Coast Integrated Management Area: Phase I – Identification of Important Areas” This was published in “Canadian Technical Reports of Fisheries and Aquatic Sciences,” and is not peer reviewed. 15920

Mr. Leadem described the “Delphic Process” by which the EBSAs were established – a panel of experts (the “Delphic Oracles”) iteratively narrow down the selection of areas for different species. Some of the witnesses had participated in this process for species for which they had expertise. 15953

The report speaks about “moving from mere science data collection and analysis to taking on ... an EBM or Ecosystem-Based Management approach.” [Adobe 41] It includes a comment that “data held by DFO has only been used to date for specie-specific stock assessments.” Ms. Antcliffe said the document was published in 2006 and the department has advanced EBM since then. Mr. Leadem asked, “Did the DFO use an EBM approach to determining the potential effect upon the ecosystem of the effects of this project?” Ms. Antcliffe: “No, we did not.” 15993

Eulachon case study: management or science at DFO

Mr. Leadem put up Map 4, “Important areas identified for Eulachon” [Adobe 61] and noted that Douglas Channel and Kitimat Arm were indicated as important for eulachon. He then switched to [AQ87-C](#) entitled “Science Response to Information Requests Submitted to the Enbridge Pipeline Project Environmental Impact Assessment Hearings Respecting Eulachon”. He focussed on the three paragraphs in Analysis and Responses [Adobe 5] which speak about abundance decline of the Kitimat River eulachon fishery in the mid-1990s, and the information which is required to assess the effects of the NGP. The Conclusions in this report say, “There is significant uncertainty around the potential interaction of the proposed activities and the different life stages of Eulachon. Although the proponent has identified mitigation for the activities, their effectiveness is uncertain.” 16006

Ms. Antcliffe said these are scientific conclusions, but they do not represent a management perspective. Mr. Brad Fanos and Mr. Michael Engelsjord also contributed to answering Mr. Leadem's concern about whether DFO supports the scientific conclusions. "You still abide by these conclusions?" Mr. Engelsjord: "It is our evidence, yes." 16064

Mr. Leadem followed his examination of eulachon with an examination of equivalent reports and similar findings with respect to marine fish. He quoted from the scientific report: "*Due to the lack of data and information provided by the Proponent, there is significant uncertainty regarding the potential effects that the Proponent's activities will have on marine fish populations or marine fisheries.*" [AQ87-D] 16107-16133

Whales

Mr. Leadem put up Map 8 in the Clarke and Jamieson EBSA report is concerned with humpback whales [AQ87-B, Adobe 65]. It shows all of Douglas Channel and Kitimat Arm as important humpback area. Dr. John Ford said that more recent work has indicated that the northeast area, Douglas Channel and Kitimat Arm would not be included. Mr. Leadem turned to his aid, the corresponding scientific report relating to "Ship Strike Risk and Acoustic Disturbance from Shipping to Whales" [AQ87-E]. In his questioning of Dr. Ford, Mr. Leadem confirmed "that 23% of all confirmed vessel strikes causing death or serious injury to whales took place at speeds of 10 knots or less," and that "as a mitigative measure" reducing ship speed will not remove the possibility of ships striking whales. 16135-16169

Mr. Leadem and Dr. Ford discussed some of the reasons – both known and speculative – that baleen whales appear to suffer a higher incidence of collisions with ships: feeding behaviour on coasts rather than deep sea, need to surface regularly to breathe, group feeding behaviour, day vs night behaviours, and other factors. In terms of improved understanding of whales, Dr. Ford said that satellite tagging and photo identification have greatly helped, but "we're still some time off ... from being able ... to define critical habitat for fin whales." Mr. Leadem asked about Sei whales. Dr. Ford said they were very populous up to the end of whaling in the late 1960s, but that only four were identified last year in Canadian waters by an international whale survey. Blue whales are a pelagic species, and not likely to be found in the Confined Channel Assessment Area (CCAA). Both Sei and Blue whales are listed as "endangered" under the Species at Risk Act (SARA). 16170-16214

Grey whales

Dr. Ford said that recent empirical work has shown that the northward migratory path of grey whales from Baja to the Bearing Sea is through Hecate Strait and Dixon Entrance. Furthermore, they "tend to be a very near-shore species when they're migrating. The great majority of the 20,000 approximate number of grey whales during the northbound migration – March to mid-April for males, into May for females and young - migrate within six or seven kilometres of the shoreline." 16218-16343

Acoustic disturbance and whales

Mr. Leadem asked if humpback whales are “highly dependent upon acoustic communication.” Dr. Ford agreed. “It’s hard to say whether it is more reliant on acoustics than other baleen whales. It tends to have very pleasant vocalizations to the human ear, and so often we think of humpback whales as being more acoustically oriented, but other species make use of the acoustic channel as well.” Mr. Leadem asked if “tanker traffic that may arise as a result of this project going forward will have a potential effect upon the acoustic environment to whales.” Dr. Ford replied, “Increasing levels of ocean noise due to shipping has a potential impact on whales of all species, either through disturbance responses because of volume at close range from sound sources, but also from masking of the animals’ own sounds.” 16255

Mr. Leadem asked about the effect on sounds in confined channels. “Is there some sort of amplification?” Dr. Ford said sound propagation is affected by different qualities in the water column and in the deep fjords of BC’s coast there is “potential for channelling and ducting of sounds.” He spoke of research done for Enbridge. There’s been great advances in recent years but there’s still much more to learn before we can really confidently make predictions about levels of impacts from ship noise.” He agreed that Orcas, killer whales, are also known as vocal cetaceans, which, unlike baleen whales, “have eco-location they use to navigate and to find prey.”

Resident and transient killer whale

Referring to Figure 4 which shows critical habitat for northern resident killer whale [AQ87-E], Mr. Leadem asked if studies have been done to enable a similar map for the transient killer whale. Dr. Ford said that about 40 years of data is available, and “What we have proposed might qualify as critical habitat is a very extensive portion of the Canadian coastline, basically waters extending out to three nautical miles from shore. This is where the animals forage, where over 90 percent of all their predation takes place is very close to shore.” 16264-16298



Figure 4. Location and extent of identified potential critical habitat for Northern Resident Killer Whales in the Camaano Sound area (from Ford 2006).

Mr. Leadem turned to the Conclusions of the “science response,” [AQ87-E, Adobe 11] which begin, “It is not possible to assess the effectiveness of the proposed ship strike mitigation measures at this time.” And “A Marine Mammal Protection Plan has not yet been developed and therefore can not be assessed. Further, it is not clear if the proponent will be legally obligated to abide by such a plan.” He asked if the same conclusions hold today. Dr. Ford said, “Yes.” 16299

Mr. Leadem asked if DFO has a position with respect to the marine mammal protection plan put forward by NGP. Dr. Ford agreed that it is a work in progress. Mr. Engelsjord said they anticipate that DFO is committed to working with the Proponent in examining that marine mammal protection plan. 16309

The last conclusion is “*It is not possible at this time for DFO Science to determine acceptable noise thresholds in the CCAA in the absence of additional modelling and in-field measurements.*” Mr. Leadem asked “What would it take to actually get that science to a position where you can determine whether or not the noise thresholds are acceptable or not?” Dr. Ford said that NGP has provided useful information in its acoustic supplement. What is lacking is fine-scale distribution – seasonally, day and night - and more field work. 16318

Mr. Leadem reviewed Map 12, “Fin Whales” in the Clarke and Jamieson EBSA report [[AQ87-B](#), Adobe 69]. Dr. Ford described the areas he would add to this 2006 map, and said that they are probably close to being able to identify critical habitat areas. 16323

Marine mammals

Mr. Leadem’s next aid was Analysis and Responses section of the science report on marine mammals [[AQ87-F](#), Adobe 6] with which Dr. Ford agreed is still the position of DFO. A 2013 paper by Mr. Fraker “raises questions regarding the linkage to the [Exxon Valdez] spill and the possibility that some of these [killer whale] mortalities may have been attributable to bullet wounds that would be residual from a period of the animals being shot at by fishermen in the area prior to the oil spill because of depredation of sable fish from fishing lines.” 16339

Mr. Leadem asked if sea otters “are expected to actually arrive within the confines of the CCAA.” Dr. Ford said the rate of sea otter expansion is difficult to predict, but “scouts”, lone individuals, have been seen in the CCAA, and historically it was highly desirable habitat. “We can expect the population to reoccupy that area in the next few years.” 16378

With respect to Steller sea lions, the Conclusions state that “*Without detailed and updated information on stellar sea lion distribution, DFO Science is not able to assess potential impacts to the species.*” Sea lions have been seen swimming in the CCAA, but have no significant haul-outs. 16395

Map 39, “Important Areas ... for Parks Canada” [[AQ87-B](#), Adobe 96].delineates certain areas as important for Parks Canada. One of these “seems to be the area encompassed by the CCAA and ... Parks Canada has depicted that area as an important area.” Mr. Leadem asked if any of the witnesses could explain why – and none could none of them represented Parks Canada. 16423

Remaining uncertainties by class

Mr. Leadem said that “uncertainties still remain.” “Do we know to Canada’s satisfaction the geographic distribution ... for the humpback whales or for some of the cetaceans sufficiently that we will be able to determine how they may be impacted by this Project?” Dr. Ford replied that we do know enough at the macro scale, but not at a fine scale – a few kilometres or less ... to be able to accurately predict what ship strike risk may exist for humpback whales, fin whales and so on because of a lack of high resolution spatial information for that area.” Similarly, the answer varies by different species of marine mammal. 16456

For marine fish, especially groundfish, Ms. Antcliffe said, “Our science paper says that there is uncertainty with respect to what the potential effects could be.” Mr. Leadem asked about anadromous fish, especially salmon. Mr. Fanos replied, “The nature of the impacts are well understood and the mitigations that are applied are well understood.” Mr. Leadem asked, “Does that include the risk from an oil spill?” Mr. Fanos said their evidence is mainly around construction and operation.” 16467

“Waterfowl?” asked Mr. Leadem. Dr. Sean Boyd said, “We have something in the order of 120 to 130 different species of marine birds using the B.C. coast. ... Near shore birds like sea ducks, loons and grebes, we have a pretty good idea of distribution of these species along the coast, but we have very little detailed information and data on the abundance and distribution patterns of these birds. ... We have four seasons that we're looking at here; breeding season, wintering season and two migrations. As far as determining the impact of the project, I would say no, we don't have enough information.” 16478

Mr. Ken Morgan spoke about pelagic birds. “The data that we've been collecting have been collected by ships of opportunity, primarily Coast Guard, DFO vessels. So we don't have good spatial coverage in terms of all areas being covered, all seasons being covered. So we're victims of wherever the ship is going. ... [Where we have] collected data, we have fairly good information with regards to relative abundance and seasonality. ... In terms of the specific question about predicting the impact, I would agree with Dr. Boyd, that we don't have that spatial and temporal resolution for that.” 16484

Ms. Coral deShield said, “In our written evidence we focused more on the potential impacts related to a potential spill. And in that regard we did say that there was the potential for significance in the event of a spill. At the time, we didn't say that there was more information needed to inform that decision. ... Knowing more details wouldn't necessarily change that conclusion that there is the potential for significance in the event of a spill. We did place emphasis however though on the need for further baseline monitoring and so that's where we have made some recommendations.” 16491

In the face of uncertainty ... we apply a precautionary approach

Mr. Leadem said, “Isn't it the case when the science is uncertain that we apply a precautionary approach to determining how to proceed?” Ms. Antcliffe replied, “It is common within the government to look at a precautionary approach to decision-making.” Dr. Caroline Caza said, “The precautionary principle is something that we use to try to

inform a lot of the work that we do. I believe the Proponent has even referred to it in some of their documents as informing their own thinking.” 16516

Mr. Leadem said, “After gathering all the baseline data ... if there’s still uncertainty about what effect this project may have upon the environment ... what, if anything, can you do at that stage?” Dr. Caza said, “that brings into play another concept ... where there is inherent uncertainty, and that is the idea of adaptive management. ... Gathering the information is not the end point. ... The end point is the application of that information and the learning from that into a continual examination of whether things are being done as well as they can.” 16524

Mr. Leadem: “Are you telling me basically build it and then the adaptive management will come into play ... or are we to take the lens of knowing what we know now and apply it before we actually let the project proceed?” Dr. Caza said, “We are not making the decision.” 16528

Mr. Leadem asked, “Can the people of Canada rely upon you to protect the environment, to protect the fishery values, to protect the whales, to protect the seabirds?” Ms. Antcliffe replied, “It would be helpful for us to focus on two components; one would be the impacts to the environment in terms of the construction and operation of the project, and the second would be spills which are unplanned.” “With respect to the construction and operation of the project and the potential environmental effects resulting from that, our evidence does suggest there is uncertainty. It could be managed through research, monitoring, adaptive management, mitigation and offsetting. With respect to spills ... I believe Panel 2 will talk about spill prevention.” 16536

Mr. Leadem asked, if the uncertainty cannot be removed, “Do you simply move forward on an adaptive management basis?” Ms. Antcliffe: “That is our understanding of the purpose of this environmental assessment, is to make that determination.” 16548

Responsibility and expectations of Canada’s civil servants

When challenged on his questioning by Ms. Anderson for the Government of Canada, Mr. Leadem replied, “There are questions of interest to my clients in terms of how the process unfolds and the continuing role of Canada’s civil servants in that process. ... Someone should be at the wheel going forward on behalf of Canada and I’m looking to see whether it’s these people that are seated across from me that are going to be helpful in the exchange.” 16556

Examination by Mr. Nathan Cullen, MP for Skeena-Bulkley Valley

16580

No DFO consultations with First Nations

Mr. Cullen put up [Exhibit E9-6-13](#), Adobe 21 and quoted: “*DFO notes that prior to issuing authorizations under the Fisheries Act, DFO would need sufficient time to review and, where necessary, undertake consultations with First Nations related to DFO’s final understanding of the nature and magnitude of impacts. Should any new information that is provided, after the conclusion of the environmental assessment, identify a HADD that*

was not already considered, a new environmental assessment may be required. He asked, “In its consultations with First Nations, can the Department inform us as to what consultations were undertaken with First Nations?” Mr. Engelsjord said, “The consultation with First Nations is ongoing and, at the stage we’re at right now, the consultation activities take place through these Panel proceedings. That’s my understanding. ... If the project proceeds forward to a regulatory phase, DFO with respect to its regulatory approvals will ensure that any outstanding consultation obligations to First Nations will be completed before we make those regulatory decisions.” 16580

For his follow-up questions relating to consultation, Mr. Cullen was directed to the federal government’s Panel 4. For other questions relating to meetings with First Nations, Mr. Engelsjord said, “DFO and the other departments are participating in a whole of government approach to Aboriginal consultation for this Project. So DFO is not leading this it’s a whole of government approach and we’re not having side meetings with stakeholders or First Nations at this stage.” 16630

No consultations with other stakeholder groups

Mr. Cullen asked about consultations and meetings with other stakeholder groups, such as the commercial and sport fisheries, and excluding First Nations. Mr. Steven Groves said those consultations have not begun. Mr. Cullen asked about the guidelines for DFO, “Is there a particular threshold?” Mr. Engelsjord said that DFO does not have a consultation duty with other stakeholders. Ms. Antcliffe said, “We do have a multi-stakeholder process called the Integrated Fisheries Management Process (IFMP) which is the forum that we use for stakeholder consultation related to fisheries.” 16647

Mr. Cullen said, “In the DFO’s attempt to understand potential impacts of the Proponent’s project, was it ever contemplated to establish ... a stakeholder group?” Mr. Engelsjord: “No. ... Stakeholders’ ... opportunity to provide their views on this project is through the process that we’re in right now.” 16674

Modelling scenarios for a spill

Mr. Cullen asked about DFO’s use of modelling scenarios for a spill and impacts on fish. Ms. Antcliffe directed him to Environment Canada (EC). Dr. Ali Khelifa said “As far as Environment Canada is concerned, we don’t have any impact assessment model. We do a trajectory and fate and behaviour modelling.” Mr. Cullen: Please explain the difference. Dr. Khelifa explained that trajectory modelling attempts to predict where the oil is going. Fate and behaviour modelling describes what happens to the oil: These models are used at EC. Superimposing this information with the spatial and temporal distribution of the resources is not done by EC. 16678

Mr. Cullen asked if any modelling has been done related to potential spill impacts on sensitive areas - tributary areas and estuary systems up and down the North Coast? Dr. Khelifa said he couldn’t recall seeing a study with that perspective. 16707

Disposal at sea permit

Mr. Cullen asked what an ocean disposal permit allows the Proponent to do? Ms. Laura Maclean of EC said that “disposal at sea is regulated under the Canadian Environmental Protection Act, not the Fisheries Act, and it is administered by EC. “There is no need that’s been determined to seek a disposal at sea permit in respect of this project. ... The Proponent has not sought a permit.” Later in Mr. Cullen’s questioning [para 16793], it was determined that NGP had included an ocean disposal permit in its list of required permits, but subsequently was advised that that permit was not required. 16710

Mr. Cullen asked about the staffing resources which DFO have put to this project. Ms. Anderson said this is not a question the witnesses are here to answer. 16742

DFO did no primary research

Mr. Cullen asked about “modelling on the loss of habitat due to a spill and what recovery methods would look like specifically to fish habitat?” Mr. Engelsjord said, “Determining or estimating or predicting the effects of the Project is the Proponent's responsibility.” Mr. Cullen asked if the DFO prepared its own independent assessment of NGP’s evidence or do some of its own primary research? Mr. Engelsjord replied that DFO’s “review consisted of reviewing the Proponent's evidence.” 16762

Mr. Cullen asked about site visits made by DFO staff. Mr. Engelsjord said “the only place that our staff may have visited would be the location of the terminal. That's the only location that would require regulatory approvals under the Fisheries Act.” 16771

DFO knowledge of fish in Kitimat watershed

Mr. Cullen asked a sequence of questions about DFO’s level of knowledge about species in the marine environment and the timing of their presence. Mr. Engelsjord said DFO understands salmon – species, timing and use. Mr. Groves said with herring they know they would be present, but when it comes to adults feeding and migrating, then it becomes less certain. 16818

Mr. Cullen asked about the level of knowledge in DFO about the Skeena watershed compared to the Kitimat watershed. Mr. Groves said that because the Skeena is a much larger watershed with a lot more communities, there is more information about the Skeena. “But it certainly doesn't mean that the Kitimat watershed and marine area is not known.” 16825

Mr. Cullen also asked about knowledge of stocks in Area 6, the north end of Douglas Channel. Asked about juveniles in the Kitimat watershed, Mr. Groves said they have good information about juveniles “when they first smolt and go to the ocean, but beyond that they tend to disperse.” 16832

Mr. Cullen asked, “Did the Government of Canada review the Proponent's spill risk assessment for freshwater spills?” Dr. Caza said that EC did not review that for the freshwater component of the project because “the Proponent filed additional information on the freshwater risk assessment considerably after the government had filed its evidence.” Mr. Cullen asked, “Have you reviewed it since?” Dr. Caza: “Our focus in

recent months has been on preparation to come to Prince Rupert to testify on the marine component of the project.” On continued questioning by Mr. Cullen, Ms. Anderson said, “I don’t think there is any intention on the part of Environment Canada to file any further evidence at this point.” 16843

No net loss policy

Referring to the Government of Canada response to Haisla Nation [[Exhibit E9-21-12](#), Adobe 50] Mr. Cullen said, “that guiding principle of no net loss of the productive capacity of fish habitat does not apply to oil spills.” He asked the witnesses to confirm this “as the department's official policy towards no net loss and oil spills.” Mr. Fanos said that was correct. Some discussion ensued as to why the no net loss policy should not be applied in the case of an oil spill. Mr. Engelsjord said, “The no net loss principle that you're referring to, it's a guiding principle from our habitat policy. And that guiding principle specifically applies to when DFO is asked for an authorization for harmful impacts to fish habitat under 35(2). We don't issue authorizations for harm to habitat as a result of accidental spills. ... It's written specifically for when DFO is considering authorization.” 16889

Mr. Engelsjord explained that the no net loss policy “only applies to impacts that are authorized by DFO or are being considered for authorization, not for breaches of the Act. That's an issue potentially for prosecution.” 16914

Habitat compensation for loss of habitat in the event of a spill

Mr. Cullen noted that “in the application of the no net loss policy, oftentimes the department will seek for a proponent to make up the fish habitat that has been destroyed through a planned activity. ... Can the same application be made but through the section of the Environment Canada Act (sic) that habitat must be restored to an equivalency or some other habitat made to compensate for that which was lost?” Mr. Engelsjord replied, “If there was a prosecution under the law and ... the courts required ... restoration of damages.” Mr. Cullen: “So just in the powers that exist under the Acts for you, in the event of an oil spill ... the Act does not provide you with the powers to order new habitat to be created to compensate for that which was lost?” Mr. Engelsjord: “No, it does not.” 16916

Examination by Mr. Robert Janes for Gitxaala First Nation 16959

What constitutes and environmental effect- understanding land use impacts in environmental assessments

Mr. Janes began his examination with a discussion on an environmental effect varying depending on the way an area is being used. Ms. Maclean acknowledged that the assessment of impacts on traditional uses is a requirement of the *Canadian Environmental Assessment Act*. 16962

Mr. Janes asked if it is also true that restoration efforts will vary depending on intended land use. Dr. Caza agreed that clean up standards for contaminated sites will vary depending on the anticipated use of the area. 16970

Mr. Janes asked if this meant that land-use needs to be taken into consideration to assess the effects of oil spills, which will have implications for mitigation and remediation. Dr. Caza mentioned the concept of end-points. Mr. Janes continued with discussion on the importance of understanding actual land-use type and end points in assessment. Mr. Bruce Hogg added his thoughts on the subject and spoke about collaborative processes. 16974

Expanding the conversation to socio-economic impacts effects, Mr. Janes asked if the witnesses agreed that the perception of how effectively an area as been restored after a spill, will contribute to whether or not people will return to using a resource they have previously used. Dr. Caza indicated that the subject was beyond the panel's expertise. 17000

Mr. Janes continued with his suggestion that an environmental effect will be based on people's perception of the impact of a spill, using the example that people avoid using an area because they believe it has been polluted, regardless of the "objective evidence of pollution being present", which in itself constitutes an effect. Dr. Caza stated that effects would tend to focus on "evidence that's related more to the actual impact on the environment". 17005-17009

Mr. Janes concluded that the Environment Canada's assessment of environmental effects have not considered effects on human behaviour. Ms. Maclean spoke about the Department's concentration on physical impacts but mentioned acknowledgement of the views of the Gitxaala Nation and their uses of resources. Mr. Janes asked if this meant that during the next phase of the process in the technical review, human behaviour impacts will not be considered. 17010

Mr. Janes questioned whether the Government of Canada intended to carry out future traditional land-use studies in relation to the project, or rely on those done by NGP. Ms. Maclean indicated that the Panel's conclusions and recommendations would determine how the government participates. Discussion continued. 17018

Impacts of the Exxon Valdez spill on marine mammals

Mr. Janes called up [Exhibit E9-21-09](#), Adobe 69-70, and asked about the DFO's review of studies showing impacts of the Exxon Valdez spill two decades after the event. Dr. Ford agreed that studies have shown hydrocarbons remaining in the benthic substrate, and of impacts on sea otters and killer whales. Discussion continued around the impacts of the Exxon Valdez spill on marine animal populations. 17036

Again drawing on scientific literature, Dr. Ford spoke about the decline in orca populations following the spill, as a result of low reproductive health as well as social factors, pointing out, "recovery may take decades". Discussion on the "recovery mode" of marine mammals continued, with mention of the impacts of previous eras of harvesting. 17080-17095

Factors influencing the buoyancy of spilled hydrocarbons

Dr. Bruce Hollebhone confirmed for Mr. Janes that the physical properties of a spilled substance will influence the impact of a spill, and the impact on an organism. He then confirmed that spill exposure to creatures will depend on where in a water column the substance ends up. Mr. Hogg spoke about the effectiveness of spill response efforts being dependant upon the behaviour of hydrocarbons in water, and whether they sink or float. 17097

Dr. Carl Brown and Dr. Hollebhone agreed that whether spilled oil sinks or floats will also impact how quickly it disperses, noting that oil will not evaporate if under water. 17147

Discussion turned to the composition of diluted bitumen, and its fate when spilled, with Dr. Hollebhone explaining, “the make-up of the product...is very important to its behaviour”. The witness agreed that whether a product sinks or floats in water will also depend on whether the water has sediments or particles in it, which can bond with hydrocarbon products. 17152

Dr. Hollebhone confirmed that the Enbridge Kalamazoo spill did involve a significant amount of sediment aggregation. Mr. Janes asked if the witnesses agreed that there is sediment in the Skeena and Naas rivers, largely as a result of glacial runoff. Ms. Maclean spoke about the variability of the issue and agreed that much is unknown on the subject, and that the Department has requested further details. 17175

Mr. Janes returned to a discussion of factors affecting buoyancy of spilled hydrocarbons, noting that in addition to product composition and sediment load of the water, density of water will also play a role. Dr. Hollebhone agreed, and also agreed that temperature and salinity of water will influence buoyancy. 17205

Dr. Hollebhone confirmed the importance of understanding the behaviour of hydrocarbons in temperatures that are typical of the region in question. Mr. Janes followed up with additional questions about substance behaviour in various temperatures and salinity conditions. Dr. Hollebhone spoke about calibrating laboratory results with those occurring in nature. 17239

Examination by Mr. Jesse McCormick for Haisla Nation 17331

The Federal Government’s assessment of impacts on fish and fish habitat

Referring to [Exhibit E9-21-09](#), page 58, Mr. McCormick noted an information response to the DFO from Gitxaala, asking, “*on what basis was the determination made that the Proponent has conducted a reasonable assessment of the risk that an oil spill would pose to fisheries resources in freshwater and marine environments?*” The response stated, “water quality and toxicology were outside the Department’s regulatory expertise”. 17334-17349

Given such a lack of expertise, Mr. McCormick questioned whether the DFO can “adequately assess potential impacts to fish and fish habitat in the event of an oil spill.” Mr. Engelsjord explained that assessing such impacts is not what the Department does.

Mr. McCormick subsequently asked, “who within the federal government would have the expertise on water quality and toxicology?” The witnesses spoke to the various areas of responsibility and expertise of Environment Canada and DFO, with Ms. Antcliffe stating, “where the DFO would have scientific expertise related to this matter, we would provide that... to be available to those regulatory agencies who should need it.” 17350- 17361

Mr. McCormick sought confirmation that DFO’s assessment of the Proponent’s application relied only on information from the Proponent itself. Mr. Engelsjord confirmed this to be the case, indicating that staff also conducted field visits. He explained that NGP has followed up with additional material in response to DFO’s recommendations, and has also committed to developing further information in the future. 17363

Mr. McCormick asked if the DFO had “established the pathways of effects relating to oil spills in the marine environment”, and Mr. Engelsjord answered that the Department had not conducted a review on the subject. 17374-17375

Mr. McCormick asked if DFO had “conducted an assessment to determine whether the information provided by [NGP] is both sufficient and accurate enough to adequately assess the risks to fish and fish habitat in the event of a spill” Ms. Antcliffe indicated that Environment Canada had made recommendations on the subject. Discussion continued around how DFO had assessed NGP’s application in terms of impacts on fish. 17376-17382

Mr. Engelsjord answered that DFO had not looked to other government agencies or departments for assessment of NGP’s spill modeling and behavior information. Mr. McCormick sought further details of government agencies’ knowledge and understanding of effects of oil spills from NGP operations. Mr. Thomas King indicated that future collaborative research with academia will be conducted on the subject, though answered that it will not be specific to those products shipped by NGP. The witness agreed, “what may be true for conventional oil products may not be true for diluted bitumen in relation to biological effects”. 17383-17393

Calling up [Exhibit E9-21-08](#), page 39-40, Mr. McCormick asked further questions about DFO’s access to data from NGP in an effort to provide a response to the Gitga’at Nation IR around pathways of effects for certain species. Mr. Engelsjord answered that the Department had not received such data, and hadn’t identified priority areas for study on the subject. 17394

The examiner asked if the DFO intended to “further study acute and sublethal effects to species in the project area” and Mr. King explained that an advisory committee had been set up to help with such research. Mr. McCormick continued, “am I correct in my understanding that that research won’t be completed and will not be available to assist in the decision-making related to these proceedings?” Mr. King responded, “that is correct” and continued to discuss the type of research that needed to be done. 17405-17411

Government department requests from and analysis of the Proponents environmental submissions

Similar discussion continued, establishing that the DFO will be relying on information from the Proponent to assess marine environmental effects and that the Department will also conduct future research. 17412

Mr. McCormick asked about Environment Canada's comments on [Exhibit B46-38](#), NGP's marine environmental effects monitoring plan, at page 7. Drawing from the Department's written evidence at [Exhibit E9-6-32](#), page 85, discussion ensued around the Department's analysis and opinion's of NGP's monitoring plans and frameworks. The witnesses described what the Department asked for from NGP for its environmental assessment, and other details related to its recommendations to the proponent. 17425

Continuing on with the discussion, Mr. McCormick asked if Environment Canada felt "there is currently a ...reasonably good understanding of fate and behaviour in relation to the specific products that will be transported" by NGP. Mr. Hollebhone pointed to the Department's recommendations where requests for additional information were made such as information around "behaviour changes like evaporation or emulsification, sedimentation" and others. 17466-17470

Mr. McCormick asked further details about the two Departments' recommendations to the Proponent, this time around development of ecological sensitivity maps. 17475

NGP's use of key indicator species to assess potential project effects

Noting that NGP had frequently used key indicator species to assess potential effects of the project, Mr. McCormick asked if the panel endorsed the use of indicator species "as an appropriate methodology for assessing effects across the broad range of species present". Ms. deShield answered, "certainly it's an approach that can be used. The key thing is to make sure that you're using appropriate species that...are representative". 17484-17486

Ms. Jennifer Wilson added that Environment Canada's written evidence recommended that NGP's selection of indicator species for the marine transportation and spills "might not be fully representative of the...guilds of the species that are present in those areas and instead had recommended a more thorough community of species approach". 17490-17492

Mr. McCormick asked what the implications of using key indicator species that are not "fully representative" would be, and Ms. Wilson answered that in such a case, "some of the potential impacts arising from...either the routine operations or in the case of an accidental release, that the...representative species...might not actually show the actual impacts that might be seen on the other species". 17494-17495

Responsibilities of Environment Canada and Department of Fisheries and Oceans

Referring to the *Spring Report of the Commissioner of the Environment and Sustainable Development*, Mr. McCormick noted criticisms and evaluations for the Commissioner in relation to compliance with the *Fisheries Act*. He asked how Environment Canada has

dealt with the lack of clear priorities and difficulties of ensuring compliance, since the release of the report. 17497

Dr. Caza described the efforts of the Department since the release of the report, including: the development of a results management framework for the *Fisheries Act* which identifies expected outcomes and objectives around Section 36; creation of the Forestry and Fisheries Act Division to coordinate and provide leadership on implementation of the Act; and, establishment of a compliance and enforcement policy for the Act. She also spoke about recent changes to the Act, which will help clarify the Department's role, and the accountability of the Minister of Environment through broad tools for management of the Act. 17503

Noting the absence of formal arrangements for Environment Canada and DFO to administer pollution prevention provisions of the *Fisheries Act* with respect to NGP, Mr. McCormick asked if the two Departments had coordinated to ensure "all potential concerns are being effectively addressed". Dr. Caza explained that the two Departments do not envision a format arrangement to administer responsibilities with respect to the Project, but that they will "collaborate...and communicate as is appropriate". Ms. Antcliffe added comments about collaboration between the two Departments. 17516-17522

Mr. McCormick continued with questions about Environment Canada's ability to address risks associated with non-compliance of the *Fisheries Act*. Dr. Caza described the details of further initiatives around a risk-based approach. 17525

Ms. Maclean added that in addition to the compliance promotion-related activities of the Department in the context of the NGP project- such as education, outreach and inspection- some activities will fall under the jurisdiction of the NEB, such as conducting inspections. 17534

Mr. McCormick asked further about the risk-based pilot project mentioned by Dr. Caza, and The Chairperson indicated that such information was not necessary for the JRP. 17542

Toxicity of oil on fish, and effects of the use of dispersants

Mr. McCormick called up [Exhibit E9-21-08](#), page 52, and asked about conclusions from the acute toxicity test data in the report for a dispersant, Corexit 9500A. Dr. Hollebhone spoke generally about the measurements. Discussion continued. 17557

Mr. McCormick noted a statement in the Exhibit regarding Environment Canada's active participation "*in research on more detailed toxicity testing at sub-lethal levels for this product*", and asked for further details on the research. Dr. Hollebhone indicated that it was being conducted with Dr. Hudson's lab at Queen's University, and that the results would be released in peer-reviewed literature within a year. 17575

Referring to a study on toxicity of oil on fish embryos, "Comparative Toxicity for Chemically Dispersed and Undispersed Crude Oils to Rainbow Trout Embryos", which

Dr. Hollebhone and Mr. King are listed as contributors to, Mr. McCormick asked, about Environment Canada's opinion of its conclusions. 17583

In response, Dr. Hollebhone indicated, "the application of dispersant can increase the amount of oil available in the water column", and that dispersant "may increase the surface to volume ration of the oil droplets". He noted that he is not a toxicologist, and that he agreed with the conclusions of the paper to the limits of his knowledge. Mr. King added his thoughts on the limitations of the study in terms of its applicability to real-world conditions where continuous dilution would change conditions. Further discussion ensued on the paper. 17589-17600

Mr. McCormick followed up, asking if the witnesses agreed that the use of dispersants "may deliver toxic components of oil to fish more quickly and efficiently than would occur in the absence of dispersants due to increased bioavailability". Dr. Hollebhone again agreed that dispersants can increase the amount of oil in a water column, but indicated a need for more research to understand how quickly this would happen. Mr. King agreed that dispersants allow oil break up, pushing smaller droplets into the water column, becoming "more bioavailable" to fish. 17601-17605

Mr. McCormick asked if the witnesses agreed that "the stability of dispersion...for use on products to be shipped by NGP is currently unknown", given that Environment Canada has not tested dispersants, nor has it received data on their use on the products shipped through proposed NGP operations. Dr. Hollebhone explained the concept of "Net Environmental Benefit" to determine the use of dispersants and noted that the Department has a large body of testing on the subject from which to draw on. He added that there are many other considerations made in deciding whether to use such a product. 17607-17617