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Order of Appearances

Northern Gateway Panel 2

Marine Emergency Preparedness & Response

Mr. John Carruthers	Mr. Randy Belore	Mr. Jeffrey Green
Dr. Alan Maki	Mr. Owen McHugh	Mr. Greg Milne
Dr. Edward Owens	Dr. Walter Pearson	Dr. Jack Ruitenbeek
Dr. Malcolm Stephenson	Mr. John Thompson	Mr. Chris Wooley
Mr. Dennis Yee		

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Examination by Joy Thorkelson for United Fisherman and Allied Workers Union (continued)..17037

Density of spilled oil

Mr. Randy Belore agreed that Northern Gateway’s (NGP) model for weathering oil reports that density of oil peaks at 1.01.

Ms. Thorkelson referred to the National Academy Press publications *Oil in Sea: Fates and Effects* which reports that emulsions can be a have a density as great as 1.03 grams per millilitre.

Ms. Thorkelson claimed that density can increase with emulsion. Mr. Belore stated that he was uncertain how the value would get over 1.025, since the full salinity of sea water is about 1.025. 17084

Fate of condensate

Ms. Thorkelson asked what happens to the condensate that does not evaporate. 17094

NGP responded that of condensate that reached shore most would evaporate and leave a small residue. As well, some of the condensate would adsorb onto suspended sediment or organic matter in the water column and spread out over a larger area, diluting and dispersing the materials. Ending at 17129

Dilbit separation

Ms. Thorkelson asked what is evaporating when evaporation occurs on dilbit. Is it the condensate? Mr. Belore clarified that the evaporation of the lighter components of dilbit is different than evaporation on condensate. 17134

Dilbit spreading

Ms. Thorkelson asked why the modelling in the application shows the oil spreading far less than what is seen in reality. Mr. Owen McHugh and Dr. Edward Owens gave a lengthy response based on the evidence in NGP's application. NGP thinks they used average hourly wind data from government met. in their modelling. 17163

Dilbit refloating

NGP stated that their current modeling does not allow for refloating if the oil dispersed. 17201

Oil penetrating sediments

Short discussion on oil penetrating the sediments on beaches. 17218

Lack of recovery of herring in Prince William Sound

Ms. Thorkelson asked whether or not NGP agreed with Dr Rice and Carls in their 2007 synthesis paper that states, "Although the 1993 collapse [of herring stocks] with the oil spill cannot be proved or disproved with certainty, reasons for the poor recovery since the collapse remain perplexing." Dr. Walter Pearson responded that the lack of recovery has nothing to do with any residual oil or the effects of the oil spill and discussed three hypotheses. 17227

Ms. Thorkelson asked, "Do you agree that EVOS showed that herring eggs have low survival rates due to oil?" Dr. Pearson responded that "There were adverse effects [with] lowered survival of development in the eggs [which] lowered the percentage of eggs that hatched." Regarding, whether oil concentrations in Prince William sound in 1989 were sufficient to damage or kill a substantial number of embryos, Dr. Pearson responded, that he could not make [the impact] into a substantial number. 17262

"Effects to pink salmon can occur" despite contradictory evidence from EVOS

Dr. Pearson agreed with Ms. Thorkelson that the estimation of short and long-term damage of the spills to pink salmon differed greatly between government researchers and those scientists under contract to Exxon. 17288

Mr. Jeffrey Green stated that "the Alaskan research may debate – whether adverse effects occurred or not – it's [NGP] conclusion that effects can occur and therefore one has to be prepared to respond." 17325

Plankton, impacts on diversity and effects on fish nutrition

Ms. Thorkelson asked about the effects on diversity and richness of the plankton bloom after an oil spill. Dr. Pearson responded with, “Potentially”.

Mr. Green also agreed that there’s the potential for adverse and locally significant effects where the oil concentrations are high, but then argued that population would recover, just like pink salmon, because of the currents and movements of plankton from undisturbed areas.

Ms. Thorkelson asked if some fish faced a lack of food, if certain plankton were not available. Dr. Pearson responded that some loss of prey can lead to nutritional issues.

17370

Ms. Thorkelson said, “Can hydrocarbons be found in the feces of plankton?” Dr. Pearson replied, “Yes.” Mr. Thorkelson asked whether toxins found in the feces of plankton and dead plankton make toxins available to bottom feeders?” Ms. Thorkelson asked and Dr. Pearson agreed that the susceptibility of larvae poisoning from hydrocarbons is dependent on the amount of hydrocarbon in the water column. 17386

Ms. Thorkelson and Dr. Pearson exchanged ideas about the spawning habits of herring, distribution of clouds of zooplankton and how this would influence the impacts of oil spill. 17396

Mr. Thorkelson suggested that the circumstances by which an oil spill would have effects on [species populations] could be agreed upon. Dr. Pearson responded these type of agreements could be created, but in the history of oil spills, in most cases, localized effects have recovered in [one to three] years. Mr. Green agreed that significant adverse effect could occur on a local population, despite the chances being minimized by cascading probabilities. 17413

Bioavailability of hydrocarbons

Mr. Thorkelson presented some contradictory studies on bioavailability of lingering oil. Dr. Pearson stated that “in some cases... there’s the potential for bioavailability, and in other cases they’re not finding bioavailability years after the spill in fish.” 17424

Effects on crab populations

Ms. Thorkelson raised the issues of contradictory evidence between NGP and UFAWU on the fate of oil on crabs. Dr. Pearson stated that it’s difficult to make any kind of predictions about the fate of crab populations as a result of a spill because of uncertain timing and magnitude of the spill. He did agree that “when you have a low stock, there’s high concern.” 17429

Parties agreed that sometimes there are and sometimes there aren’t negative impacts from crab from oiling. 17452

Effects on razor clams

Dr. Pearson agreed that [razor clams] because they are an intertidal and shallow subtidal species they are vulnerable to oil that gets into that region. 17458

Effects on fish and shellfish populations

Mr. Pearson agreed that most fish in some stage of development, if not all, are susceptible to toxins with spilled oil. 17464

Mr. Thorkelson asked about the ability to predict the impacts on populations of fish and shellfish (including direct, indirect and synergistic effects). Dr. Pearson responded, “the overall conclusion of the assessment is that under some circumstances, you can have adverse impacts, and under some circumstances, they can be significant”. 17466

Mr. Thorkelson asked, “would the effects be measureable?” Dr. Pearson responded, “Yes”.

Mr. Thorkelson asked, “would the long-term effects...be measurable?” Dr. Pearson responded, “To a certain extent. And in the course of recovery, **hopefully** [emphasis added]—and the history will tell that we expect recovery and that at some point there – you won’t be able to distinguish the control area or the baseline from the impacted.” 17471

Compensation – social and economic impacts – mixed stock management

Mr. Pearson confirmed that impact on salmon stocks would be different if oil was spilled into the river first and then carried into the estuary versus a marine spill. 17483

Ms. Thorkelson hypothetically asked what DFO’s policy will be if one salmon stock is driven down in the Douglas Channel. 17491

Dr. Pearson responded that “as a government agency responsible for the resource... they’d be conservative or precautionary. If there are links between one stock and another, then that might affect the management of the other stocks if there’s bycatch issues involved, for example.

Dr. Pearson was asked to explain the general migration for salmon smolts from lower British Columbia. He said that most of the stocks go by the north – central and north coast area [relatively close to the north coast shores]. 17498

Dr. Pearson the agreed that there “could be” impacts on stock from Southern B.C., Washington or Oregon, but could not say there “will” be impacts.

Mr. Green responded that “we think the likelihood of a large population effect that would ultimately change salmon population would be extremely unlikely.”

Ms. Thorkelson, clarified that she’s talking about impacts on the commercial fishery, including impact on stocks.

Dr. Stephenson then tried to clarify the impacts on migrating smolts, and agreed that there would be no impact on migrating smolts in open water areas. Ms. Thorkelson, clarified the question to include smolts that are feeding along the coast as the move north. Dr. Stephenson agreed, that there would be very little damage to juvenile salmon that might be exposed to oil as a result of a spill in an open water areas.

Recovery times and baselines - General

Ms. Thorkelson stated that there are five or six ways NGP has defined recovery. Dr. Pearson responded that the NGP intention of before and after the monitoring is to track changes that might be occurring in the resource, irrespective of the spill. 17539

Ms. Thorkelson asked, “Do harvest levels depend on international treaty provisions [and] DFO policies?” Dr. Pearson, “In some species, yes. [and] yes.”.

M. Thorkelson asked, “How can you determine a harvest baseline with political consideration that may change annually?”

Mr. Green responded, “...the focus would be on trying to identify ... the relationship between that spill and effects on very specific fish species. ...[We] would be using the information from the more detailed habitat specific surveys to try to get a handle on what component of the change in harvest might be responsible to the spill.”

Recovery times and baselines – dealing with spawner recruit ratio (ocean survival)

Dr. Pearson acknowledged the variations in ocean conditions that can lead variations in stock return rates from less than 1:1 to up to as high as 12:1 spawner recruit ratio. 17559

Mr. Green stated that NGP is not attempting to plan to have a baseline for this kind of variance in ocean survivals. “That’s far beyond the capability of a single proponent. ...The intent here is to focus on quantifying the effects of the actual spill incident... and then working with DFO to relate that back to how that could have affected the stock we’re speaking to.

Ms. Thorkelson asked “how would be you determine this, with that kind of variability?”

Mr. Green responded, “I don’t think there’s a specific. ... A number of things would be measured during the spill response. And there’s no specific formula for coming out with that, but it would be something what would be worked on, I’m going to assume, between DFO and the responsible authority that’s managing the spill response.”

Measuring impacts on crab given the natural variability in populations

Ms. Thorkelson explained the wide variability in crab populations year to year and asked how NGP would determine the impacts. 17572

Mr. Green said estimates could be made by measuring the extent of the impacts from actual measurements.

Mr. Pearson added, “The natural stressors on the populations like herring and Dungeness crab are so great that – and the localized effect of a spill and the temporary effect of a spill is so small in comparison that it’s those kinds of natural effect of factors and changes are going to overwhelm the effect of the spill. And that’s part of the story of recovery.” 17583

Years for an agreement on herring impacts in Prince William Sound

Ms. Thorkelson asked, “... how long did it take before there was an agreement on herring impacts in Prince Williams Sound”. “Eighteen (18) years,” responded Dr. Pearson. 17584

Compensation Process

Dr. Jack Ruitenbeek added that adjusters with international funds dealing with claims are used to situations with large natural variances, and here in Canada we’re fortunate because there is a wealth of historical data, and therefore [he believes] the claims can be treated quicker. 17591

Ms. Thorkelson inquired about situation like 2011 where the pink salmon went from a 7 million catch to zero. 17601

Dr. Ruitenbeek explained the compensation process (international funds and the Canadian SSOPF) and claimed fishermen would be compensated quite quickly. Disagreements usually have to do with the records provided. Ms. Thorkelson asked specifically about stocks. Dr. Rutenbeek responded that compensation would depend on conservative estimates based on available information and then on additional studies, which could take five to six years to complete. Mr. Thorkelson stated that the fishermen may end up going broke during this time. Dr. Rutenbeek said that payments can be made in advance of all settlements. These progress payments are made before the final claim is in fact closed and settled. 17604-17638

Impacts on Communities

Ms. Thorkelson asked, “If there was a closure, the economic impacts on our community will be very large will it not?” Mr. John Thompson responded that the compensation scheme would kick in and everyone’s income levels would remain the same. 17639

Ms. Thorkelson asked, “What about the social impacts?” Mr. Thompson said, “...a lot of those companies in Alaska communities made more money catering to the clean-up of the spill than they would under normal circumstances. He explained the numerous effects. First, the effects of the spill itself on harvesting; second, the introduction of large number of clean-up workers; and third, the time it takes to sort of get back to normal with compensation and so on. The whole approach is to try and develop a community based program beforehand. 17643

Ms. Thorkelson, “In [Exhibit B83-17, page 27](#) there a reference to the natural resources affected by the spill... would be very short term. A fishery closure of 10 days might be short term but it might be the whole fishing season.” Mr. Thompson responded, “This may be the true, but through compensation would be economically well off at the end of it as they were before.” 17664

Human Environment Protection Plan

Discussion about the cooperative spill response plans and the two Regional Advisory Committees in Alaska. 17682

Mr. John Carruthers said there are a number of initiatives that the project has taken on: Community Advisory Boards, Fishing Liaison Committee, geographic response plans, and Scientific Advisory Committee. NGP is committed to fund the community response plans that would part of the geographic response plans. 17715

Mr. McHugh said “It’s a joint responsibility between industry, government, communities. If it’s project specific item that we’ve committed to, we will meet our commitments and fund those commitments. If it’s a wider provincial application or a larger industry group, it is a joint shared responsibility.” 17726

Impacts of residential school systems

Referencing [Exhibit B83-17, Adobe Page 254](#) Ms. Thorkelson asked, “Are you saying that because many of the union’s members went to residential school that they don’t know how to collect and prepare their food and that, if they’re not working in the fishery industry jobs due to a spill, it will be the residential school that will be part of the problem.” 17729-17744

Mr. Wooley responded, “Absolutely not. ... this section was trying to clarify that the spill did not cause permanent cultural destruction that many have claimed it did. There were some disruptions. “ 17745

Shore workers and fishermen having to adapt to a spill

Ms. Thorkelson: “Why should we have to adapt to a spill?” 17754

Mr. Carruthers responded, “We’ll try and put things in play so that there’s less adaption and more prevention. And that actually, part of the planning is a big aspect of that, that we work on that together, and that’s something we want to do, is jointly work together to minimize the negative aspects.” 17761

Examination by Mr. Andrew Hudson for the Joint Review Panel 17765

Frameworks and plans

Mr. Hudson quoted from the evidence in which NGP mentions development of a framework, and cites three other instances, two of which are in transcripts, in which NGP talks about development of community plans. He asked if they could, “clarify the relationship between the frameworks referred to in [Exhibits B38-2](#) and [B70-1](#) ..., and the community management plans and community response plans mentioned by members of this witness panel last week; are they the same or are they different?” 17765

Mr. McHugh apologized for the semi-ambiguity, and said, in part, “The framework was the initial discussion and ... over the process of emergency response planning ... would lead into a community response plan.” Mr. Hudson asked, “Can you explain the

relationship between the community management plans -- or these framework documents -- and the geographic response plans?" Mr. McHugh replied, "The framework that we talked about originally would be the gauge of how groups wanted to participate in the geographic response planning process. Again, the geographic response plans, in the end, are operational plans." 17777

Mr. Hudson's efforts to understand the frameworks and the plans, and the witnesses efforts to explain them, continue in the transcript.

First Nations in the planning process

Mr. McHugh said that NGP had questioned a number of coastal First Nations ... on ... continuing discussions around community response plans, etc. They had received comments back "from several First Nation groups. The Heiltsuk and the Haida did not respond. The coastal First Nations, the Haisla, the Gitga'at, and the Gitxaala did respond." 17820

The Haisla said they were interested, provided that "Northern Gateway has demonstrated oil spill response capabilities prior to the project approval and has developed proper oil spill preparedness plans and capacity." Gitxaala said, "If the project is approved Gitxaala can advise that its participation in post-approval programs will depend on the various committees or programs proposed by Northern Gateway having the necessary powers, funding and terms of reference needed to reduce impacts on the Gitxaala's rights and titles. Gitxaala will expect the views of these committees and programs to be given adequate weight and project design and operation, will expect Northern Gateway to fund its full cost of participating."

"Ideally ... this framework would lead to ... establishment of trust through quite a detailed oil spill response planning process. ... The end result [is] the community response plan specific to helping a community understand how they would be involved in the event of an incident." 17830

Mr. Hudson asked how NGP would proceed if Aboriginal groups declined to participate. Mr. Carruthers said they would use the information they had available. Mr. Hudson asked what was in a community response plan that is not in a geographic response plan. Mr. McHugh said that the geographic response plan deals with response strategies specific to an area, the community response plan deals more with organizing, leadership and training for a specific community. 17834

Some terminology

Mr. Hudson asked for an explanation of some terms, including entrained oil, overwashed oil, tar balls, flocculation and aggregation – which led into clay-oil flocculation, calcareous fine grain sediment flocculation, the more general oil mineral aggregation and then into suspended particulate matter (SPM) in the larger silt size range. Dr. Edward Owens referred to [Exhibit B164-13](#), Adobe 57 as a reference to related material in evidence. 17850

Dilbit will sink, under specific circumstances

Mr. Hudson sought clarification about “the long-term fate of oil dispersed in the water column or bound up as an oil mineral aggregate or in flocculation.” Dr. Owens said, “The process ... where we have ... electrostatic attraction between the polars that are in the oil and the charges that are in the clays, this process creates an emulsion really of small oil particles, clay particles, and bacteria. ... The continual breakdown of a particle of oil into smaller and smaller particles radically increases the available surface area. That then allows the bacteria, microbes, fungi that are in the water column to act on that oil to biodegrade it and basically to transform it and metabolize it into carbon dioxide and water. 17887

Mr. Hudson: “So that wouldn't eventually settle to the bottom of the ocean floor? Dr. Owens: “No, sir. The process of the metabolism basically changes into carbon dioxide and water. And in effect the way in which oils are removed from the environment is by either photooxidation, by combustion or biodegradation. Those three processes act to eliminate oil. Biodegradation is probably the most significant one and particularly for oil that reaches water.” 17891

Toxicological properties of biodegradation

Mr. Hudson asked, “So there would be no potential toxicological properties after that process takes place?” Dr. Malcolm Stephenson described three ways in which oil could sink. The first, which he called the “macro scale,” was identified in the Exxon Valdez spill. Oil that was initially deposited on beaches had accumulated or had adhering sand or gravel particles, was remobilized and washed back out to sea during storms, where it subsequently sank because of the inclusion of those mineral grains. The more “micro scale” processes had two pathways. One is for very small oil droplets suspended in the water column to interact with clay or silt-sized particles and acquire additional density as a result of that merging of the clay particles or adhering of the clay particle to the oil particle. He said this was not a major process. The other is chemical adsorption of dissolved hydrocarbon to suspended sediment particles such as clays or organic materials in the water column, which themselves could subsequently sink. Dr. Stephenson concluded, “Those processes would all result in a transfer of a small amount of hydrocarbon from the water to the sediment.” 17893

Mr. Hudson asked for the second time, “With regard to the ones that do settle, there would be toxicological properties?” Dr. Stephenson: “Yes, there would be potentially. He referred to Exhibits [B16-33](#) and [B16-34](#), and said that their modelling results predicted that concentrations which were “to go to the subtidal sediment were very low and the toxicological consequences were ... negligible.” 17901

Mr. Hudson asked about the text in [[Exhibit B83-17](#), Adobe 51]: “Dispersed oil droplets adsorbed to suspended sediment making them heavy enough to settle to the seabed – likely to occur to some extent in any coastal situation where there is suspended sediment (silt/clay particles).” Dr. Stephenson said there’s a dividing line; above 20 milligrams per litre, there may be enough suspended sediment, “but it doesn't mean that all oil immediately grabs a dance partner and sinks.” 17904

Concentrations of PAHs

Dr. Stephenson noted the concentration of PAHs in different oils - Bunker C: up to 30,000 ppm, Alaska North Slope crude: 10,000-11,000 ppm, dilbit and synbit in NGP: 1600 ppm. The rest of Dr. Stephenson's discussion at this point is worth reading, in context with the evidence, again, from 17094.

Challenging other evidence

Mr. Hudson put up Haisla evidence [[Exhibit D80-27-09](#), Adobe 27] which describes the Nuka spill off Greenland in which 67% of the oil did not float. Mr. Belore and Dr. Owens commented that this was a freshwater situation, the Bunker C was heavier than would be permitted in NGP, and the authors were not present at the incident – so there's little information from which the NGP witnesses could offer an opinion. 17919

In situ burning and the percent and properties of burned oil

Mr. Hudson noted the statement: "after partial burning of heavy fuel oil it becomes heavier than seawater" [[Exhibit B83-17](#), Adobe 51]. He asked about this, and the properties of what remains. Mr. Belore said, "The efficiency of a burn is 90 to high 90 percent" leaving a few percent which would sink. Dr. Owens said it's a hard rubbery residue, and benign, but he said, "We're not the experts." 17946

Dr. Owens said, "We used to call them in situ burns -- now we like to call them controlled burns to give the impression that we're actually in control of what we're doing, and we are." 17969

Mr. Hudson said, "It is my understanding that Gateway considers [the potential for dilbit to sink if it is bound to sufficient sediment load] to be [a] relatively small percentage of the fate of spilled oil and, in fact, such an inconsequential process that it wasn't included in Gateway's oil fate modelling work. Can you confirm that?" Mr. McHugh confirmed it: "That is the conclusion that we reached within the actual modelling that was done to date." 17981

Mr. Hudson returned to [Exhibit D80-27-09](#), Adobe 28 and the Nuka spill for more questions. 17989

Sediment in the CCAA

Mr. Hudson asked about the evidence that NGP has about sediments in the confined channel assessment area (CCAA), stating that in [Exhibit B164-13](#), Adobe 57-58, "You noted that total suspended solids levels (TSS) in the CCAA are very low, ranging from less than 1 milligram per litre to 20 milligrams per litre. ... I understand ... that Gateway has very limited TSS data for the project area;" Mr. McHugh said, "I believe your statement is correct." 18002

Mr. Hudson said, "Explain why you're of the view that with the limited amount of data throughout the entire CCAA you reach the conclusion that oil would likely only sink in the near shore areas." Mr. Belore said, "We don't believe that ... these suspended fine silts would adhere enough to the surface of these larger blobs to cause them to sink. These are very fine particles, microns in diameter. You can only coat the surface of these

blobs ... You can't get enough of them in the body of the oil to cause it to sink unless you get into the heavier sediments in the near shore zone where you're rolling the oil into the sediments and having them drawn into the body of that oil to give more weight." 18009

Remobilization of shore zone oil

Mr. Hudson asked, "Fate and trajectory models did not include remobilization of the oils from the shoreline. That is, they assumed that once the oil impinged on the shorelines, it stayed there; is that correct?" Mr. Belore replied that in the modelling, "when oil reached shore, oil was retained on the shore to the capacity that that shoreline type was allowed to retain oil based on work by Gundlach. ... Different shore types would retain different quantities of oil and then once that quantity was retained on the shore, no more oil could be held in that shore segment. 18021

Certification of response organizations (RO)

Mr. Hudson said whether NGP uses "Western Canada Marine Response Corporation or its own stand-alone project-specific RO (response organization)," will it be certified by Transport Canada? Mr. McHugh replied, "Either way, ... they would be certified up to 10,000 tonnes." "It is a regulatory requirement that any ship calling ... at the terminal ... would be required to have an agreement with the 10,000 tonne RO." 18030

Mr. Hudson asked about "being certified up to 10,000 tonnes ... given the response capacity that you're committing to is 36,000 tonnes." Mr. McHugh said he cannot comment on that. NGP has not had discussions about this with Transport Canada. 18043

Mr. Hudson asked, "What would need to happen to establish either a stand-alone RO or supplement the existing RO?" Mr. McHugh but up [Exhibit B164-13](#), Adobe 9 where NGP has "laid out what we'd consider a process and some of the major tasks that would be associated with developing the 36,000 tonne response capacity." Mr. Hudson: "How does existing legislation and regulation ... allow for the establishment of a new RO or increasing the response capacity of an existing RO?" Mr. McHugh: "Within the overall Government of Canada and the Transport Canada certification process, I'm unable to comment." 18052

Dr. Owens said there are different types of ROs. "The existing model on the west coast, which is Western Canada Marine, is a cooperative response organisation. It's owned by a number of members, there is a board of directors." In Canada there are ROs "created to deal with specific projects." And there are commercial for-profit ROs. 18064

NGP in the unified command

Mr. Hudson asked about NGP's role in the unified command. Mr. McHugh said the typical setup is ship's owner or agent and provincial government. The Canadian Coast Guard monitors the unified command as representative of the Canadian government, it is not part of the unified command. Northern Gateway's role would be defined and agreed to in the marine oil spill response plan. They also discussed how NGP would participate if it were not in the unified command. 18070

Recent research and technologies regarding spills

Mr. Hudson asked for comments regarding recent developments in research on oil spills in marine environments, and the extent to which Northern Gateway is prepared to lead and fund additional research. Mr. McHugh spoke generally about NGP's interest in "being involved in the ongoing discussions" and being aware of research. He reiterated their funding commitment for the Scientific Advisory Committee, which would be focussed on research. 18092

Mr. Hudson asked for examples of newer technology for detection and clean-up. Dr. Owens mentioned remote sensing on boats that works at night and in poor weather; the shift to smaller vessels; more efficient skimmers, and a variety of specialized booms. Mr. McHugh described advances with remote operated vehicles. 18110

Information collection and post-incident monitoring

Mr. Hudson said that NGP will not be the responsible party, so will "NGP's commitments to undertake post spill follow-up and monitoring ... go beyond monitoring required of the responsible party?" Dr. Owens replied that the NGP has "a commitment to six years of information collection and a second commitment to update that information through the life of the project." 18120

Mr. Hudson asked if NGP had made commitments with regards to post-incident monitoring. Mr. Greg Milne: "Yes, we have in a general sense. We see it being done as part of the unified command decision-making process. Mr. Hudson: "Would Gateway be funding [it]?" Mr. Milne: "Funding ... would go back to the responsible party." 18137

Examination by Member Hans Matthews of the Joint Review Panel

18153

Science and the precautionary principle

Member Matthews asked, "Does Northern Gateway have full confidence and are certain of all the science that is being presented to us?" Mr. Carruthers said "We recognize it's a big issue. ... We hired the best people around." Member Matthews: "What's your interpretation of the precautionary principle?" Mr. Carruthers: "Looking for the information, then making conservative estimates, ... Where you don't have specific information, you'd make an assumption that has more conservatism in it." 18155

Member Matthews asked "How the precautionary principle was used in toxicology." Dr. Stephenson cited the Rio Declaration: "Lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." He said they are "applying toxicological models that are well understood and that are believed to have foundations that will be protective of most, if not all, species. And in doing the risk assessments based on those to apply assumptions that will overstate rather than understate the potential consequences." 18172

Member Matthews: Dilbit, Mr. Belore? Mr. Belore replied, "The way we've described the behaviour of these oils and modelled the behaviour of these oils, I'm very confident

in the results that we presented.” Dr. Walter Pearson spoke “about being in Valdez and talking to a fisherman and not being able to reassure him about his future. Sitting here today ... if I could repeat that incident in my life, I could assure that individual that there was going to be a good response, that it would mitigate the problems, that recovery does occur and that there would be [timely] compensation.” 18177

Examination by Member Kenneth Bateman of the Joint Review Panel 18186

Member Bateman’s five statements

Member Bateman said he would make five statements, based on what he had heard from this panel. He asked for comments from the witness panel, with respect to a spill which does not contain dilbit in a marine environment:

1. “A significant oil spill, particularly if it reaches the intertidal zone, will disrupt the natural equilibrium of a marine environment.” Dr. Pearson replied, that it would have effects, so “yes sir.”
2. “The impact is particularly negative to species sensitive to the toxic properties of oil in the affected marine area.” Dr. Pearson: “If you include the surface of the water and the species that are associated with the surface of the water, they’re the ones that receive the bulk of the damage in an oil spill.”
3. “A marine environment will, after the initial impact of an oil spill, naturally restore itself to its pre-spill equilibrium state?” Dr. Pearson: “Yes, sir.”
4. “Rull species recovery with few, if any, exceptions follows over time?” Dr. Pearson: “Yes, sir.”
5. “Human intervention can help direct and accelerate the natural restoration process.” Dr. Pearson: “Absolutely.” 18187

Member Bateman then asked, “Is it this panel’s scientific opinion that these same conclusions would apply without qualification to dilbit dispersed into a marine environment in a spill event?” Dr. Pearson replied, “Yes.”

Residual issues following the Exxon Valdez spill

Member Bateman asked about the residual issues that exist after the Exxon Valdez oil spill in four areas: biological, environment, social and economic? Dr. Pearson said “about 81% is recovered.” There are several that are unknown, including killer whale. 18201

Examination by the Chairperson, Sheila Leggett, of the Joint Review Panel 18213

Update on Scientific Advisory Committee

Chairperson Leggett put up [Exhibit B164-13](#), Adobe 11 and said, “It talks about a framework for the development and objectives for the Scientific Advisory Committee being initiated in 2013. I’d like you to provide an update for the Panel.” Mr. McHugh said, “The initial framework is actually part of this document, so it’s contained basically in this page and the next page.” “The intent is that, given project approval, we have a system in place ... so that we can have results coming back out of the research and being

incorporated into the detailed oil spill response planning.” The Chairperson asked more questions on this topic. 18214

Management systems which came out of OPA ‘90

The Chairperson asked Dr. Owens if he described “management systems as being a recent addition to the oil spill clean-up and recovery tool kit.” Dr. Owens said that was correct, that the unified command and incident command system came out of the US Oil Pollution Act of 1990 (OPA ’90) following the Exxon Valdez spill. Its success “was Deep Water Horizon. ... It may not always have appeared to be functional, and if you were inside it, it often appeared to be very dysfunctional, but in the big picture it worked.” 18231

The Chairperson asked what areas with the management system could be improved. Dr. Owens replied that one area is lines of roles and responsibilities and the decision-making process. Another is the question of “how does net environmental benefit become implemented in a realistic way that the laypeople can understand.” Asked to to implement improvements, Dr. Owens said “The best process are drills and exercises.” 18236

The Chairperson asked how drills help with the net benefit analysis. Dr. Owens said, ‘One of the points of drills is that you have to make decisions in the time available. You can’t wait for a study and say, "Oh, I don’t know, I can’t answer that just yet. I need to get more information". ... On a spill, you do not have time to gather more information. Drills ... are one way of exercising that decision-making process.’ 18254

More technical reporting on behaviour of dilbit

The Chairperson asked Mr. Before if there were changes he would make to the methodologies used in his technical reports. He said no, but that he “would have more thoroughly documented our understanding of the likely behaviour of [dilbit] and other heavy oils with respect to sinking.” 18262

She asked Mr. Before what advice he would give the Panel when they are reviewing lab studies that are in evidence. Mr. Before said that there are very few field studies because getting a permit to spill oil is very difficult, and costs perhaps 90% of the budget. Doing studies during a real spill is also difficult,



OHMSETT Salt Water Wave Tank, Leonardo, NJ

because the singular focus then is on clean-up. With lab tests, at the very small scale “they don’t really do that great a job of measuring the real world.” As the scale gets larger, the results more closely replicated real-world situations. At the OHMSETT facility “they have a tank that’s almost two football fields long.” 18269

Mr. Belore continued, “With these diluted bitumen products in terms of their behaviour when spilled in these meso-scale type tanks, which we’ve done ... for dispersant effectiveness and for weathering and looking at the sinking issue, these oils did not look different than the heavy fuel oils that I’ve worked with before.” 18281

The Chairperson thanked, and dismissed Northern Gateway’s witness panel 2.