ENVIRONMENTAL MONITORING TASK FORCE 1ST MEETING

7-9 DECEMBER 2011
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CONVENED BY THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE

Report of the 1st Meeting of the Environmental Monitoring Task Force

Epsom Hotel, Geneva, Switzerland, 7-9 December 2011

Contents

ACRONYMS

DG	Decision Gate
EIA	Environmental Impact Assessment
EMERCON	Russian Ministry for Emergency Situations (Russian acronym: MChS)
EMTF	Environmental Monitoring Task Force
ENL	Exxon Neftegas Limited
IBM	Institute of Marine Biology
IISG	Interim Independent Scientific Group
ISRP	Independent Scientists Review Panel
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
NTF	Noise Task Force
OGP	International Association of Oil & Gas Producers
OSR	Oil spill response
OSRP	Oil spill response plan
SE	Sakhalin Energy
SINTEF	Stiftelsen for industriell og teknisk forskning
SSG	IWC-WGWAP Scientific Steering Group
UNESCO IOC	Intergovernmental Oceanographic Commission of UNESCO
WGWAP	Western Gray Whale Advisory Panel

1 OPENING

1.1 Introductions and logistics

The Environmental Monitoring Task Force (hereafter EMTF) was established by the Western Gray Whale Advisory Panel (WGWAP) of the International Union for the Conservation of Nature (IUCN) to consider monitoring programmes related to the conservation of western gray whales and the results of such programmes. The first EMTF meeting was held at the Epsom Hotel, Geneva, Switzerland, from 7-9 December 2011 under the co-chairmanship of Glenn VanBlaricom and Brian Dicks.

The list of participants is given as Annex A. Sakhalin Energy Investment Company (Sakhalin Energy) staff based on Sakhalin Island (Evans and Larin) joined the meeting at various times by telephone conference call, and a brief presentation of recent developments in oil spill response was made by Broje from Shell's HQ in Houston. A list of acronyms is given at the beginning of the report.

1.2 Adoption of agenda

The agenda was introduced by the Chair. It had been deliberately compiled to be as wide ranging and inclusive as possible given that this was the first meeting, but it was recognised that not all items would be subject to comprehensive discussion, as this would depend on the amount of information/level of detail available from Sakhalin Energy and contractors. It was noted also that oil spill issues, which had previously been under the aegis of a separate Oil Spill Task Force (OSTF) had for practical reasons been combined into the EMTF agenda in view of the close relationship between many of the current oil and environmental monitoring issues.

Broker noted that as the sole representative of Sakhalin Energy present, he was not necessarily familiar with all agenda items, but that the conference call facility which had been put in place for the meeting, plus e-mail exchanges with staff on Sakhalin, could be used to fill any gaps. This arrangement worked well. It was noted that the proposed South Piltun platform development (Agenda items Oil Spill Issues 6 and 7 and Environmental Monitoring 2) had been considered at WGWAP 10 and extensively discussed at the recent noise workshop in Vancouver, but would be included here as the proposed development raises a number of important oil and environmental monitoring issues. It was also noted that the EMTF provided a suitable forum for reviewing the status of outstanding oil and environmental monitoring recommendations, and these were included in the agenda as opportunities arose.

The original Agenda (Annex B) was not formally rewritten or restructured, but was adapted as needed from day to day. The final format is reflected in the body of this report.

1.3 Discussion of report drafting and reporting procedures

Sarah Humphrey served as meeting rapporteur. Co-Chairmen Dicks and VanBlaricom allocated 10 December to drafting the report (see also final Agenda item).

2 OIL SPILL ISSUES IN THE CONTEXT OF POTENTIAL ENVIRONMENTAL CONTAMINATION

2.1 Oil Spill Risk Assessments

2.1.1 Risks associated with existing infrastructure (platforms, wells, pipelines, vessels, shore facilities)

Dicks noted there had been a comprehensive assessment of risks in recent years through review of Sakhalin Energy's Oil Spill Response Plans (OSRPs) and site visits to meet personnel and inspect equipment stockpiles. The general conclusion had been that the company's risk assessments and OSRPs are reasonably realistic and comprehensive, and have been modified as needed in relation to identified concerns. The main reasons to revisit the subject of risk at this meeting were in relation to any changes to vessel traffic patterns or operational procedures, and in view of the proposed South Piltun development.

Broker noted that Sakhalin Energy is now in operational mode as the construction phases for Lun-A, PA-B, pipelines and the LNG terminal at Prigorodnoye are complete. There have not been any notable changes since the Panel's 2009 site visit and thus there have been no important changes to the operational risks.

Nevertheless, the Macondo incident in the Gulf of Mexico has led to most of the world's oil companies reviewing their operational procedures for well, pipeline and platform maintenance and OSRPs, and Sakhalin Energy is no exception. Broker was not aware of any major changes to Sakhalin Energy's spill response procedures or plans as a result of that process, but a substantial reassessment of relief well procedures has extended the scope of a planned geophysical survey in 2012. There was some discussion of passing vessel traffic patterns and whether there had been any important changes. Sakhalin Energy confirmed that its operations had not changed and although there had been some seismic and construction activity by other companies, these had not resulted in major changes in vessel traffic activity.

Sakhalin Energy collaborates with and shares some spill response equipment with ENL and has assisted the Sakhalin authorities with spill response (e.g in a passing vessel incident for a minor spill from the vessel *Cristoforo Colombo*, reported at the OSTF Workshop in 2007). Dicks queried if any new incidents had occurred or whether relationships with the Russian authorities regarding spill response and planning had changed. Broker confirmed that Sakhalin Energy had not had any spills, and that there had been no requests from the authorities for assistance. Emercom is responsible for dealing with any spills in Russia and works with the relevant companies to get response plans implemented. Emercom can call upon Sakhalin Energy and ENL resources (some of which are shared) and can in theory take charge of and control them, but in practice Sakhalin Energy is of the view that in a spill (its own or when assisting with a third party's spill) it would be left in control of its own facilities and that clean up would be a collaborative effort.

VanBlaricom asked whether there had been any unforeseen developments, spills or surprises in terms of spill risk during production. Broker said as far as he knew there had not, but he **agreed** to follow up and report back. Reports of water and sand breakthrough into produced oil at Lun-A and PA-B, had been discussed at the Noise Task Force (NTF) meeting in Vancouver in November 2011. There had been some confusion over whether this changed the risk of spills. Sakhalin Energy made it clear that this was not the case and that both water and (to much a lesser extent) sediment breakthroughs were common occurrences for the industry and that the production facilities could handle them. In the case of the Sakhalin platforms, there is a 'no overboard discharge' policy in place and all produced water and sediments are re-injected back into the oil reservoir through dedicated boreholes. Thus sediment or water breakthrough should not result in any oily discharges. Some press articles (circulated earlier by Panel member Alexey Yablokov) appear to have claimed that sediment breakthrough created the potential for ingress of seabed sand into the production stream, but in general it was agreed by the task force that there is no plausible mechanism for this to occur.

Weller asked whether the oil spill response leadership group in Sakhalin Energy had changed. Broker said that it had been relatively stable, although staff changes are an inevitable occurrence. Company policy is to have operational staff trained in emergency response rather than appointing response specialists who do not have operations knowledge. Dicks noted that during his site visit in 2009, Sakhalin Energy had reported that plans were underway to considerably increase the number of trained spill response personnel. Sakhalin Energy **agreed** to follow up on this and provide the relevant statistics to the Panel. The task force briefly discussed the difficulties that staff changes in the company and in regulatory authorities can have on command and control of spill response, though it was acknowledged that Sakhalin Energy has a training programme for new response staff. Concern was expressed about the potential for politics to come into play at higher levels of the command structure, especially in the event of major incidents, as the Macondo experience showed, and the point was made that all of the advice contained within the OSRPs should be followed as far as possible.

2.1.2 Impacts of sea ice

The question was raised of whether any problems related to sea ice had arisen over the past two years. Sakhalin Energy noted that there is annual monitoring to check for sea bed sediment scour and related pipeline exposure. Some sediment removal of up to 3 metres (the pipelines are buried to 5 metres) had been found close to the shore, but it could not be confirmed whether this was a result of ice scour, sediment erosion or both. In Sakhalin Energy's view, it was most likely caused by 'alongshore drift' sediment erosion rather than ice scour. A programme of rock reinforcement in these areas addressed the problem. Sakhalin Energy is carrying out a review of pipelines currently in place in view of the possible South Piltun development.

Recent ice conditions were discussed, and in particular the implications for vessel movements at Aniva Bay. Sakhalin Energy noted that sea ice generally remains broken in this area (which is why the terminal was

located there) and no problems with tanker or other vessel movements have been experienced to date. Sakhalin Energy was asked whether sea ice thickness is recorded there and **agreed** to follow up on this and report back. It was also understood that the company operates four oil spill response vessels which have regular duties of providing supplies to the offshore facilities. All of them are Ice class Arc 4 (international)/ Ice4 (Russian). Response vessel **Agat** operates in Aniva Bay and the remaining three (**Smit Sakhalin**, **Smit Sibu** and **Irbis**) operate around the platforms. There was also discussion of whether large icebergs can form in the Sea of Okhotsk, but given a maximum ice thickness of about 4 m this is unlikely, although thick ice floes do form. There followed a brief discussion of ice scour and Fadeev noted that there was an extensive literature on this issue. Small iceberg formation is quite common and these bergs (locally known as Stamukhas) can generate scour trenches 3-4 m deep in shallow water. The benthos in scoured areas is typified by species with short life cycles that are adapted to these harsh conditions.

2.1.3 Geoseismic disturbance (shaking potential, earthquake activity on Sakhalin and in the Sea of Okhotsk, tsunamis); Earthquake and Tsunami risk

There had been some discussion of earthquake and tsunami risk at WGWAP-10, including a summary presentation from VanBlaricom and a company response. Sakhalin Energy noted that the platforms had been designed in relation to assessed seismic activity risks and that the Lenders had agreed that design criteria were adequate. Down-hole blow-out protection was also in place, as well as block valves at various points along pipelines to prevent major spillage in the event of earthquake damage, and pipelines had also been designed with zig-zag bends and various shock-protection measures in seismic risk zones to minimise risk of shock damage. These arrangements have all been reviewed post-Macondo and deemed adequate by the company.

The potential for tsunami generation had also been addressed at WGWAP-10. Sakhalin Energy confirmed that the design criteria for platforms and pipelines had, as noted for earthquakes, taken into account tsunami considerations and had been approved by their Lenders. The same protection measures, and particularly the presence of pipeline block valves either side of the shore zone, where most of a tsunami's destructive forces would be focussed, are designed to provide protection against major spillage.

Bernal noted his previous experience of the Tsunami Warning System for the Indian Ocean and of the recent Japan tsunami, and confirmed that near-shore seabed topography is the key feature related to likely extent of damage. He made the assumption that seabed topography is fairly well known in the Sakhalin area and that available models could provide a reasonable prediction of likely impacts. He **agreed** to follow up with the UNESCO IOC Early Warning Group for the Pacific on the subject of tsunami risk for the Sakhalin area and to report back to the task force on his findings.

Although various earthquake issues had been discussed at early Panel meetings (ISRP and IISG) and the Lenders' analyses of design criteria were generally accepted, there has since been little discussion between the company and present Panel members of the criteria used. As a result the Panel is still relatively uninformed on this issue and remains concerned (given the relatively recent Neftegorsk earthquake in 1995) about possible over-confidence or complacency about the risk. The risks to the existing infrastructure have already been considered by the company and approved by the Lenders and the facilities are already in place. There would be little benefit in revisiting these arrangements. The EMTF therefore **requests** further input from Sakhalin Energy specifically related to the criteria being used for the proposed South Piltun development. The company **agreed** to follow up on what had been presented to earlier meetings and on design criteria for pipelines, and would further discuss in-house whether a wider presentation to address Panel concerns would be best at the next EMTF meeting (the company's preference) or at WGWAP-11.

2.2 Risks Associated with Fate and Behaviour of Spilled Oil (surface dispersion, oil transfer to whale feeding areas, oil properties, dispersant use and oil weathering)

There have been few new developments in this area. The company has released progressively more information on the physical characteristics and emulsion-forming potential of oil and the likely fate and behaviour of spilled oil. The implications for clean-up and impacts have been discussed at previous Panel meetings. Recommendations to modify OSRPs have been made accordingly, for example by avoiding any response techniques that might result in the inadvertent transfer of oil from shore or from the water surface down into nearshore sediments where the whales feed. It is understood that these have all been implemented.

There was a brief discussion of oil properties and toxicity. It was noted that the Panel had reviewed new analytical data on aromatic compounds in Vityaz crude oil and that the data had been deemed adequate to provide baseline information relevant to any future spill. Dicks queried whether any toxicity tests had been conducted on Vityaz crude oil as such data might allow comparison of relative toxicity with other well studied crude oils. Sakhalin Energy has since confirmed that no toxicity tests have been conducted for Vityaz crude. Fadeev noted that his institute (IBM) had looked into the possibility of researching potential toxicity of certain oil fractions and had found an unpublished report by an agricultural institute (that he would try to locate). He also noted that IBM might have facilities for conducting toxicity tests if required. Fadeev and Sakhalin Energy **agreed** to report back on this issue. The question was raised as to whether the oil ENL is producing adjacent to Sakhalin Energy's operations was the same as or very similar to Vityaz crude and whether oil properties might change over the production life of the oilfield. It was later confirmed that ENL's crude oil is very similar to Vityaz crude, and that properties (e.g. viscosity) of the oil produced by both ENL and Sakhalin Energy might change slowly through the life of the fields, although such changes would likely be minor. Changes in Vityaz crude oil properties through the life of the oilfield **should be monitored** by the Panel to ensure that oil spill arrangements remain consistent with any changes.

A brief discussion followed concerning the likelihood of the formation of stable and viscous water-in-oil emulsions, as severe weather conditions can cause these sometimes highly persistent materials to form, particularly as the oil evaporates and weathers. Vityaz crude is known to form water-in-oil emulsions, but the data provided by Sakhalin Energy suggested these emulsions are not stable and would normally degrade back into oil and water. Sakhalin Energy **agreed** to check whether there was any further information available on emulsion stability.

2.3 **Spill Response and Planning**

2.3.1 Current and recently past state of affairs and issues regarding oil spill prevention (Platforms and wells; Pipelines; Vessels; Petroleum-related shoreline infrastructure; sea ice)

Sakhalin Energy confirmed that there had been no changes to its oil spill response plans or equipment in recent months, and that regulatory requirements remain unchanged.

The potential need for relief well drilling in the event of a major blowout had been looked at post-Macondo. As a precautionary measure the company intends to identify potential positions where geological conditions are suitable for deployment of mobile drilling rigs for drilling of relief wells should it become necessary during a major blow-out. The purpose of such drilling is to intercept the blow-out well and provide a channel for injecting drilling mud or cement to kill the blow-out.

Sakhalin Energy is also looking at potential improvements to response plans and equipment post-Macondo. Victoria Broje, a Shell specialist in spill response who is familiar with the incident, had visited Sakhalin earlier in 2011 to review OSR arrangements. The views of international companies on the relative merits of oil recovery at sea, in situ burning and the use of dispersants have changed somewhat after that blow-out, as reported by Dicks at WGWAP-10. Unsurprisingly, in-situ burning and dispersant use are being pushed as preferred response techniques due to their perceived effectiveness in the Macondo spill, and to some extent oil recovery is being considered less effective. These pressures could result in changes to Sakhalin Energy's response policies.

Whilst the review is welcomed it is important to maintain perspectives relevant to the specific properties of Vityaz crude oil, the Sakhalin environment and the needs of gray whale protection. In-situ burning is potentially applicable to Vityaz crude spills because this oil is light and volatile. The use of the technique needs to be carefully considered in relation to potential environmental benefits and damage however and, of course, the proximity of the platforms. Similar considerations apply to more emphasis on dispersant use. During her visit to Sakhalin, Broje met with Emercom to discuss the possible licensing of Corexit 9500, which was used during the spill in the Gulf of Mexico but is not currently licensed for use in Russia. It was not known whether this issue had been taken up by Emercom. Dicks also expressed concern that oil containment and recovery using booms and skimmers was no longer being considered as a preferred option. Whilst the method has well-known limitations, it has the important merit of removing oil from the environment, which avoids secondary air and water pollution by combustion products or oil residues in the water column. Sakhalin Energy noted that although the outcomes from the Macondo spill and the review by

Broje had merits and would not be ignored, there were no current plans for further testing of in-situ burning or for major revision of response policy by the company in the short term.

Those discussions were followed by consideration of human error, which has been a major causal factor in many oil spills, and how the company was addressing this aspect of prevention. Sakhalin Energy noted that it relies on regular training to minimise such risks. Improvements to training regimes to avoid associated pollution and other potential problems are welcomed.

Dicks recalled discussion at WGWAP-10 on Sakhalin Energy's wildlife response and that the company had been urged to consider increasing the quantity of bird hazing equipment (to deter seabirds from visiting oily beaches) and to consider adding seal cleaning facilities to the currently very good bird cleaning ones. Sakhalin Energy has not yet implemented this but noted that whilst the provision of additional hazing equipment would be straightforward, the addition of seal cleaning facilities would be considerably more demanding and costly.

2.3.2 Regional history of oil spill events and associated environmental contamination

There was nothing to report as there have been no new marine oil spills from Sakhalin Energy's or adjacent operations.

2.3.3 OSR exercises and drills

Sakhalin Energy was reminded that only partial information had been provided at WGWAP-10 on OSR exercises (recommendation WGWAP 7/020) and that the company's promise to provide a selection of detailed reports on representative drills was still outstanding. Following discussion, it was pointed out that Ecoshelf drill reports, which had been seen during the Panel's 2009 visit, were preferred for review. Sakhalin Energy provided the relevant Ecoshelf reports at WGWAP-11.

Sakhalin Energy reported that a spill response exercise involving deployment of personnel and equipment had been conducted in September 2011 in a remote area at the mouth of the Piltun lagoon, consistent with recommendation WGWAP 7/019, and provided the Ecoshelf report for Panel review. The exercise had identified several problems associated with condition of access roads, strong tidal currents in the mouth of the Piltun Lagoon and the need to remain on site overnight to maintain equipment, which the company intends to address. It is understood that a repeat drill is under consideration in the same area for July 2012. The Task Force **recommends** that Dicks should attend this drill and combine the site visit with a review of response capabilities and resources, similar to that conducted in 2009. Sakhalin Energy fully supported this proposal and noted that Dicks's attendance at a spill drill had been requested in October 2011. Dicks is also prepared to assist with planning the drill to ensure that the Panel's interests are addressed.

2.3.4 Waste storage and disposal

Sakhalin Energy reported that a waste storage and disposal facility (a series of waste reception pits) is in place and is being maintained. However, in theory the facility cannot be used because of a permitting dispute. The standoff continues because the site has been built on land which is currently designated by federal agencies for forestry and local authorities have not been successful in getting the land re-designated for industrial use. The company does not expect this to be resolved unless and until there is a pressing need, but it likely would be resolved by default in the event of a spill, given that it is the only available facility.

2.3.5 Response issues relating to sea ice - new developments

Broker noted that Sakhalin Energy regularly monitors developments in oil spill response in ice conditions via an industry initiative coordinated by the major oil companies. Broje, who has been involved in an important industry initiative, provided a verbal presentation to the meeting. She explained that in 2010, a six-company, four-year research programme had been completed. A summary report is available and on the following project website: http://www.sintef.no/Projectweb/JIP-Oil-In-Ice/. The main findings were that three techniques can be efficient in OSR in Arctic environments – dispersants, mechanical recovery and burning. The main conclusions of this program can be found on:

http://www.sintef.no/project/JIP_Oil_In_Ice/Dokumenter/jip-oil-in-ice-summary-brochure.pdf

Furthermore the International Association of Oil & Gas Producers has sponsored a research programme involving 9 companies, which will span four years with a budget of USD 21 million. This programme will look at trajectory modelling, remote sensing in poor conditions (including through ice), mechanical recovery of oil on and under ice, use of dispersants, in situ burning, environmental impact of oil and of spill response techniques, and field tests. More information can be found on:

http://www.google.nl/url?q=http://www.arcticfrontiers.com/index.php%3Foption%3Dcom_docman%26task%3Ddoc_download%26gid%3D677%26Itemid%3D389%26lang%3Den&sa=U&ei=RDJjT8agF8nM0QWLtIyQCA&ved=0CBkQFjAC&usg=AFQjCNHfq0PkPn2sj-7TlGiN2fdOutc_GA

Dicks asked about *in situ* burning and use of dispersant during the Macondo incident. Broje referred to the American Petroleum Institute that had conducted an analysis of responses to the incident. Burning had proved effective in this context. Indicative numbers were 3% for mechanical recovery, 5% for burning and 19% for the use of dispersant.

2.3.6 Spill response manuals

Recommendation WGWAP 10/017 had asked Sakhalin Energy to provide for review by the Panel a copy of an Ice Response Manual which was in preparation. The company reported that revisions had been completed in September 2011, but that the report was currently only available in Russian and was being translated. This was expected to be completed by mid-January 2012 and would be provided to the Panel as soon as it is available, hopefully before WGWAP-11. Dicks also noted the Panel's request for a revised version of a Monitoring and Assessment Handbook that he had seen in draft form during a 2009 visit to Sakhalin. Although the development of the handbook had been considered by Sakhalin Energy, it is understood that this project has been abandoned for the present.

2.4 **Proposed Development of South Piltun: New oil spill response issues, concerns and OSR planning**

2.4.1 Main features of the proposed new development

Evans had presented a status report to the meeting of the NTF in Vancouver in November 2011, where several members of the EMTF had been present, and Broker gave the same slide presentation at this meeting for the benefit of those who had not attended the Vancouver meeting. During the presentation Evans joined the meeting via conference call and subsequently contributed to this part of the agenda.

The South Piltun project is organised in phases and is still in the Select Phase during which engineering concepts, location of the platform, pipeline routes and costs/economics are being considered. The next stage in the process is termed Decision Gate 3 (DG3), during which the final concept is selected and after which the detailed design work will be carried out. DG3 is expected to be reached around the end of the first quarter of 2012. Many projects get stuck at this point because of fluctuating oil prices, upon which economic feasibility ultimately depends.

When asked whether alternative options to a platform for exploiting the South Piltun resources had been fully investigated, Evans explained that this (so-far undeveloped) oil reserve was known about at the time of the original decision to invest in Lun-A and PA-B and it was expected to produce an oil type very similar to Vityaz crude. At that time the recoverable volumes could not be well estimated and the oil price then had made development concurrently with the rest of the field un-economic. With recent more favourable oil prices and better estimates of reserves following seismic surveys, the development appeared to have more potential. Sakhalin Energy had looked at options for deviated drilling from the existing platforms and the shore, but anticipated deviated drilling improvements had not materialised and the distances necessary for deviated drilling remains beyond currently available technology. Consequently, Sakhalin Energy considers that an additional platform is the only technically viable option. Evans described a number of possible platform designs and whilst no final decision has yet been made, a gravity-based platform similar in design to PA-B (but smaller) seems a favourable option. Gas separation facilities will be necessary on the platform and in the early stages only oil would be exported – produced gas would be re-injected to the oil reservoir.

Various options remain for how the additional platform might tie in to the existing platforms and what additional pipelines might be necessary. A simple and likely option would be to tie in to Lun-A or PA-B, and the technology to do this is well known. If this option is taken, only a short new pipeline corridor would be needed, running offshore from the proposed PA-C platform to meet the existing offshore pipeline corridor.

New pipelines would then be added along the existing pipeline corridor to the chosen tie-in platform. Export pipelines from the existing platforms have sufficient capacity for the additional oil production without need for new lines. Gas production would be unlikely to take place until the 2020s and if it did develop, would require additional pipelines to export the gas, which would likely be laid along existing pipeline routes. The final position for the proposed PA-C platform will not be decided until geophysical data from the 2D seismic surveys to be conducted in summer 2012 have been fully assessed. These surveys are needed to detect any near-surface 'shallow hazard' gas deposits in the sea bed which might compromise platform security.

Spill risks associated with the proposed development were briefly discussed. Given the likely similarity between the proposed additional platform and the existing platforms, new and different risks are not anticipated and the overall risk would therefore increase only in proportion to the additional platform. Spill response planning and determination of any additional response resources would not take place until after DG3 and there should be ample time between DG3 and the start of construction for Panel involvement in the detailed planning for the development.

3 ENVIRONMENTAL MONITORING

3.1 Overview of literature review on studies of benthic ecosystems of the Sakhalin Shelf region

The session began with a verbal report from VanBlaricom on progress of a literature review of ecological aspects of gray whale foraging habitats on the north-eastern Sakhalin Island continental shelf. The review has been planned for several years but competing obligations have impeded progress. In recent months VanBlaricom has made significant progress on the review. As discussed at previous WGWAP meetings, the ecological literature for the region of interest largely appears in three languages, primarily Russian with lesser amounts in English and Japanese. VanBlaricom reported that he has found substantial literature published in English by Russian and Japanese authors, with approximately 1,500 papers published in English since 1918 that provide information on marine ecosystems in the vicinity of Sakhalin Island. Of these about 70 papers meet contemporary standards and have direct ecological relevance to areas used by gray whales for foraging off Sakhalin. He has also found references to a modest number of papers written in English by Russian or Japanese authors that are not available due to limited circulation of the original published material.

VanBlaricom provided a slide presentation of a preliminary summary of major oceanographic and ecological features of gray whale feeding areas off north-eastern Sakhalin Island, based on papers published in English and reviewed to date. The primary oceanographic feature is the southward-setting East Sakhalin Current (ESC) that flows parallel to the east side of the island. Ecological attributes of the ESC are influenced by cold water formed in polynyas of the north-western Sea of Okhotsk, by effluent waters from the Amur River, by local upwelling events driven by episodes of southerly winds, and by formation and melting of sea ice during the period from January to June each year. The result is a current system providing high concentrations of inorganic nutrients vital to primary production by phytoplankton, facilitating sustained high rates of secondary production in plankton and benthos. Principal effects of the ESC in gray whale feeding areas include low water temperatures, high primary production in the water column, high primary and secondary benthic production, high concentrations of dissolved and particulate organic detritus, and a turbid benthic boundary layer characterized by sustained high current velocities. The system includes significant seasonal and interannual variability in many ecologically important features. In addition, tidal fluctuations create diurnal shifts in current intensity and direction that are superimposed on the net southward flow associated with the ESC.

VanBlaricom briefly noted the absence of significant literature on ecological characteristics of Piltun Lagoon. This is a matter of significance as there are many published cases of spatial subsidies of coastal marine environmental productivity associated with proximity to lagoon effluents. The potential role of spatial subsidies from Piltun Lagoon in enhancing benthic productivity in gray whale feeding areas nearby is a question of long-standing interest to the Panel.

A lengthy discussion of ecological mechanisms linking ecosystem properties and gray whale foraging patterns followed VanBlaricom's presentation. Fadeev was able to inform the discussion significantly based on his research experience in the Piltun region. Fadeev made a key point in emphasizing that the ecological literature on the Sea of Okhotsk is expansive, and that a literature review on the scale of the entire region is not feasible. Group discussion then dealt with narrowing the definition of appropriate scope, topical foci,

costs, staffing, document structure and publication outlet for the proposed review. It was **agreed** that the central question guiding the review should be "Why do gray whales focus foraging effort in the recognized feeding areas on the northeastern Sakhalin shelf, given that other locations may also be available for sustained foraging success?" **It was further agreed** that VanBlaricom, Tsidulko, and Fadeev would lead an effort to provide a formal and detailed proposal for the literature review, including cost estimates and anticipated timeline, to be made available to the Panel prior to the scheduled Panel meeting in February 2012.

3.2 **Benthic ecosystems I**

The work of the Sakhalin Energy/ENL benthic monitoring research team near shore on the northeastern Sakhalin shelf was discussed by the group, beginning with a summary presentation by Fadeev. The summary included information on sampling of benthic invertebrates and fishes (in the latter case Pacific sand lance, *Ammodytes hexaptera*), sediments, contaminants (heavy metals, persistent halogenated organic compounds, and petroleum hydrocarbon residues) in sediments and in benthic invertebrates, hydrographic data, and rates of benthic secondary productivity over time. Fadeev's summary included notation that principal gray whale prey on the Sakhalin shelf fall into three categories, mobile amphipods such as *Monoporeia affinus* in relatively shallow waters, tube-dwelling amphipods (primarily *Ampelisca* spp.) in deeper waters, and sand lance. Monitoring work is done annually in the recognized gray whale feeding areas (Piltun, Offshore) and in nearby areas of interest (Chaivo/Intermediate), along with limited data from the gray whale foraging area in Olga Bay on the east coast of the Kamchatka Peninsula. Fadeev also described focused studies of Piltun Lagoon effluent, using stable isotope and fatty acid biomarker data to test spatial subsidy hypotheses as discussed at previous Panel meetings. Although much of Fadeev's work is familiar to the Panel and the task force, the overview was informative and stimulated significant questions and discussion.

Fadeev discussed recent efforts, in collaboration with statisticians at Moscow State University, to develop multivariate tools for investigation of relationships among gray whale foraging activities, distribution, and abundance with measured attributes of benthic communities in whale feeding areas. The effort has met with a number of challenges. Task force members raised conceptual concerns about matching relatively static, once-per-year samples of benthic biota with more continuous and dynamic data typically collected for gray whales in the feeding areas. Fadeev explained that an averaging approach is used to improve compatibility of the benthic and whale data sets, but there was some lingering scepticism on the part of some task force members. When asked whether the data specify behavioural categories such as feeding or travelling, given that locational data specific to feeding whales would likely be most useful in efforts to establish links with benthic data, Broker reported that behavioural specificity was not included in the data sets to which the statistical analyses are being directed.

VanBlaricom noted the high-quality data on contaminants collected by Fadeev and colleagues, and suggested that sampling effort might be streamlined in view of costs, given that measured contaminant levels have been consistently quite low since sampling began. He invited ideas on extending inter-sample intervals and other sampling strategies, perhaps including direct monitoring of tissue contamination levels in primary prey species such as *Monoporeia affinus*. Broker noted there had been a number of recommendations on changes to the programme that have not yet been reviewed but he believes these are in the 2012 Work Plan.

Weller asked whether the contaminant sampling programme is required for permits and Broker said he thought that was the case. Broker also noted that vessel time is limited across all of the monitoring components, but that benthic monitoring doesn't compete with the other monitoring work as it can be done in poor weather conditions or at night. The greater administrative concern about benthic monitoring work is the cost of analyses of samples. VanBlaricom stressed the value of Fadeev's monitoring work on benthic biota. He suggested that the sampling interval for the benthos should not be increased, in contrast to the argument for contaminant samples, because of likely negative consequences for the multivariate data analyses as described above

The task force discussed the potential use of biopsy samples to obtain contaminant data from gray whales. There was agreement in principle that such an effort was feasible and would have value in establishing a baseline for comparison in case of possible future contamination events. Concerns included the multiple analyses envisioned for the limited tissue biomass collected in biopsy sampling, the availability of appropriate field resources, such as freezers, for managing and protecting biopsy samples once collected, and

costs of analyses, particularly if done to determine component chemical spectra in high-precision detail rather than simple totals for major categories. Weller noted that contaminant levels are likely to be quite low in baleen whales generally, and are usually best tested using detailed chemical signature studies with samples from several animals utilizing different feeding habitats.

Dicks raised similar questions regarding petroleum hydrocarbon residue monitoring in sediments and whale prey species. He noted there is now a good understanding of the chemical signature of Vityaz crude oil and suggested getting a small number of samples of sediments and selected animals to do in-depth analyses, thereby allowing determination of sources for existing contaminant residues. Costs would be approximately US$500-1000 per sample and are a matter of concern. Broker said that as contaminant levels are low he doesn't expect significant contaminant levels in benthic organisms. Evans noted that regular sampling for hydrocarbons was included in the company's environmental monitoring programme and that to date no additional contamination had been noted compared to the original baseline. VanBlaricom agreed this applies for short-lived species but referred to possible bio-magnifications in longer lived organisms. However, it was **agreed** that as part of establishing a baseline of contaminant levels in prey species this would be worth investigating further.

There was discussion of the potential for emerging contaminant issues likely to be generated by the proposed new South Piltun development. Broker noted that the most likely potential source of contamination is increased vessel activity, and that such contamination would be monitored through existing sampling protocols developed for existing platforms. He did not anticipate significant contaminant issues in association with the South Piltun project should it be implemented. Broker noted further that Sakhalin Energy follows a zero discharge policy on produced waters resulting from functioning wells. Produced waters, drill cuttings and muds are routinely re-injected into wells rather than being discharged into the sea.

VanBlaricom asked if the decision to actively consider the South Piltun development was a direct consequence of increased market value of crude oil. If so, had Sakhalin Energy overlooked the geological hazards identified in the South Piltun area when the locations for the PA-B and Lun-A platforms had been selected. VanBlaricom explained that the question was posed in the context of possible contamination risks and the possible associated need to modify existing monitoring of contaminants in whale feeding areas, should the South Piltun development proceed. Broker explained that the geophysical survey planned for 2012 was required to map out any safety hazards from shallow gas deposits and that this would allow the development to be designed to minimize risks linked to geological hazards.

3.3 **Benthic ecosystems II**

3.3.1 Overview of Current Programme

Fadeev reported on benthic sampling in areas other than the recognized sites along the eastern shore of Sakhalin Island. Some sampling was conducted off eastern Kamchatka Peninsula in 2009 and 2010. Planned work in 2011 was curtailed because of funding limitations and inclement weather and sea conditions in the field; only five days of field sampling took place between 16 July and 15 August. Broker noted that gray whales were present off eastern Kamchatka in 2011. Fadeev indicated that sampling off eastern Kamchatka is generally difficult because of frequently challenging weather and seas, the use of a relatively small vessel for sampling, and substratum characteristics (high concentrations of pebbles) that add substantial time requirements for collection of each benthic sample.

When asked about comparability of benthic data among sampled locations, given a perception that sampling is systematic in some locations but opportunistic in others, Fadeev responded that the range of sampling methods has varied among locations but that data presented for comparisons among locations are obtained with comparable methods. He clarified that data presented earlier in the meeting, intended to compare benthic ecosystem characteristics among Piltun, Chaivo/Intermediate, and Olga Bay, were in all cases based on samples taken in specific locations at which gray whale foraging had been observed. In all cases samples had been collected from comparable depth ranges using the same sampling devices. Fadeev also clarified that benthic data for Olga Bay and Chaivo/Intermediate indicate similar levels of benthic biomass and productivity.

In response to questions about other possible feeding areas for gray whales, Reeves referenced his published study of historical habitat use by gray whales in the Sea of Okhotsk. Whales have been observed historically

in Shelikhov Gulf in the north-eastern Sea of Okhotsk, near Magadan (Tausk Bay) in the north-central Sea of Okhotsk, and in the Shantar Archipelago. There has been at least one recent sighting near Magadan.

With regard to recommendation WGWAP 1/020, based on a proposal from WWF-Russia relating to sampling in Severnya Bay at the northern end of Sakhalin Island, Fadeev reported that five feeding gray whales had been observed in the area in 2005 when a research vessel sheltered there from a typhoon. Benthic samples were collected at seven stations in 2006 and 2007 at depths of 40-60 m in locations at which gray whales had been observed foraging in 2005. Ampeliscid amphipods were abundant in samples, at levels (200 g/m^2) comparable to the recognized Offshore feeding area southeast of Piltun Lagoon. One graduate student thesis has been completed, investigating the benthic data from Severnya Bay and concluding that the area is suitable for gray whale foraging. Broker added that the prey populations in this bay may not be adequate for sustained feeding by gray whales. It was suggested that recommendation WGWAP 1/020 be closed since Severnya Bay apparently is used by gray whales only on an infrequent and opportunistic basis.

There has been limited effort, both directed and opportunistic, to identify areas of potential foraging by gray whales in the Sea of Okhotskoutside the Piltun region, based on historical records of gray whale locations and range. One gray whale was observed in the northernmost Kuril Islands. It was not seen feeding and appeared to be in transit.

The task force considered whether it was reasonable that a hypothetical population of western gray whales at carrying capacity (say 20,00 individuals) could be supported by prey assemblages only in the recognized Piltun and Offshore feeding areas. Such a scenario was considered very unlikely and therefore it would be reasonable to look for other areas in the region with benthic community composition and structure sufficient to support foraging gray whales. Fadeev indicated his perception that there are locations in the Shantar Archipelago and in the area from the Offshore feeding area to Shelikhov Gulf in the north-eastern portion of the Sea of Okhotsk with appropriate benthic species and biomass production rates to support gray whale foraging. He noted the high cost of identifying other foraging areas, but that some preliminary information is available to facilitate such an effort. VanBlaricom asked if there were any indications of potential feeding areas dominated by the mobile benthic amphipod *Monoporeia affinis*, which appears to be the primary gray whale prey species in the Piltun feeding area. Fadeev said he was unaware of any *Monoporeia* concentrations other than those of the Piltun feeding area, and that all other known gray whale feeding locations are similar to the recognized Offshore feeding area, with benthic assemblages dominated by ampeliscid amphipods.

Broker indicated it is unlikely that Sakhalin Energy management would support work intended to identify suitable gray whale foraging areas not currently used by the whales, and indicated his opinion that there are no substantial feeding areas other than those identified near Sakhalin Island and the Kamchatka Peninsula. Nevertheless, the matter of establishing locations into which western gray whales might expand, in conjunction with potential population growth, remains crucial in the context of whale conservation and recovery from imperilled status.

3.3.2 Methodological and analytical issues: Loss of SCUBA diving as an option for field sampling: Continuation of spatial and temporal syntheses of data collected to date; Current plans for continuation of monitoring effort; Calibration of diver and grab samples

The group discussed a previous recommendation (Item 8, p. 8 of the IISG report) regarding calibration of data collected by diver-operated and vessel-deployed grab samples collected in shallow waters of the Piltun feeding area, where safe operation of a large surface vessel is not feasible. Fadeev reported that use of divers ended four years ago as a result of SE safety regulations. As a consequence it was necessary to shift sampling methods for shallow water benthos to those requiring remotely deployed sampling using grab devices and small surface vessels. The change in sampling method has the potential to compromise the consistency of time series of benthic data with resulting difficulties in understanding temporal trends. Fadeev reported that quantitative comparisons of data collected during side-by-side deployment of vessel-deployed and diver-operated samplers have been completed. Coefficients have been developed for each of the recognized categories of substratum known for the feeding areas (e.g., coarse-grained sands, fine-grained sands), allowing conversion of sample data taken by one method to estimates of data, had the sample been taken by the other method. It was noted the subject recommendation should be considered closed and implemented and the comment removed.

3.3.3 Use of Side Scan Sonar

VanBlaricom requested clarification from Fadeev on the applicability of side scan sonar to benthic monitoring studies, based on reference to the method in the previous day's presentation. Fadeev indicated that side scan data derived from side scan sonar surveys have not been used in benthic studies, although the possibility of such applications has been discussed. Problems in the application of side scan methods to benthic surveys include the lack of availability of a support vessel designed for side scan deployment, questions about appropriate resolution of benthic structures relevant to benthic biomass and productivity, and potential contractual barriers to transferring data from survey companies to Fadeev's research program. It was agreed that previous recommendation WGWAP 1/019 regarding use of side-scan sonar for benthic studies should be considered implemented and closed.

3.3.4 New benthic monitoring issues and concerns related specifically to proposed South Piltun development; Platform, wells, cuttings, produced waters, flaring; Pipelines; Vessels; Petroleum-related shoreline infrastructure.

The task force discussed the implications of installation of the proposed South Piltun platform for monitoring of benthic communities. Broker noted there are two types of benthic monitoring projects involved. The first focuses on the vicinity of the platform construction site and would continue over the course of project development, similar to what is being done for PA-B and Lun-A. This work involves a separate contract from that involving Fadeev. The second is continued monitoring of benthos by Fadeev's team as described previously in this report.

Discussion returned to the topic of benthic monitoring in gray whale feeding areas by Fadeev's team. VanBlaricom reiterated his view that the value of the benthic surveys, and the current expertise and experience of the field and laboratory staff involved therein, is quite high in the context of western gray whale conservation. During a visit to Fadeev's laboratory in Vladivostok in 2009, VanBlaricom had been impressed by the organization, efficiency, and skill reflected by project staff and procedures. Broker agreed that there is a good team and a good routine in place and noted that the current plan is to maintain Fadeev's benthic monitoring program on an annual schedule. Broker indicated his expectation for a more thorough review of costs and benefits associated with benthic monitoring work in 2012, followed by longer-term planning. A key cost advantage of the benthic work is that, although requiring vessel support, it does not compete for vessel time because benthic work can continue during night hours and in rough weather and seas when other types of shipboard work on gray whales cannot be done. As a consequence, the incremental cost of benthic sampling in the field is relatively small compared to other gray whale research and monitoring tasks.

Fadeev indicated that contaminant data are important in any effort to understand fluctuations in benthic communities where gray whales feed. His opinion is that fluctuations observed to date have been caused primarily by natural cyclic processes, but that contaminant data are crucial in ruling anthropogenic contamination 'in' or 'out' as a cause of benthic variability. VanBlaricom raised the issue of cost and asked whether a longer contaminant sampling interval could be considered. Fadeev suggested that a biannual sampling frequency may be suitable and noted that the costs of analysing contaminant samples is less than sometimes assumed. Analyses initially focus on total hydrocarbon (HC) content in sediments, and total HC data are relatively inexpensive to obtain. Only if HC concentrations exceed specified thresholds are HC fractions evaluated, with a substantial resulting increase in overall analytical costs. To date, measured HC levels in sediments from whale feeding areas have remained below threshold. Fadeev also noted that costs of analyses of heavy metal concentrations in sampled sediments vary widely by element.

3.4 **Benthic Ecosystems III: Issues relating to Piltun Lagoon**

3.4.1 Review of information relevant to Piltun Lagoon conservation issues and western gray whales

During the life of the Panel there has been considerable discussion about the need for monitoring within and around the Piltun Lagoon - recommendations 3/015 and 3/017 covered this issue but they were rejected by the company. Dicks pointed out that there are useful elements contained within these recommendations which are spill related and are particularly relevant to post-spill restoration measures. For example, some baseline information on wetland plant communities would be extremely useful for guiding spill clean-up and to assist in deciding upon restoration measures. Sakhalin Energy's view was that if any proposals required survey work within the lagoon, then they would be rejected. This is because the Lagoon is not in the

company's licence area (it is within another operator's concession) and they have no facilities (e.g. pipelines) in the lagoon.

There was some discussion of potential studies within Piltun Lagoon that might benefit post-spill wetland restoration. Sakhalin Energy indicated that aerial surveys, mapping, zoning and access surveys of the Lagoon had already been carried out and that the results had been included within OSR Plans and related handbooks. However, the OSRP review conducted by the Panel in 2007 and during the site visit in 2009 had not revealed any significant detail relevant to post-spill restoration in the Lagoon

Dicks was invited by the company to be more specific about the types of information that might be needed from within Piltun Lagoon that would assist with post-spill restoration, and how this differed from recommendations that had been rejected. Dicks expressed the position that a primary aim would be to describe wetland vegetation communities and identify whether they would be amenable to restoration measures used in past spill responses on other regions, such as re-seeding or transplantation of vegetation plugs to damaged areas. Proper planning for such measures requires baseline data on the species composition of the wetland plant communities. Broker noted that one approach to restoration of wetlands subject to oil contamination is to allow recovery without intervention. However, the counter-argument is that there are circumstances in which restoration measures are possible and feasible, and can facilitate post-spill recovery rates. The latter are the approaches that need to be identified and be in readiness for use in the Piltun area. While it may be challenging to relate Lagoon restoration directly to gray whale conservation, any restoration measures which improve wetland recovery rates post-spill are to be encouraged and may directly benefit gray whale prey species and the wider health of the local marine environment, all of which are encouraged by the Panel. From the perspective of oil spills, the key issue is to establish priorities and procedures for post-spill restoration prior to spill events, and it was **agreed** that Dicks would take a look at the relevant recommendations and OSRP review literature alongside the proposed site visit/drill/equipment review which is planned to take place in 2012.

3.4.2 Approaches to future monitoring and studies focusing on hypotheses regarding the persistent tendency for western gray whales to feed near the mouth of Piltun Lagoon

There was a wider discussion of the potential relevance of Lagoon studies to western gray whale conservation. Panel members are of the view that the apparent preference by the gray whales to feed in shallow areas around the Lagoon mouth and along the Lagoon sand bar suggests there is some beneficial input ('subsidy') from the lagoon to the feeding grounds. In contrast, Sakhalin Energy representatives are of the view that potential subsidies from the Lagoon to whale feeding areas are likely to be minimal. Fadeev described sampling that has taken place in the Lagoon and near the Lagoon entrance. He reported that there had been preliminary studies of the plankton in the Lagoon along with stable isotope and fatty acid analysis, none of which had led to conclusive evidence supporting a significant detrital or microbial trophic contribution from the Lagoon to the feeding area. Other plausible possibilities for a subsidy mechanism include the export of phytoplankton, inorganic nutrients or other subsidies that have not been evaluated, but might be disrupted by oil spills or post-spill clean-up activities. Fadeev noted evidence that phytoplankton is of predominant food-web significance for whale prey, and that there may be some importance to specific whale prey species from detrital subsidies resulting from the extensive beds of eelgrass (*Zostera marine*) in the Lagoon. Temperature difference was also discussed. Lagoon water can be significantly warmer than waters brought to the Piltun feeding area by the East Sakhalin Current. Local warming at the Lagoon mouth might be attractive for whales, particularly females and their dependent calves, and should be investigated. Given the lack of baseline information, Panel members remain of the opinion there is a need to be precautionary with regard to the ecological integrity of the Lagoon.

3.5 **Other Issues**

3.5.1 Harmful Algal Blooms (HABs)

There was a general discussion of whether HABs occur in the gray whale feeding areas and whether they might be a threat to the Sakhalin gray whale population sufficient to justify further study. HAB effects have been documented in fish-eating baleen whales and HAB toxins have been detected in the tissues of stranded gray whales (Moore et al. 2001). Fadeev reported that his team had made some HAB studies, but while algal blooms have been noted near Magadan in the northern Sea of Okhotsk, no major blooms have been reported

off eastern Sakhalin near the gray whale feeding areas. It was agreed that expert advice should be solicited on the nature and level of potential threat of HABs to gray whales at Sakhalin.

4 RECOMMENDATIONS FROM THE TASK FORCE FOR CONSIDERATION BY THE PANEL

4.1.1 Remit of Panel – recommendations arising from task force discussions.

The question was raised about how recommendations or suggestions for study/research arising from the EMTF discussions should be handled. It seems clear from the Panel TOR that recommendations come strictly from the WGWAP Panel rather than from a task force. The mechanism is to present the task force report to the Panel which would then formulate recommendations as needed.

4.1.2 New recommendations:

1. It was noted that the properties of Vityaz crude oil might slowly change over time. Consequently, the Panel should obtain and evaluate data from Sakhalin Energy on changes in physical properties of extracted crude oil in the project area, over the life of the project, in order to consider changes that might be required in oil spill response plans and capabilities.
2. The defining question of the literature review on gray whale prey productivity will be as follows: "Why do gray whales focus foraging effort in the recognized feeding areas on the northeastern Sakhalin shelf, given that other locations may also be available for sustained foraging success?"
3. To the extent that biopsy samples are collected from western gray whales for various research purposes, the blubber portions of the biopsies should be used to assess anthropogenic contaminant levels when possible.
4. The Panel should consult with outside experts (e.g., Frances Gulland) regarding the potential for damage to the western gray whale population from harmful algal blooms.

4.1.3 Requests for additional information or action pursuant to active recommendations:

1. WGWAP7/020: Only partial information had been provided at WGWAP 10 on OSR exercises, and a selection of detailed reports on representative drills is still outstanding. Ecoshelf drill reports, which were seen during the Panel's 2009 site visit, are those preferred for review. Sakhalin Energy provided these at WGWAP 11.
2. WGWAP 8/012: There is a question regarding a copy of a lenders report by PCCI, regarding a large 2009 spill exercise, that was requested pursuant to the recommendation. There is uncertainty regarding completion of the recommendation. Evans agreed to follow up regarding compliance.
3. WGWAP 10/017: Sakhalin Energy had been asked to provide a copy of an Ice Response Manual which was in preparation for review by the Panel. The company reported that revisions had been completed in September 2011, but that the manual was currently only available in Russian and was being translated. This is expected to have been done by mid-January 2012, and it was indicated that the English version of the manual will be provided to the Panel as soon as it is available, hopefully before WGWAP 11. Sakhalin Energy is requested to provide the subject English version of the manual.

4.1.4 Suggestions for closure of existing recommendations:

1. Existing recommendation in IISG report, page 8, item 8, line 10, regarding calibration of data from shipboard-deployed and diver-deployed benthic sampling devices: The Task Force recommends that the Panel consider the recommendation implemented and closed.
2. Existing recommendation WGWAP 1/019 regarding possible use of side-scan sonar methods to assess benthic ecosystems should be withdrawn by the Panel because of lack of feasibility, and closed.

5 REFERENCES

Moore, S.E., Urbán R., J., Perryman, W.L., Gulland, F., Perez-Cortes M., H., Wade, P.R., Rojas-Bracho, K. and Rowles, T. 2001. Are gray whales hitting "K" hard? Marine Mammal Science 17:954-958.

Annex A - List of participants

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Annex B - Agenda

7 December 2011

(1) 09:00 – 09:30 Opening

- Introductions and logistics
- Adoption of agenda
- Discussion of report drafting and reporting procedures

Oil spill issues in the context of potential environmental contamination

(2) 09:30 – 10:45 Oil Spill Risk Assessments

- Risks associated with existing infrastructure (platforms, wells, pipelines, vessels, shore facilities)
- Impacts of sea ice
- Geoseismic disturbace (shaking potential, earthquake activity on Sakhalin and in the Sea of Okhotsk, Tsunamis)

10:45 – 11:00 Break

(3) 11:00 -12:00 Risks Associated with Fate and Behaviour of Spilled Oil

- Surface dispersion
- Potential for direct contact with benthic ecosystems in gray whale feeding areas
- Consequences of dispersant application for patterns of surface dispersion, weathering, and contact with benthic ecosystems
- Likely patterns of weathering

12:00-13:00 Lunch

(4) 13:00-15:30 Spill Response and Planning

- Current and recently past state of affairs and issues regarding oil spill prevention (Platforms and wells; Pipelines; Vessels; Petroleum-related shoreline infrastructure; sea ice)
- Regional history of oil spill events and associated environmental contamination
- OSR exercises and drills
- Waste storage and disposal

15:30 – 15:45 Break

(5) 15:45 – 17:15 Spill Response and Planning

- Response issues relating to sea ice - new developments
- Spill response manuals

	17:15	**Adjourn for the day**

8 December 2011

Proposed Development of South Piltun - New oil spill response issues, concerns and OSR planning

(6)	**09:00 – 10:30**	**South Piltun Development** – Main features of the proposed new development – Platform and wells – Geological conditions and instabilities – Pipelines – Vessel traffic
	10:30 – 10:45	**Break**
(7)	**10:45-12:00**	**South Piltun Development (continued)** – Petroleum-related shoreline infrastructure – Oil Spill Response Planning – Waste storage and disposal – Response issues relating to sea ice – Relationship to regional cumulative response framework and capacity.
	12:00-13:00	**Lunch**

Environmental Monitoring

(1)	**13:30 - 15:00**	**Overview of literature review on studies of benthic ecosystems of the Sakhalin Shelf region**
	15:00 – 15:15	**Break**
(2)	**15:15 - 17:15**	**Benthic ecosystems 1** – Potential sources for contaminants (Platforms, wells, cuttings, produced waters, flaring, Pipelines, Vessels, Petroleum-related shoreline infrastructure, geological issues, Legacy regional industrial activity, Other possible sources – Sediments: Petroleum hydrocarbon residues; Organohaline residues (DDTs, PCBs, HCHs, PBDEs); Heavy metal residues; Issues relating to sampling frequency, spatial distribution, and costs. – Infaunal animals consumed by gray whales: Appropriate species to be considered; Petroleum

hydrocarbon residues; Organohaline residues (DDTs, PCBs, HCHs, PBDEs, others); Heavy metal residues; Issues relating to sampling frequency, spatial distribution, and costs.

- New contaminant issues and concerns related specifically to proposed South Piltun development. Platform, wells, cuttings, produced waters, flaring; Pipelines; Vessels; Petroleum-related shoreline infrastructureDietary patterns and connections; Sampling of whale fecal material; Measurement of stable isotope signatures; Fatty acid biomarker analyses; Quantitative fatty acid signature analyses.
- Effects of disturbances by feeding gray whales on benthic communities: Short-term acute impacts; Long-term effects, including feedback connections to benthic community productivity and dynamics.
- Monitoring activities relating to other aspects of regional biodiversity: Review of current activities; Need and approaches for future monitoring activities.

17:15 **Adjourn for the day**

9 December 2011

(3) 09:00 – 10:45 **Benthic ecosystems II**

- Overview of current program; Piltun Feeding area; Offshore feeding area; Chaivo/intermediate area of interest; East coast of Kamchatka area of interest.
- Potential for assessment of known or suspected historically significant feeding areas; Justification for such efforts; Sea of Okhotsk; Kuril Islands; Commander Islands; Other locations.
-

10:45 – 11:00 **Break**

(4) 11:00 -12:00 **Benthic ecosystems II (continued)**

- Methodological and analytical issues: Loss of SCUBA diving as an option for field sampling; Continuation of spatial and temporal syntheses of data collected to date; Current plans for continuation of monitoring effort;
- New benthic monitoring issues and concerns related specifically to proposed South Piltun development; Platform, wells, cuttings, produced waters, flaring; Pipelines; Vessels; Petroleum-related shoreline infrastructure.

12:00-13:00 **Lunch**

(5) 13:00-15:30 Benthic Ecosystems III: Issues relating to Piltun Lagoon

- Review of information relevant to Piltun Lagoon conservation issues and western gray whales
- Approaches to future monitoring and studies focusing on hypotheses regarding the persistent tendency for western gray whales to feed near the mouth of Piltun Lagoon
- New issues and concerns for Piltun Lagoon related specifically to proposed South Piltun development; Platform, wells, cuttings, produced waters, flaring; Pipelines; Vessels; Petroleum-related shoreline infrastructure.

15:30 – 15:45 Break

(6) 15:45 – 17:00 Benthic ecosystems IV: Determination of specific linkages of western gray whales and benthic ecosystems in feeding areas

- Dietary patterns and connections; Sampling of whale fecal material; Measurement of stable isotope signatures; Fatty acid biomarker analyses; Quantitative fatty acid signature analyses.
- Effects of disturbances by feeding gray whales on benthic communities: Short-term acute impacts; Long-term effects, including feedback connections to benthic community productivity and dynamics.
- Monitoring activities relating to other aspects of regional biodiversity: Review of current activities; Need and approaches for future monitoring activities.

(7) 17:00 - 17:15 Workshop Closure

- Review of reporting responsibilities;
- Acknowledgements to participants and to support staff and organizations

17:15 Adjourn