WESTERN GRAY WHALE ADVISORY PANEL **WGWAP 3/3**

3rd Meeting **10-13 November 2007**

Lausanne, Switzerland

REPORT OF THE WESTERN GRAY WHALE ADVISORY PANEL AT ITS THIRD MEETING

CONVENED BY IUCN - THE WORLD CONSERVATION UNION

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1 INTRODUCTION

The third meeting of the Western Gray Whale Advisory Panel (WGWAP-3) was held at Hotel Alpha-Palmiers, Lausanne, Switzerland, from 10-13 November 2007 under the chairmanship of R.R. Reeves.

In addition to the full panel (see Annex 1), the meeting was attended by representatives from the following organizations:

Sakhalin Energy Investment Company Ltd (SEIC)
The World Conservation Union – IUCN
WWF – Russia
IFAW – Japan
IFAW – UK
Pacific Environment
UK Export Credits Guarantee Dept.
AEA
Ministry of Natural Resources of the Russian Federation

At the request of the Panel, David Weller participated in the meeting as an Associate Scientist. Julian Roberts of IUCN facilitated meeting preparations and logistics. Sarah Gotheil of IUCN served as meeting rapporteur. We appreciate their efforts in support of the Panel's work.

1.1 Background

This meeting marked a significant shift in the *modus operandi* of the WGWAP. Heretofore, the Panel's agenda and workplan had been dictated largely by SEIC's annual schedule of field data collection, reporting, and planning for the next year's construction season (SEIC also is referred to throughout this report as "the company"). The Panel's primary role, at that time, was to review company documents and provide advice on the company's analyses and plans. In keeping with the WGWAP's terms of reference, and consistent with discussions at previous meetings, the Panel has sought to develop and pursue its own workplan while meeting its ongoing core responsibilities to assess and advise on the company's work as it relates to the western North Pacific population of gray whales (*Eschrichtius robustus*), or WGWs.

At its second meeting in St Petersburg (WGWAP-2) the Panel, in consultation and collaboration with SEIC, had developed terms of reference for three intersessional task forces (the Oil Spill Task Force, the Photo-Identification Task Force and the 4-D Seismic Task Force) that would report to WGWAP-3. In addition, at WGWAP-3 the Panel agreed to review progress on a number of issues including SEIC's Marine Mammal Observer (MMO) programme, beach surveys for WGWs, satellite tagging, monitoring and management of construction noise, WGW population assessment, multivariate analyses, the company's mid- and long-term work programme and the company's future WGW research and monitoring plans.

1.2 Adoption of agenda and reporting procedures

The final agenda (Annex 2) was adopted after a brief discussion.

The Panel met to work on its report each afternoon after the plenary session, and several panel members remained in Lausanne to continue drafting, editing and organizing the report for a day after the meeting (14 November). Work on the report continued by e-mail correspondence in the weeks immediately following the meeting.

2 REVIEW RECOMMENDATIONS FROM PREVIOUS MEETING(S)

IUCN provided a comprehensive table of the status of Panel recommendations made prior to, WGWAP-3 (WGWAP 3/INF.1). In addition to the text of each recommendation, the table identified the responsible party, the formal SEIC response and the status at 18 October 2007 (in progress, ongoing, open, outstanding, closed or in need of clarification). Such a table will be provided for each future WGWAP meeting in order to ensure appropriate follow-through. A comprehensive table of recommendations made by WGW groups and panels since 2005 is in preparation by IUCN. Once vetted by the Panel and SEIC, the comprehensive table will be posted on the IUCN website as a means of tracking Panel advice and company responses over time.

The one recommendation in INF.1 requiring clarification was WGWAP 2/14 in which the Panel had requested that information on transmission loss (TL) experiments be included in SEIC's detailed work plan. The response by the company had been that the scope of TL experiments was part of the WGW scope of work provided to the Russian authorities for approval, and that it had been provided to the Panel informally on 15 May 2007. Further information was provided in Lausanne and the Panel was assured by SEIC that all TL and other sound transmission experiments requiring a transducer to operate inside the 20 m contour of the Piltun feeding area had been conducted according to the mitigation protocol specified in WGWAP 2/15.

3 MARINE MAMMAL OBSERVER PROGRAMME

3.1 Carcass Survey Programme Results

SEIC provided a preliminary report on the 2007 Marine Mammal Carcass Survey Programme (WGWAP 3/INF.2). Although no dead or injured gray whales were observed, a total of five dead marine mammals were found beached or floating off northeastern Sakhalin Island between 30 August and 19 September. Four of these (3 seals and a beluga whale) were first discovered by the shore-based behaviour team. The beluga whale and one of the seals were later detected and reported by a dedicated helicopter survey on 15 September. The only other observation was of a beaked whale (identified in the report as a Cuvier's beaked whale) found floating near the PA-B platform by a marine mammal observer on a crew boat.

Dedicated helicopter surveys were carried out in June, July and September. Although these surveys were planned to be monthly, the August survey was missed because of a problem with airport authorisations. At WGWAP-2, the Panel had recommended biweekly surveys of the Piltun feeding area during July-October and at least two surveys of the entire east coast of Sakahlin Island every open-water season. The company's response had been that it would conduct "daily surveys using existing crew change flights" and dedicated monthly (rather than biweekly) surveys of the coast between Nogliki and Okha (WGWAP 3/INF.1).

Crew change flights, which are considered supplemental to the dedicated carcass surveys, are not daily but rather depend on sea and visibility conditions. The crew change flights began on 1 June 2007 and were expected to continue until the end of October. The total flights through mid-September had been 39 between Nogliki-Piltun and 25 between

Nogliki-Lunskoye. No marine mammals had been observed although the helicopter pilots had been briefed by MMOs on how to search for carcasses.

After discussing this information, the Panel re-emphasized the importance of landing and photographing any dead gray whale (or any stranded cetacean should species identification from the air present a problem) at the time it is first observed (with special attention given to obtaining images useful for photo-identification) because it may not be possible to return to the carcass and obtain useful photographs and other data. In addition to photographs, tissue samples from the animal are needed to compare its genotype to those from the existing archive of WGW biopsies collected by the Russia-US team. SEIC stated that they did not have permission from the Russian Ministry of Natural Resources to collect such samples. In response, the Panel **recommends** that as a minimum, the company request general permission to collect small samples for genetic analyses [WGWAP 3/001].

The feasibility of identifying dead WGWs photographically was demonstrated recently when a whale was fatally entrapped in a set net on 18 January 2007 in Yoshihama Bay, Iwate Prefecture, Japan. The whale was photographed and determined to be a female calf that had been observed and photographed off Piltun in summer 2006 (IWC 2007).

3.2 MMO Programme Effectiveness

3.2.1. Background

The purpose of placing MMOs on vessels associated with Sakhalin II, Phase 2 is to reduce the risk of ship/whale collisions and to provide data to better evaluate the risk of such collisions. The use of observers during the periods of construction was considered particularly important in view of the number of vessels operating in or near whale habitat and the uncertainty about the nature and seriousness of potential interactions with the whales. MMOs were placed on a number of vessels, observation data were collected, and the records reported to date were interpreted by SEIC as suggesting that there were few close encounters and no ship/whale collisions.

To determine the reliability of such interpretations, the effectiveness of the MMO programme as a mitigation measure must be assessed, at least to an approximate degree. A low degree of effectiveness would not necessarily imply that the practice of placing MMOs on vessels was not worthwhile, but it would mean that the results of the programme should be viewed with caution and its limitations as a mitigation strategy recognised.

The report of WGWAP-2 noted that the overall effectiveness of the MMO programme would be a product of several factors, including: (i) proportion of vessels/traverses with MMOs on board; (ii) of those vessels with MMOs on board, the proportion of time spent or distance travelled during periods of daylight and reasonable visibility; (iii) of that time/distance, the proportion in which the MMOs are operating effectively; and (iv) the mean detection probability while MMOs are on effective watch, this being a function of the number of MMOs, visibility and sea state. In its WGWAP-2 report, the Panel had recommended that the MMO dataset, in conjunction with the company's other records of vessel operations, be analysed by SEIC, with a view to evaluating each of the above factors that contributes to overall effective coverage.

3.2.2. Analysis of effectiveness

An initial analysis was presented in document WGWAP3/INF.20-REV. A number of data limitations (listed below) were revealed from that analysis, leading the Panel to conclude that calculation of effectiveness is not as straightforward as envisaged at WGWAP-2.

- *There were only limited data on the operations of vessels without MMOs.* During 2005-07, the proportion of vessels with MMOs ranged from a low of 16% in 2006 to a high of 54% in 2005, but there were no data on the amount and nature of activity by vessels without MMOs.

- *For vessels with MMOs, the MMO data included only the time spent by MMOs on watch, which is only during daylight.* Data were not readily available on the amount of night time operation by most of these vessels. Records from the three cruise-change vessels operating in 2007 revealed that only 7.8% of hours steaming occurred at night (WGWAP3/INF.19), but construction vessels typically work round-the-clock.

- *The data did not include records of the amount of time spent by each vessel in each type of activity, since the activity was recorded only once per day.* Prior to 2007, MMOs kept no record of vessel speeds, so it was not known how many miles were steamed.

From the records of vessel activity, a rough division of vessel-days could be made between stationary and moving vessels, although some of the latter may have been moving very slowly (and thus represent much lower risk of collision and serious injury). Visibility was recorded by MMOs whenever it changed and the proportion of time spent in reasonable (≥ 1km) visibility ranged from 63% for stationary vessels to 71% for moving vessels.

A standard line-transect analysis of the perpendicular distance data was conducted in WGWAP 3/INF.20-REV, which found that visibility (but not sea state) was a significant covariate, and estimated an average detection of 42-46%. However, the Panel noted that the data involved a mixture of data collected while steaming and data collected while stationary or nearly so, such that it was not appropriate to analyse them as standard line-transect data. For example, there were almost as many sightings behind as ahead of the vessel. Furthermore, while the assumption of $g(0)=1$ may be reasonable when visibility is good, it probably would not hold for visibility down to 1 km, especially as there was only one MMO on watch at any time and shifts could be quite long (4-5 hours).

The Panel noted that if avoidance of ship/whale collisions was the main reason for having MMOs, then the point of interest would be the effectiveness of MMOs on vessels while steaming at medium or high speeds. However, the available data did not permit such an estimation.

Given the limitations of the data, the Panel concluded that it was not worth expending more time to complete this analysis. However, it was already clear that the overall effectiveness was probably quite low. For example, if about 50% of vessels had MMOs, 80% of activity was during daylight, 70% of this was during reasonable visibility, and the detection rate in reasonable visibility was 40%, then the overall effectiveness would be $0.5 \times 0.8 \times 0.7 \times 0.4 = 0.11$. That is, about 10% of close encounters with gray whales would be detected by

MMOs such that avoidance action would be possible, and the actual number of close encounters would be of the order of 10× the recorded number.

3.2.3. Conclusion and recommendations

The qualitative conclusion is that the MMO programme should not be regarded as the central pillar of a strategy to mitigate the risk of ship/whale collisions; although there are probably subsidiary benefits of having MMOs present (e.g. maintaining a general level of awareness of marine mammals amongst project personnel), these are hard to measure. Furthermore, the incidental sightings of WGWs by MMOs provide additional information on distribution and occurrence, which supplements that gained from dedicated surveys, especially outside the areas of high whale density.

The risk of vessel/whale collision has now shifted primarily to vessels used to exchange crews and move equipment and supplies to the platforms. Standby vessels at the platforms would pose unmeasured additional risk to the whales whenever such vessels are underway. To estimate the risks associated with the operation of vessels, the Panel **recommends** that from now on at least the following data be collected [WGWAP 3/002]:

- time and position of each start or change of vessel activity (including those when no MMO is on watch);
- visibility (including time and position when it changes);
- start and end time and position of each MMO watch period;
- time and position of each whale sighting.

The Panel **requests** that after each season, summaries of the data be presented to the Panel that show [WGWAP 3/003]:

- the number of trips by operating support vessels;
- the proportion of each trip that occurs in poor visibility (e.g., darkness, fog);
- the proportion of each trip that observers were on watch;
- hours of observation;
- numbers and locations of sighted whales.

MMO observations of WGWs in the areas to be covered by seismic surveys are of particular interest. The Seismic Survey Task Force (see item 9.1) should take account of these data when setting limits on seismic activity based on the number of whales in the survey area. The detection probability from vessels is an important factor in the effectiveness of mitigation measures for seismic surveys and the Panel **recommends** that the issue of estimating detection function probability should be addressed by the Seismic Survey Task Force [WGWAP 3/004].

3.3 Update on 2007 MMO Programme Results

The preliminary 2007 MMO Program Report (WGWAP 3/INF.19) was similar to the 2006 report except that due to limited and localised construction, fewer vessels were in the area and thus fewer observers were deployed. Vessel approaches to the general WGW area were restricted to traffic corridors. Three crew change vessels operated between Kaigon port (Nogliki) and the three existing offshore platforms (PA-A, PA-B and LUN-A).

The procedures for placing MMOs onboard vessels were similar to previous years, with the basic principle that observers would be placed only on key vessels within a vessel group as well as on vessels operating independently (i.e., not as part of a group). A total of 11 MMOs participated in the programme in 2007. Observation/data collection protocols were consistent with those of previous years except that a new column – vessel activity/velocity – was added to the data forms based on a WGWAP recommendation.

MMOs sighted 14 groups totalling 26 WGWs. No measures to avoid vessel/whale collisions were taken due to the nature of whale-vessel encounters. Eight of 14 WGW sightings indicated in the report (WGWAP 3/INF.19) were made by MMOs onboard the crew change vessels. The Panel noted that amongst the three crew change vessels seven sightings were made from *Miss Sybil*, which travelled between Kaigon and the PA-A platform, and only one sighting was made from the two vessels travelling between Kaigon and the PA-B platform. The skewed distribution of sightings – the majority came from one of the three vessels – raised concern on the part of the Panel and requires further investigation. The Panel **requests** that SEIC analyse this discrepancy and report its findings at the next meeting [WGWAP 3/005].

WGWAP 3/INF.19 indicated that MMOs were present on the crew change vessel travelling to and from LUN-A, but not all the time. At WGWAP-2 the Panel had recommended (WGWAP 2/007) that since whales are moving to and from the Piltun feeding area at the beginning and end of the season as well as moving around during the peak season, MMOs should be placed on the crew change vessel operating between Nogliki and LUN-A at all times. The Panel **reiterates** that recommendation here [WGWAP 3/006].

4 FUTURE DEVELOPMENT OF MULTIVARIATE ANALYSIS (MVA)

At the last WGWAP meeting, the Panel recognised the value of the SEIC-sponsored work of Gailey *et al.* in examining the complex problem of relating behavioural responses and anthropogenic sound for the 2005 season using an MVA approach. It also noted the inherent difficulties of analysing such data and recognised that no agreed analytical framework existed for such integrated studies. The Panel developed a "concept" document aimed at developing such a framework (WGWAP-2 report, Appendix 4).

The Panel considered this matter further at the present meeting. It recognised that the issue was not only relevant to WGWs and the Sakhalin region but had wider implications. For this reason and noting the need to involve data owners and others outside the present WGWAP process, the Panel agreed that it was appropriate for progress to be made outside the WGWAP context. Efforts to take this forward should begin as soon as possible.

The Panel agreed that the existing concept document could be valuable as a basis for progress. It supported the idea that an iterative process involving at least two scientific workshops and inter-sessional work probably would be required. It suggested that a

Scientific Steering Group should be established, nominated by data owners and perhaps other relevant bodies (e.g. IUCN, IWC). The primary tasks of the Steering Group probably would include:

(1) Developing full Terms of Reference and a timeframe for the work;
(2) Developing a *pro forma* for providing a summary of the available datasets including
   - Nature of datasets
   - Description including collection methods
   - Time periods of data collection
   - Data format (e.g. electronic, relational database, nature of validation etc.)
   - Ownership of data (including whether publicly available);
(3) Developing a literature list;
(4) Developing a draft agenda;
(5) Developing a list of attendees;
(6) Suggesting papers to be prepared in advance (contracts?);
(7) Finalising a Data Availability Agreement that would cover
   a. Use in advance of first workshop and inter-sessionally
   b. Use of data at workshops themselves
   c. Availability/confidentiality of reports and workshop papers
   d. Detail to be included in reports and working papers
   e. Authorship/publication.

To address budgetary and logistical implications aspects of this effort, the Panel suggested that the Steering Group should identify an appropriate facilitating body (e.g. IUCN, IWC) to support the initiative.

Recognising that for a variety of reasons the initiative needs to be broader than the WGWAP, the Panel proposed that a number of Panel and company members present at WGWAP-3 who also would be attending the forthcoming conference of the Society for Marine Mammalogy in Cape Town should meet there informally with other interested parties to discuss these ideas further.

5 UPDATED POPULATION ASSESSMENT

5.1. Population status

An updated population assessment was provided in document WGWAP 3/INF.18, based on photo-ID data collected off Piltun by the Russia-US team up to and including the 2006 season. This assessment had been presented to the IWC Scientific Committee in May 2007 as an update of the assessment first presented in the ISRP report (Reeves *et al.* 2005).

New median estimates of key population parameters (with 90% Bayesian confidence intervals) are 0.982 (0.972 - 0.991) for the non-calf annual survival rate; 0.76 (0.66 - 0.85) for the survival rate from calf to yearling; 2.9% (1.9%– 4.0%) for the average *annual* rate of population increase over 1994-2006; 0.45 (0.37 - 0.52) for the female sex ratio and 121 whales (112 - 130) for the 1+ (non-calf) population size in 2007. The updated assessment is more optimistic than the Reeves *et al* (2005) assessment, mainly because of the reduced calving intervals observed in recent years, implying a higher reproductive rate. The modal calving interval shortened from 3 years in the period up to 2002 to 2 years post-2002.

As noted in the report of the Photo-ID Task Force (WGWAP 3/INF.17; see item 8 of this report), the photo-ID results of the two research teams operating off Sakhalin complement each other to a large extent: that is, whales missed in a season by one team tend to be recorded by the other team. Therefore, use of the combined data set in a population assessment would be expected to improve precision. The Panel **recommends** that steps be taken to facilitate use of the combined data in a population assessment [WGWAP 3/007]. This matter is to be taken forward by the Photo-ID Task Force (see item 8 and Annex 4).

5.2. Population projections and additional deaths

Forward projections of the population model to 2050, assuming no additional mortality or disturbance to reproduction, indicate a high probability (>99%) of population increase.

However, four whales (all female) were killed in fishing nets on the Pacific coast of Japan during the 24 months up to May 2007. Given that only three deaths, all reported as strandings, had been recorded on the Pacific coast of Japan in the preceding 20 years, it seems reasonable, and precautionary, to treat this recent spate of deaths as additional mortality, not covered by the average natural mortality rate estimated for 1994-2005.

Projections of the female population incorporating this level of extra mortality (two deaths per year) indicated a high (>25%) probability of population decline and a substantial (>10%) risk of extirpation by 2050.

Subsequent to the assessment, another female western gray whale, apparently mature, was found dead on the coast of Hokkaido on 1 August 2007 (www.icrwhale.org/stranding0706.htm). The Panel had no information on the cause of death, but news reports suggested that the animal was in healthy condition, having fed during the hours before death, but that there were marks on the body that might be indicative of entanglement (based on footage of the whale, and interviews with scientists, screened on TV by HBC News, Hokkaido Broadcasting Co. Ltd., 30.08.2007, 17:30).

The whale that was fatally entrapped in a set net on 18 January 2007 in Yoshihama Bay, Iwate Prefecture, Japan, was photographed and subsequently found to match a female calf observed by the Russia-US team off Piltun in summer 2006 (IWC 2007).

The potential consequences for the population of this additional mortality, as estimated by the population model, further underline the importance of developing a range-wide conservation strategy (see item 11).

5.3. Potential impacts of industrial activities on WGW demography

The Panel noted that some company documents (e.g. WGWAP 3/INF.6) had invoked the increasing trend in the WGW population during 1995-2005 as evidence that industrial disturbance in the feeding ground was not having a population-level impact. Although this could be true, the Panel was concerned that it also could be a simplistic and overly optimistic interpretation.

The effects of noise-related disturbance might be reflected in demographic parameters, such as the mean calving rate or interval. To investigate this possibility, it would be necessary to document at least roughly the levels of construction and seismic survey activity by year over the last few years, and see how this compares with the demography. If the years can be neatly divided into "quiet" and "noisy" years, this exercise might be relatively simple; otherwise, a more detailed analysis of the available information on activity levels would be required.

A source of uncertainty in any such relationship is the latency time of an effect of environmental conditions on calf production: that is, whether breeding success of females is influenced primarily by conditions in the immediately preceding season when the whale is pregnant, or by conditions in the season before that, before the whale "decides" whether to get pregnant. Until this is resolved, it is necessary to entertain both hypotheses.

The Panel **recommends** that a preliminary analysis be carried out on the possible effects of disturbance on reproductive success or other aspects of demography [WGWAP 3/008]. The Panel also **recommends**, as suggested by the Photo-ID Task Force (WGWAP 3/INF.17), that data on body condition be incorporated into a population assessment if possible [WGWAP 3/009].

6 OIL SPILL PREVENTION, PREPAREDNESS AND RESPONSE

6.1 Report of the Task Force

As agreed in the report of WGWAP-2 (St Petersburg), SEIC's oil spill response plans for the Sakhalin II developments were reviewed by selected Panel members with regard to their technical, strategic and operational content, with the aim of identifying strengths and weaknesses and any important issues, misconceptions or errors that could have implications for WGWs. In addition, several Panel members visited Sakhalin to view sites of operation, inspect equipment stockpiles, and meet with response personnel. Based on the review of the plans and the findings of the site visit, those Panel members developed a series of topics for discussion with SEIC representatives at the Oil Spill Task Force (OSTF) workshop, held immediately prior to WGWAP-3. A preliminary draft of the Workshop report was made available to participants in WGWAP-3 as document WGWAP 3/INF.12, with the understanding that the final report of the OSTF would be completed and made available on the IUCN website.

Effective planning and response to an oil spill depends on sufficient numbers of adequately trained personnel as well as physical assets that are available and maintained in sufficient quantity and quality for the plausible range of scenarios. The OSTF judged SEIC's plans and resources against those criteria, taking a pragmatic approach adjusted for constraints that apply to spill response worldwide. The OSTF discussed a number of technical concerns regarding SEIC's response plans, but also recognised a number of areas where the company's preparation appeared to be adequate or better.

At WGWAP-3, the Panel as a whole reviewed the draft OSTF report and acknowledged that the task force had fulfilled its mandate to carry out a comprehensive, rigorous review. Some members expressed concerns that some of the conclusions as expressed in the draft report were not sufficiently precautionary with respect to WGWs. The Panel therefore made a number of recommendations to strengthen planning and response efforts (listed below). Both the OSTF and the Panel recognised that response preparation levels at or above regulatory standards do not guarantee success in actual responses to oil spills. History has shown that harsh conditions of weather and sea and unanticipated circumstances can compromise response effectiveness despite the most thorough preparation. Effective prevention is the only means of eliminating environmental damage from oil spills.

Discussions by the OSTF and Panel highlighted the following areas of concern and resulted in the following Panel recommendations:

6.1.1 Weather and Ice

Weather and ice conditions can significantly constrain the effectiveness of spill response. Fog or severe weather and seas often cause delays or interruptions in response, although response activities can be initiated or continued once conditions improve. Because of the apparently light and volatile nature of Vityaz crude oil, constraints imposed by weather and sea conditions may be counterbalanced by the fact that poor weather is also likely to assist with evaporation, weathering and natural dispersal of spilled oil.

Previous panels reviewing potential effects of Sakhalin oil and gas development had expressed concerns about spill response capabilities in the presence of sea ice (e.g. see report of the Independent Scientific Review Panel, report of the Lenders' Workshop, and report of the Interim Independent Scientists' Group). Those concerns were reiterated by the OSTF and the Panel. Spill response options in sea ice are not well developed. Internationally accepted response techniques are currently limited to mechanical recovery and *in situ* burning. The key to effectiveness of both techniques is access to the oil. In some cases, ice may restrict oil movement, effectively limiting its spread, but it can also make spilled oil difficult to detect and recover. The Panel noted that SEIC plans include ice-breaking response vessels and oil recovery equipment intended for operation in ice. *In situ* burning has not yet been proven as a viable technique for Vityaz crude oil. SEIC is undertaking further studies and stated that resources for burning oil would be included in the response strategy should those studies prove favourable. During winter and early spring, gray whales are generally not present near Sakhalin Island, so the direct risk to the whales from a spill is low at that time. However, some oil spilled in ice could be released at the late spring thaw, posing a risk to gray whales arriving in the area and therefore requiring further spill response. The Panel **recommends** that prompt and focussed clean-up response for any remaining oil residues should be a priority to minimise this risk at that time [WGWAP 3/010].

Once the Sakhalin II project reaches full production levels, the primary risks of winter spills will be from vessels in Aniva Bay. Ice cover typically is less there than in the gray whale feeding areas, and response activities are more likely to recover significant portions of spilled oil. In addition, Aniva Bay is sufficiently distant from the feeding areas that the probability of spilled oil affecting those areas is low.

6.1.2 Logistics

Depending on weather, sea conditions, spill location, and the dispersal pattern of spilled oil, access road locations and quality may limit response options. In response to concerns raised by the OSTF and Panel regarding these limitations, SEIC representatives reported that roads were frequently inspected and that repairs were made when necessary. They also reported plans to move resources and personnel by helicopter to areas needed for response when road conditions restrict or prevent ground transportation.

6.1.3 Equipment/Supplies

During the site visit to Sakhalin in summer 2007, Panel members examined stockpiles of response equipment and supplies near the Sakhalin II project area. They concluded that the available equipment was of high quality and generally suited to deployment for the types of oil likely to be spilled in or near the project area. Protocols for maintaining stockpiled materials also were judged satisfactory, although equipment and supplies were being held in temporary storage while dedicated storage facilities were being constructed. Quantities of equipment and consumable resources (e.g. sorbents, dispersants, plastic bags) were judged more than adequate to deal with SEIC's regulatory obligations for responses to Tier 1 (small volume, generally < 500 tonnes) oil spills, and most likely also for Tier 2 (intermediate volume, generally < 5000 tonnes) oil spills.

6.1.4 Personnel/Safety/Training

Trained personnel, experienced in realistic field exercises, in combination with the equipment and resources noted above, are essential for effective response. The response personnel met by panellists during the site visit appeared to be well trained (including in international spill response training courses) and as a result of regular exercises and equipment maintenance appeared well versed in handling and deploying response equipment under local conditions. Future training of personnel will include exercises in winter conditions.

6.1.5 Command and Control

The Panel understood that under the unified command system, SEIC would have control of responses to Tier 1 and Tier 2 oil spills in many circumstances and therefore would have the discretion to follow procedures needed to protect WGWs. However, at any time Russian regulators have the authority to assume command, change response priorities, and redirect the allocation and deployment of resources. Without further information from the Russian authorities, the Panel was unable to assess possible added risks to WGWs from changes in command structure.

6.1.6 Recommendations

Based on the report of the OSTF, previous panel recommendations, and discussions at WGWAP-3, the Panel **makes the following recommendations** with regard to oil spill response.

- ***Cooperation between SEIC and Russian authorities***—The Panel's evaluation of oil spill response focused primarily on SEIC's own plans and capabilities. The company's overall response strategy, however, was based on three tiers of response (Tiers 1-3). Moving from an industry-controlled response (Tier 1) to one involving either local or regional authorities (Tier 2), or national/international authorities (Tier 3), will require effective communication, coordination and cooperation. In the OSTF Workshop, SEIC had described the level of interaction with Russian authorities, particularly with regard to response exercises and drills for training and practice of response personnel. Such interactions are critical for mounting an effective response, and cooperative training and exercising need to be continued. The Panel **emphasised** the value of a flexible response strategy capable of adapting rapidly to the variety of oil spill scenarios that could arise from Sakhalin II, Phase 2 operations. It therefore **expressed support** for SEIC's efforts in working with Russian authorities to achieve such flexibility [WGWAP 3/011].

- ***Studies of crude oil toxicity,* in situ *burning, detection and response in ice and oil behaviour in the marine environment***—Some aspects of oil spill response are the subjects of considerable research and development. Oil spill detection and response under ice has become a topic of intense research, given the increasing price of oil and the expanding rate of exploitation of oil and gas resources in the Arctic. With regard to application along the NE Sakhalin coast, oil spill response capabilities would be better informed and enhanced by a range of studies, many of which SEIC indicated it was planning to undertake or had already initiated. The panel **encourages** SEIC to continue active research in a number of subject areas and, in particular, **recommends** research on the toxicity of Vityaz crude oil, the efficacy of *in situ* burning of oil in ice, detection and response options in ice, and general behaviour of Vityaz crude oil in the conditions characteristic of the Sakhalin marine environment [WGWAP 3/012]. Regarding this last topic, the Panel notes that virtually all aspects of response strategies should be tailored to the type of oil that may be spilled and its likely behaviour in that environment. Suitable tests of the behaviour of Vityaz crude oil have **not** been performed in the marine environment, and the Panel considers the absence of such tests to be a significant shortcoming in preparations for oil spill response. Although it recognises the potential difficulty of finding a suitable site and obtaining the necessary permission to carry out *in situ* experiments with Vityaz crude, the Panel **recommends** that such studies be conducted to provide information that will maximize SEIC's oil spill response capabilities [WGWAP 3/013].

- ***Completion of oil spill response handbooks***—Extensive oil spill planning documents are being completed for all major phases of Sakhalin II, Phase 2. Those that were complete had been reviewed by members of the Panel and concerns about them had been discussed in the OSTF Workshop. They are not suited to serve as useful operational guides during an actual spill. For that reason, SEIC has been developing handbooks that should be consistent with the larger response plans, but more functional during response to a spill. The Panel **recommends** that these handbooks be completed and made operational before the initiation of year-round oil production [WGWAP 3/014]. To be considered operational, all aspects of the handbooks should be ready for application in the event of a spill.

- ***Ecological monitoring of Piltun Lagoon and feeding area***—At virtually all steps in the review of Sakhalin II, Phase 2, WGW panels have highlighted the importance of Piltun Lagoon and the Piltun feeding area to the conservation of WGWs. In particular, the panels have recommended rigorous, systematic collection of baseline information from both areas to provide an adequate baseline for measuring the effects of oil and gas operations, including in the event of an oil spill. The Panel **reiterates** that recommendation [WGWAP 3/015].

- ***Detection of pipeline leaks***—As noted in previous panel reports beginning with the ISRP, existing technology has the capacity to detect pipeline leaks at or above 1% of throughput, which suggests that on the order of 700 barrels of oil could be leaked per day without detection by this system. The Panel understands that SEIC will undertake a number of additional measures to detect such leaks including "opportunistic daily crew-change flights, dedicated weekly flights of the whole pipeline, annual assessment using a subsurface remotely operated vehicle (ROV), ROV assessment after major storm or other events, monthly cleaning pigging, and

5-year intelligent pigging of the pipeline.” The Panel concurs with SEIC that these measures are necessary and **reiterates** previous recommendations that they should be carried out as standard operating procedure [WGWAP 3/016].

- ***Use of dispersants***—The Panel **recommends** that SEIC should maintain its policy of no dispersant use in or near the Piltun feeding area at any time. Under certain circumstances it may be prudent to use dispersant in or near the offshore feeding area, although the Panel anticipates these conditions will be rare and any use of dispersant will require great caution. The Panel **recommends** that dispersant should not be used when WGWs are present in the offshore feeding area [WGWAP 3/017].

- ***Oil spill response in the Piltun feeding area***—The nature and extent of oil spill response activities in the Piltun feeding area will depend on the amount, distribution, state and movement of oil in or near the area, the presence of whales, response equipment/resources immediately available, weather conditions, shoreline conditions, and water depth in the area where potential responses might occur (i.e., responses are not deemed feasible in water depths less than 10 meters). Given such variable circumstances, the Panel cannot prescribe the nature of response. However, under circumstances where response actions may pose more risk to the whales and their habitat than a lack of response, the Panel **recommends** that responders be allowed to refrain from recovery efforts in the Piltun feeding area until the oil has moved through the area to the beach where clean-up efforts are more likely to be successful [WGWAP 3/018]. Doing so could limit the amount of disturbance in the feeding area and, possibly, the amount of oil that is dispersed into the shallow-water sediment and associated benthic community. The Panel recognizes that oil on the beach poses a risk to other wildlife and that immediate and careful judgement on the part of responders in choosing response options will be required. However, the Panel also believes that, given the critically endangered status of the WGW population, it must be given the benefit of added consideration and caution commensurate with such status.

- ***Limitations of surf-washing and prop-washing***—During the OSTF Workshop, Panel members and SEIC discussed the use of surf-washing and prop-washing as techniques that should *not* be applied in the vicinity of the Piltun feeding area. Surf-washing could disperse oil from beaches into the shallow-water feeding grounds and therefore have detrimental effects on the benthos. Prop-washing involves running response vessels through oil slicks in an attempt to enhance evaporation and natural dispersion of the oil. This technique has been shown to be ineffective in many previous spills and in the case of viscous oils like heavy fuel oil it may cause the oil to break into small pieces and become more difficult to recover. The technique requires vessels to travel at speed, which is a prime reason for avoiding its use where WGWs may be present. The OSTF considered these techniques inappropriate in the Piltun area, and the Panel **recommends** that they be removed from oil spill response plans as applied to this area [WGWAP 3/019].

- ***Hazing of WGWs at risk of oil contact***—In the event of a spill, consideration may be given to hazing whales to move them away from oil or to keep them from contacting oil. Possible mechanisms to move whales include the use of vessels or sound sources. The Panel noted that hazing is being considered as a potential protection measure for other cetaceans (e.g., bowhead whales, killer whales), but also considered it to be an untested response option for WGWs. The Panel **recommends** that hazing not be attempted with WGWs until procedures have been evaluated and found to be safe and reasonably effective [WGWAP 3/020].

- ***Spills in the migratory corridor south of Aniva Bay***—The risks of oil spills to gray whales in their migratory corridor(s) south of Aniva Bay are uncertain. SEIC modelled spills in that area, and the risk was found to be a function of the location of a spill, the amount of oil spilled and its behaviour, currents and winds in the area, time of year (whales are present only during certain seasons), weather conditions and response capabilities. In the OSTF Workshop, SEIC had agreed to re-examine their oil spill modelling efforts in this area to determine if the risks of a spill there might be better quantified. SEIC has already established shipping corridors in this region that would require tankers to move southward from Aniva Bay perpendicularly across the migratory corridor before turning westward towards La Perouse Strait. While originally intended to reduce the risk of ship/whale collisions, this routing measure may have the added benefit of keeping vessels "down-current" from migrating whales. The Panel concurs with SEIC that use of a shipping corridor (traffic management scheme) in this region is a potentially useful mitigation measure.

- ***Waste disposal***—Oil spill response may generate volumes of waste far in excess of the spilled oil itself. To be comprehensive, oil spill response plans must incorporate effective disposal of those wastes. In the OSTF Workshop, SEIC had indicated that a waste storage and disposal facility was being developed in Smirnykh and that one or more additional sites may be used for the same purpose. To avoid secondary problems of contamination, the Panel **recommends** that handling, storage and disposal procedures for oil spill clean-up waste are fully developed prior to the initiation of year-round oil production [WGWAP 3/021].

- ***Post-spill assessment of response***—WGW panels had previously recommended that an independent assessment team be present to monitor response activities in the event of a spill. The Panel **rescinds** that recommendation in view of the difficulty associated with getting an assessment team on site, and the likelihood of added strain on logistical operations and other resources. The Panel **recommends**, however, that all aspects of spill response be carefully documented to ensure rigorous post-spill analysis to identify ways in which strategies might be improved [WGWAP 3/022].

- ***Restoration of lagoons, wetlands, beaches and dunes***—The value of the Piltun area as a feeding ground for the WGW population is based on ecological links of wetlands, lagoons and shallow-water nearshore environments. If a spill occurs, much of the nearshore environment could be damaged by response activities, with long-term adverse effects on the ecology of the feeding area and thus on gray whale foraging, demography and recovery. For that reason, the Panel **recommends** that any damage to the wetlands, lagoons, beaches and dunes of the Piltun ecosystem be addressed by restoration efforts as soon as possible following spill response activities [WGWAP 3/023].

6.1.7 Post-spill Monitoring of Whales

The OSTF and the Panel discussed the need for additional monitoring activities following an oil spill. The two primary components are monitoring of the WGW population during the feeding season, and monitoring of benthic communities and related ecosystems that provide prey for the whales (for a detailed discussion, see the final OSTF Report).

The Panel's discussion focussed on short-term and long-term post-spill monitoring of whales. Short-term monitoring, occurring in the days and weeks immediately following a spill event, **should include** [WGWAP 3/024]:

Surveys to document whale distribution: short-term patterns of post-spill distribution should be compared with the following:

a) existing data on whale distribution under non-spill (pre-spill) conditions;

b) observed movement of spilled oil;

c) information on various types of acoustic disturbance associated with response effort;

d) information on the location and extent of incorporation of spilled oil into the benthos in feeding areas.

Focal follows to evaluate whale behaviour: observations should be recorded on the following:

a) behaviour of whales in the presence of floating oil, including assessments of the ability and inclination of whales to avoid contact with oil;

b) general behavioural patterns of whales (for comparison with data collected during non-spill conditions);

c) changes in whale behaviour associated with spill response activities such as operations of oil recovery vessels and deployment of containment booms;

d) patterns of whale behaviour in the vicinity of areas with known contamination of benthic prey by spilled oil.

Surveys for dead whales: searches for dead whales should be carried out both on shore and on the water. Any dead whales located *must* be evaluated, at a minimum, as follows:

a) characterization of freshness of carcass;

b) description of pattern of oil coverage on the exterior surfaces of the carcass, in the eyes, in the mouth and in the baleen;

c) sampling of skin for genetic characterization;

d) photography of the animal for matching it to identified individuals in the existing photo-ID catalogues and for illustrating the extent of contact with oil.

If carcasses are found in the water, they need to be towed to locations where detailed post-mortem examinations can be carried out. Carcasses found stranded or brought ashore must be examined in detail by personnel with appropriate expertise. The Panel **recommends** the development of priority-ranked post-mortem guidelines to optimise the quality and amount of information collected [WGWAP 3/025]. This should include the acquisition of data on tissue contamination by oil. The determination of tissue contaminant levels in carcasses examined during non-spill periods will be valuable for comparison with the data collected from carcasses in the aftermath of spills.

Many of the short-term monitoring activities noted above will require use of aircraft, or will clearly be more efficient if aircraft can be used. The Panel's view is that access to aircraft dedicated to monitoring is highly desirable. If such dedicated aircraft cannot be provided, it is crucial that space dedicated to monitoring personnel be made available onboard aircraft involved in other response activities. The Panel also is concerned that aircraft used for monitoring work should have the appropriate attributes (e.g. high-winged, "bubble" windows) for effective viewing of whales on the sea surface.

The Panel **recommends** that long-term monitoring of whales following an oil spill, in the several years following a spill event, should largely resemble the monitoring of WGWs that has been conducted in the project area in recent years by SEIC and the Russia-US program [WGWAP 3/026]. As with short-term studies, the primary foci for long-term work should be distribution, behaviour, and carcass assessment. To contribute to understanding of long-term effects of oil spill events, existing protocols for whale monitoring should, in the event of a spill, be amended to incorporate the following:

a) increased effort to study whale distribution and behaviour in areas known to have been subject to significant oiling;

b) increased effort to study whale distribution and behaviour in areas known to have been subject to significant spill response activity (e.g. vessels, boom deployment and related activities);

c) increased effort to study whale distribution and behaviour in areas where benthic communities are known to have been subject to significant oil exposure.

The Panel **recommends** that existing studies of WGW distribution, behaviour and carcass evaluation in non-spill environments should be maintained to ensure that appropriate baseline information (including natural variation) is available [WGWAP 3/027]. Modified long-term studies following oil spill events should be *in addition to*, rather than in place of, established, ongoing studies. It also may be useful and informative to sample both living and dead gray whales in the vicinity of a previous spill (recent or relatively long-past) to determine levels of contaminants (e.g., polyaromatic hydrocarbons) in tissues.

6.2 SEIC Update on Status of Oil Spill Documents

WGWAP 3/INF.13 summarised the status of SEIC's oil spill response plans and their availability. Those of greatest interest and concern in relation to WGWs are the corporate plan, the Pilutn-Astokh plan, the Lunskoye plan and the Prigorodnoye offshore plan. All of these were said to be publicly available as redacted versions on the SEIC website. However, despite some discussion, it remained unclear at the meeting what was meant by "redacted." The Panel therefore **requests** that SEIC provide a clear statement as to what these documents are – e.g. the "oil spill response handbooks" described above under item 6.1.6, or the actual OSR plan documents minus appendices [WGWAP 3/028].

7 MONITORING AND MANAGEMENT OF CONTINUOUS NOISE

7.1 Shutdown Criteria: Proposed vs Implemented

7.1.1 Background

At its second meeting, the Panel presented exposure and shutdown criteria that it considered acceptable and safe for WGWs on their feeding grounds (WGWAP 2/INF.15). The Panel had hoped that SEIC would fully integrate these criteria into its planning and operations. The Panel understood that in rare cases the company could decide that it was infeasible to observe these criteria strictly, i.e., even with careful planning to minimize noise, some activities would, unavoidably, produce sufficient noise to breach the criteria. In such cases, the Panel **recommends** SEIC implement additional mitigation measures to minimize the risk to whales [WGWAP 3/029].

At WGWAP-3, the Panel reviewed two documents submitted by SEIC (WGWAP 3/INF.5 and 6) in response to the Panel's proposed noise criteria tabled at WGWAP-2 (WGWAP 3/INF.4). At the outset, it is important to state that over the last several years of construction, the amount of noise reaching WGWs in their feeding areas has been reduced from what it would have been without the mitigation efforts made by SEIC, given that the construction work was going to take place. Further, it must be acknowledged that the company has modified its original criteria to include some aspects of a dose-based approach in response to advice from the Panel and its predecessors (e.g. Independent Scientific Review Panel, Interim Independent Scientists Group). These are among the reasons individual Panel members continue to consider their participation in the WGWAP process to be worthwhile.

Nevertheless, the Panel's views and those of SEIC and its scientific consultants continue to differ in some respects, and this situation is likely to continue. With the completion in 2007 of the noisiest construction work associated with Sakhalin II, Phase 2, resolution of such differences is less urgent. However, the Panel still believes there is value in the ongoing consideration of noise mitigation criteria because it has potential relevance to future situations where noisy offshore construction activities are planned in or near sensitive whale habitat – whether around Sakhalin Island or elsewhere. SEIC states in WGWAP 3/INF.6 that it "understands the complexity of this issue and the many uncertainties that remain, and the company seems to share the Panel's view that it is worth trying "to move forward on this important issue" (WGWAP 3/INF.6).

7.1.2 Critique of SEIC Responses to Recommended Criteria

Specifically with regard to SEIC's document WGWAP 3/INF.6, the Panel has two main concerns.

The first concern is that so much emphasis was placed on hearing injury, i.e. temporary threshold shift (TTS) and permanent threshold shift (PTS). As stressed in the introductory parts of WGWAP 3/INF.6, the company's mitigation strategy has always focussed on minimising behavioural disturbance of WGWs rather than on avoidance of hearing injury. Indeed, in its design of noise-generating activities, SEIC's stated aim has been to minimize the number of whales that would be exposed to 120dB re 1µPa, the level endorsed by the

Panel and accepted by the company as the behavioural response threshold for gray whales. Avoiding injury is certainly a goal for both parties, and it is true that behavioural and physiological effects and hearing damage can occur as a result of prolonged exposure to continuous noise, even at relatively low levels (Rabat *et al.* 2006; Kastak *et al.* 2007). However, the attempt in the concluding section of WGWAP 3/INF.6 to help justify the continuous noise exposure criteria with a discussion of TTS/PTS seems unnecessary.

The Panel's second main concern with regard to WGWAP 3/INF.6 is the way the company has used and interpreted the results of the multivariate analysis (MVA) by Gailey *et al.* and the series of population assessments by the WGWAP and previous panels (see item 5).

Gailey *et al.*'s MVA indicated that WGWs responded behaviourally to noise by moving away from shore. The authors were unable to determine which source of noise – offshore construction or small research vessels operating near shore – was paramount in stimulating that response. WGWAP 3/INF.6 states that the MVA "indicated little suggestive evidence of behavioural responses directly related to noise exposure" and that the correlations "were suspected to be more related to research vessels in close proximity to the whales or could be attributed to artefacts of the statistical model." The known or potential responses of WGWs to continuous noise deserve some discussion in this context. For example, industry-supported studies off Sakhalin in the late 1990s involving shore-based behaviour and theodolite-derived data showed changes in WGW behaviour (e.g. surface-dive-respiration and movement patterns) in response to noise (Würsig *et al.* 1999). As changes of this nature are indicative of noise disturbance, it would be worth examining those data and results and considering them alongside the information on behaviour and distribution currently being used by SEIC.

In the case of population assessments, WGWAP 3/INF.6 concedes that the projected increase in the WGW population over the last several years "needs to be interpreted with caution," yet concludes that the assessment "provides some pragmatic evidence" that industrial activities in the region have had "no deleterious effect on the gray whale population level." Even though the most recent assessment by Cooke *et al.* (WGWAP 3/INF.18) did indicate some increase in the WGW population in recent years, this does not mean that industrial activities have had no population-level impact. Before any such conclusion could be reached, analyses would be required to compare annual calf production and recruitment to measures of the annual intensity of construction activity and associated noise (see section 5.3). Even then, it may be impossible to determine what the population trend would have been in the complete absence of industrial activity on the Sakhalin shelf.

In both instances (behavioural response of whales to noise and population-level effects of industrial activities) SEIC has chosen to interpret the evidence in a decidedly non-precautionary manner.

7.1.3 Further Refinement of Proposed Panel Criteria

At WGWAP-3, the Panel proposed a single revision to its earlier-proposed criteria for continuous noise. This revision related to the "low-level cutoff," i.e. the level below which industrial noise can be ignored and need not be counted as part of the overall dose received by the whales. The Panel recognises that the lack of appropriate data precludes the determination of a scientifically rigorous 'low-level cutoff' value; in such circumstances a precautionary approach is warranted. The Panel **recommends** that the low-level cutoff should be set at 107 dB re 1μPa_{RMS} [WGWAP 3/030], the value that, if sustained for 24 hours, would result in the Panel's recommended maximum dose of exposure to sound energy (i.e., the extension of the function set out in WGWAP 2/15). Prolonged exposure to continuous noise only moderately above background levels can have ototoxic impacts (Lataye and Campo 1996), and the use of a dose-based approach for noise exposure is well established for humans (Kryter 1994) and has been suggested for marine mammals (Southall *et al.* in press). The choice of 24 hours is based on the Panel's dose function, the presence of diurnal cycles in animals, and logistical concerns related to prolonged measurements. Furthermore, the best available data indicate that while 50% of whales responded behaviourally at 120 dB, 10-50% responded at levels below 120 dB (Malme *et al.* 1986). At slightly higher levels (~130 dB), prolonged exposure may result in TTS (Kastak *et al.*, 2007). At levels above 145 dB, more rapid onset of TTS, and eventually PTS can be expected.

The Panel and SEIC agreed that a dose-exposure approach for continuous noise was the most prudent way to minimize risks to the whales, although they did not agree on the acceptable dose(s). The Panel's position is that prolonged exposure to even relatively low levels carries some risk to WGWs. The severity of that risk has not been quantified for any marine mammal but has been for terrestrial mammals (Lataye and Campo, 1996).

Data provided by SEIC indicate that the Panel's recommended criteria for continuous noise (WGWAP-2) were breached by construction activities during the summer of 2007. At least one part of the feeding area was ensonified above 120 dB for >4 hours (WGWAP 3/INF.8; Racca presentation at WGWAP-3). Whether the company's own criteria (<5 whales disturbed and/or a significant portion of the feeding area ensonified >120 dB) were breached during this period was not discussed in the company documents or presentation. Racca cautioned the Panel about drawing conclusions as to how many animals might have been affected by the noise, as only some parts of the feeding area were instrumented to record noise levels and actual levels in other areas can only be estimated. The issue of instrumenting the feeding area has been raised by the WGWAP and its predecessors, and the Panel had made a suggestion with regard to sensor spacing in WGWAP 2/INF.15. Furthermore, no data in WGWAP 3/INF.8 indicated any acoustic monitoring at the 10 m isobath, so the levels of noise reaching well into the Piltun feeding area were not measured.

With regard to SEIC's ensonification of "only a small portion of the feeding area" at levels significantly above background (i.e., >110 dB) for a prolonged period of ~3 weeks, the Panel is obliged to consider all activities affecting WGWs, not only those for which SIEC is directly responsible. Such prolonged exposures, considered together with the activities of other oil and gas operators in the region, raise serious concerns about the possibility of cumulative or synergistic effects of multiple stressors on WGWs (see item 17.3).

The Panel and SEIC representatives discussed the need to have operationally feasible criteria, and the Panel maintains that its recommended criteria can be applied in the field in real time. SEIC raised the point that some operations cannot be interrupted, i.e., even if the criteria thresholds are breached, activities cannot be shut down. The Panel responded that, when planning for such activities, additional measures should be designed to minimize and monitor the impacts on whales.

Although the Panel and SEIC agreed that dose-based exposure is generally the correct metric to use for whales, they did not agree on limiting the allowable dose to absolute levels <120 dB at the edge of the feeding area, as recommended by the Panel. The Panel stressed that even if the sound level at the edge of the feeding area is 120 dB, levels well within the feeding area may still cause disturbance (e.g. Malme *et al.* 1986 reported that some feeding gray whales responded to levels of continuous noise between 110-120 dB). SEIC argued that it would be practically impossible to implement a cut-off level as low as 107 dB because both the radio noise and the periodic increase in flow noise past the monitoring hydrophones (due to tidal currents) would tend to saturate the systems to at least 110 dB. The Panel has not previously requested rigorous measurements of background noise levels and so has not seen appropriate data that would allow it to comment on this issue. In general, background noise >100 dB is not common in the frequency band of interest (10-2000 Hz) except in situations with high winds or significant shipping traffic (Urick 1983). Transient and/or periodic noise sources (e.g., tidal currents or occasional passing vessels) can be accounted for in data processing, e.g., the spectral composition of flow noise can be distinguished from industrial noise. Furthermore, steps can be taken to reduce flow noise over hydrophones (e.g., with faring), much as windscreens are attached to microphones to reduce wind noise in terrestrial applications. As for the radio noise in the transmissions from monitoring stations, the Panel and its predecessors have pointed out that these stations are not state of the art, in terms of both radio noise and overall dynamic range. Indeed, noise at 107 dB and ≥145 dB may well be outside the dynamic range of the sensors used by SEIC to monitor noise off Sakhalin. This shortcoming has been discussed several times in the past, and the Panel (and its predecessors) have been told that more advanced equipment cannot be imported into Russia. The Panel **recommends** that adequate equipment should be made available to ensure that the most appropriate mitigation measures are followed and that the necessary monitoring data are collected [WGWAP 3/031].

The inability to measure noise levels at the actual locations of whales was again identified as a limiting factor in developing and implementing mitigation measures at the lower sound levels. The use of more monitoring stations placed strategically within the feeding area would allow for more precise measurements of sound levels received by whales in the area and therefore a more accurate assessment of whether and how many whales are being exposed to disturbing noise levels.

The Panel and SEIC considered how they should pursue questions concerning WGW response to noise in the future. Both agreed to a joint effort to document the evolution of SEIC's noise management and mitigation programme, including its strengths and weaknesses, to identify lessons that could be applied in future similar situations. This process could well require, or otherwise lead to, additional analyses of the dataset that has been collected during SEIC's recent construction activities as well as during earlier years by various teams of investigators (e.g. see section 4 of this report). Certain data limitations will nevertheless remain – e.g. interpolation will be necessary to estimate noise levels at all points in the feeding area.

7.2 2006 Construction Season Revisited

WGWAP 3/INF.7 was prepared as a response to recommendation WGWAP 2/013. Unfortunately, there was a misunderstanding concerning the term "block" and the Panel's request for noise calculations for the feeding area based on a grid. The original recommendation read, "…whale density should be calculated for grid cells of 10 km^2 (5 km parallel to shore x 2 km perpendicular) with a 1-day average and reported in whales/km^2," but due to the misunderstanding, the whale densities were presented only for the larger blocks (i.e., blocks 7-9 as described in WGWAP 3/INF.7). Whale density data were not available for all construction days in 2006 due to poor weather conditions. Those observations that could be made indicated that whale density declined in blocks 7 and 8 near the end of the period, but the information needed to clarify how the whales shifted their distribution was not available. To address that shortcoming, the Panel requested that SEIC calculate and present whale densities for the entire survey area on a 1 km^2 scale for every day that data were available. These plots could then be compared manually with plots of noise that had been calculated on an hourly basis for the originally requested 10 km^2 blocks over the entire period of interest, namely 14-28 July 2006.

On the last day of WGWAP-3, SEIC provided document WGWAP 3/INF.7-REV to the Panel with the requested analyses, thereby satisfying the Panel's recommendation WGWAP 2/13. Although these data and analyses were helpful, the Panel needs to consider it further and raise any remaining concerns at the next WGWAP meeting.

With regard to WGWAP 3/INF.10, the Panel requested clarification of the high noise levels evident in two of the graphs (Figs 27 and 30). These appeared to indicate noise in excess of SEIC's criteria. Racca explained that the high levels were a result of malfunction of the sensors and the subsequent presence of a vessel providing maintenance to the buoys. No real-time mitigation was triggered because, according to Racca, spectrograms confirmed the sensor malfunction. The spectrograms were not provided to the Panel, but at least in one case the hard-disk recording confirmed that noise levels were not as high as reported by the radio buoys.

7.3 Preliminary Results from the 2007 Construction Season

In late June to early July 2007, NGOs raised concerns about in-air noise (and in-ground vibration) associated with installation of the PAB platform topsides. In response to media statements by NGOs, the Panel requested that SEIC present the noise levels and whale densities for that period. WGWAP 3/INF.8 presented preliminary analyses of the noise recorded by four acoustic monitoring stations. Whale density data were not included in the document. The acoustic data showed that although the SEIC shutdown threshold (i.e., noise >130 dB for >60 min) was not exceeded, the dose-exposure criteria recommended by the Panel (WGWAP 2/INF.15) were violated by the noise levels recorded at least at three monitoring stations. The highest levels of noise, reaching a maximum of 127 dB, were recorded between 29 June-4 July.

The Panel questioned information from acoustic sensors during this period because the tabular data provided in the text of WGWAP 3/INF.8 differed from the graphical data in the same paper. As explained by Racca, this inconsistency stemmed from the lack of reference in the document to the fact that, during all periods when internal noise recordings were acquired at a station, radiotelemetry data were also acquired. Once this was pointed out in verbal discussions at WGWAP-3, the document was updated by making the tabular information more descriptive and SEIC provided a revised version to IUCN (WGWAP 3/INF.8rev). Racca assured the Panel that multiple sensors had provided continuous coverage, but the Panel nonetheless expressed its concern because the malfunction of a single real-time monitoring sensor results in a significant gap between stations. As the stations are ca. 10 km apart, the loss of a single station results in a monitoring gap of 20 km. Both the Panel (WGWAP 2/INF.15; WGWAP 2/16) and the Seismic Surveys Task Force report (WGWAP 3/INF.9) had recommended that real-time monitoring buoys should be increased in number and improved in quality (also see 7.1.3, above). In its recommendations for continuous noise exposure (WGWAP 2/INF.15), the Panel had specified that the acoustic sensors should be placed closer together than what was reported in WGWAP 3/INF.8.

If the Panel's recommended dose-based criteria had been used, the activities at the PA-B platform in 2007 would have been shut down on at least one occasion. However, the received levels in the feeding area were reduced relative to what they would have been without planning by SEIC. It does appear that there was significant localised noise, specifically in the feeding area immediately in front of PA-B. However, based on the information provided by SEIC (i.e. only the acoustic data) and in the absence of systematic data from other sources, the Panel could not draw any conclusions about effects on WGWs from the 'noisy' events of 2007. Similar to the discussion in Section 7.1.3, the Panel suggested, and it was agreed, that a document of lessons learned should be produced, with the objective of developing improved approaches to mitigation.

The Panel **recommends** that a full report on both the acoustic and whale behaviour/distribution data from the 2007 construction season should be submitted for review at WGWAP-4 [WGWAP 3/032]. The acoustic reports should be in approximately the same form as those submitted for WGWAP-2, i.e., WGWAP 2/INF.14 from POI and WGWAP 2/INF.14a from JASCO. Whale distribution data should be reported for the whole season, in 1 km^2 blocks for 7-day moving averages. The behaviour data should be provided in a form similar to that of WGWAP 2/INF.6.

8 PHOTO-IDENTIFICATION

8.1 Report of the Task Force

The Panel had established a Photo-ID Task Force with the primary objectives of:

- comparing the Russia-US and IBM catalogues to obtain an agreed list of individuals;
- developing suggestions for further collaboration, taking into account the need for annual updating of the comparison, and for consistency;
- considering whether photo-ID-related disturbance can be reduced without compromising ability to address key scientific questions.

The report of the Photo-ID Task Force was provided as WGWAP 3/INF.17; Donovan gave a brief verbal summary of the report.

A valuable component of the work of the Task Force was the report of the external expert, Dr Victoria Rowntree, in which the two catalogues were compared up to the 2005 season. This comparison would not have been possible without the excellent co-operation given to Rowntree by the two research teams. Her report (WGWAP 3/INF.17, Annex 3) was received by the Task Force in September 2007 and discussed at the Task Force Workshop held in Vancouver in October 2007.

In short, the Task Force endorsed the view of the external expert that the two catalogues show excellent agreement. After the resolution of a small number of doubtful cases at the Workshop, it was agreed that there was a total of 155 individual whales (not all assumed to be alive, however), of which 130 were common to both catalogues. Thus 25 individuals are unique to one catalogue or the other.

A further key component in the work of the Task Force was the documentation by both research teams of the methods they used. This documentation covered: field methods including effort; laboratory methods (e.g. matching); catalogues and databases including sighting histories. An understanding of the nature of methods and datasets was essential in enabling the Task Force to address possible collaboration, future analyses, and the question of potential disturbance to whales from research programmes.

The final major component of the work of the Task Force was a preliminary comparison of sightings history data from both programmes. This valuable exercise, despite its preliminary nature provided an impression of correlation of sightings data (e.g. extent to which they duplicate or complement each other); an enhanced understanding of scope and limitations, especially with regard to potential collaborative analyses; and a chance to resolve or suggest a mechanism to resolve any discrepancies that might be found.

On the basis of these three key inputs, the Task Force reached a number of conclusions and recommendations. These are summarised briefly below. The Report of the Task Force (WGWAP 3/INF.17) should be consulted for full details and supporting logic.

The Panel **endorses** the findings and recommendations of the Task Force and **requests** that SEIC, the two photo-ID research teams, and other relevant parties implement the recommendations as expeditiously as possible [WGWAP 3/033].

8.2 Cross-matching

The cross-matching exercise up to 2005 was very successful. As a result it was agreed that:

(1) production of a single catalogue was not necessary;

(2) cross-matching should be updated each year through exchange of catalogues.

8.3 Resightings

The preliminary analysis of sightings histories suggested that the correctness and consistency between the two teams was probably not a problem. However, to confirm this it was agreed to design and undertake a comparison exercise for a subset of the data.

Noting the importance of being able to make comparisons with other areas, it was agreed to develop advisory protocols for photographs and data collection that were applicable for dead or entangled whales and for whalewatching vessels that could be used throughout the range.

8.4 Field and Laboratory Methods

The Task Force report contained clear summaries of the methods of the two teams. Some differences were noted, but it was agreed that there was no need for standardisation of protocols as long as any changes to existing methods were documented and reported back to the Panel.

Identification of individual whales is normally based on a sequence of photographs rather than an individual photograph. The Task Force agreed that with reasonable photo(s), all whales in this population are clearly distinguishable, and that classification of the distinctiveness of individuals and quality of photographs is not necessary.

8.5 Whales Identified on a Temporary Basis ("Temporary Whales")

In photo-ID studies, whales in some photographs or suites of photographs cannot be matched to the catalogue but they may not represent new individuals. Depending on how they are used, these whales, termed "temporary whales," may introduce bias into certain types of analyses. The Task Force recommended four exhaustive categories to address this problem: new, match, temporary, unusable image. The Task Force also agreed that all temporary whales should be appended to the respective catalogues and that changes in their classification must be documented.

8.6 Classification Criteria

As a result of discussions under a number of agenda items, the Task Force agreed that it was important to review and perhaps modify criteria for:

(1) identifying mother-calf pairs, including the possibility of a scoring system such as that used for southern right whales;

(2) identifying unaccompanied calves;

(3) classifying 'skinny' whales.

8.7 Relationships Between Databases and Future Analyses

The Task Force found that the sighting history datasets were complementary – combining them eliminates most of the gaps. This probably results from differences in the temporal and geographical effort of the two teams. Given that the precision and value of certain analyses can be improved by using both datasets, the Task Force agreed that proposals should be developed for joint population analyses, recognising the need to resolve issues surrounding data sharing. It also agreed that the potential use of photo-ID data in studies of anthropogenic disturbance should be evaluated.

8.8 Potential for Minimising Research Effort in the Context of Disturbance to Animals

The preliminary comparison of the sightings histories and the summary of effort suggested that the two field programmes were largely complementary; informal protocols also exist to minimise disturbance. Thus it appears that the primary way to optimise the photo-identification research is through combined analyses. However, the Task Force also agreed that the issue of whale disturbance warranted a more detailed analysis. In any given year, it is likely that most of the whales in the population are approached at least once by both photo-ID teams. As these approaches have the potential to disturb the whales, analyses are needed to determine how to gain the necessary information with the least amount of disturbance. As one way of minimising disturbance, the Task Force suggested that whenever possible, the collection of "non-whale" data (e.g. measuring ocean conditions, sampling benthos) should be carried out when whales are not in the immediate vicinity.

8.9 Way Forward

The Panel concluded that this had been a very successful process, with particular credit due to the two research teams and Rowntree. It noted that some work remained and suggested that the best way to facilitate such work would be by continuation of the Task Force. This, of course, will depend on the continuing co-operation of the two research teams and on successfully addressing any associated data sharing issues. The Panel also noted that much of the Task Force's continued work could be undertaken without the need for a workshop.

After some discussion, revised terms of reference for the Photo-ID Task Force were developed (Annex 4). The Panel **recommends** that the Task Force should continue its work according to the revised terms of reference [WGWAP 3/034].

9 4-D SEISMIC SURVEY

9.1 Background

SEIC's plans for a seismic survey of the Astokh area (around the PA-A platform) in 2008 were presented to WGWAP-2 in April 2007. WGWAP-2 appointed a Task Force to provide independent expert advice to the company as it prepared the required comprehensive Environmental Impact Assessment (EIA) that would outline the mitigation and monitoring measures intended to ensure minimal environmental impact while meeting the survey's technical objectives. The Task Force was to review and analyze (as a contribution to the EIA) noise predictions and estimated whale densities for the proposed 2008 Astokh seismic operations in the light of potential effects on gray whales, and make recommendations on mitigation and monitoring.

The survey had originally been planned for 2008 and SEIC had indicated at WGWAP-2 that it would need the Task Force's advice by the end of July 2007 so that the EIA could be submitted to Russian authorities by September 2007. Under that schedule, the Panel had not been expected to review the Task Force's report before it was used by SEIC. At WGWAP-3, SEIC explained that the main factors driving the timing were the need to secure a vessel for early-season acquisition, and the need to provide potential contractors with information on mitigation requirements that might affect timing and costs.

The Task Force held a workshop in The Hague in June 2007, and circulated its report at the end of July (WGWAP 3/INF.9). At WGWAP-3, SEIC indicated that for reasons of safety related to the possibility of a moored tanker being present in the field location at the time of the planned survey, the seismic work was to be postponed until 2009. This postponement meant that matters raised by the Task Force but not addressed thoroughly because of time constraints could now be examined in greater depth. The revised timeline for the seismic survey, now planned for 2009, is discussed below.

9.2 Report of the Task Force (WGWAP 3/INF.9)

The main objective of the survey, as explained by SEIC, was to replicate a 1997 survey to evaluate changes in the distribution of gas, oil and water in the reservoir. The findings would be used to optimise the placement of further wells and maximise the recovery of hydrocarbons while avoiding unnecessary wells. The design of the survey and the technology used would be the same as in the 1997 survey, except that it would cover only the core area (about 170 km^2) where production-related changes to the field were expected.

The reduction in area meant that, at its closest approach, the survey vessel would be about 3-4 km away from the Piltun feeding area. Consistent with recommendations of previous WGW panels, the survey would be conducted as early in the season as ice conditions permit (late June to mid-July), so that fewer gray whales would be at risk of exposure to high-energy underwater noise. The survey design included about 600 km of survey line, involving a total of about 32,000 airgun shots (about one every 7 seconds) in about 65 hours of survey time, spread over about 3 weeks.

The company anticipates additional seismic surveys in the area every 3-4 years to monitor the progressive depletion of the field.

The Task Force considered the alternative of conducting a survey during winter ice cover when WGWs were not present, but was informed that although there is ongoing research in the area of seismic surveying in ice, it is not close to yielding a practical method. Furthermore, it would not eliminate the need to replicate the 1997 survey using the same technology to assess the changes in the field.

The goals of the Task Force were to minimise (i) the risk of acoustic injury to any whales in the survey area and (ii) disturbance to whales in the feeding area.

The Task Force reviewed the available literature but was unable to identify specific maximum sound thresholds that would avoid acoustic injury and disturbance. Consequently, it adopted as a working threshold, without precedent for future decisions, an exposure limit of 165 dB_{SEL} per pulse for whales within the feeding ground. As a further measure to avoid acoustic injury, the Task Force recommended following current industry practice of not operating when marine mammals are within 1.5 km of the source array. This distance corresponds to a received sound level of approximately 180 dB_{RMS}.

The Task Force analysed data from WGW surveys conducted during 2002-06, to determine an effective boundary of the WGW feeding ground based on whale distribution patterns.

To reduce the impact on whales in the feeding ground, the Task Force recommended that survey lines that are predicted to ensonify any part of it with more than 165 dB_{SEL} per pulse should be surveyed only when all the following conditions have been met:

(i) in daylight and good visibility;

(ii) the area to be ensonified with more than 165 dB_{SEL} per pulse is within effective sighting distance of a shore station or additional vessel;

(iii) this area has been surveyed and no whales have seen there for the past 6 hours (12 hours in the case of mother-calf pairs).

These restrictions should encourage acquisition of the nearshore lines at times when few whales are present.

The Task Force further recommended that predictions of sound levels in the feeding ground should be verified in real time by placing recorders at 2.5 km intervals along the feeding ground perimeter. Model predictions should be calibrated at the start and regularly throughout the survey to ensure that they fit the measured levels at the perimeter of the feeding ground.

To reduce the risk of acoustic injury to whales in the seismic survey area (of which there are expected to be few), the Task Force recommended that the following precautions be taken:

(i) at least two marine mammals observers should be on watch at all times during active survey, in shifts of not more than 4 hours;

(ii) the immediate area should be surveyed for WGWs for at least 20 minutes prior to startup;

(iii) on startup, sound levels should be increased gradually ("ramped up") over 20 minutes;

(iv) the sound source should be shutdown whenever a WGW is sighted within 1.5 km of the source, or on a course that would bring it within this distance;

(v) a line should be shot at night or in poor visibility only if it has been surveyed in good conditions less than 6 hours previously, and no whales have been seen within 1.5 km of the line.

While the 1.5 km radius corresponds to a maximum level of about 180 dB_{RMS}, the Task Force recognised that not all whales would be detected before they entered the nominal shutdown zone and therefore that a shutdown radius of this distance would not guarantee that no whales would be subjected to more than this level. As a result, the Task Force emphasised the importance of conducting simulation studies to assess the expected effectiveness of these rules.

Preliminary calculations by the Task Force, based on the assumption of circular (cylindrical) spreading plus an absorption loss of 1.5 dB per km (as suggested by the sample profiles from the JASCO model provided in Fig. 5.3 of WGWAP 3/INF.9), indicated that while most whales in the survey area would be expected to receive a dose of more than 190 dB_{SEL}, none would receive more than 215 dB_{SEL}. The shutdown rule would reduce the expected number of whales receiving doses above 195 dB_{SEL} by between about 50 and 100%, depending on assumptions. The Task Force had emphasised the illustrative nature of these calculations, and recommended that more accurate estimates be obtained, given more time. The calculations are potentially conservative (i.e. risk-averse) to the extent that they do not account for the directionality of the sound source, or for possible avoidance behaviour by the whales, or for the possible benefits of additional mitigation measures being considered by the company, such as deployment of a secondary mobile MMO platform.

9.3 Panel Discussion of the TF Report

The Panel considered that the Task Force had made a useful first cut at the issue in the limited time it had available. The Panel agreed with the overall approach and structure of the mitigation measures recommended by the Task Force, but concluded that more work was needed on the quantitative aspects, and in particular on the exposure thresholds.

The Task Force had considered the option of expressing exposure thresholds in terms of dose received, but had not taken this approach to its conclusion. In particular, the dose thresholds should not be in terms of dose per pulse, but as dose integrated over a larger time interval, such as a survey line (an operation of about 2 hours, unless interrupted), or the entire survey. The predicted dose received should be calculated taking into account the varying distances of the source from whales as a survey vessel passes. Illustrative calculations of received dose based on this approach were given in Appendix B to the Task Force report, but these need to be refined. In particular, the directionality of the sound source needs to be taken into account. To this end, the Panel **recommends** that a table of the estimated directional profile of sound energy (for example, sound levels at 5° or finer intervals around the clock, at a fixed nominal distance from the array) be prepared and circulated to the Task Force [WGWAP 3/035] (see below).

At WGWAP-3, Racca presented initial results of a more rigorous estimation of the dose levels received at a fixed point a certain distance from a survey line, taking into account not only the varying range but also the directionality pattern of the airgun array and the bathymetry and propagation characteristics of the sea floor and water column for the selected area. He stated that any further work aimed at estimating cumulative doses from multiple seismic pulses would be performed using this more realistic modelling approach.

The recommended dose threshold of 165 dB_{SEL} per pulse, which corresponds to about 175 dB_{RMS} for pulses of this duration (about 0.1s), is not particularly well supported by the literature as a threshold for the onset of disturbance. The equivalent 175 dB_{RMS} disturbance threshold proposed by the Task Force is considerably higher than the corresponding threshold of 160 dB_{RMS} re 1 μPa currently used by the U.S. National Marine Fisheries Service (NMFS 2006) and the 163 dB_{RMS} threshold that was used for the ENL 3D seismic survey of the Odoptu block in 2001 (Johnson *et al.* 2006). Both the acoustic thresholds and the distance to whales triggering shutdown, as proposed by the Task Force, were less precautionary than those used for the 2001 ENL seismic survey, which elicited behavioural responses by WGWs (Weller *et al.* 2006; Gailey *et al.* 2007).

An analysis was presented in paper WGWAP 3/INF.16 which showed that predicted transmission losses can be quite sensitive to assumptions about acoustic parameters of the sediment layer, with predicted received levels being up to 8-9 dB different depending on assumptions about the sediment layer.

In the Panel's view, these results underlined the importance of good field calibration of any model predictions at the locations of interest. The Task Force had heard a description of the calibration approach used for the JASCO model, but had noted that questions remained, such as how to combine the results of different transects that show varying discrepancies between observed and predicted values.

The Panel concluded that the postponement of the survey provided an opportunity to do further work on several of the above issues, and thus enable better advice to be supplied to the company next year.

The following item merit further attention:

- whether to use a dose-based approach;
- the threshold levels themselves;
- estimation of doses received;
- effectiveness of the proposed mitigation measures;
- estimation of transmission loss and calibration of model predictions;
- adequacy and reliability of sound monitoring equipment;

- monitoring of possible whale responses.

The thresholds, predictions and mitigation plans, as envisaged by the Task Force in its report, implied that thresholds were not expected to be exceeded often, and hence that interruption of operations due to the presence of whales was not expected to increase the time required to complete the survey to any great extent.

However, if the further work leads to more stringent thresholds, it might turn out that these cannot easily be satisfied by the survey as it is currently planned. The question of whether the survey could be conducted using lower sound volumes might then become central.

SEIC representatives explained that the main constraint was the need for comparability with the 1997 survey. Their view, based on work with the Shell Technology Group, and on experience with hundreds of repeat surveys to date, was that this need for comparability would preclude the use of different technology and any substantial reduction in source volume. In particular, any changes to methods might risk failure to meet the survey objectives, leading to a need to repeat the survey the following year, which would expose the whales to additional risk.

The company volunteered to provide a “white paper” outlining its position on this matter by early December. The Panel reserved its position. When this paper is received, the Panel may contact other experts regarding the question of whether sound production and recording and analysis methods could be changed, so as to allow a comparable level of information to be gained using lower source volumes. A key question is whether analytical methods can be improved to an extent that would enable the results of surveys to be compared, even when the two surveys have been conducted using different technologies. The Panel considered that, in the worst case, it may be necessary to delay the survey beyond 2009.

On the subject of acoustic monitoring and mitigation, some Panel members challenged the suitability (i.e. technical characteristics) of SEIC’s existing equipment and deployment strategy for fulfilling the task. Racca acknowledged that at the moment, SEIC does not have the full stockpile of suitable acoustic monitoring equipment. However, SEIC assured the Panel that by the time of the Astokh seismic survey, an adequate number of monitoring stations would be available. The Panel **reiterates** its view that the presence of such equipment is essential.

9.4 Update from SEIC on Implementation of Task Force Recommendations

SEIC reported that the Environmental Impact Assessment had been drafted incorporating the full mitigation and monitoring strategy as specified in the Task Force report. The document remains in draft form and has not been officially submitted to Russian authorities for approval. The other information provided in the update is subsumed under item 9.1, above.

9.5 Recommendations

The Panel **recommends** that the Seismic Surveys Task Force be reconstituted with the revised terms of reference and working approach given in Annex 5 [WGWAP 3/036].

With respect to the timeline, company representatives explained that they would need to invite tenders for a 2009 survey by July 2008, and that the mitigation measures need to be designed before the company can tender for the survey, because these can affect the expected duration and cost of the survey, such that potential contractors need to know in advance what restrictions they would face, before they can submit tenders.

The timeline for the Task Force's work (Annex 5) includes a workshop in early April 2008 to allow the Task Force to provide a progress report to the April meeting of the WGWAP. The Task Force would complete its work in June (with an additional workshop if required). While it is assumed that Task Force recommendations normally would be accepted by the Panel (see item 17.1, below), it is important that the Panel retains the option of reviewing Task Force recommendations before they are adopted.

10 PULSE NOISE

10.1 Future Monitoring and Management, including other Companies' Seismic Surveys

10.1.1 Need for Information on Future Seismic Surveys

Given the demonstrated behavioural responses of WGWs to seismic surveys in or near the Piltun feeding area (Weller *et al.*, 2006a, 2006b; Gailey *et al.*, 2007), the Panel considered it imperative that any such surveys undertaken on or near WGW feeding areas, whether by SEIC or any other company, be documented, and that the whales be monitored immediately before, during and after the operations. The Panel therefore requested information on future seismic surveys to be conducted by SEIC. It also emphasized the importance of obtaining information on plans for surveys by other operators on the eastern Sakhalin Shelf in 2008 and beyond.

SEIC reported that in addition to its planned 2009 seismic survey of the Astokh field (see item 9), it has initial plans for 4D seismic surveys of the Piltun and Astokh fields in 2011–2012 (see item 12.1). Additionally, SEIC reported during the meeting that it may need to acquire some 2D lines over the eastern flank of the Piltun field some time in the next five years. Subsequent to the meeting, SEIC advised that no 2D seismic work is planned at Piltun or near the whale feeding area. Rather, SEIC, after hearing of a possible 2008 multi-client 2D survey by DMNG, is interested in purchasing a few of the lines that may be extended over the Lunskoye field.

The Panel was aware that seismic surveys in or near the WGW feeding areas would be conducted in the future by or on behalf of companies other than SEIC. Indeed, several Panel members, while undertaking a site visit to Sakhalin in August 2007, observed a seismic survey being conducted south of the Piltun feeding area. The observer from the Ministry of Natural Resources was unable to provide further information on the 2007 survey.

Racca noted that the data from the POI underwater recorders (AUARs) should contain evidence of any seismic survey activities and could be specifically analysed to detect and quantify airgun pulses. The Panel was advised by SEIC that this type of analysis is not part of the normal processing of AUAR recordings and falls outside the regular scope of the joint SEIC/ENL acoustic research project.

As noted in the WGWAP-2 report, a seismic survey by RN-Sakhalinmorneftegas on behalf of Rosneft was expected to be conducted in Lebedinskoye, immediately adjacent to the

Odoptu block and thus in the northern and near-shore part of the Piltun feeding area. At WGWAP-3, the observer from the Ministry of Natural Resources stated that he was aware of those plans, that the general proposal was going through the process of state approvals, and that the survey would most likely take place during June 2008, subject to ice conditions in the area and assuming that approvals are obtained soon enough. The actual survey time was expected to be ~10 days, dependent on weather. According to a letter from Rosneft to IUCN dated 16 July 2007, the All-Russian Institute of Fisheries and Oceanography (VNIRO) had been invited to participate in the planning and design of the monitoring/mitigation programme for the Lebedinskoye survey.

10.1.2 Importance of Acoustic and Behavioural Monitoring in 2008

In view of the information and concerns outlined above under item 10.1.1, the Panel **recommends** that SEIC should make every reasonable effort to ensure that full-scale acoustic and behaviour monitoring of the Piltun feeding area takes place in 2008 [WGWAP 3/037]. In addition to the Lebedinskoye seismic survey likely to begin in June 2008, the Panel understood that Exxon Neftegas Limited (ENL) had plans for a drilling programme on Piltun spit and that this programme would be underway by June 2008 and continue through much or all of the 2008 open-water season. As emphasized repeatedly in the report of the Seismic Surveys Task Force (item 9), it is important to take full advantage of every opportunity to learn from field observations during events that are planned and anticipated, even when there is no experimental control.

SEIC expressed its view that it would be inappropriate for the company to analyse or pass on information regarding acoustic signals from other operators' activities when such signals have been acquired incidentally in the course of SEIC's monitoring of its own operations (e.g. see item 10.1.1). In view of this, the Panel **noted** that the only potentially available source of information on noise levels generated by non-SEIC operations in 2008 would likely be from independent monitoring efforts sponsored by NGOs, and **requested** that IUCN make contact with such groups regarding the possibility of obtaining information [WGWAP 3/038].

10.1.3 IUCN Efforts to Engage other Companies

The Panel **emphasizes** the importance it attaches to IUCN's ongoing efforts to establish communication with ENL, Rosneft and the Russian Federation, and to engage them in the WGWAP process, specifically concerning seismic survey activity on and near the WGW feeding areas. Rosneft had previously indicated to IUCN that they would meet only if there was a clear agenda, and the Panel considers the subject of seismic surveys in the primary WGW feeding area to be a compelling basis for Rosneft engagement. The observer from the UK Department for Environment, Food and Rural Affairs mentioned that the UK government, via its IWC commissioner, had written to Rosneft/BP to encourage them to take more interest in the WGWAP process. The observer from WWF also mentioned his organization was in dialogue with Rosneft concerning other projects being developed jointly with BP, and was told that Rosneft would adhere to BP standards for environmental protection and due diligence. During the meeting, the Panel received conflicting information from observers concerning the issuance of a license for the Lebedenskoye surveys.

10.2 Generic Criteria for pulse noise, including dose-approach shutdown criteria

Overall, it was agreed that the full treatment of the subject item should be tabled to a reconstituted 4D seismic task force (see 9.1). However, since it seems very unlikely that any relevant new data or information would be published between now and March/April 2008, it was expected that the Task Force would have to address some of the same questions it faced during its June 2007 workshop regarding exposure criteria and monitoring and mitigation measures. Specifically, the key questions identified during the 2007 Seismic Task Force Workshop were: i) acceptable exposure; ii) how that exposure should be calculated (e.g., is a dose-exposure preferable to a single-amplitude figure?); iii) if a dose-exposure is to be used, the period over which it should be calculated (e.g., daily cycle, 24-hour running average); iv) monitoring and mitigation measures; and v) shutdown criteria. With regard to generic criteria for pulse noise exposure, there was general agreement at WGWAP-3 that a dose-based approach was preferable, but the Panel concluded that questions related to acceptable exposure and how best to apply specific criteria should be left to the reconstituted Seismic Surveys Task Force.

The Panel **recalls** that the effects of seismic surveys on WGWs have been studied on at least three previous occasions (Weller *et al.* 2006a, 2006b; Gailey *et al.* 2007), and the Panel **recommends** that the results from all three studies should be carefully considered by the Task Force [WGWAP 3/039]. Furthermore, the Panel **recognizes** that currently accepted standards for exposure of mysticete whales to seismic airgun noise use a behavioural disturbance threshold of 160 dB re 1 μPa_{RMS} and define the "exclusion zone" (i.e., the area around the seismic survey vessel such that operations are to be suspended when a whale is detected within it) by the 180 dB re 1 μPa_{RMS} isopleth (NMFS 2006). Gray whales near Sakhalin have demonstrated behavioural responses to seismic surveys (Weller *et al.*, 2006a, 2006b; Gailey *et al.* 2007) and research on eastern gray whales has shown that 50% of whales responded to levels between 160-170 dB re 1 μPa_{RMS} (Malme *et al.*, 1983, 1984, 1988).

10.3 Controlled Exposure Experiment with Eastern Gray Whales

Given that there is relatively little data on which to base noise exposure criteria and related mitigation measures, the Panel concluded that controlled exposure experiments (CEEs) with eastern Pacific gray whales could assist in understanding responses to noise, both pulsed and continuous. Such experiments intentionally expose animals to carefully controlled stimuli and doses thereof. The greatest need is for data that relate specific behavioral reactions of gray whales to multiple-pulse exposures. The whales' responses need to be linked directly to such exposures in terms of sound energy. Presently available data are insufficient to determine maximum acceptable doses (in terms of sound energy level, or SEL) for exposure to multiple pulses or intermittent/continuous noise. In the absence of such data, it is necessary to set precautionary limits on exposure.

The aim of a CEE would be to quantify behavioral reactions, dose-response curves, and recovery functions for gray whales during and following multiple exposures. Such a CEE should be designed to obtain dose-response functions based on a ranking of response severity so that the biological significance of behavioral responses can be estimated quantitatively. CEEs are difficult to design and execute, and the interpretation of results would not be straightforward. It is particularly hard to extrapolate from the effects of a limited period of pulsed noise to predict, for example, the likely effects of a seismic survey involving over 60 hours of pulsed noise spread over three weeks. Further, whether a whale does or does not respond to a particular stimulus, the biological relevance must be interpreted.

No CEEs should be conducted on WGWs or any other endangered population. Even when proposed to be conducted on animals from a large population, such experiments would be subject to the animal experimentation codes of the agency or scientific institution overseeing the study, and may or may not be approved.

If a seismic survey is conducted in Lebedenskoye in 2008, efforts should be made to monitor received sound levels and behavioural responses of WGWs (see 10.1, above).

Funding for a CEE would have to be obtained, and the "Sound and Marine Life Program" administered by the Joint Industry Program (JIP) was mentioned as a potential source.

Although the Panel agreed that it was not practical to attempt development of a detailed proposal as part of its present report, it anticipated that additional time would be dedicated to this issue at its next meeting. The Panel recognised that considerable in-depth deliberation on the issue would be needed before it could assess the likelihood of obtaining useful information from a CEE.

11 RANGE-WIDE ISSUES

11.1 WGW Interactions with Fisheries, Strandings etc.

The observer representing IFAW-Japan reported that the gray whale is not presently listed as a protected species in Japan and therefore live gray whales trapped in fishing gear can be legally killed and the products of killed or stranded gray whales can be sold in the market. However, a legal listing in Japan prohibiting the killing of entrapped whales and the sale of gray whale meat is anticipated in the next month or so.

11.2 Range-wide Scientific Workshop

The Panel considered a proposal submitted by IUCN (WGWAP 3/INF.3) that IUCN convene and sponsor a scientific and technical workshop (WGW Range-wide Workshop) to bring together international experts including scientists from each of the range states. IUCN noted that a number of IUCN and IWC Resolutions, as well as statements and recommendations from this and previous panels, had called on range States to develop and implement action plans and strategies for the protection of WGWs throughout the range of the population.

Roberts (IUCN) noted that while the engagement of SEIC is a valuable contribution to the conservation of this population, in light of the recent deaths caused by entrapment in fishing gear on the Pacific coast of Japan, it is timely to consider broadening the conservation initiative.

The Terms of Reference for the WGWAP explicitly recognise the value of addressing threats within the broader range of the population. Previous WGW panels also have called for IUCN to develop effective links with the Government of Japan, to address conservation threats in Japanese waters, and to seek their collaboration with the provision of data collected from WGWs killed (or found stranded) in Japanese waters.

The Range-wide Workshop is scheduled to be held in Tokyo during November 2008. IUCN has already convened a steering group under the leadership of Andrew Hurd of the IUCN Marine Programme. Several Panel members (Brownell, Donovan, Reeves) are in the steering group, as well as a representative from the IUCN Species Programme (Jean-Christophe Vié) and representatives from Japan (Hidehiro Kato, Tadasu Yamada).

The Panel **welcomes** the proposal and **agrees** that it is timely that the workshop should take place during 2008.

12 FUTURE SEIC PLANS FOR WGW MONITORING AND RESEARCH

12.1 SEIC's Near-, Mid- and Long-term Work Programme

The Panel's need for better information on SEIC's work programme, well in advance and before commitments of resources are finalised, had been stressed in the first two WGWAP meetings. A statement to this effect in the report of WGWAP-1 bears repeating, as follows:

"… the Panel **requests** that SEIC prepare a schedule of its work for at least the next five years – this should include the construction and operations schedule, the research and monitoring plans and the times when decisions will be taken. As well as confirmed activities, it should include all anticipated or likely events, such as seismic testing. In addition, the Panel **requests** that SEIC establish a standard practice of keeping it informed of its plans, through IUCN, without the Panel having to request such information repeatedly."

WGWAP 3/INF.15 presented information on SEIC's work plans to 2012. Offshore construction work was represented as essentially completed apart from the commissioning of facilities and equipment on the two platforms in 2008. Drilling was anticipated to recommence on LUN-A in December 2007, begin on PA-B in early 2008 and resume on PA-A in late 2009 or 2010. In discussion, the Panel was assured that measurements of drilling noise at the Molikpaq (PA-A) had confirmed SEIC's expectation that the platform legs would be effective at dampening the transmission of drilling noise into the water column. Although SEIC envisages possible expansion of the LNG facilities in Aniva Bay in the coming years, this is not expected to require additional offshore infrastructure.

From the standpoint of potential effects on WGWs, the main risks during the operational stage of Sakhalin II, Phase 2 would appear to be from oil spillage, the episodic exposure to intense pulse noise from seismic surveys, and possibly ship/whale collisions (e.g. crew change vessels although no such collisions have been documented to date). In addition to the Astokh 4D seismic survey currently planned for 2009 (see item 9), more 4D surveys are anticipated over Piltun and Astokh in 2011-12, and future surveys are planned over the areas of the field currently under production. Exploitation of other portions of the Piltun-Astokh field could ultimately require more platform or pipeline construction but the company has no detailed plans at this time.

The Panel **notes** its ongoing requirement for timely notification of planned activities with the potential to affect WGWs (also see items 17.2 and 17.3).

12.2 SEIC's WGW Research and Monitoring Plans

The Panel welcomed the document summarizing plans regarding the WGW research and monitoring programme, at least part of which had been jointly sponsored by SEIC and ENL (WGWAP 3/INF.14). Although SEIC intends to maintain some level of effort for all five existing program components – photo-ID, benthic sampling, monitoring underwater sound, monitoring whale distribution, and monitoring whale behaviour –significant scaling back is being contemplated. For example, acoustic and whale monitoring effort had started earlier in the season over the past several years only because of the early start-up to construction activities. With the end of offshore construction, SEIC plans to start monitoring later and thus return to an annual schedule (70 days as opposed to 90 days) similar to that followed before construction began.

In WGWAP 3/INF.14, SEIC explicitly requested Panel input on various aspects of the research and monitoring programme. During the meeting, the company proposed that substantial time be set aside for such discussions at or immediately before WGWAP-4. The Panel welcomed this opportunity but noted two reservations: (1) that the pattern to date had been for the Panel to be put in a position of reacting to and commenting on plans only after SEIC had largely committed resources and set its course, and (2) that SEIC's cost-sharing agreement with ENL would inevitably limit exchange of information and implementation of Panel advice.

The Panel is particularly concerned about the approaching 2008 season when the scope and scale of SEIC's construction activities are expected to be greatly reduced but the activities of other companies in or near the WGW feeding areas are likely to require monitoring and mitigation (see item 17.3). As just one example, all companies would benefit from consistent, high-quality data on underwater sound and on gray whale distribution, density and behaviour during the period of a planned seismic survey in the northern near-shore portion of the Piltun feeding area (Lebedinskoye, June 2008). Such data could contribute to understanding of WGW responses to seismic noise and facilitate the design of mitigation measures to be applied in other operations. Obtaining such data would require that the acoustic and behaviour teams be deployed earlier in the season than envisioned in SEIC's current scaled-back plan (WGWAP 3/INF.14).

After some discussion, the Panel agreed that it would (a) set aside time at WGWAP-4 for in-depth discussions of the company's future WGW research and monitoring plans, and (b) review the 2007 scope of work alongside WGWAP 3/INF.14 and provide a short, formal statement with advice on how the scope of work might be improved. This statement will be transmitted to the company via IUCN no later than the third week of January 2008 to ensure that it can be considered during the joint SEIC/ENL planning exercise at the end of the month in Vladivostok. For its part, SEIC agreed to inform the Panel immediately of any changes between the 2007 and 2008 scopes of work beyond those already outlined in WGWAP 3/INF.14.

13 SATELLITE TAGGING

13.1 Update on Weller Contract Study

Weller presented an update on the jointly funded Marine Mammal Commission (MMC)/IUCN satellite tagging report. While acknowledging the benefits of tagging in terms of greater understanding of whale behaviour, movements and habitat use, the associated fundamental gaps in knowledge regarding potential negative effects of tagging (e.g. wounds, stress, health, condition, reproduction) were also recognized. These gaps are of special concern when dealing with endangered species or populations, where the balance of benefit versus risk needs to be carefully evaluated to ensure the health of tagged individuals (and potentially the fitness of the population as a whole). To address some of these concerns, in 2005 the MMC and National Marine Fisheries Service (NMFS) convened a workshop to summarize the benefits, review the risks, and evaluate the state of follow up studies related to tagging large whales. This workshop, and the following questions, will serve as the general focus for the report being drafted by Weller:

1) What are the potential effects of tagging?

2) Is the information currently available sufficient to determine whether these effects occur?

   a) If yes, are these effects significant at the population or individual level?

   b) If no, is the information sufficiently powerful to rule out significant effects?

3) What factors should be considered when assessing the potential risks and benefits of tagging?

4) What are the key remaining questions and information/research needs to be addressed relative to potential effects of tagging?

5) What are the impediments to short- and long-term monitoring and how might monitoring capabilities be improved?

6) Are there specific studies that can and should be completed to bring clarity to this issue?

With respect to WGWs, although annual monitoring and research on the summer feeding areas off Sakhalin have been ongoing since 1995, little is known about the migratory routes and wintering areas of the population. Thus, the possibility of using satellite tags to obtain information on migration corridors and wintering areas has been under discussion for a number of years. That said, there is much concern regarding the health of tagged individuals from this critically endangered population. The WGW situation will serve as a case study in the report by Weller and, in turn, provide the WGWAP with the requisite information to make informed recommendations about the issue.

Progress to date on the report includes the following:

1) All materials from the MMC/NMFS workshop on large whale tagging have been reviewed and synthesized.

2) Recommendations from the MMC to NMFS/NOAA on an assortment of scientific permit applications to attach tags to large whales have been reviewed and synthesized.

3) Relevant literature (published, gray and unpublished) continues to be collected and synthesized with significant contributions from S. Kraus, B. Mate and P. Best.

The draft report is expected to be ready for review by January 2008, with the final report available in time for the next WGWAP meeting and subsequent meeting of the IWC Scientific Committee.

13.2 Results of IWC Scientific Committee May 2007

Donovan summarized the recommendations of the IWC Scientific Committee from its 2007 meeting with regard to satellite tagging of WGWs (IWC, 2007). In summary, the Scientific Committee recommended that the IWC acts as a co-ordinator for a WGW telemetry project *inter alia* to ensure that it is carried out in a risk averse manner. It also noted that this issue was being considered by the WGWAP. The Scientific Committee established a co-ordination group consisting of Brownell, Donovan, Gales, Reeves and Weller to ensure consistency between its recommendations and those of WGWAP in regard to satellite tagging of WGWs.

Further, Donovan mentioned that it was particularly important that all relevant recommendations of both the IWC and the WGWAP are taken into account. At its 2008 annual meeting, the Scientific Committee will undertake a review of the aforementioned report by Weller as well as other information available on the general issue of the use of telemetry and potential effects on whales, with an emphasis on the use of such techniques on endangered whale populations. Part of this review will include consideration of the need to hold a future IWC workshop on the subject.

14 DATA AVAILABILITY AND RELATED ISSUES

The issue of data sharing and related issues arose several times during discussions at this meeting as well as during the work of the Photo-ID Task Force. The Panel repeated its view that the 'Data Availability Agreement' (http://www.iwcoffice.org/sci_com/data_availability.htm#process) of the IWC Scientific Committee provided a good basis for developing a working protocol on this issue. It was agreed that Donovan and Bell would examine this issue (including reviewing previous discussions by the WGWAP and previous WGW panels) and develop a draft protocol for circulation well before the next WGWAP meeting. The protocol will provide the basis for individual agreements signed between data owners and analysts. Of course, the ultimate decision as to whether to share data in any particular case rests with the data holders.

15 WGW MONITORING BY NON-SEIC GROUPS

Weller provided a brief verbal summary of 2007 research findings from the Russia-US photo-ID programme. The Russia-US team anticipates continuing its work in 2008 although a firm commitment to do so could not be made at this time.

Tsidulko provided a brief verbal summary of field observations by IFAW in the 2007 summer season. The IFAW team had monitored WGWs from Piltun lighthouse between some time in June and 12 July, a period that included the PA-B topsides installation. Whales had been observed on 20 June, the first day with good visibility and ice-free conditions. Observers had reported hearing unusually loud noise coming from the vicinity of the PA-B platform, especially during the night of 29-30 June. A single WGW was seen on 29 June and none on 30 June, prompting IFAW to send a letter of concern to SEIC. Poor weather impaired visual observations thereafter.

Tsidulko stated that IFAW intended to continue shore-based visual monitoring of WGWs in 2008, and hoped to add an acoustic monitoring program that had proven impossible to implement in 2007.

Knizhnikov made a brief verbal presentation concerning the field observations at Piltun sponsored by WWF-Russia in the 2007 summer season. The WWF team had monitored WGWs from Piltun lighthouse between 25 June and 10 July and experienced and reported the same loud noise as the IFAW observers during the period 29 June to 1 July. According to Knizhnikov, whales had been absent from the viewing range of the shore-based observers during the days of greatest noise but were observed in the area again on 5 July, by which time the noise level had diminished.

As indicated above under item 7.3, only preliminary acoustic monitoring data for the period surrounding the most intense construction activity at PA-B (23 June-14 July) were provided by SEIC for the Panel's consideration at this meeting (WGWAP 3/INF.8). The Panel understands that a full accounting of both the acoustic and whale behaviour/distribution data from 2008 will be presented by SEIC and discussed by the Panel at WGWAP-4. At present, the Panel is unable to evaluate whether the whales moved away from the Piltun area in response to loud construction noise, as postulated by both IFAW and WWF.

Knizhnikov presented radar and satellite images from space (obtained via the internet) showing vessels (and other metal objects on the sea surface), ice coverage and oil slicks. He stated that substantial amounts of sea ice can remain off northeastern Sakhalin until as late as 20 June. Also, he showed a remotely sensed image that had been interpreted by WWF as evidence of an oil slick between PA-B and PA-A in the first week of July 2008. SEIC stated that it had no report of a large oil spill off Sakhalin in summer 2008. The Panel expressed appreciation to Knizhnikov and WWF for bringing this information to its attention and noted that more details on the data and methods were needed before an informed judgement could be made concerning the implications. Follow-up is important because, for example, the Oil Spill Task Force had been operating on the assumption that a large oil spill would be detected, but this assumption may not be correct.

The Panel **reiterates** its request from WGWAP-2 that in cases where independent groups studying WGWs wish to receive comments from the Panel, they need to provide written documents well in advance of meetings to ensure adequate time for review [WGWAP 3/040].

16 SPECIALLY PROTECTED AREA DESIGNATION(S)

Knizhnikov (WWF-Russia) advised the Panel that work was continuing towards the development of a proposal for a marine protected area in the Piltun region but that there was nothing new to report beyond what had been summarized at WGWAP-2. He noted that efforts were also being made to establish protected areas in other parts of the Russian Far East, including locations near Kamchatka.

17 OTHER BUSINESS

17.1 Relationship between Task Forces and the Panel

The Panel clarified the formal relationship between the Panel and its Task Forces. Task Forces were designed to assist the Panel in its work and to facilitate co-operation with SEIC and perhaps others on specific technical issues. Task Forces are subsidiary bodies to the Panel. Task Force reports are stand-alone public documents and are the responsibility of their members. Although the aim is for Task Forces to work by consensus, it is not expected that consensus will be achieved in all cases. When it is not, the different views will be clearly stated in the Task Force report along with supporting rationale. The Panel stresses that Task Force reports do not necessarily represent the views of the Panel. The Panel receives and reviews the report and then decides whether to adopt as its own view some or all of a Task Force's conclusions and recommendations. While it is expected that in most cases the Panel will adopt the conclusions and recommendations of its Task Forces, there may be circumstances where it does not. If it does not agree with one or more conclusions or recommendations, the Panel report will clearly document its rationale for any disagreements.

17.2 Problems of Timing

The mismatch between the timing of commitments on the part of SEIC to carry out particular activities in the field and the time available for WGW panels (including the WGWAP and its predecessors) to review company plans and to provide advice on mitigation, monitoring etc. is a longstanding point of contention. The Panel was encouraged by SEIC's solicitation of advice last spring on mitigation and monitoring in advance of the planned Astokh 4-D seismic survey. Nonetheless, the Panel is concerned that the work of the reconstituted Seismic Surveys Task Force could, like its predecessor, be placed under severe time constraints that would again compromise its effectiveness (see item 9).

Most of the construction activities associated with Sakhalin II, Phase 2 are now completed, and its operational stage is imminent. This may mean that there is less need for Panel input to SEIC's annual updating of its Marine Mammal Protection Plan. However, it also means that there is an opportunity for earlier and thus more effective interaction between the Panel and the company as plans arise for specific potentially high-risk (to WGWs) events such as seismic surveys, for site selection and construction of additional platforms and other infrastructure, or for changes in the company's commitment to long-term WGW research and monitoring.

17.3 Obtaining Information on Activities by other Companies Operating on the Sakhalin Shelf

The problem of obtaining timely information on the activities of other companies operating in the region has long been recognised and discussed by WGW panels (also see item 10.1.1). At WGWAP-3, specific examples were discussed and the Panel wished to record these as representative of this ongoing problem (also see item 10.3).

- Although its importance was noted in the report of WGWAP-2, no new or authoritative information was available to WGWAP-3 on the Lebedinskoye seismic survey planned for summer of 2008. The observer representing the Russian Ministry of Natural Resources reported informally that the survey would begin as early as possible in June and require ten days of acquisition. He also mentioned that some effort would be made to monitor both the whales and the underwater sound environment during the survey, but the Panel was dissatisfied with the lack of detailed information on planned mitigation measures for this seismic survey, which will take place in the heart of the nearshore feeding area where WGW mothers with calves concentrate in summer.

- The Panel was equally concerned about the lack of reliable information on the plans and activities of ENL associated with Sakhalin I. Other than vague reports of onshore drilling and of pipelaying across Piltun Lagoon, soon to begin or already begun, the Panel had no authoritative information on these large-scale activities, either or both of which could have significant impacts on gray whales and their habitat.

No clear way forward on this problem was identified although the Panel acknowledged IUCN's previous efforts to establish communication links with other operators. The Panel **recommends** that such efforts be accorded high priority and continue to be made [WGWAP 3/041]. Also, the Panel acknowledged input received from NGOs and welcomed the specific offer by the observer from WWF to share information on Rosneft's plans and activities. This information should be routed through Roberts at IUCN.

18 INTERSESSIONAL WORK AND POTENTIAL AGENDA ITEMS FOR WGWAP-4

The Panel agreed to provide SEIC with inter-sessional advice concerning the 2008 Scope of Work (Program for Studying and Monitoring of the Korean-Okhotsk Gray Whale Population off the Northeast Coast of Sakhalin Island in 2008). This advice will be collated and provided as a unified set of recommendations no later than the third week of January 2008. This timing will allow the company to take the Panel's advice into account before commitments of funding and personnel have been made in relation to the 2008 open-water season.

The following represents a preliminary (non-comprehensive) list of items to be included on the agenda of the next WGWAP meeting:

- SEIC's mid- and long-term plans for WGW research and monitoring, placed in the context of the company's plans for further development of the Sakhalin II project area (at least one full day);

- Full consideration of results from SEIC's 2007 noise and whale monitoring program;

- Review of report from Seismic Surveys Task Force;

- Review of progress report from Photo-ID Task Force;

- Review of Weller report on satellite tagging and development/refinement of recommendations on WGW satellite tagging possibilities;

- Elaboration of the concept of a controlled exposure experiment to assess responses to acoustic disturbance, using eastern gray whales.

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SUMMARY OF RECOMMENDATIONS FROM THE 3RD MEETING OF THE WGWAP 2007

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
ITEM 3: MMO PROGRAMME					
WGWAP 3/001	WGWAP 3/3 Section 3.1	The Panel **recommends** that as a minimum, Sakhalin Energy request general permission from the Russian Ministry of Natural Resources to collect small tissue samples from dead WGWs for genetic analyses.	SEIC		
WGWAP 3/002	WGWAP 3/3 Section 3.2.3	The Panel **recommends** that from now on at least the following data be collected by the MMO Programme: • time and position of each start or change of vessel activity (including those when no MMO is on watch); • visibility (including time and position when it changes); • start and end time and position of each MMO watch period; • time and position of each whale sighting.	SEIC		
WGWAP 3/003	WGWAP 3/3 Section 3.2.3	The Panel **requests** that after each season, summaries of the MMO data be presented to the Panel that show: • the number of trips by operating support vessels; • the proportion of each trip that occurs in poor visibility (e.g., darkness, fog); • the proportion of each trip that observers were on watch; • hours of observation; • numbers and locations of sighted whales.	SEIC		
WGWAP 3/004	WGWAP 3/3 Section 3.2.3	The detection probability from vessels is an important factor in the effectiveness of mitigation measures for seismic surveys and the Panel **recommends** that the issue of estimating detection function probability should be addressed by the Seismic Survey Task Force.	Seismic Survey Task Force		
WGWAP 3/005	WGWAP 3/3 Section 3.3	The skewed distribution of MMO sightings from crew change vessels – the vast majority came from one of the three vessels – raised concern on the part of the Panel and requires further investigation. The Panel **requests** that SEIC analyzes this discrepancy and reports its findings at the next meeting.	SEIC		

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
WGWAP 3/006	WGWAP 3/3 Section 3.3	The Panel **reiterates its previous recommendation** that MMOs should be placed on the crew change vessel operating between Nogliki and LUN-A at all times.	SEIC		
ITEM 5: UPDATED POPULATION ASSESSMENT					
WGWAP 3/007	WGWAP 3/3 Section 5.1	The Panel **recommends** that steps be taken to facilitate use of the combined data in a population assessment.	Photo-ID Task Force		
WGWAP 3/008	WGWAP 3/3 Section 5.3	The Panel **recommends** that a preliminary analysis be carried out on the possible effects of disturbance on reproductive success or other aspects of demography.	Panel		
WGWAP 3/009	WGWAP 3/3 Section 5.3	The Panel **recommends**, as suggested by the Photo-ID Task Force, that data on body condition be incorporated into a population assessment if possible.	Panel		
ITEM 6: OIL SPILL PREVENTION, PREPAREDNESS AND RESPONSE					
WGWAP 3/010	WGWAP 3/3 Section 6.1.1	Some oil spilled in ice could be released at the late spring thaw, posing a risk to gray whales arriving in the area and therefore requiring further spill response. The Panel **recommends** that prompt and focussed clean-up response for any remaining oil residues should be a priority to minimise this risk at that time.	SEIC		
WGWAP 3/011	WGWAP 3/3 Section 6.1.6	The Panel **emphasised** the value of a flexible response strategy capable of adapting rapidly to the variety of oil spill scenarios that could arise from Sakhalin II, Phase 2 operations. It therefore **expressed support** for SEIC's efforts in working with Russian authorities to achieve such flexibility.	SEIC		
WGWAP 3/012	WGWAP 3/3 Section 6.1.6	The panel **encourages** active research by SEIC in a number of subject areas and, in particular, **recommends** research on the toxicity of Vityaz crude oil, the efficacy of in situ burning of oil in ice, detection and response options in ice, and general behaviour of Vityaz crude oil in the conditions characteristic of the Sakhalin marine environment.	SEIC		
WGWAP 3/013	WGWAP 3/3 Section 6.1.6	The panel **recommends** that studies of the behaviour of Vityaz crude oil in the marine environment be conducted to provide information that will maximize Sakhalin Energy's oil spill response capabilities.	SEIC		

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
WGWAP 3/014	WGWAP 3/3 Section 6.1.6	The Panel **recommends** that the oil spill response handbooks be completed and made operational before the initiation of year-round oil production. To be considered operational, all aspects of the handbooks should be ready for application in the event of a spill.	SEIC		
WGWAP 3/015	WGWAP 3/3 Section 6.1.6	The Panel **reiterates the previous recommendation** for rigorous, systematic collection of baseline information from both Piltun Lagoon and the Piltun feeding area to provide an adequate baseline for measuring the effects of oil and gas operations, including in the event of an oil spill.	SEIC		
WGWAP 3/016	WGWAP 3/3 Section 6.1.6	The Panel **reiterates previous recommendations** that opportunistic daily crew-change flights, dedicated weekly flights of the whole pipeline, annual assessment using a subsurface remotely operated vehicle (ROV), ROV assessment after major storm or other events, monthly cleaning pigging, and 5-year intelligent pigging of the pipeline are necessary and that they should be carried out as standard operating procedure for the detection of pipeline leaks.	SEIC		
WGWAP 3/017	WGWAP 3/3 Section 6.1.6	The Panel **recommends** that SEIC should maintain its policy of no dispersant use in or near the Piltun feeding area at any time. Under certain circumstances it may be prudent to use dispersant in or near the offshore feeding area, although the Panel anticipates these conditions will be rare and any use of dispersant will require great caution. The Panel **recommends** that dispersant should not be used when gray whales are present in the offshore feeding area.	SEIC		
WGWAP 3/018	WGWAP 3/3 Section 6.1.6	Under circumstances where response may pose more risk to the whales and their habitat than a lack of response, the Panel **recommends** that responders be allowed to refrain from recovery efforts in the Piltun feeding area until the oil has moved through the area to the beach where clean-up efforts are more likely to be successful. Doing so could limit the amount of disturbance in the feeding area and, possibly, the amount of oil that is dispersed into the shallow-water sediment and associated benthic community. The Panel recognizes that oil on the beach poses a risk to other wildlife and that immediate and careful judgement on the part of responders in choosing response options will be required. However, the Panel also believes that, given the critically endangered status of the WGW population, it must be given the benefit of added consideration and caution commensurate with such status.	SEIC		
WGWAP 3/019	WGWAP 3/3 Section 6.1.6	The Panel **recommends** that surf-washing and prop-washing be removed from oil spill response plans as applied to the Piltun area.	SEIC		

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
WGWAP 3/020	WGWAP 3/3 Section 6.1.6	The Panel **recommends** that hazing not be attempted with WGWs until procedures have been evaluated and found to be safe and reasonably effective.	SEIC		
WGWAP 3/021	WGWAP 3/3 Section 6.1.6	To avoid secondary problems of contamination, the Panel **recommends** that handling, storage and disposal procedures for oil spill clean-up waste are fully developed prior to the initiation of year-round oil production.	SEIC		
WGWAP 3/022	WGWAP 3/3 Section 6.1.6	In view of the difficulty associated with getting an assessment team on site, and the likelihood of added strain on logistical operations and other resources, the Panel **rescinds** the previous recommendation that an independent assessment team be present to monitor response activities in the event of a spill. The Panel **recommends**, however, that all aspects of spill response be carefully documented to ensure rigorous post-spill analysis to identify ways in which strategies might be improved.	SEIC		
WGWAP 3/023	WGWAP 3/3 Section 6.1.6	The Panel **recommends** that any damage to the wetlands, lagoons, beaches and dunes of the Piltun ecosystem be addressed by restoration efforts as soon as possible following spill response activities.	SEIC		
WGWAP 3/024	WGWAP 3/3 Section 6.1.7	The Panel's discussion focussed on short-term and long-term post-spill monitoring of whales. Short-term monitoring, occurring in the days and weeks immediately following a spill event, **should include**: *Surveys to document whale distribution*: short-term patterns of post-spill distribution should be compared with the following: e) existing data on whale distribution under non-spill (pre-spill) conditions; f) observed movement of spilled oil; g) information on various types of acoustic disturbance associated with response effort; h) information on the location and extent of incorporation of spilled oil into the benthos in feeding areas. *Focal follows to evaluate whale behaviour*: observations should be recorded on the following: e) behaviour of whales in the presence of floating oil, including assessments of the ability and inclination of whales to avoid contact with oil; f) general behavioural patterns of whales (for comparison with data collected	SEIC		

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
		during non-spill conditions); g) changes in whale behaviour associated with spill response activities such as operations of oil recovery vessels and deployment of containment booms; h) patterns of whale behaviour in the vicinity of areas with known contamination of benthic prey by spilled oil. *Surveys for dead whales*: searches for dead whales should be carried out both on shore and on the water. Any dead whales located *must* be evaluated, at a minimum, as follows: e) characterization of freshness of carcass; f) description of pattern of oil coverage on the exterior surfaces of the carcass, in the eyes, in the mouth and in the baleen; g) sampling of skin for genetic characterization; h) photography of the animal for matching it to identified individuals in the existing photo-ID catalogues and for illustrating the extent of contact with oil.			
WGWAP 3/025	WGWAP 3/3 Section 6.1.7	If carcasses are found in the water, they need to be towed to locations where detailed post-mortem examinations can be carried out. Carcasses found stranded or brought ashore must be examined in detail by personnel with appropriate expertise. The Panel **recommends** the development of priority-ranked post-mortem guidelines to optimise the quality and amount of information collected from carcasses. This should include the acquisition of data on tissue contamination by oil.	SEIC		
WGWAP 3/026	WGWAP 3/3 Section 6.1.7	The Panel **recommends** that long-term monitoring of whales following an oil spill, in the several years following a spill event, should largely resemble the monitoring of WGWs that has been conducted in the project area in recent years by SEIC and the Russia-US project. As with short-term studies, the primary foci for long-term work should be distribution, behaviour and carcass assessment. To contribute to understanding of long-term effects of oil spill events, existing protocols for whale monitoring should, in the event of a spill, be amended to incorporate the following: d) Increased effort to study whale distribution and behaviour in areas known to have been subject to significant oiling; e) Increased effort to study whale distribution and behaviour in areas known to have been subject to significant spill response activity (e.g. vessels, boom deployment and related activities); f) Increased effort to study whale distribution and behaviour in areas where	SEIC		

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
		benthic communities are known to have been subject to significant oil exposure.			
WGWAP 3/027	WGWAP 3/3 Section 6.1.7	The Panel **recommends** that existing studies of WGW distribution, behaviour and carcass evaluation in non-spill environments should be maintained to ensure that appropriate baseline information (including natural variation) is available. Modified long-term studies following oil spill events should be *in addition to*, rather than in place of, established, ongoing studies. It also may be useful and informative to sample both living and dead gray whales in the vicinity of a previous spill (recent or relatively long-past) to determine levels of contaminants (e.g., polyaromatic hydrocarbons) in tissues.	SEIC		
WGWAP 3/028	WGWAP 3/3 Section 6.2	The Panel **requests** that SEIC provide a clear statement as to what the "redacted" documents referred to in WGWAP 3/INF.13 are.	SEIC		
ITEM 7: MONITORING AND MANAGEMENT OF CONTINUOUS NOISE					
WGWAP 3/029	WGWAP 3/3 Section 7.1.1	The Panel understood that in rare cases the company could decide that it was infeasible to observe these criteria strictly, i.e., even with careful planning to minimize noise, some activities would, unavoidably, produce sufficient noise to breach the criteria. In such cases, the Panel **recommends** SEIC implement additional mitigation measures to minimize the risk to whales.	SEIC		
WGWAP 3/030	WGWAP 3/3 Section 7.1.3	At WGWAP-3, the Panel proposed a single revision to its earlier-proposed criteria for continuous noise. This revision related to the "low-level cutoff," i.e. the level below which industrial noise can be ignored and need not be counted as part of the overall dose received by the whales. The Panel **recommends** that the low-level cutoff be set at 107 dB re 1µPa$_{RMS}$, the value resulting in the Panel's recommended maximum dose of sound energy for a 24-hour period (i.e., the extension of the function set out in WGWAP2/15).	SEIC		
WGWAP 3/031	WGWAP 3/3 Section 7.1.3	The Panel **recommends** that adequate equipment should be made available to ensure that the most appropriate mitigation measures are followed and that the necessary monitoring data are collected.	SEIC		
WGWAP 3/032	WGWAP 3/3 Section 7.3	The Panel **recommends** that a full report on both the acoustic and whale behaviour/distribution data from the 2007 construction season should be submitted for review at WGWAP-4. The acoustic reports should be in approximately the same form as WGWAP 2/INF.14 and WGWAP 2/INF.14a. Whale distribution data should be reported	SEIC		

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
		for the whole season, in 1 km^2 blocks for 7-day moving averages. The behaviour data should be provided in a form similar to that of WGWAP 2/INF.6.			
ITEM 8: PHOTO-IDENTIFICATION					
WGWAP 3/033	WGWAP 3/3 Section 8.1	The Panel **endorses** the findings and recommendations of the Task Force and **requests** that SEIC, the two photo-ID research teams, and other relevant parties implement the recommendations as expeditiously as possible.	SEIC and others		
WGWAP 3/034	WGWAP 3/3 Section 8.9	The Panel **recommends** that the Task Force should continue its work according to the revised terms of reference.	Photo-ID Task Force		
ITEM 9: 4-D SEISMIC SURVEY					
WGWAP 3/035	WGWAP 3/3 Section 9.3	The Panel **recommendS** that a table of the estimated directional profile of sound energy (for example, sound levels at 5° or finer intervals around the clock, at a fixed nominal distance from the array) be prepared and circulated to the Task Force.	SEIC		
WGWAP 3/036	WGWAP 3/3 Section 9.4	The Panel **recommends** that the Seismic Surveys Task Force be reconstituted with the revised terms of reference and working approach given in Annex 5.	Seismic Survey Task Force		
ITEM 10: PULSE NOISE					
WGWAP 3/037	WGWAP 3/3 Section 10.1.2	In view of the information and concerns outlined in sections 10.1.1 and 10.1.2 of the report, the Panel **recommends** that SEIC should make every reasonable effort to ensure that full-scale acoustic and behaviour monitoring of the Piltun feeding area takes place in 2008.	SEIC		
WGWAP 3/038	WGWAP 3/3 Section 10.1.2	In view of this, the Panel **noted** that the only potentially available source of information on noise levels generated by non-SEIC operations in 2008 would likely be from independent monitoring efforts sponsored by NGOs, and **requested** that IUCN make contact with SUCH GROUPS regarding the possibility of obtaining information.	IUCN		
WGWAP 3/039	WGWAP 3/3 Section 10.2	The Panel recalls that the effects of seismic surveys on WGWs have been studied on at least three previous occasions (Weller et al. 2006a, 2006b; Gailey et al. 2007), and the Panel **recommends** that the results from all three studies should be carefully considered by the Task Force.	Seismic Survey Task Force		
ITEM 15: WGW MONITORING BY NON-SEIC GROUPS					

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
WGWAP 3/040	WGWAP 3/3 Section 15	The Panel **reiterated its request** from WGWAP-2 that in cases where independent groups studying WGWs wish to receive comments from the Panel, they need to provide written documents well in advance of meetings to ensure adequate time for review.	3rd parties		
ITEM 17: OTHER BUSINESS					
WGWAP 3/041	WGWAP 3/3 Section 17.3	No clear way forward on this problem [little information on third parties' activities on the Sakhalin shelf] was identified although the Panel acknowledged IUCN's previous efforts to establish communication links with other operators. The Panel **recommends** that such efforts be accorded high priority and continue to be made.	IUCN/SEIC		

ANNEX 1

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ANNEX 2
FINAL AGENDA
Adopted 10 November 2007

Chair – Randall Reeves (WGWAP)

10 November 2007			Documents
(1)	**09:00 – 09:15**	**Opening**	
		– Introductions and logistics	
		– Adoption of agenda	WGWAP 3/1
		– Documents	WGWAP 3/2
		– Discussion of report drafting procedures	
(2)	**09:15 – 09:45**	**Review recommendations from previous meeting(s)**	WGWAP 3/INF.1
(3)	**09:45 – 10:45**	**MMO programme**	
		– MMO programme effectiveness – report back in regard to recommendation WGWAP 2/009	WGWAP 3/INF.2
		– Updates (preliminary) on 2007 MMO and carcass survey programme results (including response time implications from events in Japan)	WGWAP 3/INF.11 WGWAP 3/INF.19 WGWAP 3/INF.20
	10:45 – 11:00	**Break**	
(4)	**13:00-14:30**	**Photo-ID – report of the task force**	
		– report of the task force	WGWAP 3/INF.17
	12:30-13:30	**Lunch**	
(5)	**13:30-15:00**	**Oil spill prevention, preparedness and response**	
		– report of the task force	WGWAP 3/INF.12
		– SEIC update on status of oil spill documents	WGWAP 3/INF.13
	15:00	**Adjourn for the day**	

11 November 2007

(6)	**09:00-10:30**	**Monitoring and management of continuous noise** – Noise and whale density/distribution for 2006 season – Shutdown criteria, proposed vs implemented (including low levels; how low can you go?) – (Preliminary) results from 2007 construction season	WGWAP 3/INF.4 WGWAP 3/INF.5 WGWAP 3/INF.6 WGWAP 3/INF.7 WGWAP 3/INF.8 WGWAP 3/INF.10
	10:30-10:45	**Break**	
	10:45-12:00	**Continuous noise contd.**	
	12:00-13:00	**Lunch**	
(7)	**11:00-12:30**	**Satellite tagging** – Update on WGWAP / MMC workshop report – Update from IWC SC Anchorage meeting – Way forward	
(8)	**14:30-15:00**	**Updated population assessment**	WGWAP 3/INF.18
	15:00	**Adjourn for the day**	

12 November 2007

(9)	**09:00-10:30**	**4-D seismic survey** – report of the task force – update from SEIC on implementation of TF recommendations (EIA)	WGWAP 3/INF.9 WGWAP 3/INF.16
	10:30-10:45	**Break**	
(10)	**10:45-12:30**	**Pulse noise** – future monitoring and management, including other companies' and SEIC future seismic surveys – generic criteria for pulse noise, including dose-approach shutdown criteria – need for controlled exposure experiment with EGWs	
	12:30-13:30	**Lunch**	
(11)	**13:30-15:00**	**Range-wide issues** – WGW interactions with fisheries, strandings etc. – Range-wide scientific workshop	WGWAP 3/INF.3

	15:00	**Adjourn for the day**	

13 November 2007

(12)	**09:00-10:15**	**Future SEIC plans for WGW monitoring and research**	
		– Near-, mid- and long-term work programme (construction, drilling, seismic surveys etc.) for SEIC	WGWAP 3/INF.14
		– Panel input to SEIC research and monitoring plans	WGWAP 3/INF.15
	10:15-10:30	**Break**	
(13)	**10:30-12:00**	**Future development of multivariate analysis (MVA)**	
		– MVA / science workshop	
	12:00 – 13:00	**Lunch**	
(14)	**13:00-14:00**	**Non-SEIC groups monitoring**	
		– WWF, IFAW, Russia-USA Team	
		– Implications of WGWAP recommendations on other species	
(15)	**14:00-14:30**	**Specially protected area designation(s)**	
(16)	**14:30-15:00**	**Any other business**	
	15:00	**ENDS**	

	Deliverables	**Deliverable Dates**
(1)	Completion of the report of the Western Gray Whale Advisory Panel at its third meeting and associated recommendations	30 November 2007
(2)	Detailed response from SEIC to individual recommendations made in the report of the Western Gray Whale Advisory Panel at its third meeting	14 December 2007

ANNEX 3

List of documents distributed in connection with the first meeting of the WGWAP

Document Ref.	Document Title	Status
WGWAP 3/1	Provisional agenda	Public
WGWAP 3/1-R	Provisional agenda (Russian)	Public
WGWAP 3/2	List of documents distributed in connection with the 3rd meeting of the WGWAP	Public
WGWAP 3/INF.1	Progress report and status of previous recommendations	Public
WGWAP 3/INF.2	Beach / Carcass surveys	Public
WGWAP 3/INF.3	Proposal for a Western Gray Whale Range-Wide Workshop	Public
WGWAP 3/INF.4	WGWAP position on exposure criteria for continuous noise - WGWAP 2/INF.15	Public
WGWAP 3/INF.5	SEIC response to recommendation WGWAP 2/016: Rationale for SEIC not adopting the WGWAP noise criteria for the PA-B topsides installation	Public
WGWAP 3/INF.6	Noise management and mitigation: SEIC approach to exposure criteria for continuous noise	Public
WGWAP 3/INF.7	SEIC modeling of 2006 continuous noise including density distributions	Confidential
WGWAP 3/INF.8	SEIC modeling of 2007 continuous noise including density distributions (June)	Confidential
WGWAP 3/INF.9	Report of the 4-D seismic task force	Public
WGWAP 3/INF.10	Acoustic Monitoring of Piltun 2006 Offshore Construction	Confidential
WGWAP 3/INF.11	Western gray whale detection function and gradient	Confidential
WGWAP 3/INF.12	Report of the oil spill task force	Public
WGWAP 3/INF.13	Status of oil spill plans	Public
WGWAP 3/INF.14	SEIC future WGW research and monitoring plans	Public
WGWAP 3/INF.15	Summary of SEIC Anticipated Offshore Activities 2008-2017	Public
WGWAP 3/INF.16	The assessment of sound energy level prediction accuracy in the Piltun area	Confidential
WGWAP 3/INF.17	Report of the Photo-ID Task Force	Public
WGWAP 3/INF.18	Population assessment of western gray whales in 2007	Public
WGWAP 3/INF.19	Marine Mammal Observation Program – 2007 preliminary report	Public
WGWAP 3/INF.20	Marine Mammal Observation Program – Effectiveness of programme	Public

ANNEX 4

Draft Terms of Reference for Continuation of Photo-ID Task Force

Background

The report of the photo-id Task Force (WGWAP3/INF.17) presented to WGWAP 3 contained a number of recommendations for further work to continue the promising progress towards making optimal use of the photo-ID research efforts by the Russia-US and IMB teams.

The implementation of these recommendations will require the continued engagement of both photo-id teams. This can best be facilitated through a continuation of the Task Force. It is envisaged that the Task Force will work initially by email, and that no further workshops will be required during the first 12 months, although it could be useful to hold a workshop later.

Because the Photo-Id research is ongoing, it is proposed to re-establish the Task Force. The decision to continue the Task Force will be reviewed at each WGWAP meeting, and the terms of reference updated if necessary. The Task Force shall submit a Progress Report to each WGWAP meeting. The Progress Report may also contain recommendations by the TF to WGWAP.

Composition

The composition of the Task Force shall include:

(a) one or more representatives of each photo-id team

(b) one or more Panel members

(c) one or more representatives of SEIC

(d) an independent expert, if any, co-opted to the Task Force by IUCN

Terms of Reference

The Terms of Reference of the Task Force are to:

(i) oversee and facilitate the carrying out of the tasks assigned to it by WGWAP
(ii) review progress reports submitted by each team on their field and laboratory work, paying especial attention to any changes reported by each team
(iii) note, and if appropriate discuss, any new reports, analyses or publications by each team
(iv) discuss and make recommendations on any questions referred to it by the WGWAP
(v) discuss and make recommendations on questions raised by either photo-Id team
(vi) submit a Progress Report to each WGWAP meeting. The Progress Report shall include:
    (a) update on progress with the implementation of the tasks assigned to it by WGWAP;
    (b) update on any other work conducted;
    (c) summary of updates received from each team;

(d) recommendations, if any, by the TF to the WGWAP on issues related to photo-id research or analysis

Initial list of tasks referred by WGWAP to the Task Force
The initial tasks assigned to the Task Force are based on the recommendations submitted by the Photo-IdTask Force to WGWAP 3:

(1) Annual updating of the cross-matching of the catalogues, through the exchange of updated catalogues. Each team should attempt to match each new catalogue entry (new whale or new temporary whale) against the other catalogue, and exchange results. Each team should also highlight any revisions to existing catalogue entries (such as new photo or new assignment of photos to whales) so that the other team can re-match these entries if necessary.

(2) Design and undertake a comparison exercise on a subset of the annual sighting histories.

(3) Develop an advisory protocol to help ensure that identifiable photos are obtained from any dead whales found anywhere in the range. In addition, draw up a protocol for obtaining id-quality photos, for circulation to whalewatching vessels within the range.

(4) Review the field criteria for judging mother-calf pairs, and, if appropriate, develop a scoring system (e.g. as used for southern right whales)

(5) Review the criteria for identifying unaccompanied calves, and, if appropriate, develop revised criteria for use by each team

(6) Compare the criteria used by each team for recording body condition ("skinny whales"), and agree on a coding system that would allow analyses of the combined datasets

(7) Draw up specifications for population analyses using the combined data (on annual sighting histories), and seek permission from the relevant parties to enable these to be conducted.

(8) Evaluate the potential for analyses using photo-ID and other data that could help measure the effects of anthropogenic disturbance on the whales.

(9) Examine the extent of overlap in the research effort in time and space. This should initially be based on a broad graphical summary provided by each team of their hours of photo-ID research effort by square and time period. Based on this, the need for a more extensive analysis can be assessed.

Data safeguards
All data exchanged between the teams shall be treated as strictly confidential, unless or until they have been published by the submitting team. No confidential data may be included in a Task Force report without agreement of the submitting team.

Timeline
(1) The Task Force continues until terminated by WGWAP

(2) A Progress Report is submitted to IUCN at least 2 weeks before each WGWAP meeting

(3) The annual updating and exchange of catalogues including each seasons' new additions should be effected by the end of February following each season

(4) Updates by each team on their field and laboratory work should be provided to the TF by the end of February following each season

(5) The one-time tasks listed above shall be completed in time for inclusion in the first Progress Report by the TF to WGWAP

(6) Each new task assigned to the TF shall have its own timeline.

ANNEX 5

Workplan of the Seismic Task Force

PRIMARY TASK

To build upon and complete the work of the first seismic task force i.e. to review and analyse the noise associated with the proposed 2009 Astokh seismic operations in the light of its possible effects on gray whales, and make recommendations on mitigation and monitoring.

The Task Force aims to have mitigation and monitoring advice available for consideration prior to SEIC finalising the draft English version of the EIA for the Astokh 4D seismic survey in June 2008. Advice within this timeframe can be provided to Seismic Contractors when SEIC issues tender invitations in June/July. It is recognised that this is the primary function of the Task Force. However, the results will also be relevant for other seismic operations.

PARTICIPANTS

The final composition is not yet decided. It will include at least: Angelatos, Bell, Cooke, Donovan (Chair), Gailey, Muir, Nowacek, Racca and Vedenev. Where outside expertise is deemed necessary by either Panel members or SEIC, they will indicate this to the Chair as soon as possible (both the topic and the nominated expert or experts). If there is disagreement over an expert for a particular topic, the Panel and SEIC may nominate one person each and the Chair will inform IUCN. A final list of participants will be developed by the beginning of February but preferably before then. February has been chosen as the review of the 'white paper' will have been completed by then at the latest; depending on the nature of that review, it may be necessary to invite an outside seismic expert or experts to the Workshop. It was agreed that at least John Diebold (Columbia University) should be requested.

MODUS OPERANDI

Lead persons have been assigned to the various major topics to be addressed (see below). The tasks of the lead persons will be to ensure that, as appropriate, the literature, data and analyses required are available to the full Task Force well in advance of the first (and preferably only) workshop. The emphasis will be on providing information to all members of the Task Force during the pre-Workshop period such that exchanges of views (email, telephone conferences as necessary) on e.g. analyses to be carried out and presented to the first workshop can occur during the intersessional period. The IUCN Project Manager and the SEIC Project Leader will be included in all correspondence. The report of the workshop will be discussed at the next Panel meeting. Should a second workshop be necessary, a mechanism will need to be developed to enable timely review by the Panel.

MAJOR TOPICS

Topic	Preparation: Lead persons
Review of available publications on previous seismic work in the area (1997, 1999, 2001) incl. sound levels, behaviour, mitigation measures	Gailey, Angelatos, Nowacek
Update of review of what is known on effects of sound on cetaceans	Gailey, Nowacek
Generate and review of 'white paper' on seismic survey methods, incl reducing array gun volumes	Angelatos, Diebold
Consideration of dose-based approach: • How to compute (including discussion of appropriate metrics) • Estimation of received dose under various scenarios with full examination of modelling uncertainty • How to interpret including o review of available mammalian literature o effect of duty cycles, allowable doses, weighting, threshold levels, etc	Racca, Vedenev, Gailey, Nowacek
Real-time calibration issues – framework for comparison of real time measurements with modelling results and consideration of how to react if differences found	Nowacek, Racca,
Real-time monitoring and related issues	Vedenev, Racca
Estimation of expected distribution and numbers of whales (geographic and temporal)	Muir
Estimation of MMO detection function	Muir
Review of existing mitigation measures, including examination of time trade-off (between length of survey and triggering of measures). Simulation involving information from past surveys and potential mitigation measures	Gailey, Nowacek, Angelatos

REFERENCE MATERIAL

Relevant references will be identified (co-ordinated by Gailey, Nowacek and Racca) and made available to all participants by IUCN.

ADDITIONAL DATA

Earlier seismic surveys in region

Monitoring data obtained during earlier surveys (sound levels, behaviour etc) – Gailey will investigate the available reports to examine whether requests for data are required; IUCN and SEIC will follow up with data owners if necessary. Angelatos will obtain information/data on set up and implementation of surveys themselves.

Geophysical data

Vedenev will investigate whether suitable additional geophysical data exist; IUCN and SEIC will follow up with data owners if necessary.

TIMELINE

Circulate white paper	Early December 2007
Identify and circulate references	Mid-December 2007 (latest)
Circulate first draft of analysis outlines	Mid-December 2007
Identify data needs	Early January 2008(latest)
External reviews of white paper	end January 2008
Circulate working papers for workshop	One month in advance of workshop
5-day (?) Workshop – aim should be to try and finalise report at Workshop	Late March-Early April 2008 (IUCN to determine precise dates and venue, taking into account the dates and venue of the WGWAP meeting
[Reluctant option for follow up work and 2nd workshop if required] *	[Before June 2008]
Final report	June 2008

*NOTE: If occurs a mechanism needs to be developed to enable review by Panel.