Marine Mammal Protection Plan for 2009 Season

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REVISION CHANGE DETAILS

Rev	Location of Change	Brief Description of Change
01		First formal issue of 2003 Western Gray Whale Protection Plan
02	Throughout document reflecting new companies approach	Update of 2003 Western Gray Whale Protection Plan. Title of document changed into Marine Mammal Protection Plan.
03	Throughout document reflecting MMO Audit recommendations + inclusion of Annex 3, noise management approach	Update of 2005 Marine Mammal Protection Plan to reflect MMO Audit recommended changes + addition of noise action criteria in Annex 3.
04	Edits and restructure throughout document. Update of Annex 2 and 3.	Changes made to reflect updates as per the 2006 construction season and adaptation in mitigation measures (vessel corridors and vessel speed limits).
05	Updates throughout document, specifically to Annex 1, 2 and 3.	Changes made with regard to the protection zones, vessel corridors, MMO program, noise impact assessment and WGW monitoring program to reflect updates as per the 2007 season.
06	Updates throughout document	Changes made with regard to speed limits, MMO program and WGW monitoring program. Noise impact assessment and noise action criteria annexes were excluded
07	Updates throughout document	Changes made with regard to speed limits, MMO program and WGW monitoring program.

MARINE MAMMAL PROTECTION PLAN

A FRAMEWORK FOR MITIGATION AND MONITORING RELATED TO SAKHALIN ENERGY OIL AND GAS OPERATIONS, SAKHALIN ISLAND, RUSSIA

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1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

Sakhalin Energy considers marine mammal protection an important issue that will remain relevant for the duration of the Sakhalin offshore oil and gas development (approximately 50 years).

The focus of this marine mammal protection plan (MMPP) is on the critically endangered Okhotsk-Korean or Western North Pacific (western) population of gray whales (WGW), which feeds along the NE coast of Sakhalin Island close to Sakhalin Energy's oil and gas developments. Specific protection measures for other endangered whale and pinniped species have not been included in this protection plan for the reasons outlined below:

- Available information and research evidence suggests that the potential environmental impacts of the Sakhalin II project upon other endangered and vulnerable marine mammals in the waters around Sakhalin Island and the Sea of Okhotsk are very low. This has been assessed through a process of Environmental Impact Assessment (EIA) and reported in the Sakhalin II Phase 2 International EIA (SEIC, 2003a) and associated EIA addenda (SEIC, 2005a).
- With the implementation of the mitigation measures in this plan that are defined primarily for the western gray whale and with supplementary activity-specific measures, the impacts to both western gray whales and other marine mammals will be managed.

Sakhalin Energy developed the first protection plan in 2001 in analogue to a "habitat conservation plan" as defined by the U.S. Fish and Wildlife Service (USFWS) and the U.S. National Marine Fisheries Service (NMFS) (USFWS and NMFS 1996). A "habitat conservation plan" is a requirement of the U.S. Endangered Species Act when a proposed activity may have impacts on an endangered species in the United States or in International Waters by a United States entity. Although there is no regulatory requirement to develop a "habitat conservation plan" or similar plan in Russian waters, Sakhalin Energy has agreed to develop this marine mammal protection plan and to implement mitigation strategies, protection measures and continued monitoring programs to reduce the possibility that its activities may cause harm to the critically endangered western gray whale. Since 2001 the protection plan has been updated and the current 2008 marine mammal protection plan supersedes all previous versions. It contains the most recent information from the western gray whale research program, and incorporates adaptations to mitigation measures based on evaluations of previous years in terms of effectiveness, availability of new information and recommendations from independent reviewers (GEOCON, 2005; IISG-IUCN Report, 2006; recommendations from the WGWAP[1]).

1 WGWAP is the Western Gray Whale Advisory Panel, established under auspices of the IUCN in 2006. Information on this panel can be obtained from the IUCN website (www.iucn.org).

1.2 SCOPE OF MARINE MAMMAL PROTECTION PLAN

This document is presented to demonstrate that:

1. Sakhalin Energy has conducted a detailed western gray whale research and monitoring program since 1997 that provides sufficient information to design mitigation and protection measures for western gray whales off north-eastern Sakhalin Island;
2. Sakhalin Energy has implemented mitigation and protection measures in all of its offshore activities based on previous protection plans;
3. Sakhalin Energy has committed to fund future western gray whale studies to meet information needs;
4. Sakhalin Energy evaluates the effectiveness of its mitigation and monitoring programs and modifies plans and studies as necessary in order to respond to new information as it becomes available, i.e., Sakhalin Energy adopts an adaptive approach to assessing and managing impacts on the western gray whales and their habitat.

This document presents the general approach used by Sakhalin Energy to help protect critically endangered western gray whales while in their summer feeding grounds and to ensure that any potential impact by Sakhalin Energy to their northeast Sakhalin Island habitat is minimized.

An updated summary of background information on western gray whales, and a summary of Sakhalin Energy's Phase 1 and Phase 2 offshore activities that may have impacts on western gray whales are included in chapters 4 and 5. Note that this document does not go into detail on the technical background of impacts on marine mammals. These subjects are addressed separately in the International EIA (SEIC, 2003a), the WGW Technical EIA (SEIC, 2003b), the respective EIA addenda (SEIC, 2005a) and the Comparative Environmental Analysis of the Piltun Astokh Pipeline routes (SEIC, 2004b).

The protection programme applies during all stages of the project lifecycle, being:

- Planning and design stages, including surveys and site selection
- Site preparation activities
- Installation and construction
- Commissioning and operation
- Decommissioning

This marine mammal protection plan does not address the following issues:

- Protection guidelines for seismic surveys – Strategy and specific mitigation measures for geophysical surveys need to be considered on a case-by-case basis in close communication with the environmental manager of the HSES department.
- Onshore facilities and activities
- Wastewater discharges – refer to the guidelines outlined by the Convention for the Prevention of Pollution from Ships (MARPOL 73/78) and by Russian federal law.
- Oil spill response and prevention – refer to Oil Spill Prevention and Response Plan for Piltun-Astokh Offshore Operations (SEIC 2008).

- Biodiversity – refer to the Standard for Biodiversity (SEIC 2003d)
- Safety issues
- Detailed descriptions of the offshore activities (refer to the specific project plans and schedules).

1.3 TARGET AUDIENCE

The protection programme applies to all Sakhalin Energy staff and contractors involved in offshore construction and operation activities.

1.4 USERS NOTES

The requirements of this document are mandatory. Non-compliance must be authorized using the deviation procedure described in Chapter 10 of the Corporate Document Control Procedure (SEIC, 2004a).

A controlled copy of this document is located in LiveLink and is available via SEIC website. Before using this document it is the User's responsibility to ensure that any hard or electronic copy is current. The Document Custodian should be contacted for any assistance and any feedback.

The Document Custodian will review this Marine Mammal Protection Plan as necessary. Triggers for full or partial review may include:

- Emerging/growing HSES concerns in specific areas
- Changes in shareholder requirements and concerns of staff, contractors, customers, Government agencies and the public
- Changes in legislation and/or regulations
- Incident investigations revealing shortfalls in the Marine Mammal Protection Plan
- Changing Company activities and locations, and
- New hazards or activities not considered by the Marine Mammal Protection Plan.

2 RISKS AND CONTROLS

Risks that occur without a corporate document outlaying SEIC's approach towards WGW population monitoring and conservation are the following:

- Lack of awareness about WGW status, risks and mitigation measures among company and contractor teams;
- Absence of clearly defined structure setting scope of monitoring programme, mitigation implementing decision making process and related responsibilities;

To mitigate abovementioned risks the following controls are put in place:

- Marine Mammal Protection Plan is developed by SEIC's corporate environmental team;
- The plan is communicated to the company and contractor teams and embedded into relevant guidelines and procedures;

- Responsibilities concerning Marine Mammal Protection Plan are assigned to relevant persons;
- Process and triggers of Marine Mammal Protection Plan review and revision are defined.

3 RESPONSIBILITIES

Marine mammal and western gray whale protection is centrally managed within Sakhalin Energy. All activities are therefore subject to the same management framework, with clearly defined responsibilities that apply to all relevant Sakhalin Energy staff and contractors.

Project and Asset Managers responsibilities

- Ensure that Environmental Impact Assessments (EIA's) are conducted prior to all new major activities or significant modifications to existing facilities if these are not covered by existing EIA's and have the potential to affect the western gray whale population (from Biodiversity Standard);
- Ensure that requirements of this protection programme are reflected in the planning of offshore activities and in documents that are of relevance for the projects. Activities not explicitly covered by the protection plan and with a major potential to impact western gray whales may need implementation of additional or adapted protection measures. These will be identified in the EIA (see previous bullet);
- To ensure that a detailed understanding of the marine mammal protection conditions of the project area is gained, and effective and available measures and means are taken by the contractors and their staff to ensure that impact on any marine mammal is minimized.

The General Manager HSES shall be responsible for:

- Implementing marine mammal/western gray whale monitoring as required and ensure analysis and collation of the monitoring data. Based on this information, updates of the marine mammal protection plan will be issued if necessary.
- Development of generic and specific marine mammal protection mitigation measures in cooperation with project engineers for offshore installation and construction activities and operations that may affect the western gray whale and other marine mammals;
- Marine mammal/western gray whale awareness training materials for all new and existing Sakhalin Energy staff and its relevant contractors in relation to this protection plan;
- Conducting routine audits of activities as part of the HSES Management System (HSES-MS) auditing or as part of a themed audit;
- Reporting audit findings within the Company and to other stakeholders as appropriate.

The SEIC Representative, where on board, shall:

- Understand the potential impacts on marine mammals associated with their area of responsibility and required measures to minimise these impacts.

- Ensure that staff and contractors under their supervision understand the marine mammal protection issues associated with their work, and the required measures to minimise potential impacts on marine mammals.
- Liaise with other SEIC chartered vessels to communicate on marine mammal related issues to maximise efficiency of specific measures.
- Report incidents, such as injury, death or entanglement of marine mammals, to the HSES department using the Marine Mammal Mortality - Injury Report (Annex 2).
- In the course of conducting their duties they comply with this protection plan.

Staff and contractor responsibilities shall:

- Understand the marine mammal protection issues associated with their work, and the required measures to minimise potential impacts on marine mammals.
- Report incidents, such as injury, death or entanglement of marine mammals, to the supervisor using the Marine mammal Mortality-Injury Report form (see Annex 2).
- Comply with this protection plan in the course of conducting their duties.

4 WGW ECOLOGY – BACKGROUND INFORMATION

The following sections summarise our current knowledge of the status, distribution / migration and feeding ecology of western gray whales. More detailed information is provided in the CEA (SEIC, 2004b), in separate reports from the WGW research and monitoring program (available on www.sakhalinenergy.com) and in scientific publications. Detailed literature references are included in Chapter 9.

4.1 STATUS

The western gray whale is listed as a Category I species (endangered) in the Red Data Book of the Russian Federation (2000) and is considered “endangered” by the United States Government (USFWS, 1997). This population was recently reclassified as “critically endangered” (facing an extremely high risk of extinction) by the International Union for the Conservation of Nature (IUCN) (Hilton-Taylor, 2000; Weller and Brownell, 2000).

Most recent population modelling studies by Cooke et al. (2008), based on Russia-US team photo-identification data (estimate the size of the population off northeast Sakhalin to be about 130 animals.

The chance of population recovery for the western gray whale is likely to be constrained by a variety of demographic factors. Small populations are inherently more vulnerable than large populations to stochastic changes in parameters such as sex ratio or birth rate (Clapham et al., 1999; Gilpin and Soule, 1986). The number of western gray whale calves seen between 1997 and 2008 is very variable, and includes an unexplained significant male bias of about 2:1 in the sex ratio.. The estimate of annual population increase rate is 2.5% per year in 2008 (Cooke et al., 2008).

4.2 MIGRATION AND DISTRIBUTION

4.2.1 Migration Routes

The western gray whale is a long-range migratory species. Its total habitat is large with migration routes expected to exceed 3000 km in length. The species is thought to spend winter months in breeding grounds in the Yellow, East China, or South China seas, while extensive studies have identified feeding grounds offshore northeast Sakhalin Island in summer (ice-free) months (approximately June to November).

Little is currently known about their migration routes. Western Gray whales likely migrate along several possible routes, including along the coast of eastern Asia along the Korean Peninsula, or along coastal waters of Japan. Migratory routes potentially include the waters off the coast of eastern Asia from Tatarskiy Strait to south of Korea or through coastal waters of Japan (Swartz et. al., 2006). The latter route is supported by findings of five dead Gray whales on the Pacific coast of Japan in 2005-2007 (Cooke et al., 2008).

Gray whales travel preferably in relatively shallow waters; WGW can therefore be expected during migration along the whole east coast of Sakhalin Island; sightings of gray whales have been recorded as far south as Cape Menaputsi (offshore side of Aniva Bay), at Cape Terpenia, at Lunskoye, near Piltun and Chaivo, near Okha and in Severney Bay, beyond Cape Elizabeth (SEIC MMO data; Yakovlev & Tyurneva, 2006, 2007, 2008).

4.2.2 Distribution in and near the Sea of Okhotsk

Extensive research programmes have studied the distribution and feeding behaviour of the western gray whale population offshore northeast Sakhalin Island. Distribution data collected from 2002 to 2007 from aerial, vessel and onshore-based surveys have been combined to calculate densities of whales per square kilometre in the Piltun and Chaivo areas[2]. Figure 1 describes two density areas where WGW have been recorded during distribution surveys, and where they have also been observed feeding: the nearshore Piltun Feeding Area, and the Offshore Feeding Area near Chaivo (Blokhin et al., 2002; Maminov, 2003, 2004) (Figure 1). The Piltun Feeding Area extends for about 100 km along the coast and is mostly located within the 20m isobath (Gailey et al., 2005 - 2008; Votrogov and Bogoslovskaya, 1986; Vladimirov et al., 2006 - 2008), whereas the offshore area covers depths of 35-65 m. Both feeding areas were used by large numbers of whales in 2002 to 2003 and 2006 to 2007; however, in 2004 to 2005 only a few whales were observed in the Offshore Feeding Area, and mostly later in the season (Blokhin et al., 2002, 2003a,b, 2004; Maminov 2003, 2004; Vladimirov et al., 2006; Yakovlev and Tyurneva, 2008). Reasons for variation in distribution are likely related to food resources (see below).

To date, the majority of mother/calf pairs in the Piltun Feeding Area have been observed within 1 km from shore, and other whales mainly within 2 km from shore. No mother/calf pairs have been observed in the Offshore Feeding Area in any of the years from 2001 to 2007 (Yakovlev and Tyurneva, 2003 - 2008).

Results from the photo-identification studies have shown frequent movements of western gray whales between the two feeding areas (Yakovlev and Tyurneva, 2008). Seasonal shifts in whale distribution are likely to occur as whales reduce and deplete their own prey habitat (i.e. top-down effects) or as the biomass and quality of prey fluctuates throughout the season (i.e. bottom-up effects). The low numbers of whales in the Offshore Feeding Area in 2004 and 2005 resulted in a higher average number of whales in the Piltun area, with relatively high concentrations in the northern part where also large concentrations of prey where found (Vladimirov et al., 2005, 2006; Fadeev, 2005, 2006).

Besides the observations of whales in the Piltun and Offshore feeding areas, small groups of whales were also observed in 2005 more to the north in the shallow nearshore waters off the coast of Okha (four whales) and in the waters of Elizabeth Cape (two whales). Two of these whales were identified as new individuals that were not observed in the Piltun or Offshore feeding areas in previous years (Yakovlev and Tyurneva, 2006). In 2006 and 2007, a small number of whales were also observed feeding in the shallow nearshore waters off the coast of Chaivo Bay (Vladimirov et al. 2007; Yakovlev and Tyurneva, 2008). Sixteen gray whales have been identified off southeast Kamchatka in 2004-2006. Six of these 16 whales were also photographed offshore Sakhalin. In 2006, two of these six individuals were sighted in the two regions during the same season, while in 2007, three gray whales that have been previously observed in Kamchatka, were sighted offshore Sakhalin, illustrating that whales may travel between northeast Sakhalin and northeast Kamchatka both within and between feeding seasons. Three gray whales were identified in the north of the Sea of Okhotsk in 2006 (Yakovlev and Tyurneva, 2008).

[2] Survey data were excluded during 26 September to 19 October 2004 when a geophysical seismic survey took place and had the potential to impact the “normal” WGW distribution.

4.3 FOOD RESOURCES

Western gray whales feed predominantly on organisms that live in or on the sea bottom (benthic organisms). They consume these organisms by ploughing into the sediment and extracting their food by filtration against baleen plates as they expel associated sediment. This method of feeding leaves large oval depressions in the sea floor that gradually fill up over time and are re-colonised by benthic organisms.

Since gray whales have a relatively short season in which to feed, any change in distribution or quantity of their prey could result in reduced food consumption. Whales that do not eat enough may lose weight, making them less able to complete their long migration, or for females less able to carry a foetus to term or suckle it after birth. Prey studies conducted throughout the Piltun area since 2001 demonstrate high but patchy prey abundance. The prey distribution corresponds with the distribution and abundance of western gray whale sightings in both the Piltun and Offshore feeding area insofar that relatively high biomass of amphipod species have been recorded in both the Piltun and Offshore areas where whales have been observed feeding, while waters typically not used by gray whales for feeding were characterised by lower concentrations of potential gray whale prey or by unsuitable species for feeding, i.e. sand dollars (Blokhin et al., 2004; Fadeev, 2003 - 2008; Vladimirov et al., 2006, 2007).

Year-to-year comparisons of whale distribution and benthos distribution suggest that there may be a link; considering that the whales primary activity during summer offshore Sakhalin Island is feeding, it seems logical that whale densities would, at least to some extent, follow prey availability. For instance, it is possible that the lower numbers of whales in the offshore feeding area in 2004 and 2005 were not attributed to a lower concentration of prey in that area, but rather to more favourable prey conditions in the Piltun feeding area (Fadeev, 2006; Vladimirov et al., 2006). A similar pattern was observed in 2006 and 2007, when a decrease in prey availability in the Piltun area was noted; whales were observed feeding in the nearshore area off Chaivo and a larger number of whales were observed in the Offshore feeding area (Fadeev, 2007, 2008).

Therefore, it seems that whales might utilize different areas offshore Sakhalin Island with different intensities between years depending on the availability of prey in those areas; further analysis of this relationship is required. That whales may move between areas in search of food needs to be taken into account in the development and implementation of mitigation measures.

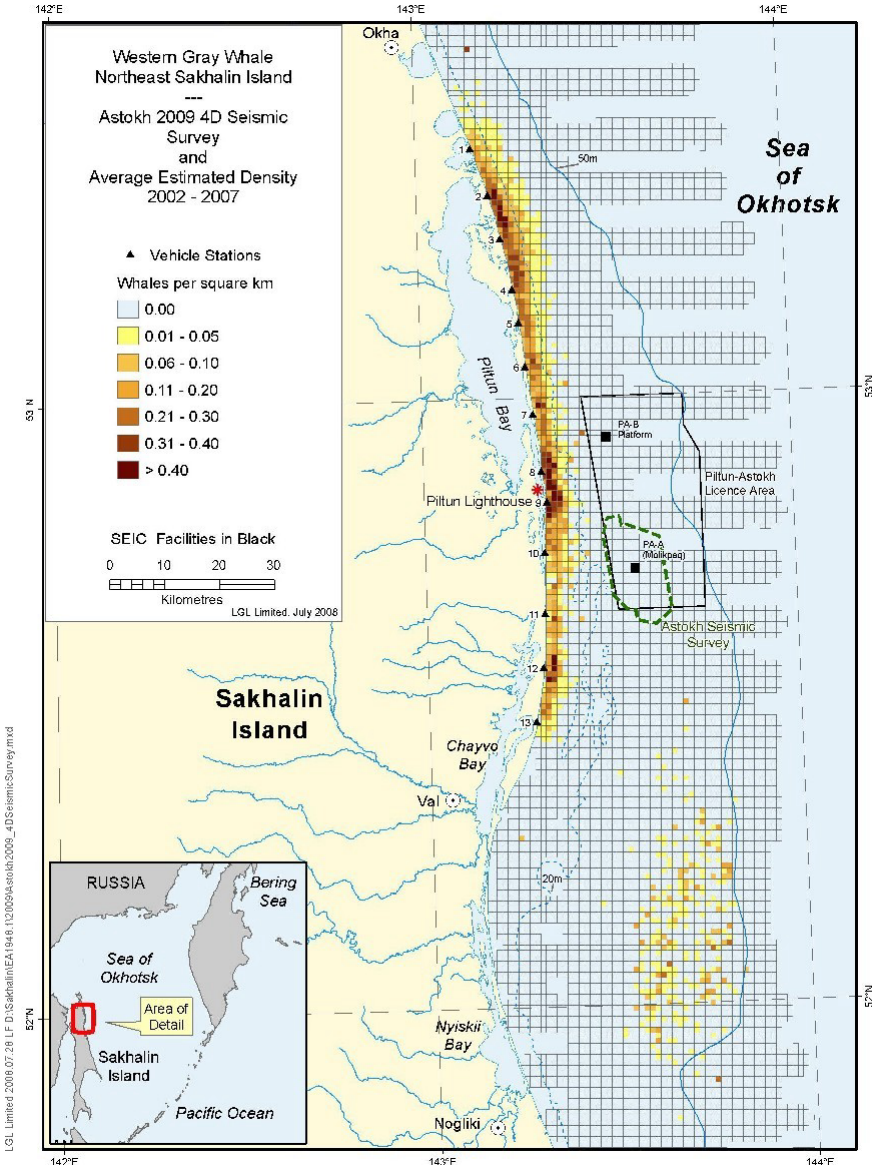

Figure 1: Western gray whale distribution along the Sakhalin coast[3].

[3] Average estimated whale density is displayed in number of whales per km^2 and calculated from distribution data collected from 2002-2007. Survey data were excluded for periods when geophysical seismic surveys took place, i.e. 26 September to 19 October 2004. Densities of whales and hence probability of encounters are highest in the nearshore area from the Piltun lighthouse to the north.

5 POTENTIAL RISKS TO WGW

5.1 POTENTIAL IMPACTS

An overview of the most important potential impacts on the western gray whales and other marine mammals related to all Sakhalin Energy's offshore construction and operations activities is summarised in Table 1. A short summary of the main potential sources of impact is outlined below. More detailed information on western gray whales impacts and potential impacts for other marine mammals can be found in the EIA's (SEIC, 2003a, 2003b), EIA addendum (2005a) and CEA (SEIC, 2004b).

The main sources of impact with regard to the WGW can be divided into two categories as follows:

- Those that will definitely occur to some extent, such as sounds generated by offshore construction. Mitigation is needed to the point that potential impacts are considered to have no biological impacts at the population level (see section 6.1 for definition).
- Those that are risk based, with mitigation measures in place to prevent impacts from occurring. In case of an event, the impacts are potentially high and directly visible in the short term. These sources of impact include oil spills and collisions.

5.1.1 Collisions

A direct relationship exists between the amount of ship traffic and ship speed and the number and severity of ship-whale collisions. Certain assumptions about the risk of ship-whale collisions can be made (Laist et al., 2001):

- All types and sizes of vessels can hit whales
- Ships over 80 m in length cause most severe or lethal injuries
- Vessels sailing at the speed of 14 knots or more cause the most part of severe or lethal injuries
- Serious injuries to whales rarely occur if struck by vessels travelling at speeds of 10 knots or less
- Whales struck by vessels are usually not seen beforehand, or are seen too late to be avoided
- The risk of ship-vessel collisions increases in poor visibility

There is strong evidence that the probability of death or severe injury is considerably higher with an increasing vessel speed. Thus, the probability of death and severe injury increases from 45% to 75% when a vessel speed increases from 10 to 14 knots. At a speed of 17 knots, the probability exceeds 90% (Pace, Silber, 2005).

Although Sakhalin Energy supply vessels and crew change vessels generally travel south and offshore of the Piltun feeding area, some migrant whales moving along the coast in summer and autumn may be vulnerable to collisions with these vessels. Additional potential impact could occur with survey and environmental monitoring vessels performing work within the Piltun Astokh license area.

In order to manage the collision risk mitigation measures have been developed that will decrease collision risk for western gray whales and all other marine mammals occurring in the area.

In order to assess the magnitude of the potential collision risk between vessel traffic and whales from SEICs vessel movements, a collision risk assessment was performed using data of a representative number of vessels. The expected number of vessel/whale encounters was estimated using a simple, two dimensional model that used vessel width, whale length, vessel distance travelled, monthly transects, whale vulnerability, population density, whale avoidance, observer success, and a proximity factor which considers whether whales and vessels co-occur in space and time. This report shows that the collision risk is very low, especially with MMOs present and with vessel travelling in the designated corridors. The vessel with the highest risk of encountering gray whales is the crew change vessel that runs from Kaigon to the Piltun platforms (LGL, 2006).

5.1.2 Oil spill

There are few reports or studies relating specifically on the interaction of gray whales and oil slicks and so it is unclear whether whales can detect surface oil (Moore and Clarke, 2002). The recorded data on other cetaceans also leads to no firm conclusions. While some reports conclude that cetaceans do not avoid oil slicks others have suggested otherwise.

Studies on the effects of direct contact of petroleum products to cetacean skin have demonstrated that the marine mammals do not react to the type of prolonged exposure that would cause severe reaction in other mammalian species (Hunter, 1968; Hansborough et al., 1985). Where histological changes were evident, they healed within a week of the exposure. Experiments appear to show that the cetacean epidermis is a near-complete barrier to hydrocarbons (Geraci and St. Aubin, 1990; Bratton et al., 1993).

The potential for baleen whales to have their baleen plates fouled by oil has also been a focus of concern. Because baleen whales rely on filtering their food from the water through their baleen plates, any fouling that diminishes feeding efficiency or increases the likelihood of ingesting oil, could have implications for individual survival. More detailed studies (Geraci and St. Aubin, 1982, 1985) demonstrated that oiling increased resistance to flow across the baleen, but also showed that over 70 percent of the oil was lost from the baleen within 30 minutes and that over 95 percent of the oil cleared after 24 hours. These data suggest that a baleen whale that suffered oiling of its baleen might have its feeding efficiency reduced for, at most, a few days. Stranded gray whales, examined after the “Exxon Valdez” spill, had oil on their baleen but not in their digestive tracts, suggesting that the baleen was fouled after the animals died (M. Dahlheim, pers. comm. in Moore and Clarke, 2002).

Based on the above, the following assumptions can be made regarding the impact of oil on marine mammals. More background information and references are included in the project EIA’s (SEIC, 2003a, 2003b) and the CEA (SEIC, 2004b):

- Cetaceans do not appear to consistently avoid oil slicks.
- At least some species are able to detect some oils (indicated by avoidance behaviour).
- Cetacean skin is largely impermeable to hydrocarbons, although surface layers may be damaged by crude oils and gasoline.
- Baleen appears to be only temporarily affected by oiling.

Prevention of oil spills is primarily managed through project design, e.g. construction of oil sumps for offshore pipelines. The direct impact following an oil spill is dependent on many factors such as the type of oil spilled, the quantity, and prevailing wind direction. This is also true for the indirect impact (pollution of food organisms), however even in the worst-case scenario the potential impact on food resources is negligible compared to natural variations in food availability (SEIC, 2005b).

Reduction of impacts of an oil spill on western gray whales and other marine mammals is managed through the development of oil spill response plans (SEIC 2008).

5.1.3 Anthropogenic sound

Marine mammals rely heavily on the use of underwater sound to communicate and to gain information about their surroundings. Experiments also show that they hear and react to many anthropogenic sounds (see review in Richardson et al. 1995). Sound in the marine environment has the potential to interfere with a whale's ability to communicate, which in turn has the potential to affect their distribution, abundance, behaviour, and general well being (Richardson et al. 1995). Potential impacts due to high or increased sound levels are:

- Direct physical impact on the hearing and other physical damage in whales due to high sound levels at close range (PTS and TTS).
- Behaviour modifications due to increased levels of sound, such as diversion from a migration path, avoidance of an area, changes in orientation and breathing, and interrupted feeding (received levels of 163 dB re 1µPa for pulsed sounds and about 115-123 dB re 1µPa for continuous sounds).

Physical damage

Temporary Threshold Shift (TTS) is the mildest form of hearing damage that occurs on exposure to a strong sound (Kryter 1985). While experiencing TTS, hearing sensitivity is decreased. TTS can last from minutes or hours to days. The magnitude of TTS depends on the level and duration of sound exposure, among other considerations (Richardson et al. 1995). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity recovers rapidly after exposure to the sound ends. Permanent Threshold Shift (PTS) is a physical damage to the sound receptors in the ear. In some cases, there can be total or partial deafness, whereas in other cases, the animal is unable to hear sounds at specific frequency ranges. Physical damage to a marine mammal's hearing apparatus can occur if it is exposed to sound impulses that have high peak pressures, especially if they have very short rise times. Such damage can result in permanent decrease in functional sensitivity of the hearing system at some or all frequencies. Sounds generated from vessels involved during offshore pipeline and platform constructions do not have these specific characteristics and are not expected to cause PTS or TTS to marine mammals.

Behaviour responses

Behavioural reactions of marine mammals to a sound are difficult to predict. Reactions to sound, if any, depend on species, state of maturity, experience, current activity, reproductive state, time of day, weather, and many other factors. If a whale does react to an underwater sound by changing its behaviour or moving a small distance, the impacts of the change may not be significant to the individual, the stock, or the species as a whole. On the other hand, if a sound source displaces whales from an important feeding or breeding area for a prolonged period, impacts on the animals could be

significant. Quantitative information on the reactions of gray whales to *continuous* anthropogenic sounds of the types associated with offshore pipeline construction and platform installations is very limited and show a wide variety in behavioural responses (Richardson et al. 1995; Moore and Clarke 2002; Dahlheim 1987; Bryant et al. 1984). Most available information relates to migrating or breeding whales, which appear to be less tolerant of anthropogenic sounds than are feeding gray whales (Richardson et al. 1995).

Based on the scientific information available with regard to behavioural reactions of gray whales to continuous anthropogenic sound levels, 120 dB re 1 µPa has been adopted as the sound threshold above which 50 percent of gray whales are predicted to avoid the area. A noise impact assessment strategy has been developed based on this received level and includes the criteria amount of potential feeding area avoided and duration of sounds above the threshold level in the feeding area. Both the scientific information and the noise impact assessment approach can be viewed in more detail in Chapter 4 of the CEA (SEIC, 2004b).

NOISE TRESHOLD LEVELS:

DESCRIPTION	TRESHOLDS*
Hearing impairment due to physical damage	190 dB rms (for pinnipeds)
	180 dB rms (for cetaceans)
Behavioural disruption	120 dB rms

* From US Marine Mammal Protection Act. Note that only thresholds for continuous sounds are provided here. These levels are guidelines that can change in specific situations, based on regulations, international precedents or other reasons.

Malme et al. (1983, 1984) documented behaviour reactions of migrating gray whales to seismic pulses as well. Migrating gray whales began to avoid seismic pulses at levels > 160 dB re 1 µPa. 10%, 50%, and 90% probabilities of avoidance were calculated at levels 164, 170, and 180 dB re 1 µPa respectively.

5.1.4 Disruption of the Seafloor

Dredging activities required for the installation of the subsea pipelines, cables, GBS, TLU, jetty, and landing pier, disrupt seafloor habitat and cause removal and burial of benthic fauna. Of all the marine mammals present in the area only western gray whales are particularly vulnerable to seafloor construction activities because they are critically endangered and rely for their food on benthic organisms living in or on the seabed. Other whale species lead nomadic lives, form no stable local aggregations, and are only found in these waters in small groups or as individuals during their seasonal search for food.

The only two known western gray whale feeding grounds along the NE Sakhalin coast are the Piltun feeding area and the Offshore Feeding area (Figure 1) off Chaivo. All of the dredging and pipelay activities in the Piltun area took place south and about 8-9 km east of the Piltun feeding area. Dredging only took place at depths less than 30 m.

As part of the conditions imposed by the Water Use Licenses and Construction permits, plume cloud monitoring activities were conducted as a routine activity during pipeline

installation activities in Piltun in 2006. The results were similar as the Lunskoye study in 2005, this is that general sediment transport is to the south, based on net current direction. Also, the sediment plumes didn't extend further than 300-500m on either side of the pipeline and turbidity was within background concentrations (SAIPEM, 2005, 2006). Disturbance of benthic communities due to sedimentation of dredging activities is local and within natural variation.

5.1.5 Cumulative Impacts

Cumulative effects result from the incremental impact of the proposed action when added to other past, present, and foreseeable future activities regardless of who is responsible for these. Cumulative effects can result from individually minor, but collectively significant, activities taking place over time. A discussion of cumulative impacts is appropriate because cumulative impacts, rather than the isolated impacts associated with specific SEIC operations, are ultimately more likely to have effects on western gray whales and their environment.

In the offshore environment along the NE Sakhalin coast, cumulative effects on the western gray whale population can occur during the summer season from current and planned petroleum developments in the region, and from national, regional, and local interests of the Russian Federation in maintaining other commercial and domestic activities (e.g., fishing, shipping, industrial development). To date it is unknown where the whales spend the winter season and what threats they encounter while on their breeding grounds. Also their migration path is unknown but occurs likely in shallow coastal waters of China, Korea and Japan in areas with heavy vessel traffic. Threats from fishing industry along the coast of Japan appears to be a very realistic threat that needs attention as a total of five whales have been reported to have died in fisherman gear off the Japanese coast in 2005-2007.One female died in a net in Tokyo Bay in May 2005. Two more whales (a mother and a female calf) were taken in a net near Enoshima, northeastern Honshu in July 2005, while an additional female was found in a trap net in Yoshihama Bay in January 2007. This animal was subsequently matched photographically with a 2006 calf in the Russia-US Photo-Id catalogue. A 12.3 m female gray whale was found dead in southern Hokkaido on 1 August 2007 (Cooke et al., 2008). It is extremely difficult to distinguish the effect of the individual offshore industrial activities conducted by SEIC from the overall threats that the western gray whales experience over their entire distribution range. The approach that Sakhalin Energy takes with regard to this is that the Company commits to do everything that is in its control to minimize any impact that their construction and operation activities might have. Also SEIC is sharing as much as possible research and monitoring initiatives and mitigation measures with other operators in the area to obtain a consistent approach in western gray whale protection on the short and long term.

6 MARINE MAMMAL PROTECTION

6.1 OVERVIEW OF SEIC OFFSHORE ACTIVITIES

In 2008-2009, SEIC completed the majority of Phase II construction activities, and moved into commissioning and production stages. Flotels, FSO and SALM were decommissioned, and associated activities ceased.

Offshore activities that may affect WGW during the commissioning and production stages are summarized in Table 1. Special projects (e.g. seismic surveys) have not been included; mitigation measures for special projects are considered additional to this Marine Mammal Protection Plan, and are developed specifically, and on a case-by-case basis.

Compared to previous “construction” years, SEIC offshore activities in the Piltun and Lunskoye areas will decrease during commissioning and operations years.

Vessels that present the highest risk to the whales are the crew-change vessels that run from Kaigon to LUN-A, PA-A and PA-B. Crew-change vessels, *Miss Sybil*, *Miss Ina*, and *Seabulk St. James*, that shuttle between Kaigon port and the PA-A, PA-B, and LUN-A platforms will be replaced during 2009 by two Norwegian catamaran ferry boats, with less draft.

The field-supply vessels (e.g. *Pacific Endurance*, *Pacific Endeavour*, *Pacific Enterprise*, *Smit Sakhalin*, and *Smit Sibu*) will shuttle by rotation between Kholmsk and the SEIC license areas, as required.

The oil spill response vessel, the *Irbis*, will be located in the vicinity of platforms as per usual oil response procedure.

Research vessels will operate in Aniva, Lunskoye, and Piltun areas, where relevant, to conduct (1) hydrological and benthic monitoring, and (2) a joint WGW monitoring programme for acoustic, benthic, distribution, behaviour, and photo-ID studies.

Table 1 Summary of SEIC offshore commissioning and production activities[4] and their potential impact on marine mammals in general and the western gray whale in particular.

Area of activity	Offshore activities	Period of activity	Importance of project area for Marine mammals	Source of impact	Description of impact	Impact assessment western gray whales[4]	Impact assessment other Marine mammals[5]
ANIVA BAY	Tanker traffic, to and from TLU, through La Perouse straight	Throughout year	Western gray whales migrate from winter breeding grounds to summer feeding grounds. Possible migration routes include La Perouse straight and / or along the east coast of Japan. WGW sightings and fatalities have been recorded along both routes. Migration to Sakhalin occurs at the beginning of summer, around May-June; migration from Sakhalin occurs at the end of summer, around October. WGW need to complete migration to Sakhalin successfully to feed, and need to complete migration from Sakhalin to breed.	Collisions	Injury or death due to collisions with vessels	Risk unknown. Although details about vessel activity are known, sufficient detail about WGW migration routes and movement is unknown so that risk assessments have not been possible. Risk considered to be similar to other vessel traffic along routes.	Risk to individual animal low, negligible impacts on population level.
				Oil spill	Damage to skin, respiratory system, toxicity due to oil spills	Risk low due to vessel control and very low density of whales along routes.	Low risk due vessel control, negligible impact on population level
				Sound	Possible disturbance during migration caused by increased anthropogenic sound levels.	No impact on hearing loss expected from vessel related sounds.	No impact on hearing loss expected from vessel related sounds.
LUNSKOYE	LUN-A commissioning and production. One support vessel will be on standby next to the platform. Crew change vessel will shuttle between Kaigon and LUN-A.	During the ice-free season (usually early June – mid-October)	Western gray whales migrate nearshore Lunskoye area and very low numbers observed feeding. Sightings of other endangered marine mammals rare. Regular sightings of porpoises, seals, Killer Whales and to a lesser extent Minke whales and dolphins. Lunskoye project area is not a specific feeding or breeding area for marine mammals.	Collisions	Injury or death due to collisions with vessels	Risk low, due to very low probability of encounters and establishments of vessel corridors	Risk to individual animal low, negligible impacts on population level
				Oil spill	Damage to skin, respiratory system, toxicity due to oil spills	Risk low due to pipeline and platform design and very low density of whales in area.	Low risk due to pipeline and platform design, negligible impact on population level
	Well drilling from LUN-A platform	Throughout year		Sound	Hearing damage leading to decreased orientation, food allocation, communication due to high sound levels (≥180 dB re 1 uPa)	No impact on hearing loss expected from vessel related sounds and drilling.	No impact on hearing loss expected from vessel related sounds and drilling.
PILTUN	Production and well drilling from PA-B platform. Production from PA-A platform.	Throughout year	Western gray whale feeding areas along Piltun and Chaivo coast. Regular sightings of other marine mammals visiting the area include Killer whales, Minke whales, Harbour porpoises, seals. Sightings of other endangered marine mammals rare. All offshore activities occur outside western gray whale feeding area. Noise disturbance can extend into areas were whales have been observed feeding. Piltun feeding area is most critical due to mother/calf presence and high site fidelity. Lower return rate in Offshore feeding area, but high abundance of food and hence probability of western gray whale sightings high.	Collisions	Injury or death due to collisions with vessels	Risk high, mainly from crew change vessels.	Risk to individual animal, negligible impacts on population level
				Oil spill	Damage to skin, respiratory system, toxicity due to oil spills	Risk low due to pipeline and platform design, potential impact can be high depending on circumstances	Low risk due to pipeline and platform design, negligible impact on population level
					Direct loss of food sources due to pollution of benthos (oil spill)	Impact minor, modeling of worst case spill scenarios show a potential impact on benthos in 0,1%-0.3% of feeding area.	Not applicable
				Sound	Hearing damage leading to decreased orientation, communication, food allocation, due to high sound levels (≥180 dB re 1 uPa)	No impact on hearing loss expected from vessel related sounds.	No impact on hearing loss expected from vessel related sound
					Avoidance of the feeding area and/or disturbance during feeding caused by increased continuous sound levels (≥120 dB re 1 uPa)	Potential high impact, though analysis of whale behaviour during the 2005 construction season show no apparent reactions from construction related sounds.	Not applicable

[4] These activities are intended to reflect steady state. Any specific activities not addressed here may require separate risk assessment and

[5] No, negligible and low impacts belong to the category “no biological impact”, mitigation is not required. High impacts belong to the category “Potential biological impact”, mitigation is required. See section 4 for more details on mitigation approach.

6.2 MITIGATION APPROACH

Sakhalin Energy is committed to minimising the impact of its offshore activities on the marine environment and specifically on the western gray whale, and to continually improve its environmental performance. This commitment is reflected in the company's HSES Commitment & Policy.

The mitigation framework is based upon compliance with Russian law and the incorporation of good international practice in the field of marine mammal protection. The regulatory instruments, guidelines and industry standards that guide this Marine Mammal Protection Plan are:

- Terms and conditions of the agreement on development of the Piltun-Astokhskoye and Lunskoye oil and gas fields on the basis of the Production Sharing Agreement between the Government of the Russian Federation, the Sakhalin Oblast Administration and Sakhalin Energy;
- Requirements of the environmental legislation of the Russian Federation and the Sakhalin Oblast;
- Relevant international laws and conventions;
- International guidelines for impact assessment, for which the World Bank/IFC guidelines are applied as a benchmark; and
- Shareholder standards.

The greatest opportunity for avoidance and/or minimisation of impacts to marine mammals is during the project planning, design and site selection stage. During this stage issues relating to facility construction and operations need to be considered so that potential problems and negative environmental impacts can be identified and addressed. Impact assessment criteria, methodologies and impact assessment documents have been developed and authored by external specialists. The results of this impact assessment process are reported in:

- Detailed EIA's for each of the project assets, prepared for the Russian approval (TEOC) process. TEOC Environmental Protection Book, Volume 7 (2002);
- Summary EIA for the Russian approval (TEOC) process (2002);
- Comprehensive international-style EIA (SEIC, 2003a) and related addenda (SEIC, 2005a);
- EIA on the 2003 seismic survey in the Lunskoye area (SEIC, 2003c);
- Specialised WGW Technical EIA (SEIC, 2003b).
- Additionally to the EIA's Sakhalin Energy developed the Comparative Environmental Analysis of the Piltun Astokh Pipeline route options (SEIC, 2004b) with internal and external technical specialist. The purpose of the CEA was to compare the advantages and disadvantages from an environmental perspective for three proposed pipeline routes including their landfalls and connective routes to the main north-south onshore pipeline, associated with the development of Sakhalin Energy's Piltun-Astokhskoye (Piltun) oil field. Main focus of this documents was to assess potential impacts on the western gray whales.

The implementation of appropriate mitigation, monitoring and management measures, as defined within this protection programme, will be carried out by the individual Sakhalin Energy assets and overseen by Central HSES group.

Sakhalin Energy's strategy for the definition of mitigation measures is based upon two basic principles (see also International EIA, WGW Technical EIA and CEA):

1. **Avoidance of biological impact at the population level.** Sakhalin Energy will not plan, implement or continue any activity predicted or found to have a biological impact on the western gray whale population or any other marine mammal population after all practicable mitigation measures have been adopted.
2. **Reduction of biological impacts.** Sakhalin Energy will work by planning, design and control measures to reduce predicted potential biological impacts on the population level to impacts that are not distinguishable from natural variation.

6.3 PROTECTION ZONES

Environmental impact assessments and the findings of extensive WGW monitoring programmes have informed, and continue to inform mitigation plans. According to available information, areas where WGW are likely to be encountered have been identified. Protection zones have been defined in relation to WGW feeding grounds and key migration / transit corridors. Mitigation measures to reduce risks associated with these zones are prescribed in Section 6.5.

The nearshore, east Sakhalin coast is an area where western gray whales may be encountered on their way North in spring and South in autumn and throughout the year in low numbers feeding on route. Mitigation measures related to avoidance of collisions are of main importance in this area (see section 6.5).

6.4 SEASONAL EFFECTS

Western gray whales

The seasonal nature of WGW migration is likely linked to the ice conditions prevalent in the Sea of Okhotsk. The annual variability of the sea ice freezing and break up make it difficult to accurately predict the annual appearance and departure of gray whales in the Sakhalin Energy offshore development areas. The general pattern, with annual fluctuations due to environmental conditions, is as follows: small numbers of whales begin to arrive in the area in May, increasing in numbers during June and July. The abundance of whales fluctuates during the summer with highest numbers of whales observed in August and September, and slowly declining numbers during late September, October and November as the whales begin their southward migration.

Four distribution seasons can be distinguished, based on whale density analysis calculated in 1,0 km^2 grid cells in the Piltun area over the entire season using all available distribution data (2002 to 2005 aerial surveys, 2002-2007 vessel based surveys, 2001 to 2007 shore-based behaviour scan surveys and the 2004-2007 shore-based vehicle scan surveys). The seasons are defined as follows:

- **Off Season (1 December to 30 April)** – Western gray whales are not present due to sea ice conditions. No monitoring is carried out.
- **Early Season (1 May to 30 June)** – Western gray whale presence is low, although numbers will gradually increase over this period. Specific protection measures related to the physical presence of the whales are implemented. Because of the limited number of whales present in the feeding areas, offshore activities should be scheduled as much as possible in this season.
- **Peak Season (1 July to 30 September)** – Western gray whales will definitely be present and numbers will increase to annual maxima. Specific protection measures related to the physical presence of the whales need to be implemented. Monitoring of whales is carried out. The number of feeding western gray whales potentially being impacted is considered to be at annual maximum.
- **Late Season (1 October to 30 November)** – Western gray whales are still present but the numbers are gradually decreasing over this period. Specific protection measures related to the physical presence of the whales are implemented. Monitoring is completed or nearing completion. Because of the limited number of whales present in the feeding areas, offshore activities should be scheduled as much as possible in this season.

Other marine mammals

The zoning described for the western gray whale reflects also the important seasons for the other marine mammals.

- Northern Fur Seals and Steller's sea lion arrive in the Sakhalin area around early May and reach highest abundance by late June-July. They are wintering in the Sea of Japan.
- Seal species: all seal species occurring around Sakhalin Island are present the whole year round in large numbers.
- Other whale species (baleen and toothed whales) enter the Sea of Okhotsk to feed between spring and autumn when these waters become free from ice. With the onset of winter, they leave for the Pacific Ocean or the Sea of Japan. Only bowhead whales (Balaena mysticetus) and beluga whales (Delphinapterus leucas) are year-round inhabitants of the Sea of Okhotsk.

6.5 GENERAL MITIGATION MEASURES

The mitigation measures outlined in this section apply to all offshore activities of Sakhalin II Phase 1 and 2, in all zones and where relevant (Table 2). Detailed descriptions and background of the mitigation measures related to 2008 offshore activities that are occurring in the Piltun area are described in Annex 1.

6.5.1 Collision

In general, the risk of ship-whale collisions can be effectively mitigated by:

- Controlling vessel routes
- Establishing speed limits
- Using Marine Mammal Observers

Although the likelihood of a ship-whale collision is low in the vicinity of both platforms and along the designated shipping routes, mitigation measures will be employed to further reduce the probability of a harmful encounter (LGL, 2006). The following standard mitigation measures will be used to reduce the likelihood of ship-whale collisions in all phases of SEIC operations during the early, peak and late season.

Controlling vessel routes

Special vessel corridors have been established for all vessel traffic along the east coast of Sakhalin Island. All SEIC vessels are required to keep within the designated corridors, unless deviation is essential for safety or specifically required and authorised. These corridors are:

- Crew Transfer Corridors for crew change vessels travelling from Kaigon port to LUN-A, Molikpaq (PA-A) or PA-B platforms (see Figure 2B).
- Navigational corridors for all transiting vessels from Kholmsk or Korsakov to Lunskoye and/or Piltun(see Figure 2Aand 2B).
- Construction corridors for all vessels involved in offshore construction activities around the platforms. These vessels are required to operate within an area with a radius of 5 km around Molikpaq (PA-A) platform[6] and 2 km around the LUN-A platform and PA-B platform locations (Figure 2B).

The Piltun and Lunskoye pipelines will be inspected annually for a total period of about 2-3 weeks in July starting in 2008, using a DP vessel equipped with sonar and ROV. These vessels will follow the established navigational corridors while on transit and will follow the pipeline locations during their survey.

To prevent collisions between vessels and whales and also disturbance to feeding whales, all vessel traffic MUST comply with the navigational corridors, established outside the areas where gray whales are expected to occur (Figures 2A, 2B). Deviation from these routes towards areas where whales have been observed is possible for safety / emergency reasons, or if specifically authorized.

[6] This radius of 5km may change to 2km after the Vityaz complex has been decommissioned. Such decision would be taken formally, and updates to relevant controlling documents, e.g. this MMPP, would need to be made.

Establishing speed limits

Speed limits for vessels are established as follows.

Speed limits (maximum in knts)	Crew transfer corridor[7]	Within navigational corridors	Westward from corridors[8], within PA-A and PA-B approach corridors and during pipeline inspection
Daylight conditions & visibility≥1 km	21 knts	17 knts	10 knts
Visibility <1 km or at night	21 knts[9]	17 knts	7 knts

- Sudden changes in speed and course should be avoided.
- Non-transiting vessels moving with a speed of less than 5 knts will maintain course and speed unless there is an imminent risk of collision. In case of a collision risk with a whale they should stop if it is safe to do so until it has been determined that the potential danger to the whale has passed.

Using Marine Mammal Observers

- One or two trained marine mammal observers shall be present on all key vessels involved in offshore activities along the east Sakhalin coast and shall maintain a continuous watch for western gray whales and other marine mammals. All marine mammal sightings shall be recorded on specific data sheets. Key vessel is defined as a vessel that has a high probability of a whale encounter or that provides the most appropriate base for marine mammal observations during the planned activity.
- All crewmembers shall be alert for marine mammals, regardless of whether or not the MMO is on watch.
- Transiting vessels will attempt to maintain a minimum of 1,000 m separation from observed western gray whales and other endangered whale species (bowhead whale, North Pacific right whale, and fin whale) and a 500 m separation for other non-endangered marine mammals (excluding pinnipeds). If a whale surfaces in the vicinity of or is heading towards the vessel, all precautionary measures possible need to be taken to avoid collisions until it has been determined that the potential danger to the whale has passed. No minimum separation distance is imposed for pinnipeds, but vessels are directed to proceed with appropriate caution if pinnipeds are observed close to the vessel.
- Do not pursue, intercept, encircle, or cause groups of whales to separate.
- Vessels will not cross directly in front of or in the immediate vicinity of moving or stationary whales. When moving parallel to whales, vessels will maintain a constant speed and course.

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[7] See Annex 1 for more details concerning the local situation with regard to crew transfer vessels and consequences for speed requirements

[8] Speed limits westward from the corridors (towards areas where encounters with WGW are more likely) need to be adhered to in all cases, unless the emergency or safety situations require otherwise.

[9] The speed limit within the corridors is the same under all conditions under the assumption that the probability of encountering western gray whales in these offshore routes is very low

Monitoring / Control

- All mitigation measures outlined above shall be included in the Phase 2 Marine Operating Procedures and Guidelines (SEIC, 2008).
- Prior to mobilisation all relevant persons on the vessel shall receive a briefing with regard to Marine Control Guidelines and mitigation measures that apply for its activity and area of operation.
- Marine mammal observers are to report on a daily basis all marine mammals observed relative to the vessels.
- The marine mammal observers will immediately report all cases of whale/marine mammal collisions to SEIC HSES representative.
- Position tracking via the online PurpleFinder tracking system, via transponders, or via GPS used by MMOs.
- Vessel positions in relation to the corridors and protected areas (e.g. feeding areas) shall be monitored, and all deviations from the vessel corridors shall be recorded, investigated and corrective action implemented by Marine Department where necessary. SEIC CHSES Department shall reports on deviations to the WGWAP in MMO Close-Out Reports.

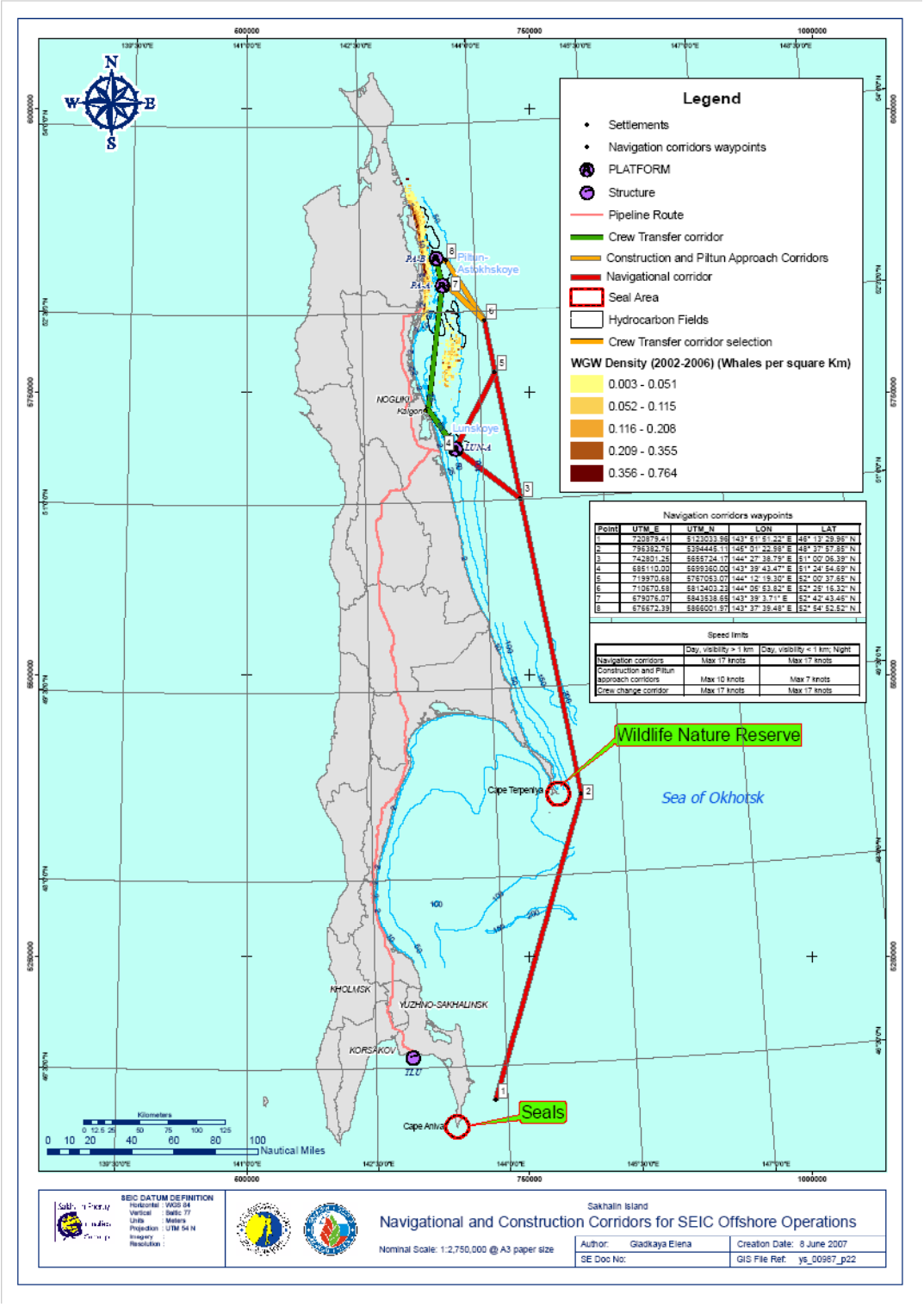


Figure 2A: Vessel corridors for all vessel traffic involved in offshore activities related to the Sakhalin II project.

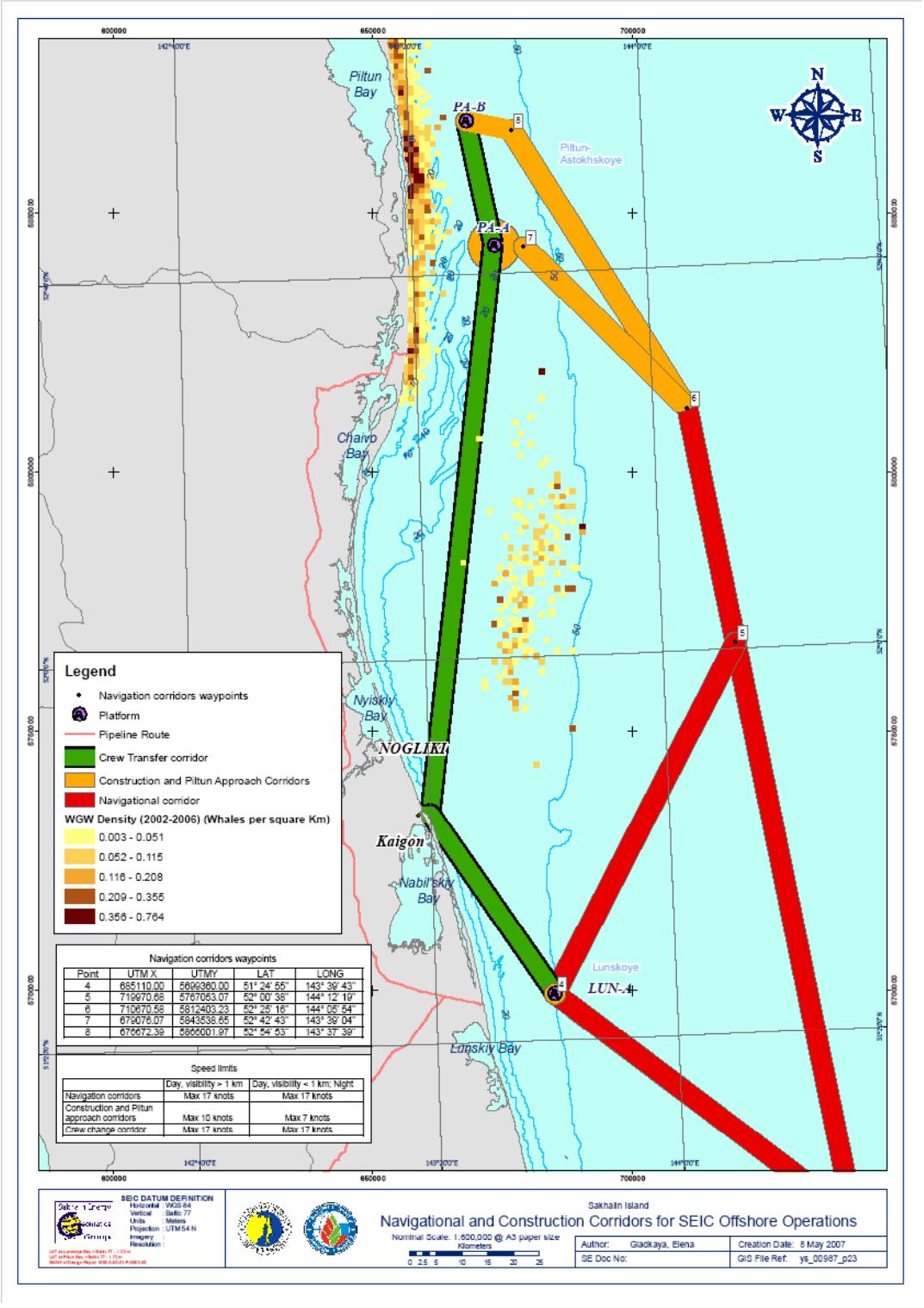


Figure 2B: Detail of the navigational, Piltun-approach, and crew transfer corridors in the Piltun area for vessel traffic related to the Sakhalin II project.

6.5.2 Oil spill

Specific requirements with respect to oil spill response close to the Piltun feeding area have been identified and are documented in the Oil Spill Prevention and Response Plan for Piltun-Astokh Offshore Operations (SEIC 2008). In the event of an oil spill and there is a possibility of whales in the area, then the following should be taken into consideration:

- MMOs will be on board spill response vessels during a response
- Vessel masters shall immediately report to the Offshore Installation Manager any and all whale sightings
- Masters shall navigate their vessels at speeds stipulated while in the vicinity of whale feeding areas
- Observers assigned to aerial support shall monitor and report whale sightings
- Boom will be deployed to prevent oil spreading to areas of whale sightings
- Special consideration to be given to exclusion booming to prevent oil spreading to Western Gray Whale (WGW) feeding areas
- Dispersant should not be used in the vicinity of WGW or WGW feeding areas
- Oil spill response and preparedness procedures shall be implemented, including procedures for clean up of oil spill in ice where required to minimize risk to gray whales arriving in the area after the spring thaw.

6.5.3 Anthropogenic sound

A specific noise mitigation approach has been developed for the planning phase of offshore activities that have the potential to impact whales on their feeding grounds (SEIC, 2004b, WGWAP, 2008, Figure 3). This approach involves predictions of the acoustic footprint using an advanced acoustic model and an extensive source level measurement program.

Prevention/Mitigation

If practical feasible (schedule, weather and safety related), offshore activities that have the potential to impact whales on their feeding grounds are to be scheduled outside the peak season, in order of preference this is:

1. Off season from December 1 to April 30
2. Early season from May 1 – June 30 or
   Late season from October 1 – November 30

Contractors are requested to use equipment and procedures that minimise sound[10]. Possible options include use of special enclosures, mufflers, sound-isolation mounts, tuned propellers and drive shafts, and shrouds on propellers, along with minimal use of thrusters. Possible measures are outlined in the document Noise Mitigation Strategy relevant to Sakhalin II Construction and Operations (SEIC, 2004c).

[10] During the Lunskoye acoustic monitoring program in 2004 source level measurements of vessels involved in pipe laying activities have been measured. These results have been used to identify suitable vessels for work to be conducted in Piltun, so far as availability, suitability and contractual issues allow.

Use of bubble curtains or other mitigation strategies have been identified and/or are being considered for platform operations in case modelling results and acoustic monitoring of analogue operations predict higher sound levels than those that are considered to be acceptable in relation to potential impacts to gray whales (SEIC, 2004c).

Verification of the predicted acoustic footprint should be undertaken wherever possible in consideration of the associated potential impact on the whales, as reflected by whale distribution and behaviour surveys. A specific procedure is established to define actual impacts and decide on actions to be taken (Step 2, Figure 3).

All types of aircraft shall maintain a minimum altitude of not less than 450 m over the western gray whale feeding area, subject to pilot safety requirements. Aircraft are prohibited from flying over or circling wildlife, including whales, for purposes of casual viewing.

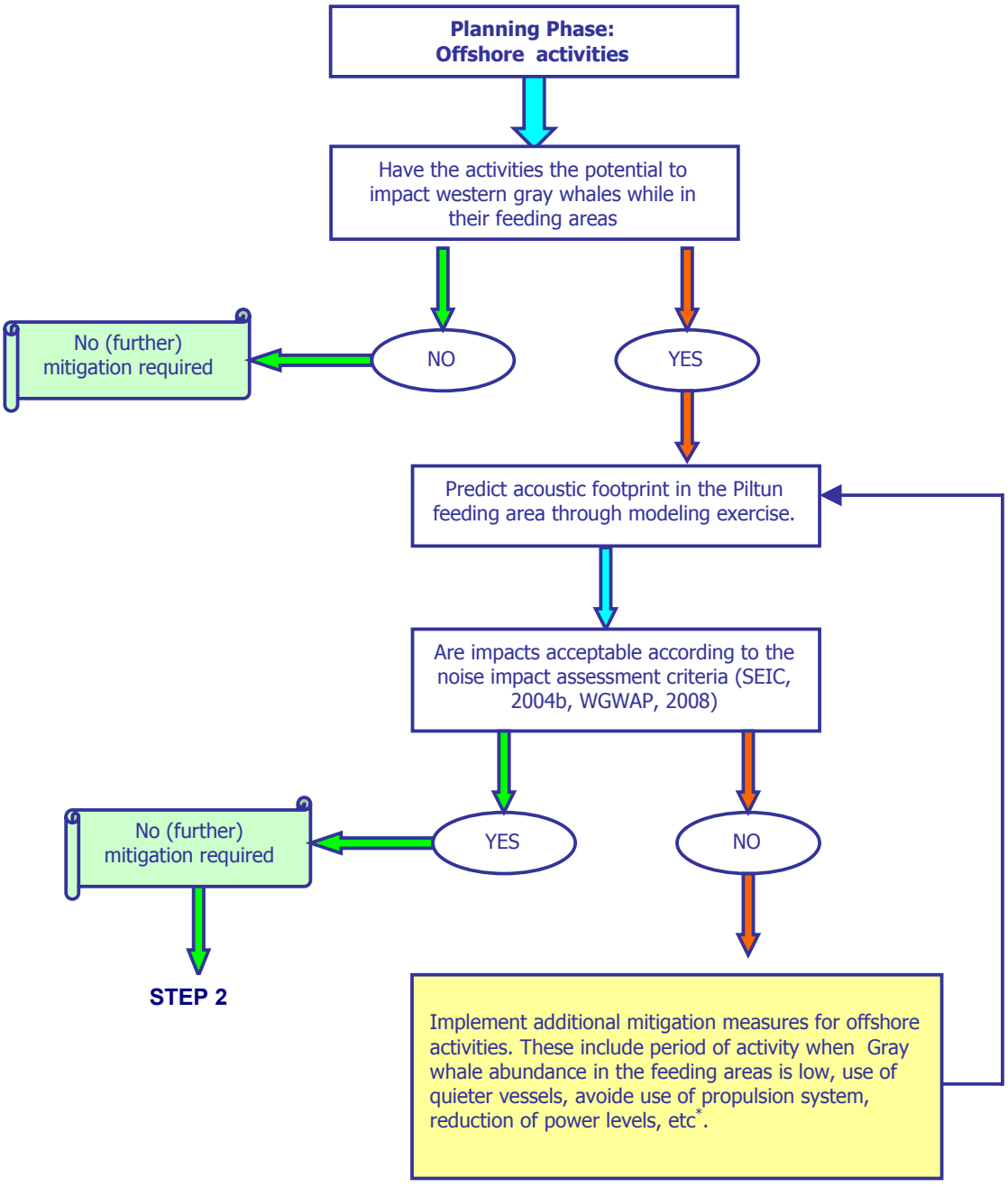
Specific mitigation plans for seismic surveys are not addressed in full by this MMPP, due to the particular circumstances and requirements of such activities; comprehensive mitigation plans for anthropogenic sounds associated with seismic surveys are developed on a project-by-project basis and are additional to the requirements set out herein.

Monitoring/Control

A special acoustic monitoring program shall be implemented to monitor sound levels received in the Piltun feeding area from industrial sources during construction and operational phases (refer to Fig 3).

Monitoring programmes for particular activities, e.g. seismic surveys, are addressed in plans (e.g. EIA) specific to those activities.

STEP 1: Noise Mitigation Assessment Planning phase



Note *The possibility to use these mitigation measures depends on the nature of the offshore activity. The mitigation measures will therefore be judged on practicality and effectiveness for each relevant offshore activity separately.

Figure 3: General Noise Mitigation Approach (*continued on next page*)

STEP 2: Actual noise impact approach during offshore construction

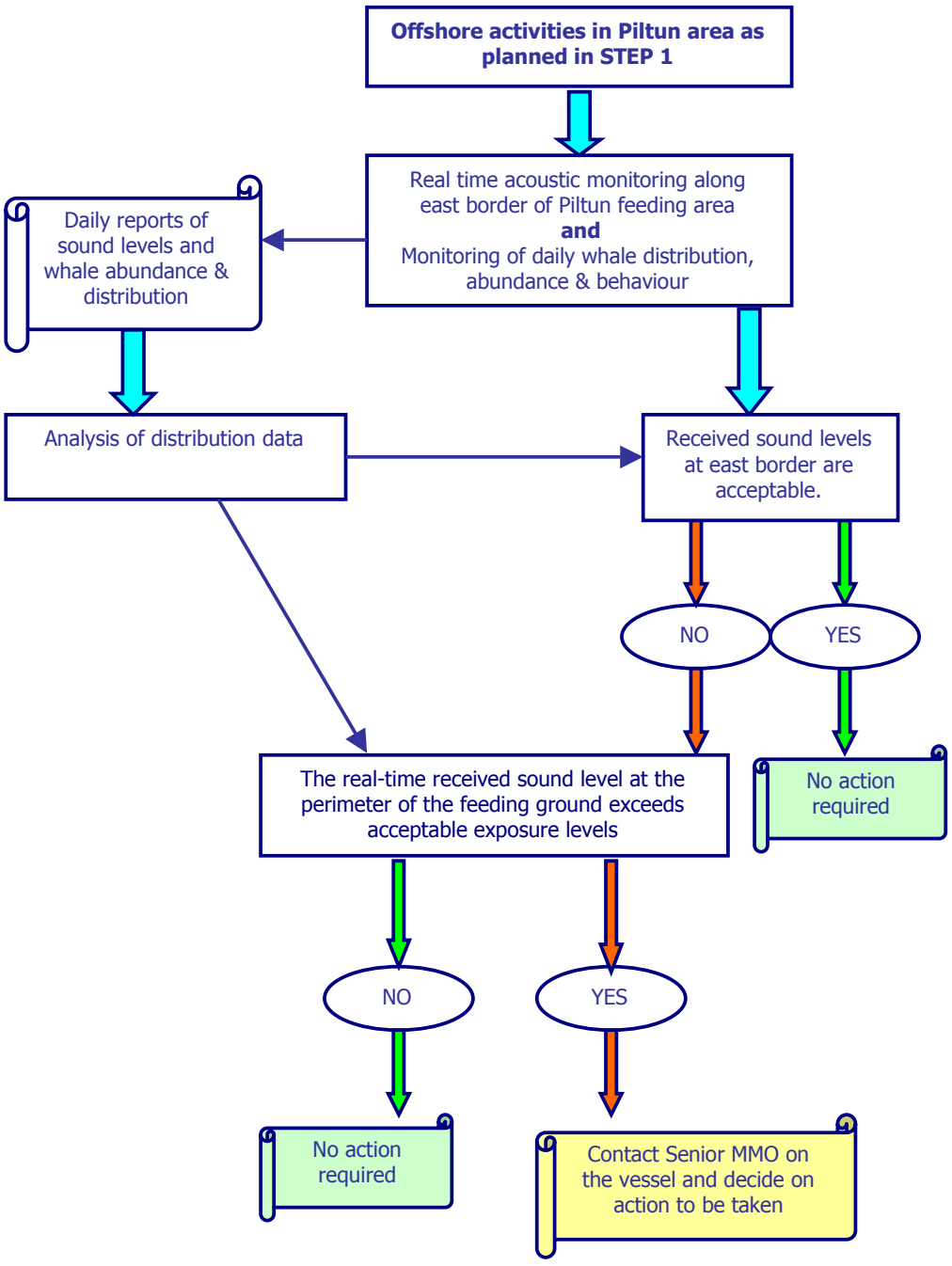


Figure 3 continued: General Noise Mitigation Approach

Table 2 Summary of general mitigation measures related to collision and noise disturbance (*continued on next page*).

Source of impact	Mitigation measures[11]				Area[12]	Construction (C), Operation (O)	Control/ Monitoring / Documentation
Collision	Special vessel corridors have been established for all vessel traffic along the east coast of Sakhalin Island. All SEIC vessels are required to keep within the designated corridors, unless deviation is essential for safety or specifically required and authorised (See Figures 2A and 2B for corridor details).				All	C / O	Position tracking via www.purplefinder
	Speed limits (maximum in knts)	Within Crew Transfer corridor	Within navigational corridors	Westward of all corridors + within inspection and Piltun approach corridors	All	C / O	MMO
	Visibility ≥ 1km	21 knots	17 knots	10 knots			
	Visibility < 1km and at night	21 knots	17 knots	7 knots			
	Sudden changes in speed and course should be avoided				All	C / O	MMO
	Non-transiting vessels moving with a speed of less than 5 knts will maintain course and speed unless there is an imminent risk of collision. In case of a collision risk with a whale they should stop if it is safe to do so until it has been determined that the potential danger to the whale has passed				All	C / O	MMO
	Transiting vessels will attempt to maintain a minimum of 1,000 m separation from observed western gray whales and other endangered whale species (bowhead whale, North Pacific right whale, and fin whale) and 500 m from all other marine mammals (excluding pinnipeds). If a whale surfaces in the vicinity of or is heading towards the vessel, all precautionary measures possible need to be taken to avoid collisions until it has been determined that the potential danger to the whale has passed				All	C / O	MMO
	Do not pursue, intercept, encircle, or cause groups of whales to separate				All	C / O	MMO
	Vessels will not cross directly in front of or in the immediate vicinity of moving or stationary whales. When moving parallel to whales, vessels will maintain a constant speed and course				All	C / O	MMO

[11] All mitigation measures apply in Early, Peak and Late season

[12] All means all areas where SEIC is constructing or operating: Piltun, Lunskoye and Aniva

Table 2 (Continued) Summary of general mitigation measures related to collision and noise disturbance.

Source of impact	Mitigation measures	Area	Construction (C), Operation (O)	Control/ Monitoring / Documentation
Collision	MMO shall be present on key vessels (this includes crew change vessels that travel from Kaigon to PA-A, PA-B, and LUN-A) and shall maintain a continuous watch for western gray whales and other marine mammals. All marine mammal sightings shall be recorded on specific data sheets	Piltun, Lunskoye	C/O	Daily MMO reports
	All crewmembers shall be alert for marine mammals, regardless of whether or not the MMO is on watch.	All	C / O	
Noise disturbance (general)	If practically feasible (schedule, weather and safety related), offshore activities that have the potential to impact whales on their feeding grounds are to be scheduled outside the peak season (=July-August)	Piltun	C/O	Project schedules
	Contractors are requested to use equipment and procedures that minimise noise. Possible options include use of special enclosures, mufflers, sound-isolation mounts, tuned propellers and drive shafts, and shrouds on propellers, along with minimal use of thrusters.	Piltun	C / O	Noise Mitigation Strategy (SEIC, 2004c)
	Acoustic footprint of offshore activities close to the whale feeding area will be predicted with acoustic models prior to offshore activities that have the potential to impact whales on their feeding grounds and tested against noise impact criteria.	Piltun	C / O	Real time acoustic & whale monitoring
	MMOs will observe the area in the vicinity of the operating vessel for 20 minutes prior to commencement of operations that have the potential to evoke PTS or TTS (see section 5.3.2); start up of the operations may be delayed if gray whales are observed within 1 km of the vessel.	Piltun	C / O	Real time acoustic & whale monitoring
Noise Disturbance (aircraft)	All types of aircraft will maintain a minimum altitude of not less than 450m over the western gray whale feeding area, subject to pilot safety requirements.	Piltun	C / O	Aviashelf Flight Operations Manual
	All aircraft will be prohibited from flying over or circling wildlife, including whales, for the purposes of casual viewing.	All	C / O	Aviashelf Flight Operations Manual
Noise Disturbance (Platform operations)	Mitigation strategies have been identified in case monitoring and modelling results predict higher sound levels from platform operations than those that are considered to be acceptable in relation to potential impacts to gray whales	Piltun	O	Noise Mitigation Strategy (SEIC, 2004c)
	Acoustic footprint of offshore activities close to the whale feeding area, other than normal operational activities, will be predicted with acoustic measurements and modeling prior to these activities and tested against noise impact criteria.	Piltun	O	Noise modelling strategy (SEIC, 2004d) Acoustic monitoring

7 WGW RESEARCH AND MONITORING

SEIC-sponsored western gray whale research and monitoring programmes have been conducted off the northeast coast of Sakhalin Island since 1997. The western gray whale monitoring program, endorsed by Russian authorities, is composed of a suite of studies designed to provide information about western gray whale ecology and their marine acoustic environment. Studies conducted since 1997 helped to:

- Delineate the gray whale feeding areas in northeast Sakhalin waters,
- Estimate of the population size and seasonal dynamics,
- Identify the main feeding season start and end dates,
- Understand seasonal and spatial distribution trends,
- Understand characteristics of whale behaviour and examine potential disturbance to whales,
- Assess prey abundance and identify relationships between large-scale variations in whale distribution and changes in prey distribution and biomass,
- Detect whale movements between feeding areas including Sakhalin and eastern Kamchatka waters,
- Conduct acoustic measurements in the vicinity of whale habitat and to measure level of anthropogenic noise penetration into such areas as a result of oil and gas developments,
- Plan construction in such a way that they have the lowest impact on the whales, etc.

Future studies will help to further understand gray whale biology and subsequently improve efficiency of efforts to save the population.

The research components that have been identified and designed in order to collect baseline information on western gray whale ecology and to determine their status form part of a long term monitoring program that will be continued after construction has finished. Currently the program consists of a suite of studies that will be continued in future. It allows SEIC to build upon the large amount of knowledge collected to date and to evaluate potential changes in the status or distribution of the whales on a longer term. Based on research findings and recommendations from the Interdepartmental Ichthyological Comission (Russian expert body) and the Western Gray Whale Advisory Panel, that has been established in 2006, the long term monitoring plan will be subject to minor adaptations.

The long-term western gray whale research and monitoring program has been developed with other operators in the Sakhalin area. A summary of the components is provided below.

7.1 ACOUSTIC AND HYDROLOGICAL STUDIES

These studies are designed to accomplish the following tasks:

- Measurement of ambient sound levels and the variation in sound levels in the western gray whale feeding areas resulting from anthropogenic activities, such as oil and gas exploration and production. Acoustic monitoring is conducted using Autonomous Underwater Acoustic Recorders (AUAR) that are deployed every year at the same locations within the western gray whale feeding areas or at their edges. Simultaneous ambient noise level measurements are taken at a control site that is located at sufficient distance from any proposed or existing industrial developments to ensure unbiased comparison of data.

- Real time Transmission Loss (spectral) along profiles from the major facilities (existing or proposed) to the edges of the Piltun and Offshore feeding areas. Results of such studies make it possible to predict the potential change in sound levels in the feeding areas should a facility generating a known sound spectrum be installed at a specific location.
- Hydrological data needed for estimation of sound transmission.

7.2 DISTRIBUTION AND ABUNDANCE SURVEYS

Distribution surveys were conducted by means of systematic aerial surveys (2002-2005), vessel based surveys (2002-present), and surveys conducted from shore (vehicle based 2004-present; behaviour scan surveys 2001-present). These distribution surveys were designed to provide quantitative and systematically collected information on the distribution and abundance of western gray whale (all surveys), gray whale feeding plumes in the Piltun feeding area (aerial survey), and distribution in the Offshore Feeding Area and over a broader area of the NE Sakhalin coast (aerial and vessel surveys). The western gray whale distribution data collected by the different surveys have been analyzed to produce estimates of whale densities in the areas surveyed. The data from each survey are maintained in a database that allows average western gray whale density estimates to be determined for most combinations of survey type and time period. These estimates have been used to create density surface maps at several temporal scales (e.g. monthly, yearly) that depict the western gray whale spatial distribution and abundance at a resolution of 1.0 km^2 for the entire coastline of northeast Sakhalin Island (see Figure 1 as an example). These maps have been useful impact assessment and mitigation tools.

In continuance of this programme, vessel-based and shore-based surveys will be conducted to monitor WGW distribution in relation to SEIC industrial activities.

7.2.1 Vessel-based surveys.

Specific objectives of the vessel-based observations are the collection of:

- Systematic data on the distribution of gray whales off northeastern Sakhalin throughout the feeding season.
- Observations of activity (e.g. feeding, breaching, social behaviour) of gray whales.
- Systematic data on the distribution of other encountered marine mammals.
- Opportunistic data while other vessel-based operations are underway.

7.2.2 Shore-based surveys.

These surveys address the following specific objectives:

- The distribution of gray whales in the Piltun area during the feeding season and over a period of years.
- To obtain data on the distribution of other cetacean species observed during the surveys.

7.3 BEHAVIOUR MONITORING

Systematic behaviour monitoring studies were initiated in the Piltun feeding area in 1997. These studies are designed to provide information on western gray whale abundance

and behaviour using several quantitative survey methods, i.e., scan sampling, focal animal tracking and theodolite tracking. The specific objectives are:

- Assessment of the spatial and temporal dynamics of the movements of gray whales in relation to natural environmental parameters and potential anthropogenic impact.
- Investigation of the animal's behaviour, especially their feeding behaviour, and identification of behavioural characteristics that could be disrupted as a result of human related activity.
- Assessment of the abundance and spatial distribution of WGW.
- Identification of possible differences in behaviour, movement and the nature of area use by mother-calf pairs.
- Development of a database that will combine data on the state of the environment, areas used by the whales, food resources and the effects of anthropogenic activity.

The overall goal of the study is to use each of the aforementioned objectives for better understanding of the biological characteristics and natural parameters of the behaviour, distribution, abundance and movements of WGW, for further improvement of environmental impact mitigation and environmental protection measures in connection with existing and planned commercial activity off the northern coast of Sakhalin Island.

7.4 FOOD RESOURCES AND TROPHIC ECOLOGY

The objective of this long-term monitoring program is to improve knowledge of the food resources and trophic ecology of WGW, to determine (1) the colony density of prey organisms and the distribution and availability of food for gray whales, and (2) whether local and regional movements of WGW are related more closely to prey availability or to anthropogenic activity. The specific objectives of this study are therefore:

- To characterize the distribution and abundance (colony density and biomass) of prey organisms in actively used feeding areas and outside these areas.
- To define and characterize the feeding range of WGW.
- To compare the distribution of WGW during the season and from year to year to the prey distribution to understand the movements that occur.

7.5 PHOTO-IDENTIFICATION OF WGW

The main objective of the photo-ID work is individual identification of WGW and their location to (1) analyze patterns of their movement within and between feeding areas, and (2) to provide data essential for modelling the size, structure and status of the population. Whales will also be photographed along the northeast coast of Sakhalin outside the main feeding areas if they are encountered. Photo-identification can be used to understand various aspects of western gray whale ecology such as:

- Number and status of cow/calf pairs (birth rate and survival rate of calves).
- Habitat utilization:
  - Individual feeding areas and their selection,
  - The overall feeding habitat used by the population,
  - Attachment to specific feeding areas,
  - Evidence of movement between feeding areas.
- Health of the population:

  - Physical condition of individuals – recording of “skinny whales” and long-term monitoring of such individuals to identify the predisposition to “emaciation” and/or recovery to normal conditions.
- Data needed for population estimates using mark-recapture methods:
  - Number of repeated sightings of individuals within a single season and over a period of years,
  - Demographic structure of the population.
- Size of feeding grounds.
- Patterns of formation of groups of individuals.

7.6 WGW MONITORING IN EVENT OF OIL SPILL

In line with the recommendations of the WGWAP (Western Gray Whale Advisory Panel), monitoring plans shall be adapted should an oil spill occur.

7.6.1 Short term monitoring

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: (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.

7.6.2 Long term monitoring

In line with the recommendations of the WGWAP, 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.

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.

8 WGW EMERGENCY RESPONSE

The Sakhalin Energy Marine Mammal Emergency Response Procedure forms part of the overall SEIC Crisis and Emergency Response Management System. The response organisation diagram in Figure 4 is based on the existing structure conform guidelines in the Emergency Coordination Procedures (SEIC, 2005) and Crisis Management Procedures (SEIC, 2006):

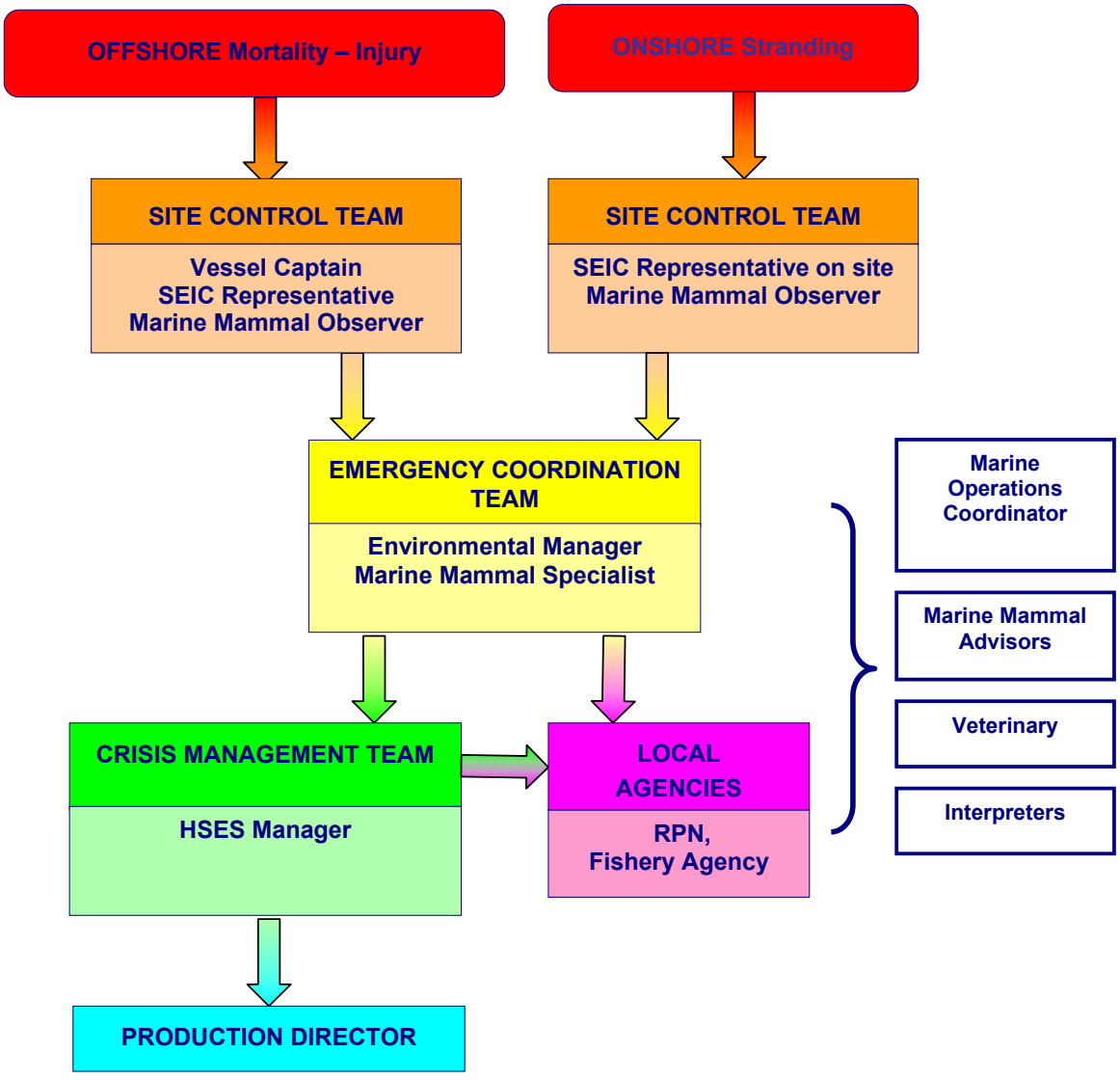


Figure 4. SEIC Marine Mammal Emergency Response Organisation

Although Sakhalin Energy will facilitate where practicable, the ultimate responsibility and authority for protection of red book species (such as WGW) lies with the Ministry for Natural Resources and Ecology of the Russian Federation (Rosprirodnadzor, RPN). All wildlife response, including response to marine mammal-related incidents, will be conducted with the guidance and pre-authorization of the Sakhalin branch of RPN.

The responsibility and authority for protection of marine resources lies with the Fishery Agency, Sakhalin-Kuril Territorial Administration. For marine mammals, this includes all species that are not listed in the Russian Red Book.

SEIC recognises that it may not legally conduct necropsy of red book species without the authorisation and guidance of RPN.

In the event of an incident, SEIC will contact both local Russian authorities. The agencies may provide a representative to coordinate with SEIC representatives. SEIC will provide agency representatives access to all vessels, facilities, and sites.

SEIC will take photographs and non-invasive measurements of dead or injured marine mammals. SEIC should where possible take small tissue samples of dead WGW for DNA analyses, for identification and comparison with extensive monitoring data. All other actions to be taken are to be discussed with the responsible government agencies. For certain actions, permits from government agencies are required before response measures can be undertaken that deal directly with wildlife. Authorisation to respond to a marine mammal-related incident may take the form of a documented telephone call or written authorization. SEIC will only attempt to tow a carcass to shore if expressly requested to do so by RPN, and if activity is deemed safe by SEIC Marine Department. SEIC will make necropsy kits, manuals[13], and forms readily and freely available to government agencies.

Examination and Reporting of dead whales

In case a dead or injured marine mammal is observed offshore the Marine Mammal Observer closest to the animal will be involved for a quick assessment of the situation. The Marine Mammal Mortality - Injury Report (Annex 2) will be used insofar possible considering the situation at sea and status of the animal. Reporting will occur through the normal communication protocol or according to the emergency response procedures depending on the situation. The relevant authorities will be notified.

In case a dead or injured marine mammal is observed onshore identification of the animal must be made by people present on site and photo's taken to be able to quickly confirm the identification of the species by experts in case they were not present on the site. The relevant authorities will be notified. If the animal is reported as a large whale, the emergency response procedure needs to be activated immediately. The relevant authorities will be notified. Extensive photographs and small tissue samples will be taken when the animal is reported as a western gray whale. SEIC will cooperate with authorities to help logistically and financially.

Carcass surveys

Sakhalin Energy has undertaken active efforts to find and investigate whale carcasses through helicopter surveys and to document ship strike injuries or scars through photography when possible. Carcass surveys will be continued monthly between June and October.

[13] Woods Hole Oceanographic Institution, *Marine Mammal Necropsy: An introductory guide for stranding responders and field biologists*, WHOI-2007-06, September 2007

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ANNEX 1: COLLISION MITIGATION DURING OFFSHORE ACTIVITIES

In this Annex a brief overview is provided on how the mitigation measures described in section 6.5 of the Marine Mammal Protection Plan will be implemented during offshore activities of Phase 2 and the operations of Vityaz complex. It includes background information on the aspects considered in the development of the measures.

As is outlined in section 6.5 in the Marine Mammal Protection Plan the main mitigation measures to prevent collisions between whales and vessels are:

- Establishment of vessel corridors
- Establishments of speed limits
- Use of marine mammal observers

Establishment of vessel corridors and speed limits

The corridors for all vessel traffic have been divided in three different categories, being:

- Navigational corridors, these are transit corridors most regularly used by support and supply vessels from the port of departure (mostly Kholmsk) to the platform locations and back.
- Construction corridors around the PA-A, PA-B and LUN-A platforms, used by vessels during offshore activities. (Construction activities have decreased substantially since 2008, but these corridors may still be used by other vessels, e.g. supply vessels).
- Crew transfer corridors, used by small boats used to transport people to and from the construction vessels and platforms.

These corridors and associated speed limits are described in the Marine Mammal Protection Plan and form an integral part of the Marine Operating Procedures and Guidelines (1000-S-90-90-P-0017-00), a document that is being provided to all marine contractors and issued to all vessels coming into the Project.

While defining the corridors and speed limits several aspects were taken into consideration, such as:

- Avoidance of primary western gray whale feeding habitats and limiting potential encounters of whales during spring and autumn migration. The routes are designed such that they avoid the areas with highest densities of feeding gray whales. Because exact migration routes are not known the assumption is made that the whales keep close to the shore (as is known for eastern gray whales);
- Establishment of the most direct routes for vessel traffic to keep the travel distance and time at sea as limited as possible. Reasons for this are:
    - Concern on safety issues
    - The commitment from the Company to minimise CO2 emissions. The longer the distance travelled the more fuel is used;
    - To keep the construction season as short as possible.

Crew transfer corridors

The crew transfer corridor from Kaigon to Moliqpak (PA-A), PA-B and LUN-A has the highest potential to encounter whales as the route lies relatively close to shore and runs between the Piltun and Offshore feeding area. SEIC has looked into various options to optimize this route such that collision risk with western gray whales is being avoided to the extent possible. Information on the crew transfer situation is presented below.

Number of vessels and frequency

Crew boats will carry out crew changes on the days when the weather is too severe for helicopters to fly (mainly due to visibility). The crew boats are also restricted in their own operational envelope by heavy seas.

Situation at Kaigon port

There is only a 4-hour opportunity window per day on either side of high tide to leave and return to the port due to draft restrictions over the bar. This window needs to be utilised to ensure that the risks to the passengers are minimised.

The crew transfer corridor and the speed limits have been established together with the captain of the crew change vessel and, together with concern for the western gray whales, are based on safety considerations. The most direct route that avoids both feeding areas is established as crew transfer corridor. The optimal speed for the vessels reduces plane stress and draught. With much lower speeds the vessel cannot return to Kaigon within the time available and this will pose a risk for the passengers.

Marine mammal observers

In general the decisions to place MMOs on a vessel are being made on a case-to-case basis taking into account the following factors:

- Area of activities and likelihood of gray whale encounters. Likelihood of encounters have been analysed in the Collision Risk Assessment Report.
- Activities of the vessels, are these stationary or moving through the area.

The approach for provision of MMO's for operations is based on circumstances specific for each activity and is summarised in the table below:

MMO support for specific activities (e.g. seismic surveys) are addressed in comprehensive mitigation plans developed for those activities.

Table 1. MMO Provision SEIC vessels

Activity	Description	MMO provision
Crew transfer	Crew transfer from Nogliki to the Piltun and Lunskoye areas will take place by helicopter or by crew change vessels as required. The crew vessel runs at any time of day or night depending on the tide. Helicopters will be a transport of choice for crew rotation in favourable weather conditions.	The Captains and crew of the vessels have received awareness training and this will be repeated in future years. MMOs will be based in Nogliki camp and go onboard the crew vessels every time it sails.
Supply vessels	The platforms are serviced by about five vessels. A voyage from Kholmsk to Piltun and Lunskoye is made along the navigational corridors.	Captain and Crew received awareness training. They have been in the field previous years and are well aware of the issue. They will keep to the corridors. No MMOs are planned on these vessels.
Offshore monitoring vessel	Two surveys are usually completed each year, usually by the *Pavel Gordienko*. Both surveys cover Piltun area (PA-A, PA-B) as well as Aniva and Lunskoye.	Two MMOs will be on this vessel all the times.

ANNEX 2: MARINE MAMMAL MORTALITY AND INJURY FORM

Marine Mammal Mortality - Injury Report

EXAMINER

Name: _____

Affiliation: _____

Address: _____

Phone: _____

SPECIES AND LOCATION DETAILS

Common Name:_____

Genus:_____**Species:**_____

Site Description:_____

_____

_____

GPS
Coordinates:_____

Vessel (if applicable):
Sighting conditions:_____
Vessel speed: _____
Vessel activity:_____
Distance to Marine Mammal at first sighting:_____

Floating?	YES	NO
Stranded?	YES	NO

DATE OF INITIAL OBSERVATION

Year:_____ **Month:**_____ **Day:**_____

CONDITION:

1. **Alive/Healthy**
2. **Alive/Injured**
3. **Alive/Sick**
4. **Fresh Dead**
5. **Moderate Decomposition**
5. **Advanced Decomposition**
6. **Mummified/Skeletal**
7. **Decomposition Unknown**

CARCASS DISPOSITION

Check One or More:

1. Left at site
2. Buried
3. Towed ashore
4. Other_____
5. Unknown

NECROPSIED? YES NO Date:_____
NECROPSIED BY:_____

TAG DATA

Tag #	Color	Type	Placement
_____	_____	_____	_____
_____	_____	_____	_____

MORPHOLOGICAL DATA

SEX:

1. Male
2. Female
3. Unknown

Straight Length:_____ cm (in approx)
Weight:_____ _kg/lb (estimate)

PHOTOS TAKEN? YES NO
Disposition:_____
VIDEO TAKEN? YES NO
Disposition:_____